41 00 ... 0 Contents of Body, General

Before beginning repair work
- Checking the body for damage (e.g. following an accident)

General notes
- Quality standard
- Workshop equipment

Safety regulations
- Safety at work
- Information on hazards
- Information on vehicle protection

Material/new part
- Materials science
- Expendable materials

Handling components
- Electrical system, electronics and optical fibre
- Vehicles with hybrid/electric drive
- Flood damage
- Passive safety
- Seats/seat belts
- Chassis and suspension and steering
- Wheel rim repairs
- Retractable hardtop
- Headlight repairs

Cavity sealing
- Installation of shaped parts
- Position of shaped parts

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Repair method
- Repair stage 1a

  BMW/MINI/BMW i
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  BMW/MINI
  - Bonding and riveting
  - Welding using a MAG welder
  - **without** straightening bench

  BMW i
  - Repairs to life module
  - Repairs to drive module
  - **without** straightening bench
- Repair stage 3

  BMW/MINI
  - Bonding and riveting
  - Welding using a spot welding system
  - **with** a straightening bench

  BMW i
  - Repairs to life module
  - Repairs to drive module
  - **with** a straightening bench

Corrosion protection
- General notes

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Paint

- General notes
- Information / warning labels

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41 ... 0 Notes on the repair technique used in the main group 41

Two different repair techniques are used in body repair.

These are welding and bonding/riveting.

If the repair instructions do not specify a repair technique, then welding must **always** be used.

The bonding/riveting repair technique is **always** described in detail in the repair instructions.

Quality standards must be met.

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41 00 ... Blind rivet

1.0 Recommended tools and equipment

- Blind riveting tongs
- Rivet head extension

Sourcing reference BMW Workshop equipment catalogue

Setting blind rivets:

- Refer to repair instructions for rivet size.
- Position bore holes for blind rivets in accordance with specification in repair instructions. If necessary, carry over the positions of the blind rivets to the new part.
- Drill holes that exceed the outer diameter of the blind rivet (example ⌀ 4.2 mm with 4 mm blind rivet and ⌀ 6.8 mm with 6.5 mm blind rivet).
- The edge of the hole must even on both sides.If necessary, sand down and even out surfaces (e.g. edges of punch rivet connections).Deburr bore holes.
- Apply adhesive.
- Insert blind rivet. If necessary, remove adhesive that has emerged.
  Position blind rivet tool vertically. Use rivet head extension if accessibility is poor.
- Rivet blind rivet with blind rivet tool. In the meantime clean rivet head if dirty with adhesive. Risk of damage to rivet head by penetrating adhesive.
- Seal blind rivet with sealantD1 (risk of corrosion).
- Seal cavities after work on vehicle paintwork on with cavity preservation (risk of corrosion).

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41 00 ... Bonding aluminium on steel

Attention!

Conform with safety regulations !

Overview of topics:

1. Equipment
2. Preparing the surface
3. Bonding coat
4. Hardening times
5. Subsequent treatment

1.0 Equipment

- Sandpaper
- Cleaning agent R1
- Cleaning agent R2
- Adhesive K1
- Cartridge gun

2.0 Preparation of surface:

2.1 Steel surface:

- Remove coarse dirt from the bonding surfaces using solvent cleaner R2.
- Clean bonding surfaces using R1 solvent cleaner prior to sanding.
- Remove paint from bonding surfaces using a wire brush or sandpaper with 120 graining.
- Clean bonding surfaces with cleaning agent R1.
- Allow cleaned surfaces to dry for approx. 5 minutes.
  Bonding surfaces must be completely dry.

2.2 Aluminium surface:

2.2.1 Procedure for new aluminium component:

- **Do not grind/sand bonding surfaces.**

  Clean bonding surfaces with cleaning agent R1.
- Allow cleaned surfaces to dry for approx. 5 minutes.
  Bonding surfaces must be completely dry.

2.2.2 Procedure for previously bonded aluminium component:

- Remove coarse dirt from the bonding surfaces using solvent cleaner R2.
- Clean bonding surfaces using R1 solvent cleaner prior to sanding.
- Remove oxide layers or paint from bonding surfaces using a stainless steel wire brush or sandpaper with 120 graining.
- Clean bonding surfaces with cleaning agent R1.
- Allow cleaned surfaces to dry for approx. 5 minutes.
  Bonding surfaces must be completely dry.

- Flame spray the surface:
- Go over the bonding surfaces slowly with the flame.
- Avoid flaming with the blue part of the flame.
- Condensation water appears on the area that is still uncoated. The condensation water in the line of the flame must evaporate completely.
- Directly after flaming, coat the still hot bonding surfaces (approx. 50 °C) with primer.

- Apply primer:

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- Apply primer with a brush, cotton or similar item.
- Allow the coated surfaces to dry for approx. 5 minutes.

3.0 Adhesive application:

- Processing temperature of glue cartridge 18 °C - 30 °C.
- Object temperature, vehicle and new parts, min. 15°C.
- Read the vehicle-specific repair instructions to determine the thickness and positioning of the adhesive bead.
- After applying the adhesive, check whether an adhesive component has emerged at the back of the glue cartridge. If yes, break off the bonding procedure. Clean new part. Use new glue cartridge. Contact national hotline.
- Join components and secure in position.
- Remove excess adhesive. Do not use solvent cleaning agents.

3.1 Bonding in conjunction with repair elements (expanding elements):

- Repair elements are special shaped parts to connect new parts with the body. E.g. partial replacement engine support.
- The repair elements will spread when a special bolt is screwed in. The repair elements will thereby connect flush to the corresponding profile shape.
- Ensure there is a sufficient gap between the adhesive and the threads for the expander screws (approx. 10-15 mm).
- Spread adhesive over the repair element with a spatula up to the height of the ridges.

3.2 Bonding in conjunction with rivets:

- Make sure that the blind rivet wrench comes in as little contact with the adhesive as possible. There is a risk of damaging the exchangeable head of the rivet wrench due to emerged adhesive.
- The standard punch rivets are **always** replaced by blind rivets in conjunction with bonding.
- The required strength of the connection is only achieved through a combination of bonding and riveting.

4.0 Hardening times:

- Refer to Notes regarding adhesive K1

5.0 Subsequent treatment:

- Protect the repair area with cavity sealant.

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41 00 ... Bonding on painted/primed surfaces

Attention!

These repair instructions apply only to components of the outer skin and not to structural components.

These include roof outer skin, tail panel, rear side panels and components of the luggage compartment floor.

Follow the vehicle-specific repair instructions.

Only the repair method described there must be used!

Conform with safety regulations !

Overview of topics:

1. Equipment
2. Expiry date of consumables
3. Preparation of surface
4. Bonding coat
5. Hardening times
6. Subsequent treatment
7. Disposal of adhesive

.

1.0 Equipment

- Cleaning agentR1
- Cleaning agent R2
- Adhesive K5
- Cartridge gun

2.0 Expiry date of consumables:

- Glue cartridge is marked with a date.
- Do not use adhesive after this date.

3.0 Preparation of surface:

3.1 Preparation of the surface on the vehicle (series status):

- Establish a level bonding surface (e.g. grinding).
- **Do not sand primed bonding surfaces.**
  If the bonding surface is painted in the vehicle colour, the paint must be completely sanded off.
- If necessary, pre-clean the bonding surfaces with cavity protection wax remover.
  Clean bonding surfaces with cleaning agent R1.
- Allow cleaned surfaces to dry for approx. 5 min.
  Bonding surfaces must be completely dry.

3.2 Preparation of the surface on the vehicle (replacement of a bonded component):

- Remove adhesive residue completely from vehicle. Remove all the existing reinforcement plates if necessary (e. g. rear side panel).
- **Do not prime in the area of the bonding surfaces!** Adhesive insufficiently bonds to primer.
  If priming is needed after straightening work, cover the bonding surfaces.
- If necessary, pre-clean bonding surfaces with cavity sealing wax remover.
  Remove coarse dirt from the bonding surfaces using solvent cleaner R2.
  Clean bonding surfaces with cleaning agent R1.
- Allow cleaned surfaces to dry for approx. 5 min.
  Bonding surfaces must be completely dry.

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3.3 Preparation of surface on new part:

- Do not remove primer on new part.
  Do not grind/sand bonding surfaces.
- Remove coarse dirt from the bonding surfaces using solvent cleaner R2.
- Clean bonding surfaces with cleaning agent R1.
- Allow cleaned surfaces to dry for approx. 5 min.
  Bonding surfaces must be completely dry.

4.0 Adhesive application:

- Processing temperature of glue cartridge 18 °C - 30 °C.
- Object temperature, vehicle and new parts, at least 15°C.
- Do not use an air-powered cartridge gun.
- Insert glue cartridge into cartridge gun, remove cap and allow both adhesive components to emerge. Strip adhesive components uniformly and attach mixing tube.
- Allow approx. 10 cm of mixed adhesive to emerge and then apply the mixed adhesive first on one side of the bonding surface.
- After applying the adhesive, check whether an adhesive component has emerged at the back of the glue cartridge. If yes, break off the bonding procedure. Clean new part. Use new glue cartridge. Contact national hotline.
- Pot life of mixed adhesive approx. 2 h. A change of mixer is necessary only if no material has flowed through the mixer for a period of 30 min.
- Join components and secure in position.
- Remove excess adhesive.

5.0 Hardening times:

- **Do not move the vehicle before the adhesive has hardened.**
  Check the degree of hardness of the adhesive with a fingernail.
  If the adhesive cannot be pressed in any further with a fingernail, the vehicle may be moved (without engine force) for further processing applications (e.g. painting).
- Vehicle **strength for driving applications** is achieved after:
  48 h at an object temperature of at least 15 °C (corresponds to approx. 18 °C room temperature).
  Or 1 h in the spray booth (spray booth temperature 80 °C/object temperature 60 °C).
- When using radiant heaters, make sure that the object temperature does not exceed 85 °C. Excessively high temperatures will destroy the adhesive.
- Remove contamination caused by adhesive residue immediately.
  Hardened adhesive can only be removed mechanically.

6.0 Subsequent treatment:

- Reseal areas which are cavity-sealed as standard.

7.0 Disposal of adhesive:

- Hardened adhesive is disposed of as normal waste.
- Empty glue cartridges are disposed of as normal waste.
- Non-hardened adhesives and mixtures of adhesive and solvent and the like must be disposed of as hazardous waste.

These regulations apply to the Federal Republic of Germany.

For other countries, comply with the (possibly differing) nationally applicable regulations.

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41 00 ... Bonding steel on steel

Attention!

These repair instructions apply to structural components.

Such components include engine supports, A-pillars, B-pillars, etc.

Follow the vehicle-specific repair instructions.

Only use the repair procedures described there.

Conform with safety regulations!

Overview of topics:

1. Equipment
2. Preparing the surface
3. Bonding coat
4. Hardening times
5. Subsequent treatment

1.0 Equipment

- Sandpaper
- Cleaning agent R1
- Cleaning agent R2
- Adhesive K1
- Cartridge gun

2.0 Preparing the surface:

- Remove coarse dirt from the bonding surfaces using solvent cleaner R2.
- Clean bonding surfaces using R1 solvent cleaner prior to sanding.
- Remove paint from bonding surfaces using a wire brush or sandpaper with 120 graining.
- Clean bonding surfaces with cleaning agent R1.
- Allow cleaned surfaces to dry for approx. 5 minutes.
  Bonding surfaces must be completely dry.

3.0 Adhesive application:

- Processing temperature of glue cartridge 18 °C - 30 °C.
- Object temperature, vehicle and new parts, min. 15°C.
- After applying the adhesive, check whether an adhesive component has emerged at the back of the glue cartridge. If yes, break off the bonding procedure. Clean new part. Use new glue cartridge. Contact national hotline.
- Join components and secure in position.
- Remove excess adhesive. Do not use solvent cleaning agents.

4.0 Hardening times:

- Refer to Notes regarding adhesive K1

5.0 Subsequent treatment of bonding surfaces:

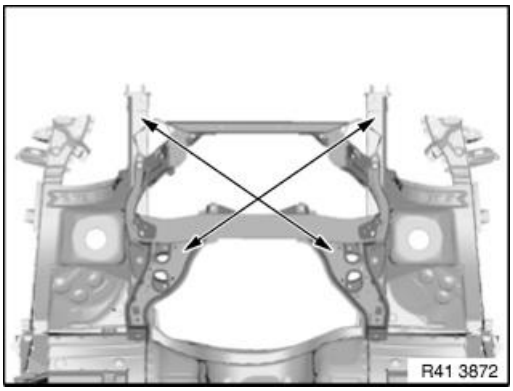
- Protect the repair area with cavity sealant.

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41 00 505 Checking front body structure

Necessary preliminary tasks:

- Remove front underbody protection

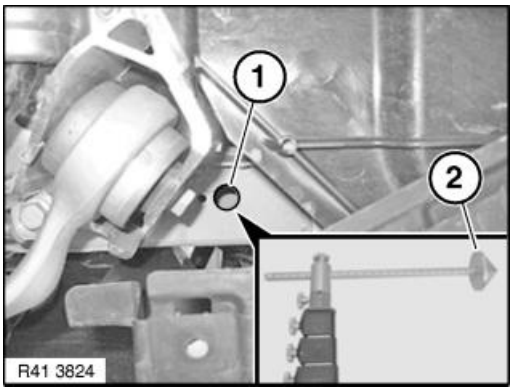


Structural damage can be identified by measuring with a beam trammel.

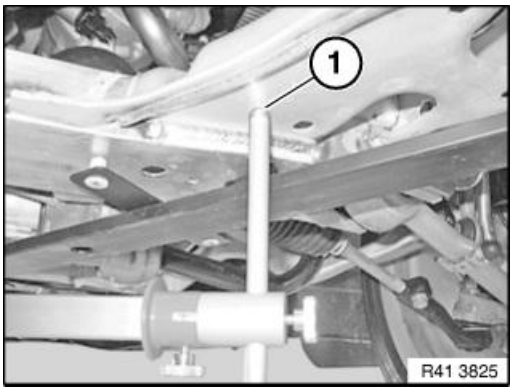
Here, symmetrically arranged points on the vehicle are measured in diagonal sequence.

If the two measured values are identical, there is no damage to the vehicle.

Note:
Illustration only an example. Detail deviations, depending on engine version, are possible.



In front area use conical adapter (2) at bore holeÂ (1).



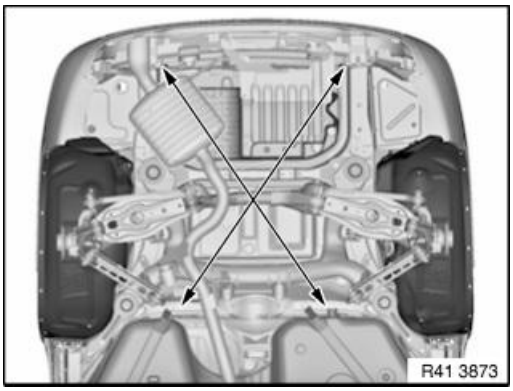
Use 8 mm dia. bore hole (1) on front axle support.

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41 00 510 Checking rear body structure

Necessary preliminary tasks:

- Remove underbody panelling

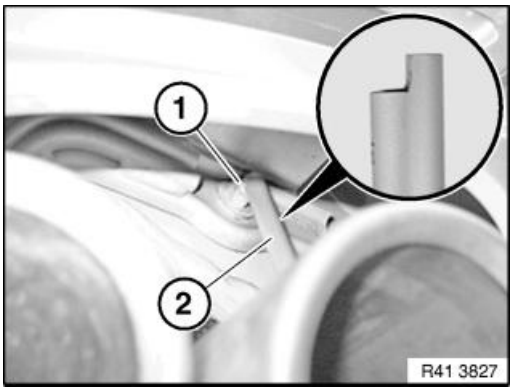


Structural damage can be identified by measuring with a beam trammel.

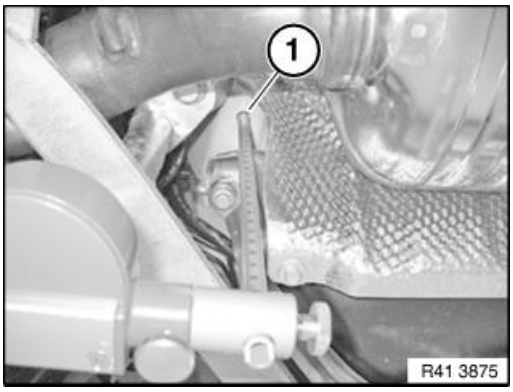
Here, symmetrically arranged points on the vehicle are measured in diagonal sequence.

If the two measured values are identical, there is no damage to the vehicle.

Note:
Illustration only an example. Detail deviations, depending on engine version, are possible.



In rear area use adapter (2) on threaded bolt of impact plate (1).*Note:*
If necessary, make recess in adapter yourselves.



Remove plug in areaÂ (1).

Use bore hole for measurement.

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41 00 ... Corrosion protection

Note:

Following repairs, the corrosion protection work already begins with the correct removal of the underbody protection, anti-drumming layer and seam sealing in the repair area.

The products recommended by BMW are optimized with regard to corrosion protection.

1.0 Removing and applying sealant:

1.1 Removing sealant:

Important!

- Do not burn off PVC material (sealant) with an autogenous torch or similar or heat to temperatures above 180 °C. This would generate highly corrosive hydrochloric acid and release harmful vapour.
- The new sealant does not adhere appropriately to burnt polyvinyl chloride material and hence subsequent rust creep is possible.

Remove PVC material with a rotating steel brush, or heat PVC to maximum 180 °C with a hot air blower and scrape off with a spatula.

1.2 Applying sealant:

Prime and seal all weld seams that are sealed with sealant in original condition immediately after repair work. Replace damaged or removed anti-drumming layers.

Note:

Required spray gun for sealant (order number 81 49 0 300 887).

Seal blind rivet with sealant (risk of corrosion).

Seal affected cavities with cavity preservation (risk of corrosion).

2.0 Basics of cavity preservation:

Apply cavity preservation after all body repairs.

Concluding cavity preservation is the most important part of all corrosion protection measures.

Use the cavity protection spray only for smaller-scale straightening work where the parts in question are easily accessible. Use the pressure cup gun for all other repairs. Cavity protection agent is available in different container sizes.

Use the relevant sensors with tubes for the different cavity areas.

Required tools can be found in the Aftersales Assistance Portal (ASAP) - Service/Technology - Workshop Equipment (Start BMW) - Shop Workshop Equipment or at www.bmwgroup-wep.com.

Important!

Incorrectly performed cavity protection can, especially in the case of steel/aluminium joints, give rise to a non-calculable product liability and safety risk.

The best repair is worth nothing if the subsequent cavity protection measures are not conscientiously carried out.

2.1 Cavity preservation of steel parts:

New doors and lids must be sealed with cavity protection agent after being painted.

New sheet-metal parts or cavities, weld seams and folds formed by new sheet-metal parts must be sealed

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with cavity protection agent after being painted.

The cavities affected must be sealed with cavity protection agent after all straightening work.

2.2 Cavity preservation of aluminium parts:

New doors, lids and side panels made of aluminium are not sealed with cavity protection agent.

After all straightening work on aluminium components, the cavities affected must be sealed with cavity protection agent after being painted.

After all welding work (E52 only) on aluminium components, the cavities affected must be sealed with cavity protection agent after being painted.

Cavities, seams and folds formed from new sheet metal parts or extruded profile must be sealed with cavity protection agent after being painted.

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41 00 ... EMC screws

(EMC = electromagnetic compatibility)

1. Purpose:

- EMC screws are used in the bonding/riveting repair method to re-establish bonding transition.
- They adopt the task of welded connections, which handle bonding transition between the individual components in series production.
- The punch or blind rivets used in the repair do not guarantee permanent bonding transition between the individual components!
- The EMC screws ensure the operational reliability and safety of the electrical/electronic components following repairs!

2. **Procedure for aluminium front end**:

- Each welded joint which is opened must be replaced by at least 2 EMC screws.
- Position the 2 screws on the flange on which the weld seam has been separated. In the event of partial replacement, position the screws in the area of the component overlap.
- In the case of repairs using partial replacement, the number of EMC screws described in the repair instructions must be fitted.
- Drill holes to a diameter of 4.2 mm and insert screws.
- Seal EMC screws with PU sealing material (risk of corrosion).

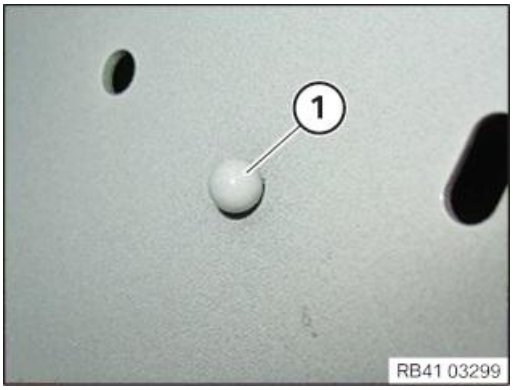
3. **Procedure, steel body**:

- Install the number of EMC screws described in the repair instructions.
- Drill holes to a diameter of 4.2 mm and insert screws.
- Seal EMC screws with PU sealing material (risk of corrosion).

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41 00 513 Fix bolts on the new part

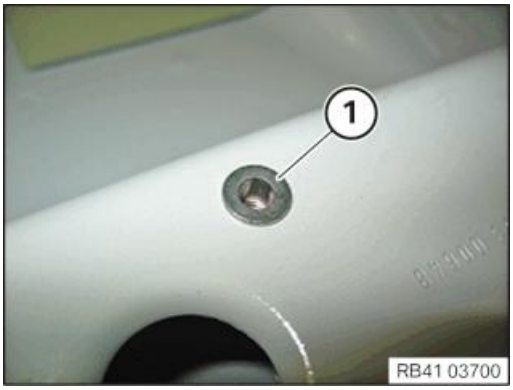
Note: On BMW and MINI bodies, various welded and pushed in bolts are being used.



Single ball/double ball (version 1):

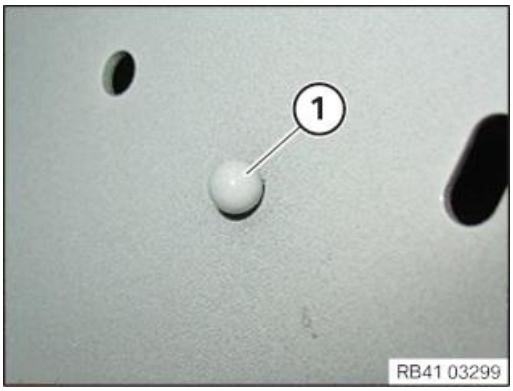
Grind off any residues of the single ball (1), if applicable.

Drill hole with diameter 7 mm.



Set blind rivet nut (1).

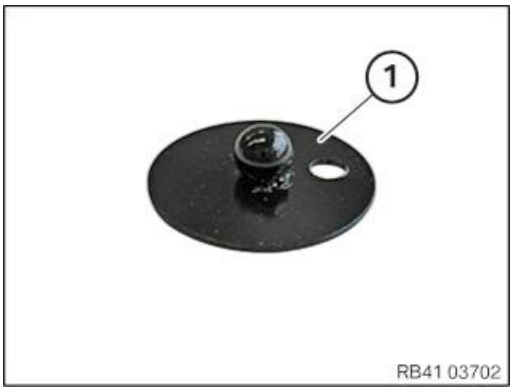
Screw in single ball with thread until a height of 5 mm (double ball 10 mm) is reached.



Single ball/double ball (version 2):

Grind off any residues of the single ball (1), if applicable.

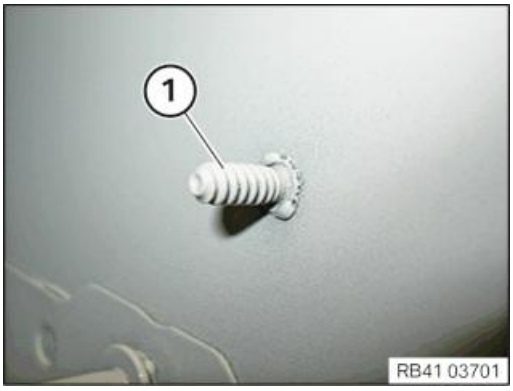
Clean area with solvent cleaner R1.



Clean bonding surface of repair element single ball (1) with solvent cleaner R1.

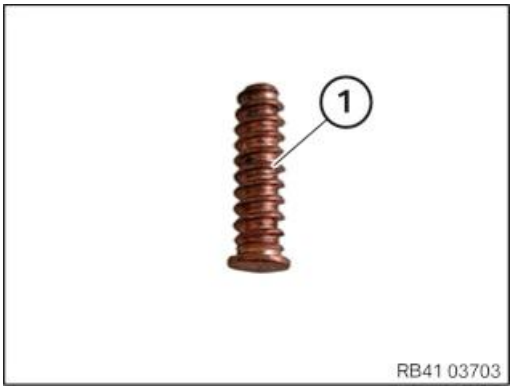
Bond repair element optionally with adhesive K1, K5 or window pane adhesive at the same position.

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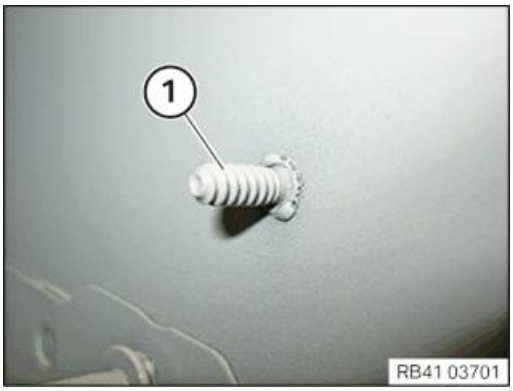


Coarse threaded bolt (version 1):

Grind off any residues of the coarse threaded bolt (1), if applicable.



Spot weld coarse threaded bolt to same position.



Coarse threaded bolt (version 2):

Grind off any residues of the coarse threaded bolt (1), if applicable.

Drill hole with diameter 7 mm.

Set blind rivet coarse threaded bolt using riveting pliers.

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41 00 ... Frame alignment control dimensions, body

Dimensions in mm.

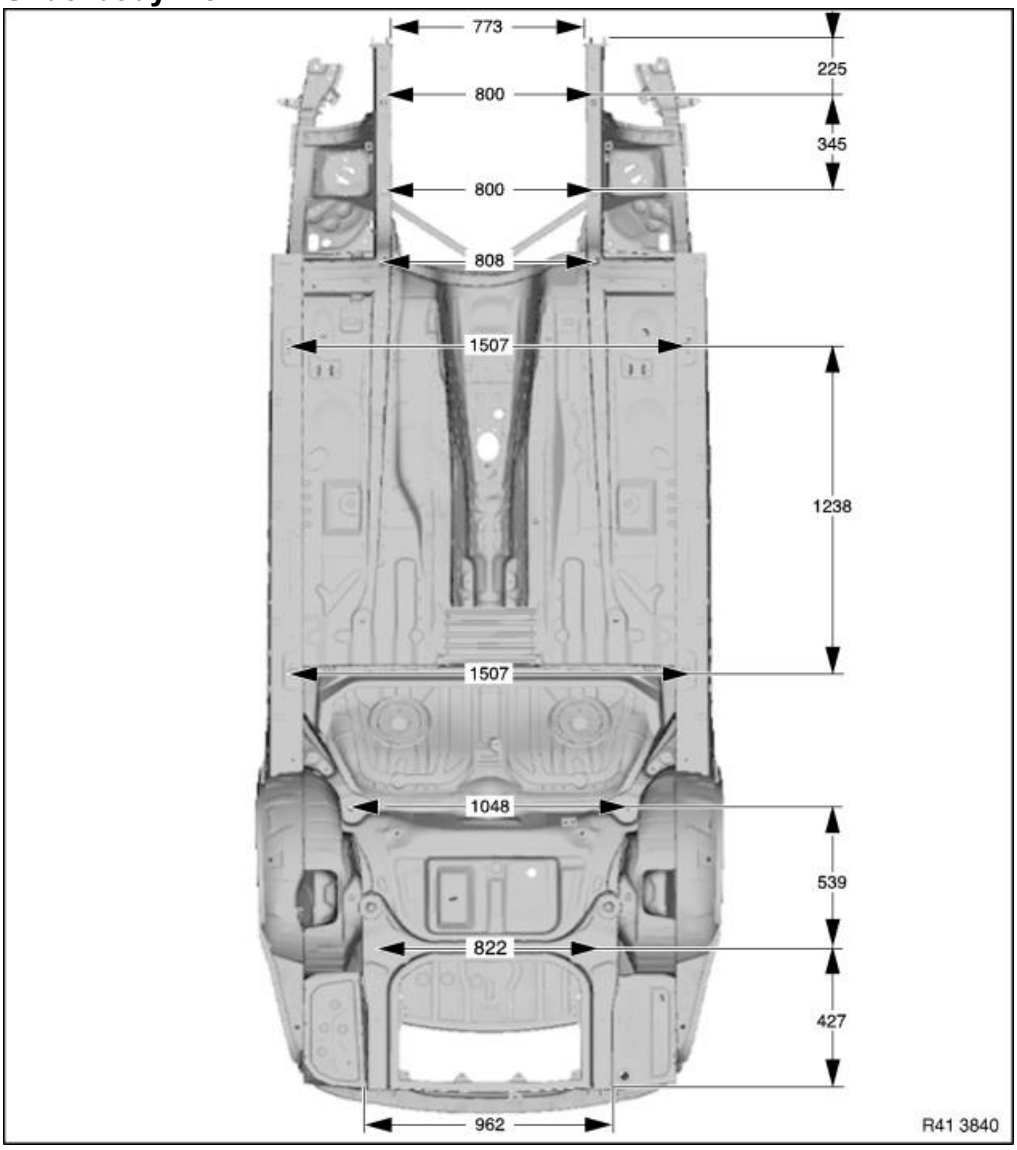
Measurement tolerances:

- ≤ 1000 mm ± 1.5 mm
- ≥ 1000 mm ± 2.5 mm

The control points shown serve to check the body and the straightening attachment.

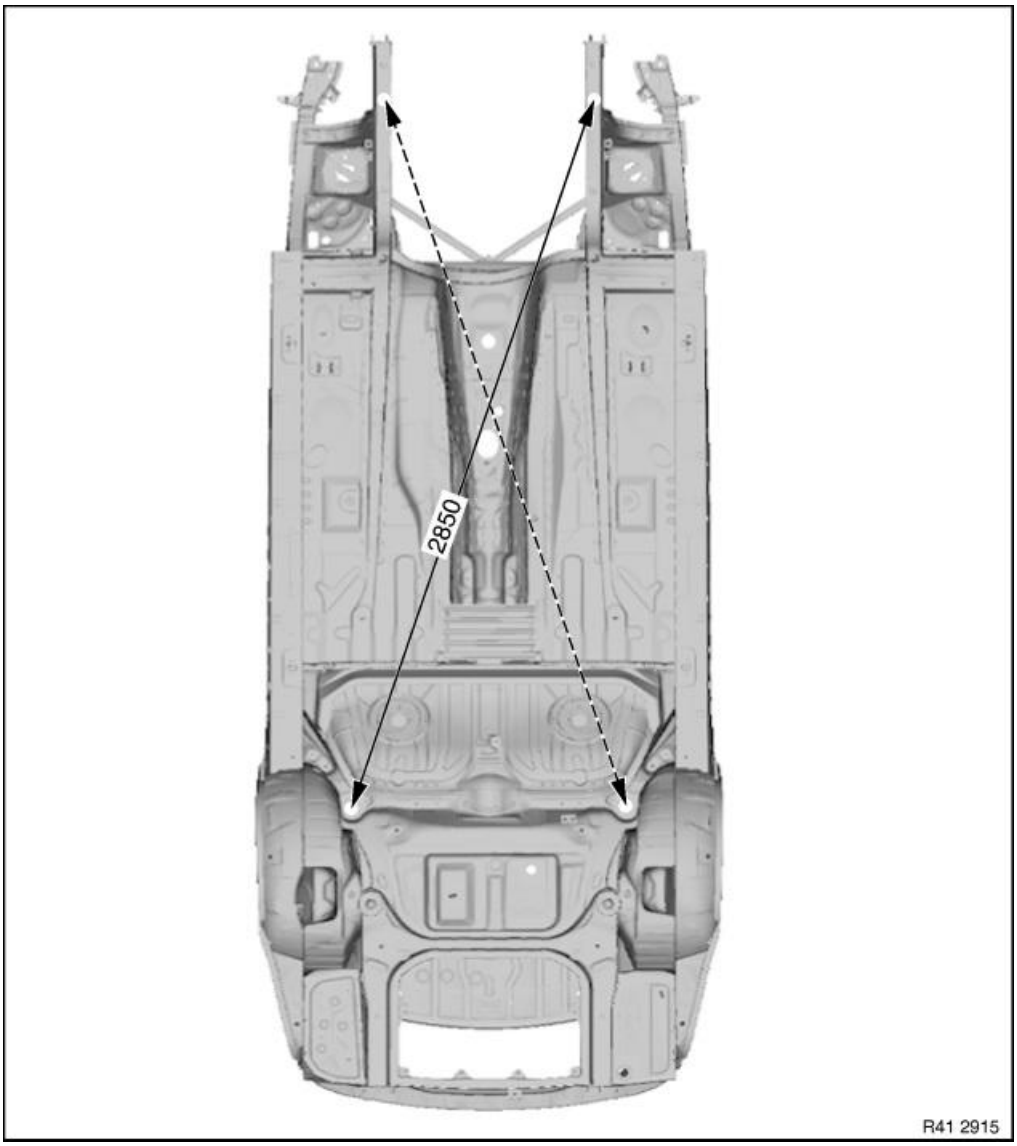
The specified dimensions/measurements always refer to the centrepoint of the bore/screw.

Underbody view 1

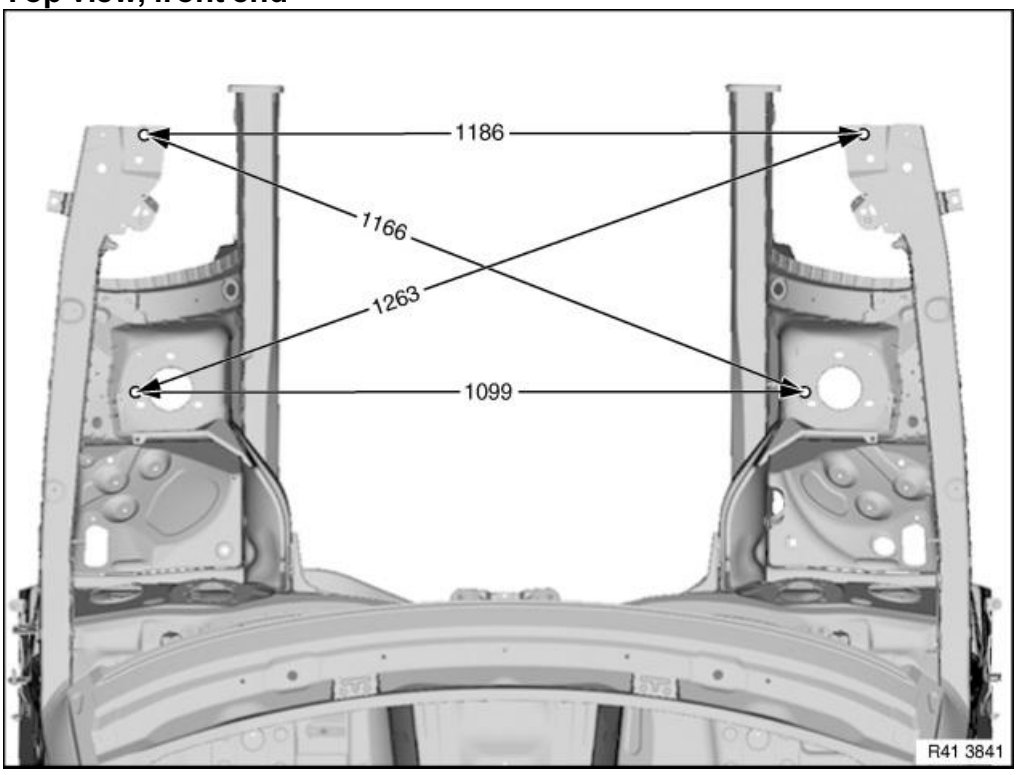


Underbody view 2

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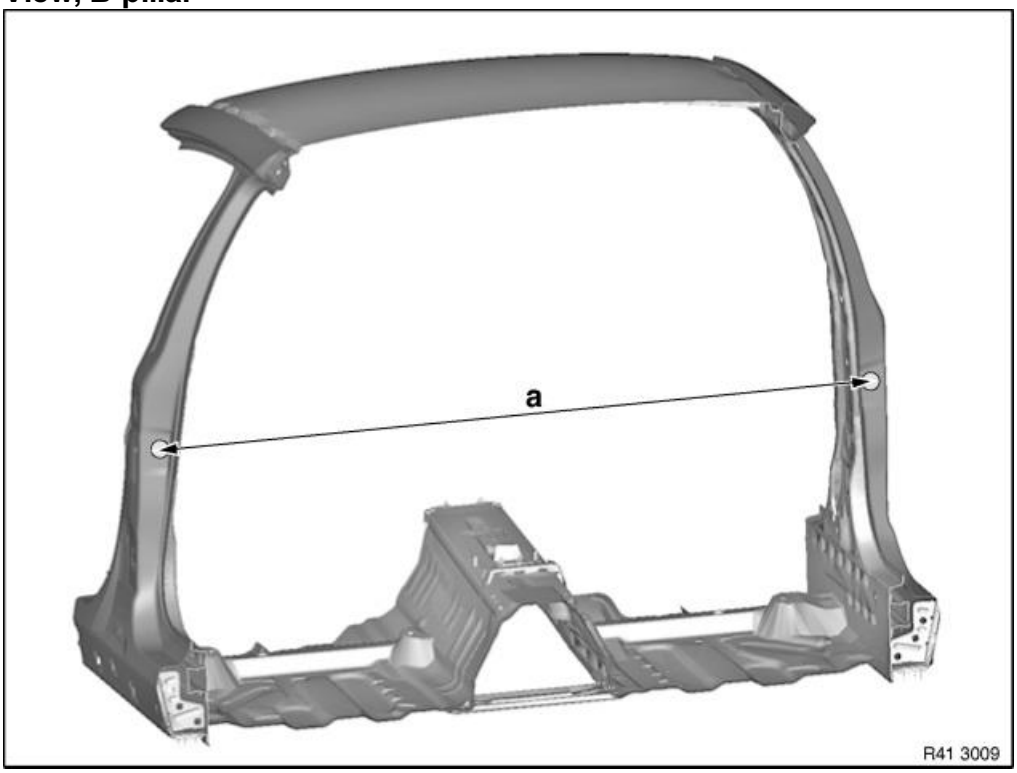
Top view, front end



The specified dimensions refer to removed assemblies.

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View, B-pillar



Measurement a=1513 mm between screw-on points of door brakes.

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41 00 ... Gap dimensions, body

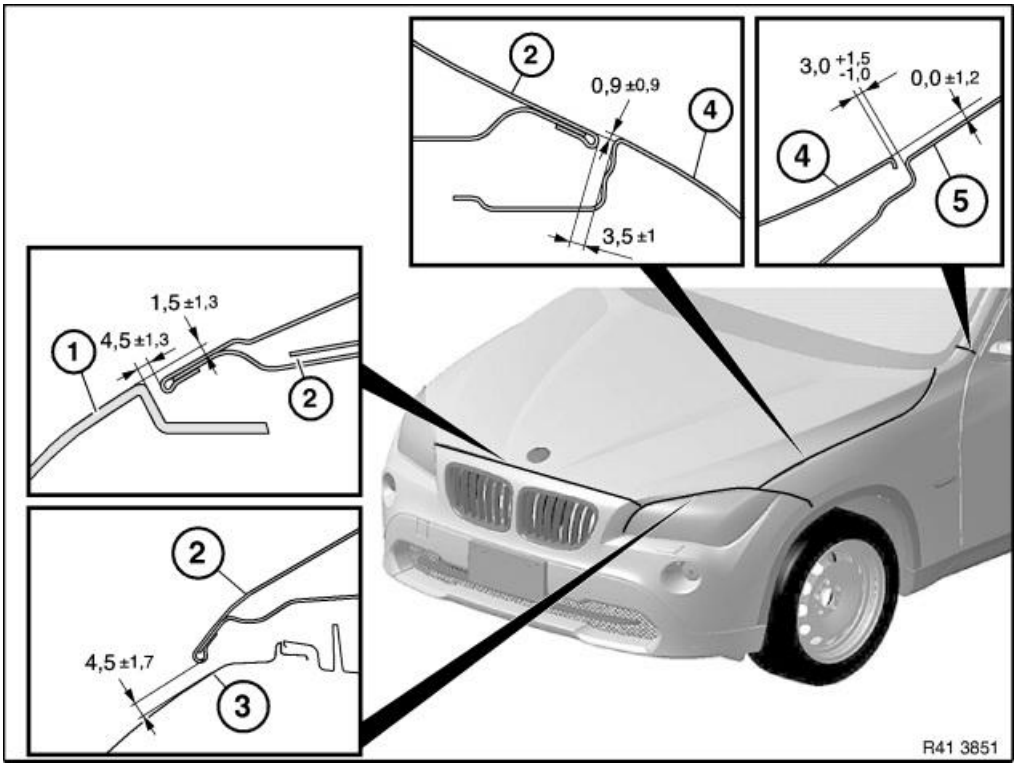
The dimensions specified in this document are applicable at an object temperature of 20 °C. The aim of adjustment is to achieve a uniform join.

Symmetry of the gaps between left and right sides of the vehicle has top priority.

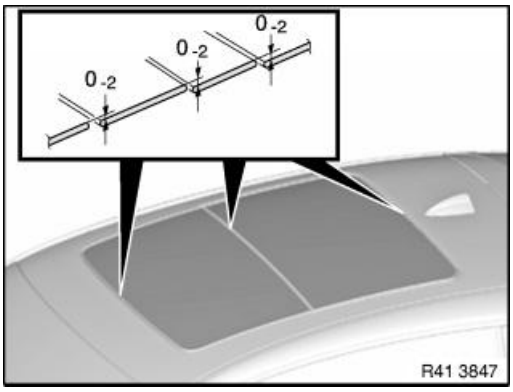
The door gaps must not deviate between the front and rear gap by more than 1.0 mm.

No gap dimension are specified for components which cannot be adjusted.

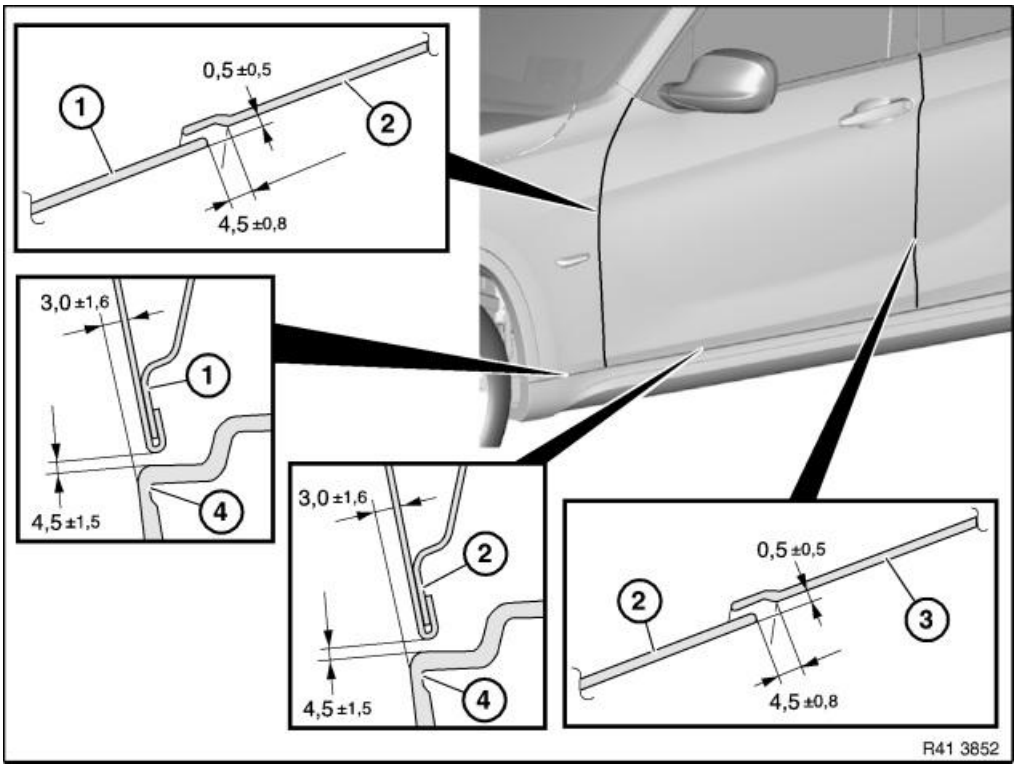
Dimensions in mm



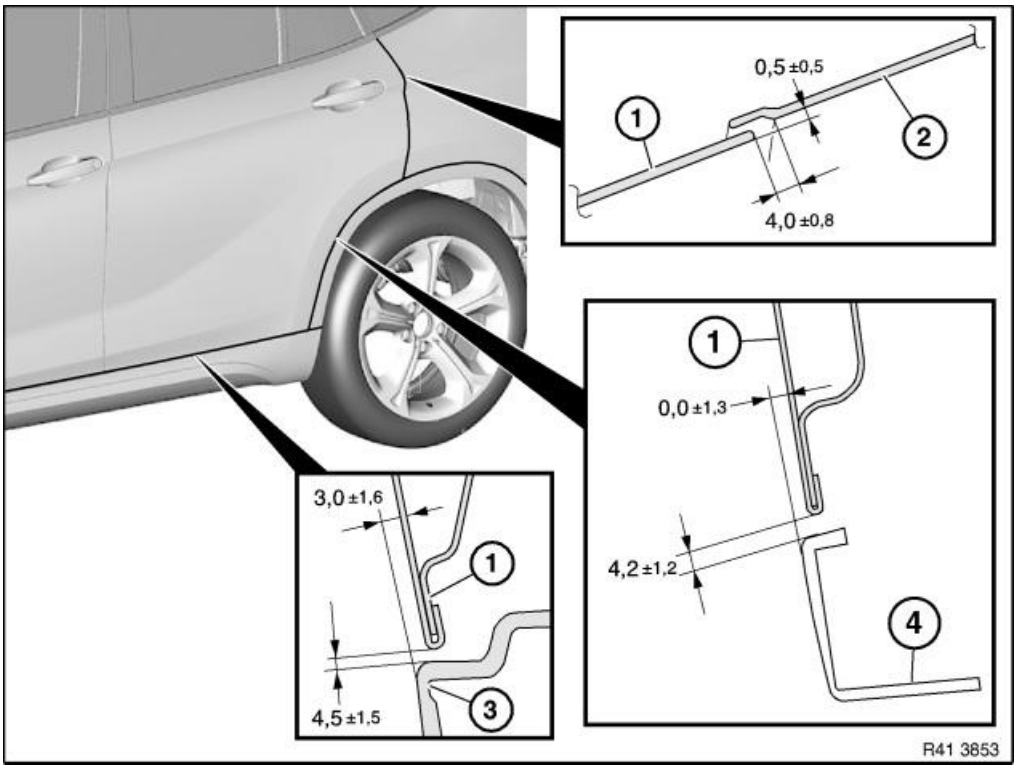
1. Panel, bumper, front
2. Engine bonnet/hood
3. Headlight
4. Side wall, front
5. A-pillar



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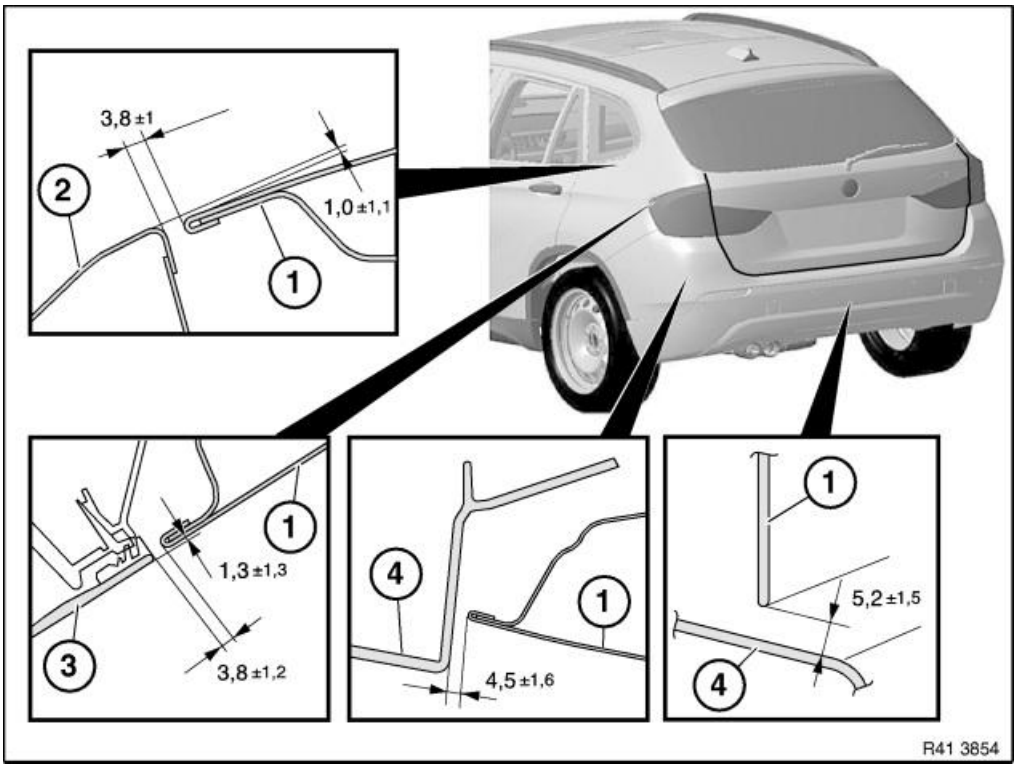


1. Side wall, front
2. Front door:
3. Rear door
4. Trim panel for entrance

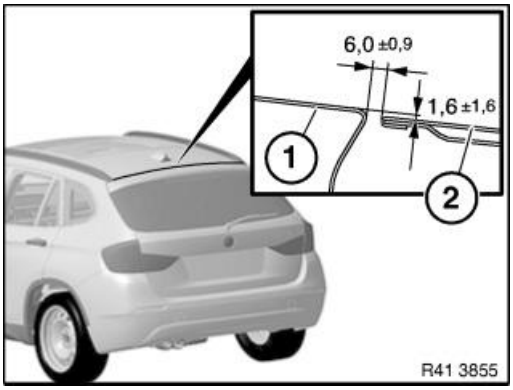


1. Rear door
2. Side wall, front
3. Trim panel for entrance
4. Wheel arch cover

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1. Tailgate
2. Rear side panels
3. Rear light
4. Rear bumper panel



1. Outer roof skin panel
2. Tailgate

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99 00 ... General instructions on paintwork

General instructions and classification of paint stages are described on the KSD CD (under Notes, General information on flat rate unit data, Passenger car explanation for FRU specifications for paintwork).

The marked area shows the basis of area calculation for creating the flat rate unit. The marked area does not show the area actually to be painted. If touching up is required, the painter defines the precise position as he sees fit.

Special procedure for matte paintwork:

Matte paintwork cannot be touched up since the painted surface cannot be polished.

For further information, see also the BMW painting handbook and the Aftersales Assistance Portal.

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51 14 ... General notes for labelling with adhesive films

In the event of a repair the adhesive films must be partially or completely replaced. The basic procedure for all areas of the vehicle is described below.

In addition, vehicle-specific repair instructions are available.

1. Preparation:

Wash and dry vehicle. Rework with compressed air as required in area of joints.

Clean complete component surface with glass cleaner (BMW part number 83 12 0 396 775). Also clean the inside of the component in areas, in which adhesive films are applied.

Only carry out repair work with clean hands!

Important!

Labels can only be applied to recently painted components after a waiting period of **2 weeks**. The paint hardening is only fully completed after this time.

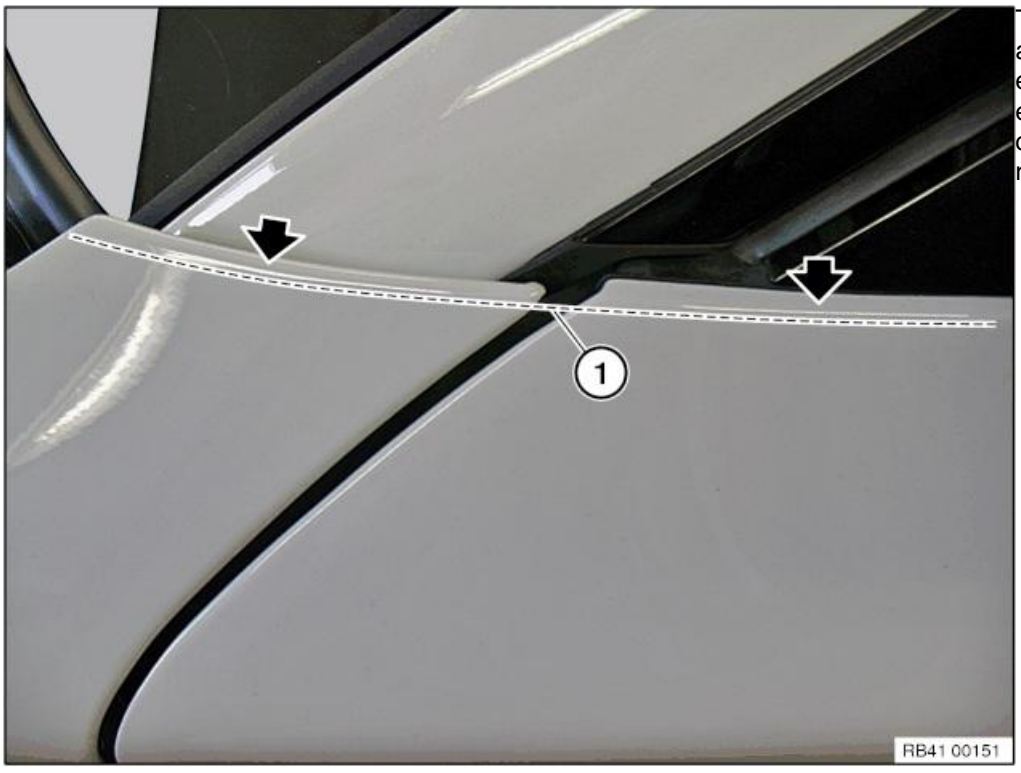
2. Procedure for applying labels:

All adhesive films in the repair kit are marked with numbers. Prepare the required plastic films prior to start of repairs.

The templates included in the repair kit assist orientation. A straight line running over the different components is the top priority.

Pull off the templates positioning of the adhesive films.

Only throw away templates after completion of all repair work, as some templates are used several times.



Templates are always applied along the light edge (1). The light edge is the reflection of the light source in radius (see arrow).

Roughly align the adhesive film using a template.

For large adhesive films, pull off the first 20 cm of protective film and fold back the edge.

Align and lightly press down the adhesive film. Use only one finger for this and not the entire hand so that air pockets are unable to form under the adhesive film.

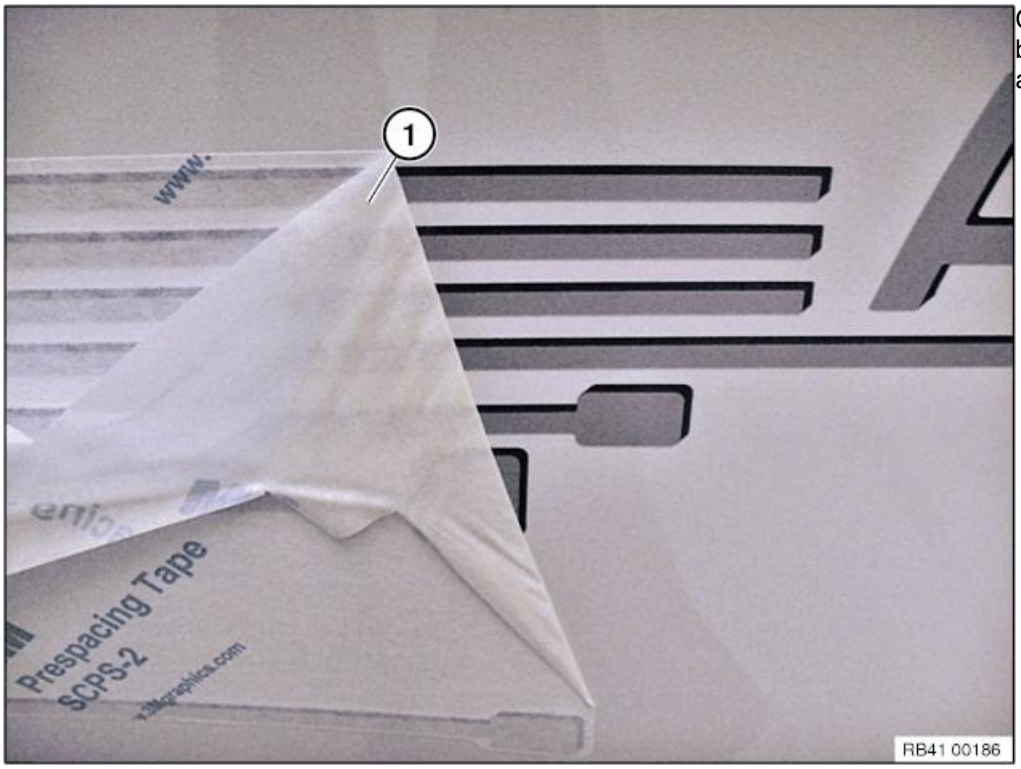
Pull off the remaining protective film and press down the adhesive film from front to rear and from inside to outside.

If faults are made in applying the adhesive film, it can be pulled off and repositioned several times. When no

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further corrections have to be made, use a squeegee to press down the adhesive film firmly from inside to outside.

Lay protruding ends of the adhesive film around the component edge and press down firmly.



Carefully pull off backing film (1) at an acute angle.

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41 00 ... Grinding aluminium components

1.0 Recommended tools and equipment

Grinding work on the outer skin:

- To carry out grinding work by hand or machine, you must use the recommended tools and equipment (refer to Service Information 5 03 03 975).
  The workbay can be cleaned with conventional extractor systems (low dust concentration).

Grinding work on the structure (except Z8):

- To carry out grinding work by hand or machine, you must use the recommended tools and equipment (refer to Service Information 5 03 03 975).
  The workbay can be cleaned with conventional extractor systems (low dust concentration).

Z 8 Spaceframe structure:

- To carry out machine grinding on the structure, you must use the recommended device with grinding dust extractor facility (refer to Service Information 5 01 00 532).
  The workbay must be cleaned with the recommended explosion-proof extractor system (refer to Service Information 5 01 00 532).
  High dust concentration, **explosion hazard!**

2.0 Grinding outer skin and structure

Do not use any abrasives (grinding wheels, paper, etc.) which contain iron (risk of corrosion).

Always replace abrasives which have already been used to treat steel (risk of corrosion).

Use stainless steel wire brushes only (risk of corrosion).

Reduce speed of grinding machines. Excessive speeds cause a smearing effect.

Do not use coarse abrasive grains (only ≥ 80).

Do not grind notches into the material (risk of cracking).

Do not grind the material thin.

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41 00 ... Grinding steel parts

1.0 Recommended tools and equipment

- Tools are recommended for manual grinding work.
- Machines/equipment are recommended for machine grinding work.

See also Aftersales Assistance Portal (ASAP) - Service/Technology - Workshop Equipment (StartÂ BMW) - Shop Workshop Equipment

2.0 Grinding outer shell and structure

Always replace abrasives which have already been used to treat aluminum (risk of corrosion).

Do not grind the material thin.

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41 00 ... Handling airbags and restraint systems

1.0 Airbags and restraint systems

- In the case of vehicles with airbags and restraint systems observe the relevant safety instructions.
- When straightening work is carried out on the body there is a risk of airbags being accidentally activated when the battery is connected.
  Because of this risk the battery ground cable must be disconnected prior to all repair work on the body.

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11 00 ... Handling components after flood damage

Flood damage can occur if the permissible fording depth of a vehicle is exceeded. Ingress of water can cause damage to the engine (water shock) or components.

Because dirt particles generally enter into the component with the water (e.g. starter motor, wiring harness), the components need to be thoroughly inspected.

Residual moisture in the components leads to corrosion (increased contact resistance in the component), which can lead to a component failure at a later time.

If water ingress into the electrical components cannot be ruled out, it is recommended to replace the component to ensure correct functioning through the vehicle lifetime.

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41 00 ... Handling electrical system and electronics

1.0 Battery

- Explosion hazard in the vicinity of the battery during welding and grinding work. The battery must be removed.

2.0 Control units

- Control units with visible mechanical damages and/or electrical damages caused by accidents must be replaced.
- The following risks exist when the battery is connected:
  - Damage to control units resulting from welding work on the body or a line short circuit.
  - Accidental activation of airbags during straightening work on the body.

Because of these risks the ground cable must be disconnected prior to all repair work.

- Control units are designed for a temperature of 65 °C. The temperatures in a spray booth do not pose any problems. If a vehicle is in the spray booth at a displayed temperature of 80°C, the actual temperature of the vehicle is ≤ 60 °C (object temperature).
- Protect control units against the influence of heat >65 °C (e.g. during welding and drying work with infrared beams or hot air blowers).

3.0 Electrical wires and wiring harnesses

- Protect electrical wires and wiring harnesses against damage (e.g. during straightening and grinding work).
- Protect electrical wiring and wiring harnesses against the influence of heat >65 °C (e.g. during welding and drying work with infrared beams or hot air blowers).
- Do not kink electrical wiring.

4.0 Optical fibres

- Follow instructions for handling optical fibres.

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41 00 ... Information on hazards

1. Aluminium

Hazards/effects	Measures / regulations
Repair stage 1 and 2: No hazards/effects	none
Repair stage 3: (Welding - only E52) • Explosion hazard due to high concentration of fine aluminium dust. Arising e.g. during straight-through grinding of coated components in the base material and large-surface grinding of bright-finish components. • Explosion hazard due to swirling up of fine aluminium dust in cavities. Created by the necessary, thorough cleaning of machining surfaces and tools before and after machining aluminium.	• Avoid high concentration of fine aluminium dust by means of continuous extraction. • Use explosion-proof exhaust extraction unit • Do not use compressed air when cleaning the workbay. • Avoid swirling up dust when cleaning the workbay.
• Spontaneous combustion of fine aluminium dust when ignition and fire sources are drawn in. E.g.: hot swarf, grinding sparks, cigarettes, etc.	• Do not operate ignition and fire sources in the intake area of exhaust extraction unit.

2. Carbon

Hazards / effects	Measures / regulations
Repair stage 1: No hazards/effects	none
Repair stage 2 and 3: • Explosion hazard due to high concentration of carbon dust. Produced when grinding carbon. • Explosion hazard due to swirling up of carbon dust in cavities. Created by the necessary, thorough cleaning of machining surfaces and tools before and after machining carbon.	• Avoid high concentration of carbon dust by drawing it off continuously. • Use explosion-proof exhaust extraction unit • Do not use compressed air when cleaning the workbay. • Avoid swirling up dust when cleaning the workbay.
• Spontaneous combustion of carbon dust when ignition and fire sources are drawn in. E.g.: hot swarf, grinding sparks, cigarettes, etc.	• Do not operate ignition and fire sources in the intake area of exhaust extraction unit.

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41 00 ... Information on metal filler

Note:

The metal spatula is omitted.

Changes to the procedure are described here.

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64 00 ... Information on using cleaning agent/paints (personal protection equipment)



Warning!

Use of cleaning agents/paints not compliant with instructions can cause serious injuries or burns!

Handling cleaning agents/paints can trigger allergic skin and respiratory reactions!



Important!

Observe following instructions:

- Store cleaning agents/paints only in a secure cabinet.
- Keep cleaning agents/paints away from naked flames and other sources of ignition.
- Protect cleaning agents/paints from high temperatures and direct sunlight.
- Always keep an eye douche on hand, change the water regularly (once a month).



Important!

Observe following instructions before use:

- Manufacturer's instructions (on container/packaging)
- Hazard warnings (on container/packaging)
- Manufacturer's instructions on package insert
- Material safety data sheet of manufacturer
- Product information in EPC
- National market regulations



Important!

Observe following instructions during use:

- Do not eat, drink or smoke while working with these products.
- Avoid direct contact with skin and eyes.
- Wear personal protective clothing/equipment.
- Ensure that all enclosed areas are well ventilated or extract fumes directly.
- Immediately change working clothes soiled with cleaning agent/paint.
- After finishing work, wash your hands and apply protective skin cream.



Important!

Follow hazard warnings and wear personal protection equipment!

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First Aid:

- If product comes in contact with eyes, immediately flush with running water for about 10 - 15 minutes. Seek the advice of eye specialist.
- In the event of skin contact and where applicable an allergic skin reaction, clean the affected areas immediately with soap and water and then apply silicone-free skin cream. Seek advice of physician.
- If an adhesive product is swallowed, rinse mouth/parts of mouth thoroughly with running water. Drink 1-2 glasses of water. Do not induce vomiting. Consult a doctor.
- After inhaling vapours ensure ample supply of fresh air. Keep calm, keep respiratory tracks clear and call doctor.



Recycling:

Dispose of cleaning agents/paints in a professional manner!

Observe national/country-specific disposal regulations.

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41 00 ... Information on vehicle protection

- Vehicle parts located in the repair zone or threatened by heat, sparks or dust, must be removed or covered. For suitable covering material , see ServiceÂ Information.

Important!

Do not use flammable or dirty material for covering.

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41 00 ... Information/warning labels

Missing or damaged labels (e.Â g. tyre pressure) must be replaced.

--> overview via the installation location

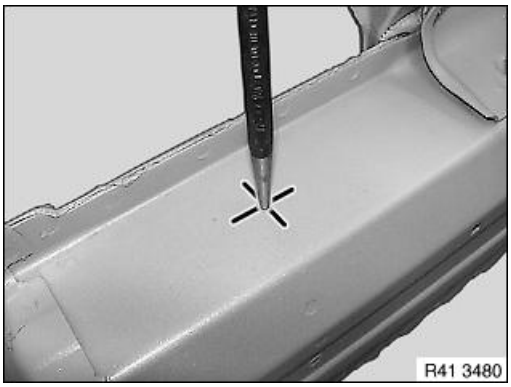
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41 00 ... Installation solution for straight shank/hexagon rivet nut



Protection measures!

- Wear safety goggles
- Wear protective gloves



Hexagon/straight shank rivet nut (up to thread 8) with hand rivet gun ZS308 Important!

Risk of damage!

Failure to comply with these instructions may result in the drill bit slipping and causing significant paintwork damage.

1. Mark position of bore and then punch-mark component



Important!

If the determined drill bit diameter is not observed:

- the knurling on the straight shank rivet nut is rendered useless
- the component will be damaged when the straight shank rivet nut is inserted

Determining suitable drill bit:
Depending on the rivet nut shank diameter, the next drill bit diameter higher (5/10 step) can be used.

E.g. with a shank diameter of 10.1 mm, the 10.5 mm drill bit can be used. The 11.0 mm drill bit must not be used.



2. Drill bore with determined drill bit and deburr, pilot-drill with a smaller drill bit if necessary

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3. Clean component, eliminate paintwork damage if necessary

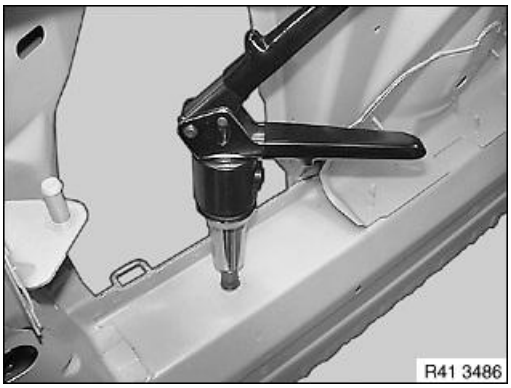


Important!

To avoid corrosion, stop chips/swarf by means of cavity sealing.

Follow instructions on corrosion protection .

4. Preserving cavity

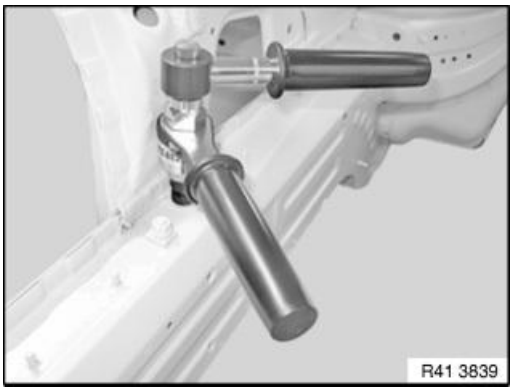


Important!

Follow manufacturer's operating instructions.

Make sure straight shank rivet nut correctly contacts component.

5Set rivet nut with hand rivet gun*Note:*
According to the manufacturer, the pictured tool is suitable up to an M8 thread (see Aftersales Assistance Portal (ASAP) - Service/Technology - Workshop Equipment (Start BMW) - Workshop Equipment Shop or www.bmwgroup-wep.com).



Hexagon / straight shank rivet nut (up to thread M12) with hand rivet gun MB512

Important!

Follow manufacturer's operating instructions.

Make sure hexagon rivet nut correctly contacts component.

Set rivet nut with hand rivet gun

Note:
According to the manufacturer, the pictured tool is suitable up to an M12 thread (see Aftersales Assistance Portal (ASAP) - Service/Technology - Workshop Equipment (Start BMW) - Workshop Equipment Shop or www.bmwgroup-wep.com).

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41 00 ... Installing a cavity sealing with 2-component PU cavity foam

Sourcing reference for cavity foam HS1 (refer to BMW Parts Department).

Important!

The cavity foam may only be use for cavity sealing at the points at which cavity sealing is present as standard!

The following repair represents the replacement of a shaped part for the cavity sealing by the use of cavity foam.

This type of cavity sealing is used at points at which shaped parts cannot be used for repairs.

This is the case when large amounts of heat occur (e.g. due to welding, soldering or tin-plating) in the direct vicinity or at the point of the standard cavity sealing.

It is not possible here to install shaped parts for the cavity sealing because of the fire risk!

To replace shaped parts with cavity foam at further locations, adopt the procedure shown here and adapt it to the relevant ratios.

It must be ensured that the cavity sealing is fully completed.

Note:

Check the accessibility for the spraying pipe of the cavity foam to the affected cavity after removing the defective parts.

Properties of cavity foam HS1:

- 2-component PU foam, solvent-free.
- Excellent flow capacity, enabling complete sealing of cavities.
- Good strength, preventing slipping in cavities.
- Low water absorption, preventing corrosion.
- Ideal for use as insulating and sealing compound.

Information on dangers/hazards:

- Avoid eye and skin contact.
  Wear eye protection, solvent-resistant protective gloves and protective clothing.
- Do not inhale.
  Apply in well ventilated rooms only.
- **Warning!**
  Application time after mixing process: within **8 minutes!**
  Completely empty open can after use.
- Residual amounts which are not used can cause the can to explode on account of a chemical reaction (buildup of heat)!
  Alternatively, cool the can containing the non-removed residual amount for several hours in cold water.
- Do not eat, drink or smoke while working with these products.
- Keep heat and ignition sources far away.
- Read the manufacturer's information on hazards/dangers (printed on the can) prior to application.

Processing instructions:

- Observe the expiry date on the cartridge.
  Do not use spray can after the expiry date has passed. After the Use by date the properties of the cavity foam will no longer meet the requirements of the BMW Group.
- Cavity preservation of the repair area possible after an air drying time of 1 hour.
- Surface must be **clean, free of dust, grease, oil and separating agents**.
- Application temperature at least 15 °C. Optimally 20 °C.
- Important!

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Foam expands many times over as it sets (change in volume).

- Before applying to the vehicle, fill a clearly visible cavity of corresponding size with foam on a used part. This enables an optimal dosage (i.e. spraying time) to be specified for filling the cavity on the vehicle with foam.
- Tape off open passages to visible areas with adhesive tape to prevent foam from escaping.
- The setting takes approx. 30 minutes. Mechanical processing (e.g. drilling, cutting, etc.) is then possible
- Cavity preservation of the repair area possible after an air drying time of 1 hour.
- Remove fresh, non-hardened polyurethane foam with adhesive remover 208.
  Sourcing reference: BMW Parts Department.
  Hardened polyurethane foam can only be removed mechanically.
- Excess hardened polyurethane foam can be disposed of as residual waste.
  Cans that are not entirely empty or are unused and have an expired expiry date are classed as hazardous waste.
  Observe country-specific waste disposal regulations.
- Observe the manufacturer's processing instructions (printed on the can).

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41 00 ... Installing a cavity sealing with 2-component PU cavity foam

Sourcing reference for cavity foam HS3 (refer to BMW Group Parts).

Attention!

The cavity foam may only be use for cavity sealing at the points at which cavity sealing is present as standard!

The following repair represents the replacement of a shaped part for the cavity sealing by the use of cavity foam.

This type of cavity sealing is used at points at which shaped parts cannot be used for repairs.

This is the case when large amounts of heat occur (e.g. due to welding, soldering or tin-plating) in the direct vicinity or at the point of the standard cavity sealing.

It is not possible here to install shaped parts for the cavity sealing because of the fire risk!

To replace shaped parts with cavity foam at further locations, adopt the procedure shown here and adapt it to the relevant ratios.

It must be ensured that the cavity sealing is fully completed.

Note:

Check the accessibility for the spraying pipe of the cavity foam to the affected cavity after removing the defective parts.

Properties of cavity foam HS3:

- 2-component PU foam, solvent-free.
- Excellent flow capacity, enabling complete sealing of cavities.
- Low water absorption, preventing corrosion.
- Ideal for use as insulating and sealing compound.

Information on dangers/hazards:

- Avoid eye and skin contact.
  Wear eye protection, solvent-resistant protective gloves and protective clothing.
- Do not inhale.
  Apply in well ventilated rooms only.
- **Warning!**
  Processing after the mixing process within a few seconds!
- Do not eat, drink or smoke while working with these products.
- Keep heat and ignition sources far away.
- Observe the manufacturer's information on dangers / hazards prior to application (imprint on double cartridge).

Processing instructions:

- Observe the expiry date on the cartridge.
  Do not use cavity foam after the expiry date has passed. After the Use by date the properties of the cavity foam will no longer meet the requirements of the BMW Group.
- Cavity preservation of the repair area possible after an air drying time of 1 hour.
- Surface must be **clean, free of dust, grease, oil and separating agents**.
- Application temperature at least 15 °C. Optimally 20 °C.
- Attention!
  Foam expands during hardening (volume change).
- Tape off open passages to visible areas with adhesive tape to prevent foam from escaping.
- The setting takes approx. 30 minutes. Mechanical processing (e.g. drilling, cutting, etc.) is then possible
- Cavity preservation of the repair area possible after an air drying time of 1 hour.

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- Remove fresh, non-hardened polyurethane foam with adhesive remover 208.
  Sourcing reference, see BMW Group Parts.
  Hardened polyurethane foam can only be removed mechanically.
- Excess hardened polyurethane foam can be disposed of as residual waste.
  Double cartridges that are not entirely empty or are unused and have an expired expiry date are classified as hazardous waste.
  Observe country-specific waste disposal regulations.
- Observe the manufacturer's processing instructions (imprinted on double cartridge).

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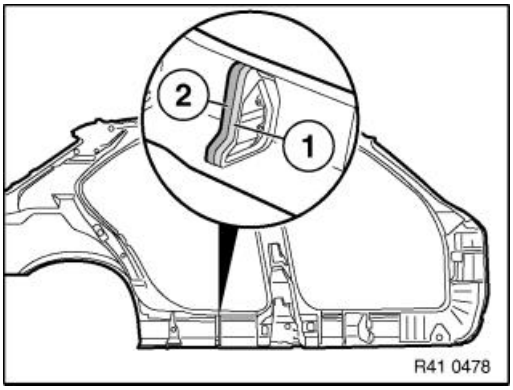
41 00 ... Installing cavity sealing (expanded)

Note:
Carry over schematic diagram to the relevant vehicle type.

The following repair represents the procedure for an already expanded cavity acoustic baffle.

The cavity acoustic baffle remains on the body in this instance.

Before these work steps, prepare the new part so that it is ready to install (adapting, cutting to size, applying welding primer etc.).



Clean contact surface (1) with cleaning agent R2.

Apply a bead (2) approx. 15 mm high of sealant D2 to contact surface (1).

If necessary apply sealant D2 somewhat thinner on each side, to prevent the sealant from running.

Fit, secure and weld up new part.

Warning:
Ensure adequate ventilation over entire processing period.

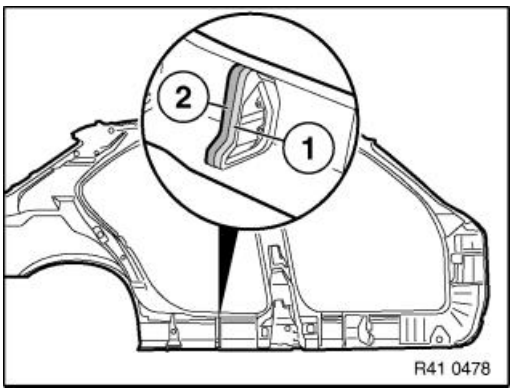
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41 00 ... Installing cavity sealing (not expanded)

Note:
Carry over schematic diagram to the relevant vehicle type.

The following repair represents replacement of a cavity acoustic baffle.

Before these work steps, prepare the new part so that it is ready to install (adapting, cutting to size, applying welding primer etc.).



Sand contact surface of cavity acoustic baffle (1) with coarse-grained sandpaper (grain 50-100).

Clean contact surface (1) with cleaning agent R2.

Apply a bead approx. 15 mm high of sealant D2 to contact surface (1).

If necessary apply sealant D2 somewhat thinner on each side, to prevent the sealant from running.

Attach cavity acoustic baffle in specified position (see old part).

Fit, secure and weld up new part.

Warning:
Ensure adequate ventilation over entire processing period.

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41 00 ... Materials science

1. Aluminium

1.1 Chassis/suspension components

Read and observe the Notes on chassis/suspension components before handling aluminium.

1.2 Material influences

Causes	Effects / remedies
A galvanic element is created under the effects of moisture by contact with materials such as copper, tin, nickel, iron and zinc.	This plating process causes aluminium to be removed from the connection point. This results in surface corrosion or pitting. New parts and accessory parts which have been approved by the BMW Group for aluminium (screws, washers, nuts etc.) have undergone special surface treatment. Such parts must not be replaced by conventional parts. *Note:* Damaged parts lose this protection and must be specially coated or replaced. Damage caused by contact corrosion is excluded from the warranty.
Tools also used for work on steel components can implant steel particles in the softer surface of an aluminium component.	Surface corrosion or pitting occurs. A separate tool set is available for processing/machining aluminium.
Surfaces are attacked when fluxing agents are used.	Soldering is not permitted for joining aluminium components. Risk of corrosion from chemical factors.
Aluminium/steel grinding dust from adjoining working areas.	This results in surface corrosion. Erection of protective barriers.

1.3 Machining properties

Properties of aluminium compared with steel	Effects
Aluminium parts are magnetically neutral.	Attachment with magnetic tools/working aids is not possible.
Elasticity is only 1/3 as high. Elongation failure is approx. 50 % slighter.	Convertibility is limited in comparison with steel. Overstretching the material results in strain-hardening and an increased tendency of cracking.

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Electrical conductivity is almost 4 times higher.	Electric welding methods require different equipment (MIG welding).
Material expansion during heating is twice as high.	The material expands more markedly. Shorter heat treatment is necessary for removing dents.
Thermal conductivity is 3 times higher.	Heat is drained more quickly. Adjoining working areas are affected more heavily e.g. during welding.
Structural transformation between 200 °C and 250 °C	Elongation characteristics and thus plasticity are improved. Strength is reduced. ***Important!*** No heat treatment during repair work on the vehicle structure! Workshop operation doesn't make it possible to control the temperature to sufficiently exact levels.
Aluminium shows no annealing colours.	The melting point is 650 °C. Once the melting temperature has been reached, the material begins to flow without any further indications. The temperature can only be estimated by means of the paint colouring and the surface warpage. ***Important!*** Do not use thermo crayons. Not suitable for workshop operation because the paint runs too quickly.

1.4 Storage

Characteristic features of aluminium	Special measures
Corrosion (ageing) in damp environments.	Store aluminium components in a dry place.
Contact corrosion in event of contact e.g. with steel components.	Always store aluminium components separately or in isolation from steel components.
Susceptibility to paint infiltration.	Do not damage factory protective layer of the surface since this would cause oxidation. Failure to comply with this requirement would result in more painting work.

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32 00 ... Notes and specifications for the replacement of the steering gear, steering column and the steering shaft following accident damage

Situation:

In the event of accidents or driving conditions similar to accidents, shock-like loads can cause different types of damage to steering boxes. When a steering box is externally undamaged, it is sometimes only possible to identify damage with great difficulty and with great effort. However, damage of this nature poses an unacceptable risk to the vehicle because it can result in failure of the steering system.

Because of the disproportionate amount of effort involved, it is generally not sensible to check thoroughly all the individual components of the steering box and as an alternative it is necessary to take into account other components which can be checked more easily.

Procedure:

The steering box must be replaced if one or more of the following points apply:

A. Visible or noticeable damage to the steering box
   - Version with electric steering box (EPS): Examine in particular the control unit with all plug connections for damage and hairline cracks.

B. Unacceptable torque increase and jamming when the steering box is turned from lock to lock (without hydraulic/electrical assistance)

C. Fire damage

D. Damage, permanent deformation or fractures to:
   - Wheel rims in the event of a negative result from the wheel alignment check
   - Spring struts, steering stubs, wheel carriers
   - Wishbones
   - Struts or trailing links or anti-roll bar with this function
   - Body-side attachment points for wheel guide/control components
   - Front axle support
   - Pitman arms
   - Track rods
   - Steering box fixtures
   - Steering column
     A lopsided steering wheel, significant deviations of camber/track values and noises when cranking the steering can be additional indications for the damage/deformations listed here.

This guideline is binding for all accident repairs to BMW and MINI vehicles.

Note:

> If the steering box replacement work which is required for safety reasons is refused by the customer or an insurance company for cost reasons, a memorandum to that effect must be drawn up and countersigned by the party bearing the costs of the accident repair.
>
> For a corresponding example of the memorandum, see Service Information (bulletin) 320188(828) Appendix 1.

Actual situation of the steering column and steering shaft:

In the event of accidents or driving conditions similar to accidents, shock-like loads can cause different types of damage to the steering shaft and steering column. In case no external damaged of the steering column and the steering shaft can be noticed, it is sometimes only possible to identify damage with great difficulty and with great effort.

Proceedure for steering column and steering shaft:

The steering column and steering shaft must be replaced if one or more of the following points apply:

- Visible or noticeable damage, deformation or breakage of the steering column or steering shaft
- Damage, permanent deformation or breakage of the track rod
- Unacceptable torque increase and jamming when the steering column is cranked from limit position to limit

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position (without hydraulic/electrical assistance)

- If the wheel alignment nominal data cannot be reached after all the damaged wheel components are changed (exceedance of the permissible wheel alignment tolerances). If required, attach the measurement protocol of the invoice/certificate
- Positive check for activated crash system of the steering column:
- If no damage is visible on the steering column, the mechanical steering column must be checked for an activated crash system:
    1. Open ELV
    2. Pull steering wheel out towards the driver (towards the body) until the physical limit position is reached, but do not use excessive force
    3. Push steering wheel towards engine compartment (approx. 20-30 mm away from body) into the comfort position and lock

       If no end stop is present when pulling out the steering column or the gaiter of the steering column shroud has tension, the crash system has activated and the steering column is to be renewed.

Note:

If the steering column/steering shaft replacement work which is required for safety reasons is rejected by the customer or an insurance company for cost reasons, a memorandum to that effect must be drawn up and countersigned by the party bearing the costs of the accident repair.

For corresponding specimen of the memorandum, refer to Service Information 320188(828) Appendix 1

Attention!

The vehicle's operating licence will be invalidated whenever the function of any of its safety components is compromised!

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41 00 ... Notes on adhesive K1

Important!

Note the following information before starting to apply adhesive!

- Country-specific safety and industrial safety regulations
- Material safety data sheet of manufacturer
- Processing instructions on glue cartridge

Storage:

Dry at 15°- 25 °C.

Shelf life:

The glue cartridge is marked with a date.

Do not use the adhesive after this date.

Surface pre-treatment:

The pre-treatment depends on the material to be bonded and its coating.

Required cartridge gun:

Overview of glue cartridge guns

Do not use compressed-air-operated cartridge guns!

Preparing the glue cartridge:

Opened glue cartridges may be used again before the expiry date as long as a new mixing tube is used.

The working temperature of glue cartridge must be at least 20°C.

Insert glue cartridge into cartridge gun, remove cap and allow both adhesive components to emerge. Strip adhesive components uniformly and attach mixing tube. Only use mixing tubes supplied with glue cartridge. Allow approx. 10 cm of mixed adhesive to emerge.

Only after this apply the mixed adhesive to one side of the bonding surface.

Application time of mixed adhesive approx. 2 hours. A change of mixer is only necessary if over a period of 1 hour no material has flowed through the mixer.

2-component adhesive application:

Read the vehicle-specific repair instructions to determine the thickness and positioning of the adhesive bead.

After applying the adhesive, check whether an adhesive component has emerged at the back of the glue cartridge. If yes, break off the bonding procedure. Clean new part. Use new glue cartridge. Contact national hotline.

Remove contamination caused by adhesive residue immediately.

Hardened adhesive can only be removed mechanically.

Hardening time:

Do not move the vehicle before the adhesive has hardened.

Check the degree of hardness of the adhesive with a fingernail.

If the adhesive cannot be pressed in any further with a fingernail, the vehicle may be moved (without engine force) for further processing applications (e.g. painting).

Vehicle **strength for driving applications** is achieved after:

48 hours at an object temperature of 15°C.

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10 hours at an object temperature of 23°C.

1 hour at an object temperature of 60°C.

0.5 hours at an object temperature of 85°C.

Important!

> When using radiant heaters, make sure that the object temperature does not exceed 85 °C. Excessively high temperatures will destroy the adhesive.

Disposal of adhesive:

Hardened adhesive is disposed of as normal waste.

Empty glue cartridges are disposed of as normal waste.

Non-hardened adhesives and a mixture of adhesive and solvent and the like must be disposed of as hazardous waste.

These regulations apply to the Federal Republic of Germany.

For other countries, comply with the (possibly differing) nationally applicable regulations.

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41 00 ... Notes on adhesive K2

Important!

Note the following information before starting to apply adhesive!

- Country-specific safety and industrial safety regulations
- Material safety data sheet of manufacturer
- Processing instructions on glue cartridge

Storage:

Dry, at 15 °C - 25 °C.

Shelf life:

The glue cartridge is marked with a date.

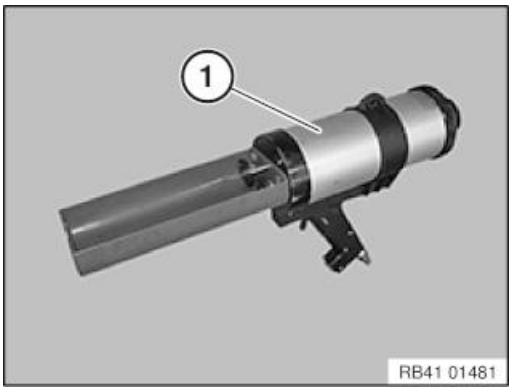
Do not use the adhesive after this date.

Surface pre-treatment:

Refer to vehicle-specific repair instructions or Notes.

Required cartridge gun:

Cartridge gun 81 49 2 355 475 for 2x290 ml container



Preparation of the glue cartridge (2x290 ml):

Opened glue cartridges may be used again before the expiry date as long as a new mixing tube is used.

The working temperature of glue cartridge must be at least 20°C.

Application time of adhesive at 28 °C 35 min and at 18 °C 50 min

Remove the sealing cap on the back of the glue cartridge. Remove the safety and connecting pipe. Puncture the glue cartridges open. Attach the connecting pipe and insert the glue cartridge in the cartridge gun. Allow both adhesive components to emerge. Strip adhesive components uniformly and attach mixing tube. Only use mixing tubes supplied with glue cartridge. Allow approx. 10 cm of mixed adhesive to emerge.

Only after this apply the mixed adhesive to one side of the bonding surface.

2-component adhesive application:

Read the vehicle-specific repair instructions to determine the thickness and positioning of the adhesive bead.

After applying the adhesive, check whether an adhesive component has emerged at the back of the glue cartridge. If yes, break off the bonding procedure. Clean new part. Use new glue cartridge. Contact national hotline.

Remove contamination caused by adhesive residue immediately.

Hardened adhesive can only be removed mechanically.

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Hardening time:

Do not move the vehicle before the adhesive has hardened.

The following hardening times apply unless the specifications in the vehicle-specific repair instructions indicate otherwise:

Adhesive K2 (2x290 ml):

Important!

> During the initial 12 hours, no accelerated hardening with a heat gun or heat chamber is permitted!

The **solidity for installation work** on the vehicle is reached after:

12 hours at an object temperature of 18°C.

Vehicle **strength for driving applications** is achieved after:

48 hours at an object temperature of 18°C.

Important!

> When a complete side frame is replaced (without partial replacement), the hardening period will increase to 24 hours until the beginning of installation work.

Disposal of adhesive:

Hardened adhesive is disposed of as normal waste.

Empty glue cartridges are disposed of as normal waste.

Non-hardened adhesives and mixtures of adhesive and solvent and the like must be disposed of as hazardous waste.

These regulations apply to the Federal Republic of Germany.

For other countries, comply with the (possibly differing) nationally applicable regulations.

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41 00 ... Notes on adhesive K3

Important!

Note the following information before starting to apply adhesive!

- Country-specific safety and industrial safety regulations
- Material safety data sheet of manufacturer
- Processing instructions on glue cartridge

Storage:

Dry at 15°- 25 °C.

Shelf life:

The glue cartridge is marked with a date.

Do not use the adhesive after this date.

Surface pre-treatment:

See vehicle-specific repair instructions

Required cartridge gun:

Overview of glue cartridge guns

Preparing the glue cartridge:

Do not prepare the glue cartridge until just before applying the adhesive.

The working temperature of glue cartridge must be at least 18°C.

Pot life of adhesive is approx. 10 minutes at 25 °C.

Insert glue cartridge into cartridge gun, remove cap and allow both adhesive components to emerge. Strip adhesive components uniformly and attach mixing tube. Only use mixing tubes supplied with glue cartridge.

Before starting to apply adhesive, allow approx. 1 mixing tube length of mixed adhesive to emerge. Only then apply the mixed adhesive to one side of the bonding surface.

Opened cartridges may be used again before the expiry date as long as a new mixing tube is used.

2-component adhesive application:

Read the vehicle-specific repair instructions to determine the thickness and positioning of the adhesive bead.

Hardening time:

See vehicle-specific repair instructions

Adhesive disposal:

Hardened adhesive is disposed of as normal waste.

Empty glue cartridges are disposed of as normal waste.

Non-hardened adhesives and mixtures of adhesive and solvent and the like must be disposed of as hazardous waste.

These regulations apply to the Federal Republic of Germany.

For other countries, comply with the (possibly differing) nationally applicable regulations.

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41 00 ... Notes on adhesive K4

Important!

Note the following information before starting to apply adhesive!

- Country-specific safety and industrial safety regulations
- Material safety data sheet of manufacturer
- Processing instructions on glue cartridge

Storage:

Dry at 15°- 25 °C.

Shelf life:

The glue cartridge is marked with a date.

Do not use the adhesive after this date.

Surface pre-treatment:

See vehicle-specific repair instructions

Required cartridge gun:

Overview of glue cartridge guns

Preparing the glue cartridge:

Do not prepare the glue cartridge until just before applying the adhesive.

Opened glue cartridges may be used again before the expiry date as long as a new mixing tube is used.

The working temperature of glue cartridge must be at least 18°C.

Working life of adhesive is approx. 10 minutes.

Insert glue cartridge into cartridge gun, remove cap and allow both adhesive components to emerge. Strip adhesive components uniformly and attach mixing tube. Only use mixing tubes supplied with glue cartridge.

Before starting to apply adhesive, allow approx. one half mixing tube length of mixed adhesive to emerge. Only then apply the mixed adhesive to one side of the bonding surface.

2-component adhesive application:

Read the vehicle-specific repair instructions to determine the thickness and positioning of the adhesive bead.

Hardening time:

The bonded connection will be resistant after 30 minutes.

Disposal of adhesive:

Hardened adhesive is disposed of as normal waste.

Empty glue cartridges are disposed of as normal waste.

Non-hardened adhesives and mixtures of adhesive and solvent and the like must be disposed of as hazardous waste.

These regulations apply to the Federal Republic of Germany.

For other countries, comply with the (possibly differing) nationally applicable regulations.

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41 00 ... Notes on adhesive K5

Important!

Note the following information before starting to apply adhesive!

- Country-specific safety and industrial safety regulations
- Material safety data sheet of manufacturer
- Processing instructions on glue cartridge

Storage:

Dry at 15°- 32 °C.

Shelf life:

The glue cartridge is marked with a date.

Do not use the adhesive after this date.

Surface pre-treatment:

See vehicle-specific repair instructions

Required cartridge gun:

Overview of glue cartridge guns

Preparing the glue cartridge:

The working temperature of glue cartridge must be at least 20°C.

Opened glue cartridges may be used again before the expiry date as long as a new mixing tube is used.

Insert glue cartridge into cartridge gun, remove cap and allow both adhesive components to emerge. Strip adhesive components uniformly and attach mixing tube. Only use mixing tubes supplied with glue cartridge.

Before starting to apply adhesive, allow approx. 1 mixing tube length of mixed adhesive to emerge. Only then apply the mixed adhesive to one side of the bonding surface.

Pot life of adhesive is approx. 60 minutes at 23°C.

2-component adhesive application:

Read the vehicle-specific repair instructions to determine the thickness and positioning of the adhesive bead.

After applying the adhesive, check whether an adhesive component has emerged at the back of the glue cartridge. If yes, break off the bonding procedure. Clean new part. Use new glue cartridge. Contact national hotline.

Remove contamination caused by adhesive residue immediately.

Hardened adhesive can only be removed mechanically.

Hardening time:

Do not move the vehicle before the adhesive has hardened.

Check the degree of hardness of the adhesive with a fingernail.

If the adhesive cannot be pressed in any further with a fingernail, the vehicle may be moved (without engine force) for further processing applications (e.g. painting).

Vehicle **strength for driving applications** is achieved after:

48 hours at an object temperature of 15°C.

10 hours at an object temperature of 23°C.

1 hour at an object temperature of 60°C.

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0.5 hours at an object temperature of 85°C.

Important!

When using radiant heaters, make sure that the object temperature does not exceed 85 °C. Excessively high temperatures will destroy the adhesive.

Disposal of adhesive:

Hardened adhesive is disposed of as normal waste.

Empty glue cartridges are disposed of as normal waste.

Non-hardened adhesives and mixtures of adhesive and solvent and the like must be disposed of as hazardous waste.

These regulations apply to the Federal Republic of Germany.

For other countries, comply with the (possibly differing) nationally applicable regulations.

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41 00 ... Notes on adhesive K6

Important!

Note the following information before starting to apply adhesive!

- Country-specific safety and industrial safety regulations
- Material safety data sheet of manufacturer
- Processing instructions on glue cartridge

Storage:

Dry at 15°-25 °C.

Shelf life:

The glue cartridge is marked with a date.

Do not use the adhesive after this date.

Surface pre-treatment:

See vehicle-specific repair instructions

Required cartridge gun:

Overview of glue cartridge guns

Preparing the glue cartridge:

Do not prepare the glue cartridge until just before applying the adhesive.

The working temperature of glue cartridge must be at least 18°C.

Pot life of adhesive is approx. 10 minutes at 25 °C.

Insert glue cartridge into cartridge gun, remove cap and allow both adhesive components to emerge. Strip adhesive components uniformly and attach mixing tube. Only use mixing tubes supplied with glue cartridge.

Before starting to apply adhesive, allow approx. 1 mixing tube length of mixed adhesive to emerge. Only then apply the mixed adhesive to one side of the bonding surface.

Opened cartridges may be used again before the expiry date as long as a new mixing tube is used.

2-component adhesive application:

Read the vehicle-specific repair instructions to determine the thickness and positioning of the adhesive bead.

Hardening time:

See vehicle-specific repair instructions

Disposal of adhesive:

Hardened adhesive is disposed of as normal waste.

Empty glue cartridges are disposed of as normal waste.

Non-hardened adhesives and mixtures of adhesive and solvent and the like must be disposed of as hazardous waste.

These regulations apply to the Federal Republic of Germany.

For other countries, comply with the (possibly differing) nationally applicable regulations.

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41 00 ... Notes on cleaning agent R1

Use only cleaning agent R1, as other cleaning agents cab be emollient/moistening or may start to dissolve the cathodic dip paint primer.

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61 00 ... Notes on handling the high pressure cleaner



Warning!

Only used a high pressure cleaner approved by BMW!

Only specially trained persons of 16 years of age or older may work with the high pressure cleaner.

Check the high pressure cleaner and electrical wiring for visible damage.

Only use at a suitable location.



Attention!

Pay attention to following hazard warnings:

- Danger of injury due to water jet
- Contact with hazardous substances in spray
- Risk of skidding on wet floor
- Risk of stumbling due to hoses and cables
- Comply with notes and instructions on handling cleaning agents !
- Risk of scalding when cleaning with hot water.
- On electric or hybrid cars, the safety instructions for handling with hybrid cars are to be complied with.



Warning!

The following personal protective equipment is to be used:

- Safety goggles/face guard
- Suitable gloves
- Apron
- Rubber boots
- Ear protectors
- Safety shoes



Attention!

Notes on washing a vehicle with a high pressure cleaner:

- Do not wash directly on gaskets and control units during engine

  washes.
- A minimum distance of 30 cm must be adhered to for tyres and tyre valves.
- A minimum distance of 30 cm must be adhered to for the soft top and painted parts.
- Do not use if engine is still hot.
- Do not exceed maximum water temperature of 60Â degrees.
- Do not spray directly onto cameras/sensors.

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Attention!

- For your own safety, we recommend that you do not wash on the high-voltage components in electric or hybrid vehicles.

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41 00 ... Notes on repairing threads

Important!

Install Helicoil thread inserts so that they are flush with the original thread.

Note:

Damaged threads may be repaired with Helicoil thread inserts. Comply with the procedure described in the example.

Screw connection	Vehicle	Bolting point(s)	Helicoil thread insert
Front axle support to engine support	E46	All	M12x1.5x18
	E53	All	M12x1.5x18
	E60, E61, E63, E64	Front, middle	See repair elements
		Rear	M12x1.5x18
	E65, E66, E67	All	M12x1.5x18
	E70, E71, E72	All	M14x1.5x21
	E83	All	M12x1.5x18
	E85, E84, E86, E89	All	M12x1.5x18
	E81, E82, E87, E88	All	M12x1.5x18
	E90, E91, E92, E93	All	M12x1.5x18
	E92 with S65	All	M10x1.5x15
Bracket, wishbone, to engine support	E46, E85, E86, E89	All	M10x1.5x15
Rear axle support to side member	E46	All	M12x1.5x18
	E53	All	M14x1.5x21
	E60, E61	All	M14x1.5x21
	E63, E64	All	M14x1.5x21
	E65, E66, E67	All	M14x1.5x21
	E70, E71, E72	All	M14x1.5x21
	E83	All	M12x1.5x18
	E84, E85, E86, E89	All	M12x1.5x18
	E81, E82, E87, E88	All	M12x1.5x18
	E90, E91, E92, E93	All	M12x1.5x18
Bearing support, trailing arm to side member	E46, E83, E85, E86, E89	All	M12x1.5x18

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41 00 ... Notes on the water drain hose of the slide/tilt sunroof

The water drain hoses for the slide/tilt sunroof are partially permanently integrated in the body and cannot be replaced individually.

These water drain hoses can only be completely replaced with extensive body repair work (e. g. after an accident).

Component	Vehicle	Individually replaceable
Water drain hose, front	All BMW All MINI	No
Rear water drain hose	E60, F34	No
	All other BMWs	Yes
	All MINI	Yes

An individual solution is required for damage that was not caused by an accident.

Contact national hotline.

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99 Notes on using temperature-controlled infra-red radiators

When using temperature-controlled infrared radiators, damage to adhesive bonds, paint and vehicle components can occur when drying spatula and filler.

The temperature sensors in the infrared radiator only operate reliably on large, even surfaces.

On small surfaces such as C-pillars or sills, often only a colder, adjacent area is measured.

This leads to actual surface temperatures of up to 130°C, even if only 70°C is set on the infrared radiator.

When the rear side walls are partially replaced by bonding and riveting, these high temperatures can lead to a visible pattern in the area of the joint.

Remedy:

Check the surface temperatures on small component surfaces during the drying process with an external temperature sensor.

The general rule is: The surface temperatures must not exceed 85°C.

Important!

Do not use infrared radiators on carbon parts!

Risk of component destruction.

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41 00 ... Opening bonded connections

1. Opening spot-welded adhesive joint

Open welding spots.

Warning!

Draw off vapour and gases!

Use personal protective clothing/equipment.

Heat connecting flange with a hot air blower. Heat components to max. 250 °C object temperature.

Release connecting flange with chisel.

Remove adhesive residue from connecting flange.

2. Opening bonded connections

Release any punch rivet or blind rivet.

Roughly cut out damaged component.

Warning!

Draw off vapour and gases!

Use personal protective clothing/equipment.

Heat adhesive flange with a hot air blower. Heat components to max. 250 °C object temperature.

The component can be peeled with the aid of pliers. Do not damage adjacent components.

Remove adhesive residue from connecting flange.

3. Opening bonded connections on aluminium roofs

Procedure is described in detailed in the relevant repair instructions.

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41 00 ... Opening brazed connections

The ”Bonding and Riveting” repair method involves replacing the watertight brazed connection with adhesive.

This gives rise to a new procedure for opening brazed connections.

Grind brazed seam with a belt grinder. This keeps the influence of heat in the area around the brazed seam as small as possible.

Important!

Never use a gas flame.

All traces of brazing solder do not have to be removed.

Do not grind body panels thin.

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41 00 ... Opening rivet connections

Different rivet types are used on BMW vehicles.

1. Opening blind rivets:

1.1 Loosening blind rivets (N1, N2, N7, N8, N9 and N10):

Grind off blind rivet head with a belt or angle grinder. Do not grind off base material. Remove rivet remnants with a drift punch.

1.2 Opening blind rivets (N3 and N6):

Drill out blind rivet head with a 5 mm dia. drill bit. Do not damage base material. Remove rivet remnants with a drift punch.

2. Opening punch rivets:

2.1 Opening punch rivets by extraction:

This procedure is used on the reduced-weight aluminium front end.

Recommended tools and equipment:

- Stud welding apparatus (refer to Service Information 5 03 03 975) with gas bottle containing inert gas (82 % argon, 18 % CO_2).
- Stainless steel stud (sourcing reference via BMW Parts Department image board Aluminium and steel/bonding and welding)
- Universal riveting tool (refer to Service Information 5 03 03 975)

Grind off paint and dark grey coating of punch rivets.

Position bolt centrally on the rivet and weld on vertically. The area in which the bolts are welded on should be between the two grounding terminals. Position both terminals, if possible, on the top side of the panel on which the rivet is located.

Extract bolt with welded-on rivet using universal riveting tool. Use a large plastic nose piece if not otherwise specified in the repair instructions. Check plastic nose piece prior to use for wear.

Plastic nose piece must rest on sheet metal all round; if necessary, grind off plastic noise piece in collision area.

Do not push riveting tool forcefully onto special-steel bolts.

Do not use riveting tool to bend special-steel bolts.

Pay particular attention to central positioning of the bolt when using the small plastic mouthpiece.

Follow the equipment manufacturer's instructions for use.

2.2 Opening punch rivets by drilling out:

Drill out rivets with a 6 mm dia. carbide drill bit.

Punch rivets can be drilled out on both sides. When drilling from the protruding rear side, spot-drill the rivet shank only and remove the rest with a rivet punch.

Note:

Sand down and even out remaining burr on the rear side.Deburr bore holes.

Use a drift punch to remove punch rivet remnants in the aluminium (risk of corrosion).

Clean vehicle to remove swarfs (risk of corrosion).

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41 00 ... Opening welded connections

1. Components made of steel:

1.1 Opening welding spots (resistance pressure spot welding):

Sheet steel panels made from high- and super-high-strength materials make great demands on the tools used.

Only with special carbide milling cutters can welding spots be drilled out on these sheet panels.

Use BTR/BOR milling cutters only in conjunction with Vario Drill spot-weld remover. Sourcing reference for spot-weld remover and BTR/BOR milling cutters, see Aftersales Assistance Portal (ASAP) - Service/Technology - Workshop Equipment (Start BMW) - Shop Workshop Equipment or at www.bmwgroup-wep.com.

- **Procedure:**
  If necessary, surface-grind existing unevenness with a belt or angle grinder in the area around the welding spot.
  Set punch mark in centre of welding spot. Set 8 mm dia. welding spot drill bit on punch mark and drill through top metal sheet.
  Note: Because the welding spots may have surface-hardened, grind them if necessary with an angle grinder and paper grinding disc.
  Use a chisel to separate the sheet metal flange and remove the component.
  Follow the special procedure for spot welds .

1.2 Opening MAG weld seams and MIG brazing seams:

- **Procedure:**
  Grind off weld seams with a belt or angle grinder. Do not grind the base material thin.
  Use a chisel to separate the sheet metal flange and remove the component.

1.3 Opening laser weld seams:

Laser weld seams are used in the roof outer skin area.

- **Procedure:**
  Roughly cut roof outer skin in the roof channel to improve accessibility.
  Place angle grinder with grinding disc on laser weld seam and grind through top metal sheet. Be careful not to cut through and damage sheet metal underneath.
  Remove sheet metal flange.

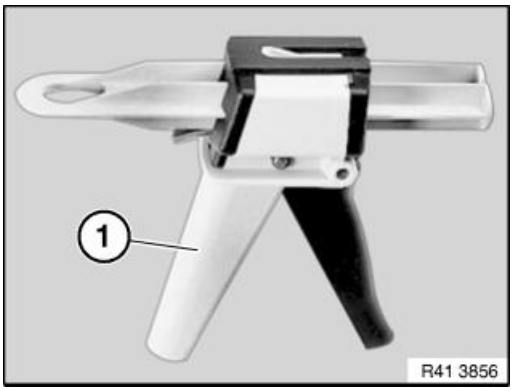
2. Components made of aluminium:

2.1 Opening MiG weld seams:

- **Procedure:**
  Grind off weld seams with a belt or angle grinder. Do not grind the base material thin.
  Do not use a chisel.
  Remove component.

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41 00 ... Overview of adhesive cartridge guns



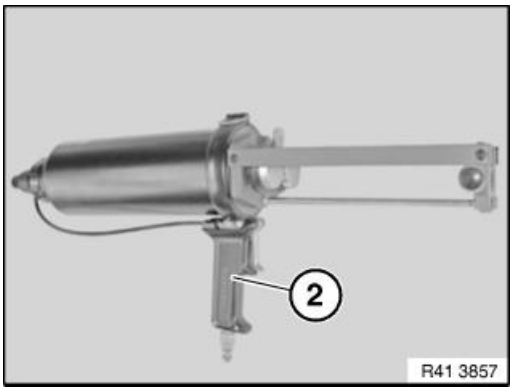
Adhesive gun 83 19 2 149 522

Obtainable via Electronic Parts Catalogue.

Usable for adhesives K4, K5a.

Usable for BMW 2K polyurethane foam.

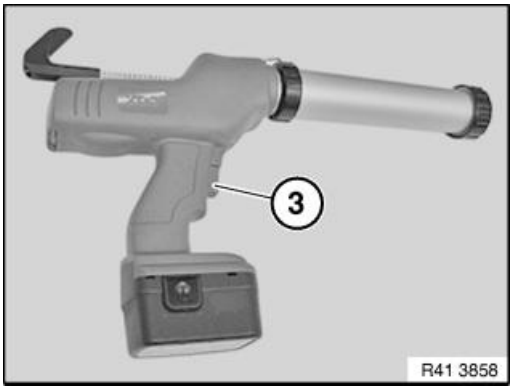
Including insert 1:1 and 2:1.



Adhesive gun 81 49 0 443 166

Orderable via BMW Workshop Equipment Catalogue.

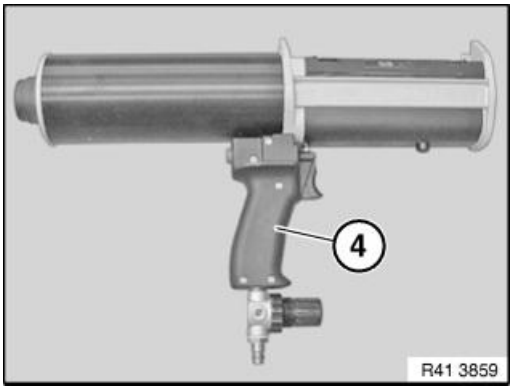
Usable for adhesive K3.



Adhesive cartridge gun 81 49 2 213 059

Orderable via BMW Workshop Equipment Catalogue.

Usable for adhesives K1, K5b, sealant D1/D2, window glass adhesive and all 310 ml Euro cartridges.



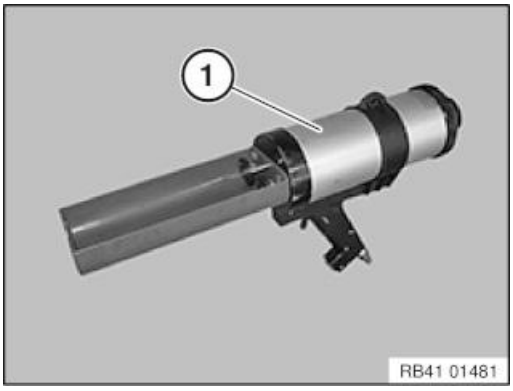
Adhesive cartridge gun 83 30 0 494 836

Orderable via BMW Workshop Equipment Catalogue.

Usable for structural foam HS2.

Note:
Special tool number 41 3 010

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Adhesive cartridge gun 81 49 2 355 475

Orderable via BMW Workshop Equipment Catalogue.

Usable for adhesive K2 (2x290 ml glue cartridge)

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41 00 ... Overview of consumables (Electronic Parts Catalogue)

1.0 Adhesives

Designation, repair instructions	Naming of Electronic Parts Catalogue	Part number of Electronic Parts Catalogue	Remarks
Adhesive K1	Body adhesive K1	83 19 0 413 015	195 ml
Adhesive K2	Body adhesive K2	83 19 2 355 849	2x290 ml
Adhesive K3	Body adhesive K3	83 19 0 417 144	2 x 300 ml
Adhesive K4	Body adhesive K4	83 19 2 149 520	50 ml
Adhesive K5	Body adhesive K5	83 19 2 158 654	50 ml
Adhesive K5	Body adhesive K5	83 19 2 157 298	195 ml
Adhesive K6	Adhesive set K6	83 19 2 317 925	

1.1 Primer / activator

Designation, repair instructions	Naming of Electronic Parts Catalogue	Part number of Electronic Parts Catalogue	Remarks
PrimerP1	PrimerP1	83 19 0 302 556	50 ml
PrimerP2	Primer P2/Gas cartridge	83 19 0 302 555	50 ml
Betawipe 4800	Betawipe 4800	83 19 2 357 707	10 ml
Bonding base VP 206	Bonding base VP 206	83 19 9 407 777	30 ml
Aktivator 205	Aktivator 205	83 19 0 030 155	250 ml

1.2 Cleaning agent

Designation, repair instructions	Naming of Electronic Parts Catalogue	Part number of Electronic Parts Catalogue	Remarks
Filler S1	Alluvial tin replacement	83 19 2 464 575	175 ml

1.3 Fillers

Designation, repair instructions	Naming of Electronic Parts Catalogue	Part number of Electronic Parts Catalogue	Remarks
Cleaning agent R1	Cleaning agent R1	83 19 2 211 217	125 ml
Cleaning agent R2	Cleaning agent R2	83 19 0 417 324	500 ml
Cavity sealing wax remover	Cavity sealing wax remover	83 12 0 390 086	500 ml

2.0 Rivet

Designation, repair instructions	Naming of Electronic Parts Catalogue	Part number of Electronic Parts Catalogue	Remarks
Blind rivet N1	Blind rivet N1	83 19 0 301 414	dia. 6.5 mm; clamping range 2.8-4.8 mm
Blind rivet N2	Blind rivet N2	83 19 0 301 419	dia. 6.5 mm; clamping range 4.8-6.8 mm
Blind rivet N3	Blind rivet N3	83 19 0 301 421	dia. 4 mm; clamping range 1-3 mm
Punch rivetN4	Punch rivetN4	83 19 2 457 307	dia. 3 mm; length 4 mm
Punch rivetN5	Punch rivetN5	83 19 2 158 079	dia. 5 mm; length 5 mm

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Blind rivet N6	Blind rivet N6	83 19 2 158 655	dia. 4 mm; clamping range 3-5 mm
Blind rivet N7	Blind rivet N7	83 19 2 240 352	dia. 6.5 mm; clamping range 1.5-3.5 mm
Blind rivet N8	Blind rivet N8	83 19 2 355 998	dia. 6.5 mm; clamping range 6.8-8.8 mm
Blind rivet N9	Blind rivet N9	83 19 7 239 634	dia. 6.5 mm; clamping range 8.8-10.8 mm
Blind rivet N10	Blind rivet N10	83 19 9 144 282	dia. 6.5 mm; clamping range 10.8-12.8 mm
Blind rivet N11	Blind rivet N11	07 14 7 391 057	Blind rivet for carbon connections dia. 4.8 mm; clamping range 2.2-4.7 mm
Blind rivet N12	Blind rivet N12	07 14 7 391 046	Blind rivet for carbon connections dia. 4.8 mm; clamping range 4.5-7.5 mm

2.1 Plastic nuts

Designation, repair instructions	Naming of Electronic Parts Catalogue	Part number of Electronic Parts Catalogue	Remarks
Cap nut	Plastic nut	51 16 1 943 122	Dia. 18 mm
Cap nut	Plastic nut	07 14 7 169 847	Dia. 22 mm

3.0 Primer/paint spray aerosol

Designation, repair instructions	Naming of Electronic Parts Catalogue	Part number of Electronic Parts Catalogue	Remarks
Primer	Emergency program base filler 2K spray	51 91 0 432 615	200 ml; application time 8 h
Welding primer	INOX spray welding primer	83 40 0 409 992	500 ml
Paint spray aerosol, cathodic dip coating, grey	Paint spray aerosol, inside filler of spare wheel well	51 91 0 411 026	400 ml
Spray can, black, matte	Spray paint, black matt	51 91 1 900 346	400 ml

4.0 Sealant

Designation, repair instructions	Naming of Electronic Parts Catalogue	Part number of Electronic Parts Catalogue	Remarks
Sealant D1 Sprayable sealant	Seam sealing	83 42 2 409 985	310 ml
Sealant D2	Seam sealing, spreadable	83 42 2 409 986	310 ml

5.0 Cavity preservation

Designation, repair instructions	Naming of Electronic Parts Catalogue	Part number of Electronic Parts Catalogue	Remarks
Cavity sealant	Cavity sealant spray	83 42 2 457 337	400 ml

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Cavity sealant	Cavity preservation	83 42 2 457 338	1000 ml

6.0 Cavity foam

Designation, repair instructions	Naming of Electronic Parts Catalogue	Part number of Electronic Parts Catalogue	Remarks
Cavity foamHS1	Cavity foam	83 42 9 410 694	400 ml
Structural foamHS2	Structural foam	83 19 0 007 361	420 ml
Cavity foamHS3	2K polyurethane foam	83 42 2 288 930	50 ml

7.0 EMC screw (electromagnetic compatibility)

Designation, repair instructions	Naming of Electronic Parts Catalogue	Part number of Electronic Parts Catalogue	Remarks
EMC screw	Screw	83 19 0 301 639	SF Plus M5x15

8.0 Twist drill

Designation, repair instructions	Naming of Electronic Parts Catalogue	Part number of Electronic Parts Catalogue	Remarks
Drill bit	Drill bit	83 19 2 460 424	4.2 x 120 mm
Drill bit	Drill bit	83 19 2 460 425	6.8 x 150 mm
Drill bit	Twist drill	83 19 2 166 463	4.2 x 55 mm
Drill bit	Twist drill	83 19 2 166 464	6.8 x 74 mm
Drill bit	High-strength drill	83 19 2 359 262	6.8 x 79 mm
Drill bit	High-strength drill	83 19 2 359 263	4.2 x 66 mm

9.0 Grinding material

Designation, repair instructions	Naming of Electronic Parts Catalogue	Part number of Electronic Parts Catalogue	Remarks
Non-woven abrasivesS1	ScotchBrite Multiflex A, very fine	51 91 0 402 967	

10.0 Spacer

Designation, repair instructions	Naming of Electronic Parts Catalogue	Part number of Electronic Parts Catalogue	Remarks
Spacer	Adhesive tape	51 71 7 901 759	

11.0 Adhesive tape

Designation, repair instructions	Naming of Electronic Parts Catalogue	Part number of Electronic Parts Catalogue	Remarks
Aluminium adhesive tape	Adhesive tape	11 00 7 769 948	Width 50 mm

12.0 reinforcement plates

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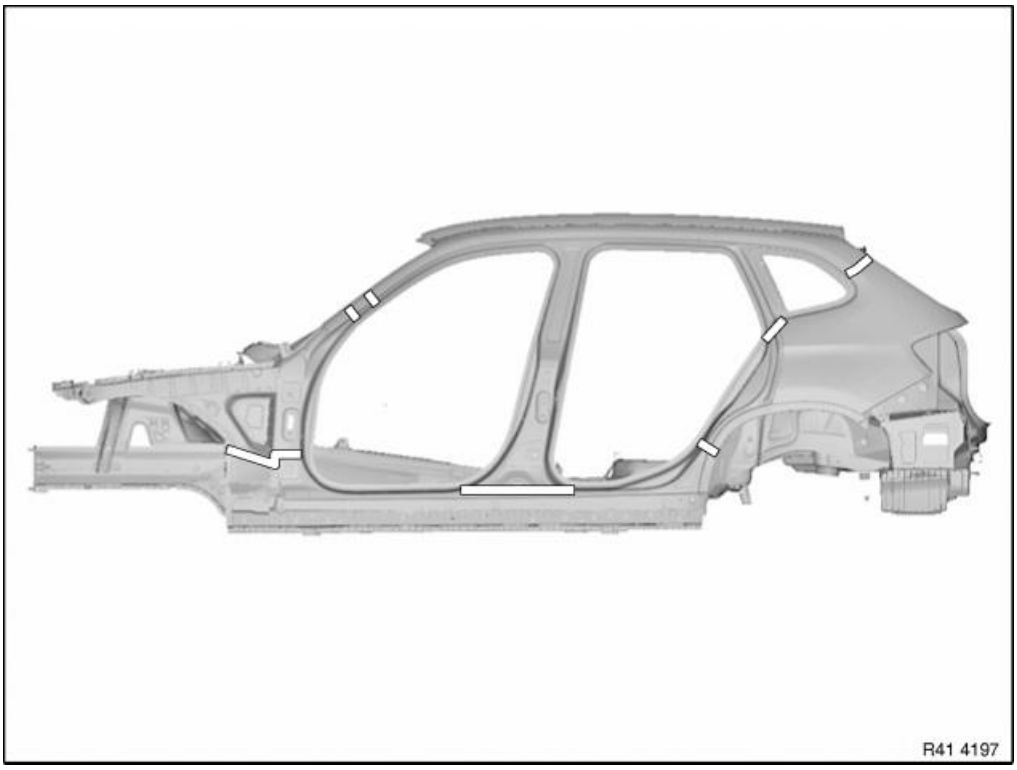
Designation, repair instructions	Naming of Electronic Parts Catalogue	Part number of Electronic Parts Catalogue	Remarks
Reinforcement plate, universal	Reinforcement plate, universal	41 21 7 275 563	

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41 00 ... Position of shaped parts for cavity sealing

Cavity sealing is carried out in specific body areas in order to reduce internal noise and to reduce condensate. To do this, shaped parts are inserted in the cavities. These shaped parts adapt themselves optimally due to heating of the body to approx. 180 Â°C by expansion to the shape of the cavities.

Because it is not possible to heat the body to this extent for a body repair, a different procedure has been specified for this situation.



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41 00 ... Punch rivets

The "Bonding and Riveting" repair method involves the use for the first time of punch rivets in the repair. This requires new tools and procedures.

The punch rivets are matched in size to the material thickness and quality used at the respective connection point.

1.0 Recommended tools and equipment

- Punch rivet tool (see Service Information 05 03 09 (535))

Sourcing reference via Aftersales Assistance Portal (ASAP) - Service/Technology - Workshop Equipment (Start BMW) - Shop Workshop Equipment or at www.bmwgroup-wep.com.

Setting punch rivets:

- Refer to the vehicle-specific repair instructions for the punch rivet size.
- Mark the positions of the rivets on the vehicle. Set punch rivets at roughly equal spacings.
  Punch rivets do not require a predrilled hole. They are pressed directly into the full material.
- Insert punch rivet in riveting die. Position punch rivet tool on sheet metal parts to be riveted.

  Riveting direction:
  Always from new part to used part.
  Deviations are specified in the vehicle-specific repair instructions.
- Rivet punch rivets with punch rivet tool. In the meantime clean riveting die and matrix if fouled with adhesive.
- Seal punch rivets in moist area (e.g. wheel arch or carrier support) on both sides with sealantD1 (risk of corrosion).
- Seal cavities after painting vehicle with cavity sealant (risk of corrosion).

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41 00 ... Quality standard

- The overall requirements relating to a vehicle can only be implemented by including "all" components. This applies in particular to the body. With regard to an optimum crash result, it is necessary to maintain the structural measures.

  The procedures described in the repair instructions must be complied with. Deviations are only permitted after arrangement with and approval by BMW. Should you have any questions, please contact the country-specific Hotline.

  The use of non-approved repair steps or tools may have serious consequences for the structure of the vehicle (e.g. in the event of a crash). In the end, this can result in safety and product liability risks which cannot be calculated.

  Corrosion protection measures during and after repair work are vital for ensuring the vehicle retains its value.

- For repair work, only use original BMW/MINI parts, or parts that are of an equivalent quality, and approved auxiliary materials and operating fluid.

  For repairs that are settled by a warranty or goodwill, only original BMW/MINI parts may be used.

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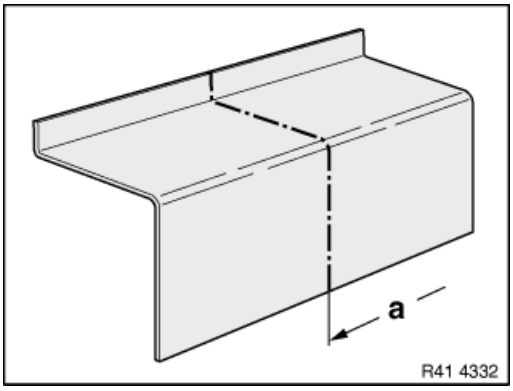
41 00 ... Reinforcement plate (bonded)

In the case of a partial replacement piece, a body component is cut at a point described in the repair instructions.

A reinforcement plate is bonded in to ensure sufficient strength.

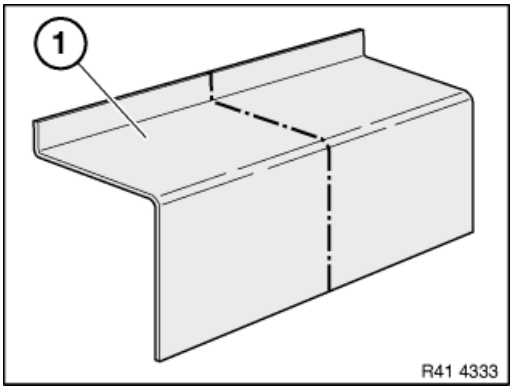
Observe notes on repair stage 2 .

Note:
The following graphics serve as general illustrations of reinforcement plate repair work. They apply to sectional repairs to the structure.

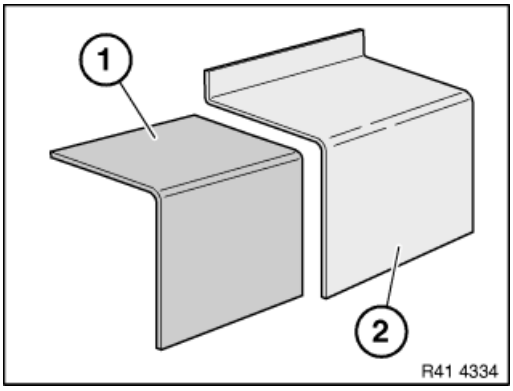


Mark component in accordance with measurement a and cut.

Preparation of new part:



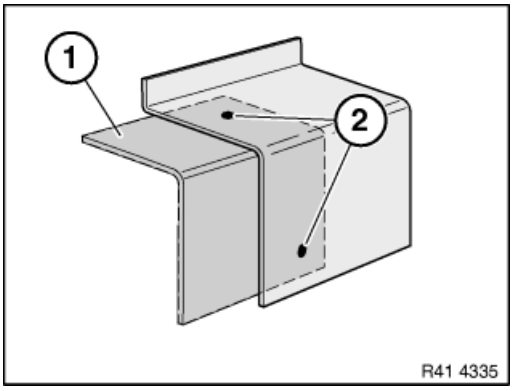
Cut new part (1) in accordance with cut on vehicle and if necessary adjust to fit with straightening attachment or universal mount.



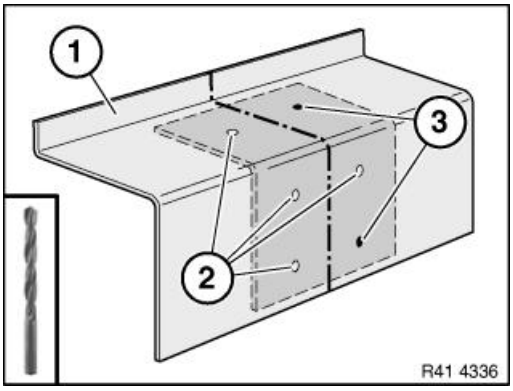
Make reinforcement plate (1) from trim of new part (2).

Length of reinforcement plate is 80 mm.

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Slide reinforcement plate (1) half-way into component on body and fasten with 2 self-tapping screws (2).



Adjust new part (1) to fit and set 4.3 mm dia. bore holes (2).

Remove new part again.

Release self-tapping screws (3).

Remove reinforcement plate.

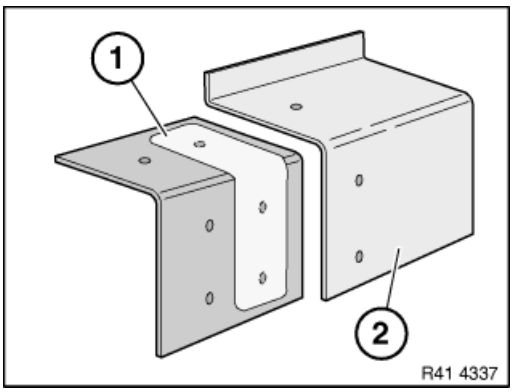
Drill out bore holes (3) for screws to 4.3 mm dia.

Deburr all bore holes.

Important!

Do not grind new part and body in area of bonding surfaces.

Installing reinforcement plate



Clean <u>all</u> bonding surfaces with cleaning agent R1.

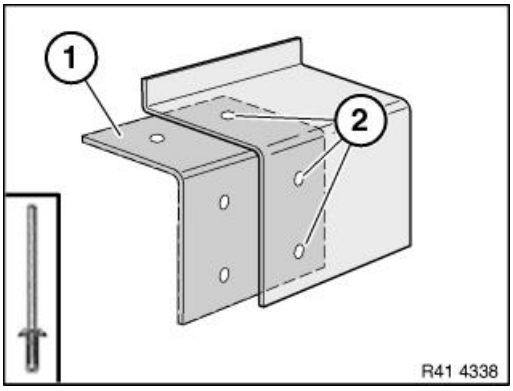
Apply adhesive (1) to reinforcement plate bonding surface.

Carefully slide reinforcement plate half-way into body component (2).

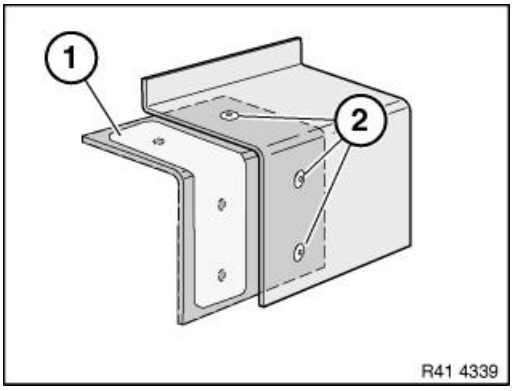
Important!

When joining reinforcement plate, make sure there is sufficient adhesive on bonding surfaces.

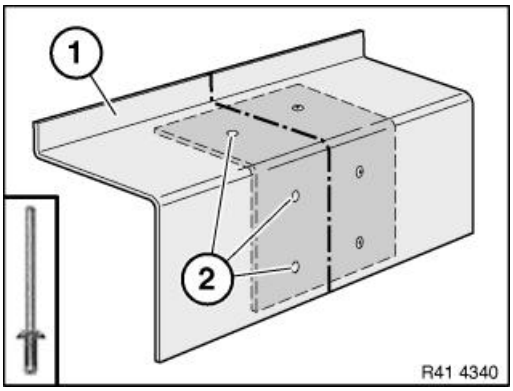
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Rivet reinforcement plate (1) up to half-way with blind rivets N3 (2).



Apply adhesive (1) to reinforcement plate bonding surface.



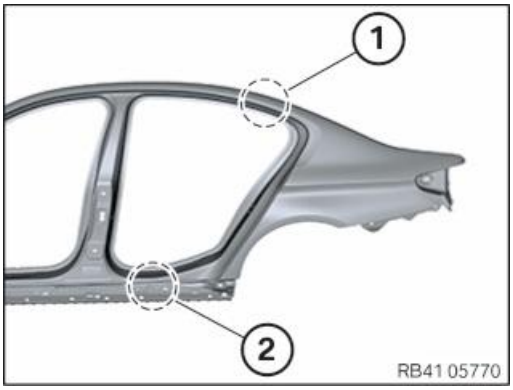
Install new part (1) with straightening attachment or universal mount and rivet with blind rivets N3 (2).

After adhesive has hardened, flatten adhesive area and seal blind rivets.

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41 00 ... Reinforcement plate with stud bolt (bonded or welded)

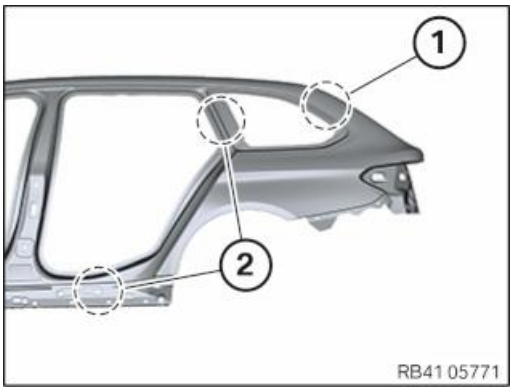
When replacing the rear side panel, reinforcement plates are bonded or welded on the separation points.



Applicable to Saloon, hatchback, Coupé.

Welding is done in area (1) (incl. water channel).

Bonding is done in area (2).

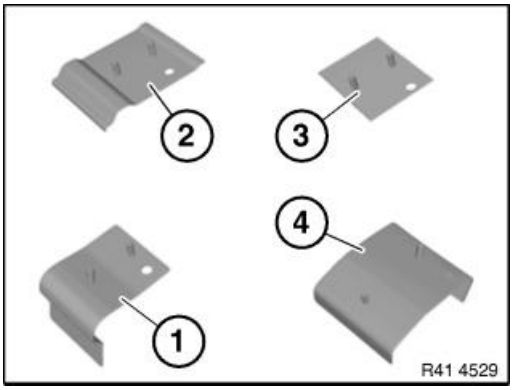


Applicable to Touring, X models, Gran Coupé, Gran Turismo.

Welding is done in area (1) (incl. water channel).

Bonding is done in areas (2).

Note:
The following graphics serve as general illustrations of reinforcement plate repair work. They apply to sectional repairs on the outer skin which are produced using the adhesive joining method.



Overview of the reinforcement plates (for sourcing reference, see Electronic Parts Catalogue):

(1) Reinforcement plate, sill

(2) Reinforcement plate, C-pillar

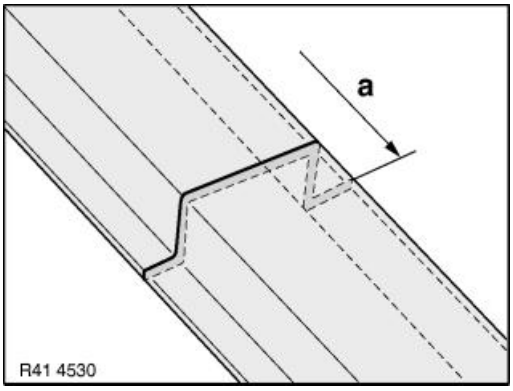
(3) Reinforcement plate, universal

(4) Reinforcement plate, C- or D-pillar

(5) Nuts (not shown)

- Plastic nut dia. 18 mm, part number 07 14 1 943 122
- Plastic nut ⌀ 22 mm, part number 07 14 7 169 847

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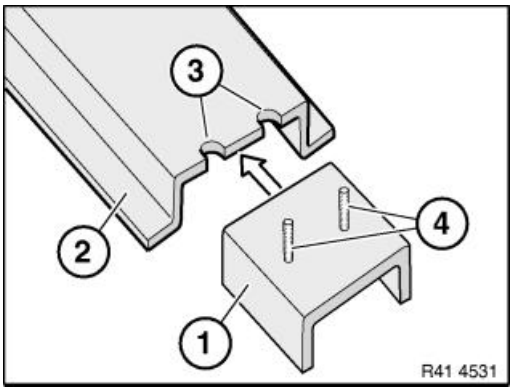


Mark side panel according to dimension a and detach it.

Preparation of the reinforcement plate (bonded or welded)

Some reinforcement plates are oversized.

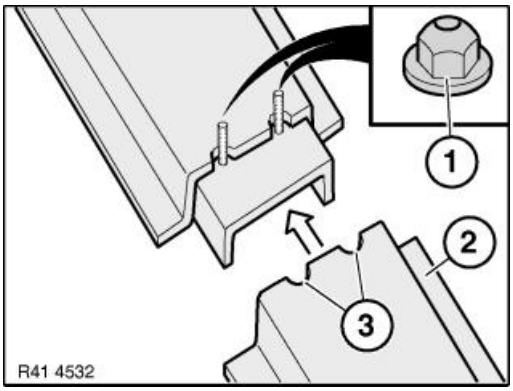
It may be necessary to rework the reinforcement plates at the edges or cut them to size until they rest against the outer skin free of tension.



Adjust reinforcement plate (1) to fit in component (2) on vehicle.

Make semicircular recesses (3) for the stud bolts (4).

Diameter of recesses approx. 10 - 12 mm.



Fix the reinforcement plate using plastic nuts (1).

Fit new part (2).

Make semi-circular recesses (3) in the new part.

Diameter of recesses approx. 10 - 12 mm.

Remove reinforcement plate.

Note:

Bonded reinforcement plates:

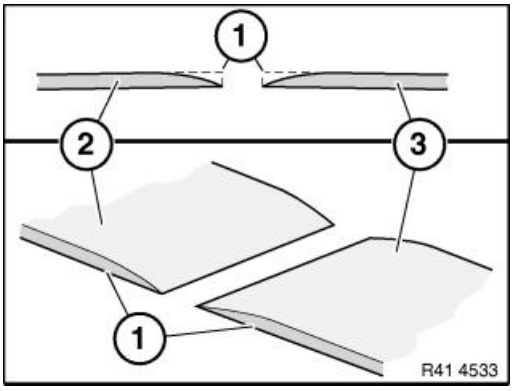
Width of joint between new part and component on vehicle approx. 5 - 8 mm (at least 30 mm flange width per side).

Welded reinforcement plates:

Width of joint between new part and component on vehicle approx. 2 - 3 mm.

Grind down to the metal in the area of the joint.

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Carry out the following step only if the reinforcement plates are bonded.

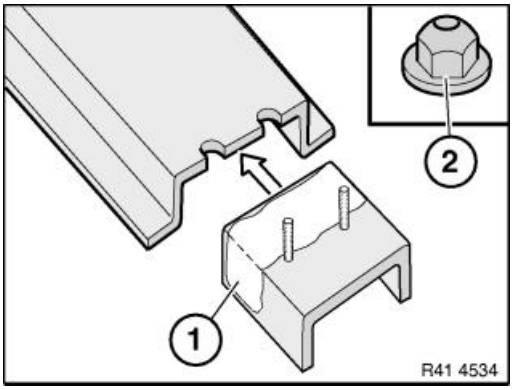
Chamfer cutting edges (1) on joint by grinding.

(2) Component on vehicle

(3) New part

If the cutting edges have not been sufficiently chamfered, there may be voids in the paintwork after painting.

Installing bonded reinforcement plate



Clean <u>all</u> bonding surfaces.

Apply the adhesive in area (1) on the reinforcement plate.

Apply more adhesive in the radii to avoid air pockets.

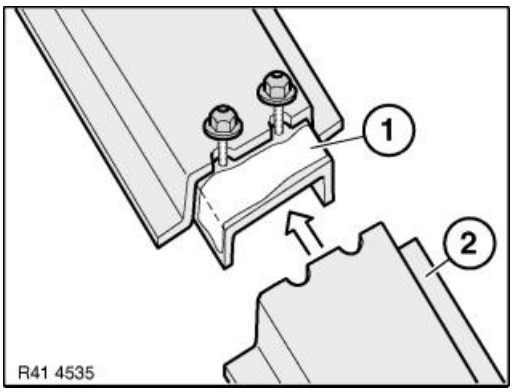
Apply additional adhesive to the outer skin around radii.

Slide the reinforcement plate carefully into the component on the vehicle and fix plastic nuts (2).

Screw on the nuts with only a few turns.

Attention!

When joining the reinforcement plate, make sure that there is sufficient adhesive on the bonding surfaces!



Apply the adhesive on bonding surface (1) of the reinforcement plate.

Apply more adhesive in the radii to avoid air pockets.

Apply additional adhesive to the outer skin around radii.

Fit new part (2).

Align new part to adjoining component and secure with gripping pliers.

First tighten the plastic nuts at the radii.

Only then tighten all the plastic nuts in the flat areas.

Tightening torque 41 14 1AZ.

Attention!

Check that the transition of the components is OK at the separation point. Corrections can only be made <u>before</u> the adhesive has hardened. Straightening at a later stage is not possible.

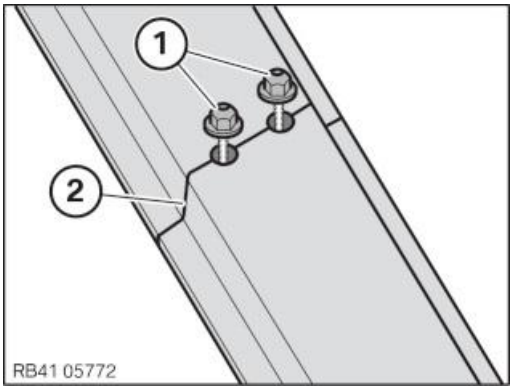
<u>After adhesive has hardened:</u>

Grind off stud bolts and surplus adhesive flush.

Paint area as specified in BMW Painting Handbook.

Installing welded reinforcement plate

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Attention!

Risk of damage!

Protect the adjacent components from heat and flying sparks.

Align new part to adjoining component and secure with gripping pliers.

First tighten the plastic nuts at the radii.

Only then tighten all the plastic nuts in the flat areas.

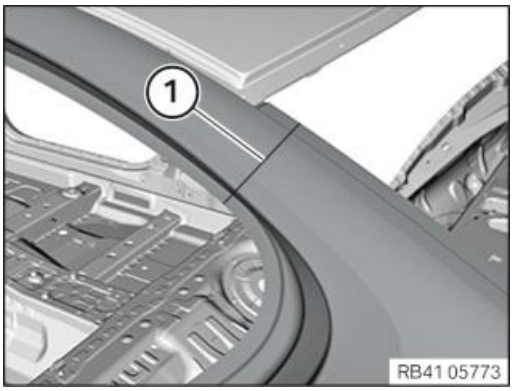
Tightening torque 41 14 1AZ.

Weld joint (2) between plastic nuts (1).

Release plastic nuts (1).

Grind down stud bolt until flush.

Weld joint (2) in the remaining areas.



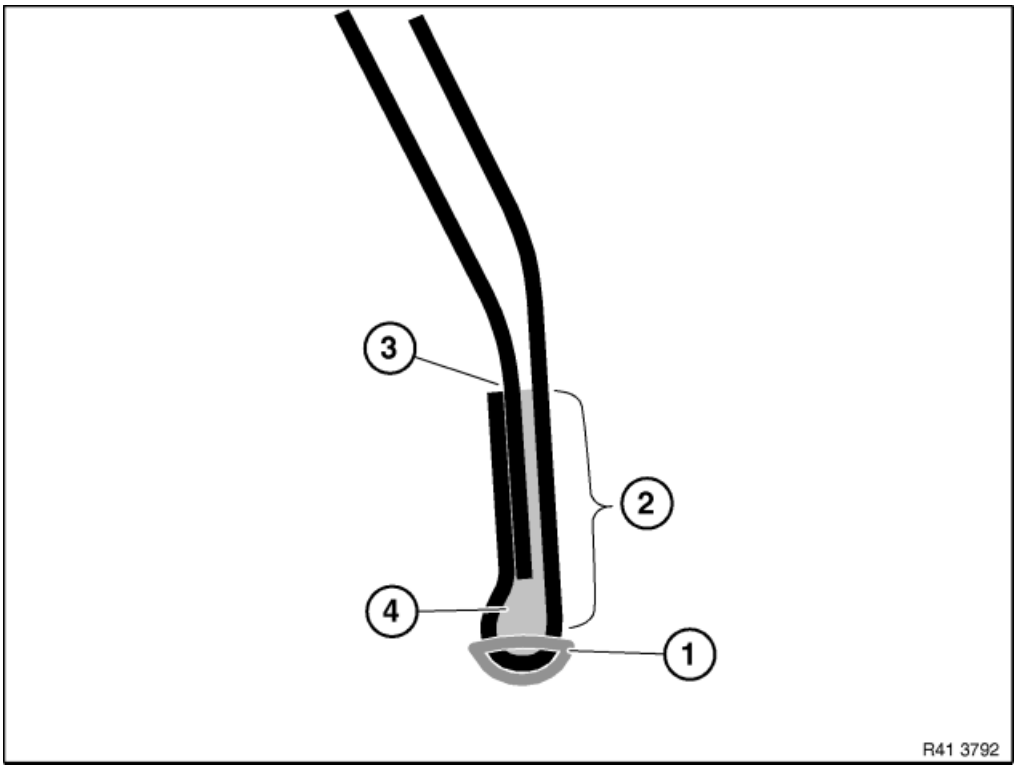
Grind weld seam (1) until flush.

If necessary, straighten area (1) and level it with a multi-functional spatula.

Paint area as specified in BMW Painting Handbook.

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41 05 800 Releasing bonded folded seam connections



- Remove area (1) of bead edge on wheel arch bend with a one-hand angle grinder and rough grinding wheel.
- Heat area (2) with hot air blower.
  Caution! Extract vapours and gases.
- Release connection flange with chisel.
- Grind adhesive residue (4) off wheel arch connection flange.
  Caution! Wear a grinding dust mask.
- Remove remnants of sealing material in area (3).

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41 00 ... Repair methods, repair stages 1

All work as part of which screwed body components must be replaced.

Repair techniques -> Repairing threads

Repair stage 1a

-> Blind rivetÂ

-> Blind rivet nuts and bolts

-> Glass pane

All procedures during which repairs are to be done on the outer skin.

Repair techniques -> Straightening outer skin -> Straightening aluminium parts

Repair stage 1b

-> Straightening steel components

-> Repairing plastic components

-> Grinding -> Grinding aluminium components

-> Grinding steel parts

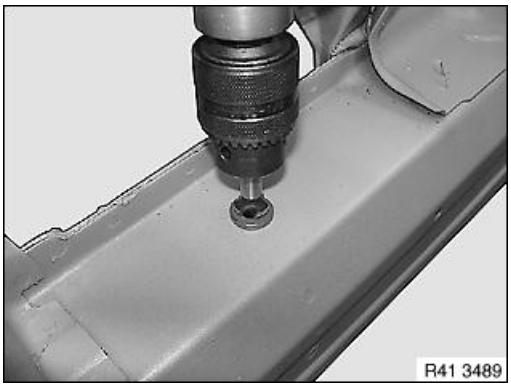
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41 00 ... Repair solution for straight shank/hexagon rivet nut



Protective measures!

- Wear safety goggles
- Wear protective gloves



Important!
To prevent the material from tapering, do not drill out the rivet head.

1. Carefully spot-drill rivet head with a larger drill bit/countersink



Important!
Avoid paint damage

2. Knock rivet head away with a chisel



3. Punch through rivet shank into cavity, remove if necessary

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4. Clean component, eliminate paint damage if necessary



If the rivet shank can be removed: **Important!**

To avoid corrosion, stop chips/swarf by means of cavity preservation.

Follow notes on corrosion protection.

5. Preserving cavity



If the rivet shank cannot be removed: **Warning!**

Danger of injury!

Observe notes on cavity foam.

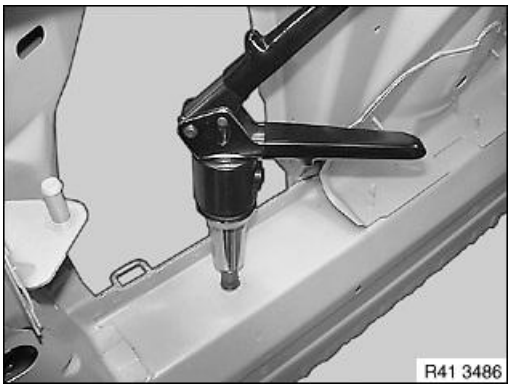
Important!

To avoid corrosion and rattling noises, stop chips/swarf and rivet nut shank with cavity foam.

Remove foam remnants with isohexane (benzine).

5. Stop rivet shank by means of specific foaming
6. Set rivet nut with hand rivet gun

Note:
Fit rivet nut as quickly as possibly, ideally before the cavity foam hardens.



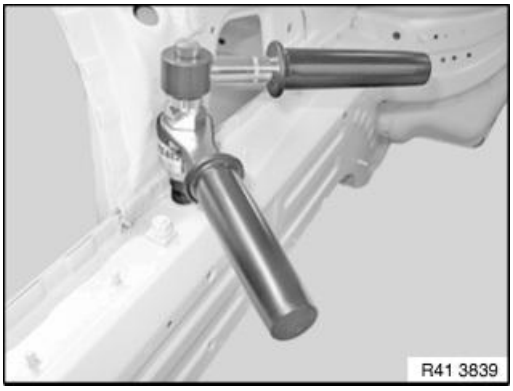
Hexagon / straight shank rivet nut (up to thread M8) with hand rivet gun ZS308 Important!

Follow manufacturer's operating instructions.

Make sure rivet nut correctly contacts component.

Note:
According to the manufacturer, the pictured tool is suitable up to an M8 thread (see Aftersales Assistance Portal (ASAP) - Service/Technology - Workshop Equipment (Start BMW) - Workshop Equipment Shop or www.bmwgroup-wep.com).

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Hexagon / straight shank rivet nut (up to thread M12) with hand rivet gun MB512 Important!

Follow manufacturer's operating instructions.

Make sure rivet nut correctly contacts component.

Note:
According to the manufacturer, the pictured tool is suitable up to an M12 thread (see Aftersales Assistance Portal (ASAP) - Service/Technology - Workshop Equipment (Start BMW) - Workshop Equipment Shop or www.bmwgroup-wep.com).

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41 00 ... Repair techniques, repair stage 2

Repairs that are carried out by bonding and riveting and/or welded with MAG welder without the use of a straightening bench.

Repair techniques -> Removing used part -> Opening welded connections
-> Opening brazed connections
-> Opening rivet connections
-> Opening bonded connections

-> Grinding aluminium components
-> Grinding steel components

-> Sectional repair -> Reinforcement plate (bonded)
-> Installing new part -> Notes on consumables
-> Notes on adhesive
-> Bonding on painted surfaces
-> Blind rivet
-> Punch rivets
-> Welding steel components
-> Cavity sealing
-> EMC screws

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41 00 ... Repair techniques, repair stage 3

Repairs that are carried out by bonding and riveting with the use of a straightening bench or welding.

Repair techniques -> Straightening structure -> Straightening aluminium components on the structure
-> Straightening steel components on the structure

-> Removing used part -> Opening welded connections
-> Opening brazed connections
-> Opening rivet connections
-> Opening bonded connections
-> Removing carbon components

-> Grinding aluminium components
-> Grinding steel components

-> Sectional repair -> Welding in reinforcement plate (sheet steel)
-> Sectional repair (steel) with repair element
Sectional repair (aluminium) with repair element

-> Installing new part -> Welding aluminium components
-> Welding steel components
-> Spot-weld bonding steel components
-> Soldering steel components
-> Notes on consumables
-> Notes on adhesive
-> Bonding aluminium on steel
-> Bonding steel on steel
-> Blind rivets
-> Punch rivets
-> Cavity sealing
-> EMC screws

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63 12 ... Repairing headlights

It is possible to repair the following damage:

- Deformed or broken holders can be replaced using the available repair kits.
  Replacement of headlight is **not required**!
  For reasons of pedestrian safety it is **not permitted** to use adhesive or reinforcements to repair broken holders!

Note:

Headlight repair kits are not available for every vehicles (see Electronic Parts Catalogue).

Follow the vehicle-specific repair instructions.

It is not possible to repair the following damage:

- Deformed or broken headlight housing.
- Scratched or damaged headlight lenses
  The standard coating of headlight lens cannot be restored. Commercially available repair systems are unable to provide sufficient protection from ultraviolet radiation and external influences (stone chipping).

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41 00 ... Repairing plastic components

1.0 General notes

- In general, the economic viability must be checked prior to the repair.
- The following painted components on the outer skin are suitable for repair:
  - Bumper panels (exception: E52)
  - Side sill trim panels
  - Side Panels
  - Door outer skin
  - Hardtop/roof
  - Soft top compartment lid
  - Rear lid
- **It is possible to repair the following damage:**
  - Slight deformations without visible cracks in the paint.
    Visible cracks reach the component and it is not possible to permanently rectify the damage.Cracks once again become visible on the paintwork after a certain period of time.
  - Slight damage, e.g. scrapes, if the component underneath does not become visible.
  - Cracks, holes up to 2.5 centimetre in length.
    Cracks must **not** reach the edge of the component.
- **Attention!**
  The following components **cannot** be repaired:
  - Components that are not painted as standard.
    Unable to restore grained surface.
  - Fuel tank, fluid tank (e.g. window washer system, brake fluid, coolant expansion tank, etc.)

2.0 Reshaping of plastic parts

- A hot air blower can be used to reshape plastic parts as per the aforementioned criteria.

3.0 Bonding of plastic parts

Important!

Conform with safety regulations!

- A plastic repair box is offered (sourcing reference via BMW Parts Department) for inexpensive repair with fair time values.
- The procedure for repair of plastic parts is included in the plastic repair box.
  Clamps or other metal reinforcements must **not** be used for reasons of pedestrian protection.

4.0 Welding plastic parts

- Plastic welding procedures are permitted as they are cost-effective repairs in line with the components' current value.
- Clamps or other metal reinforcements must **not** be used for reasons of pedestrian protection.

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41 00 ... Replacing blind rivets

Special tools required:

- 2 348 128
- 72 1 210

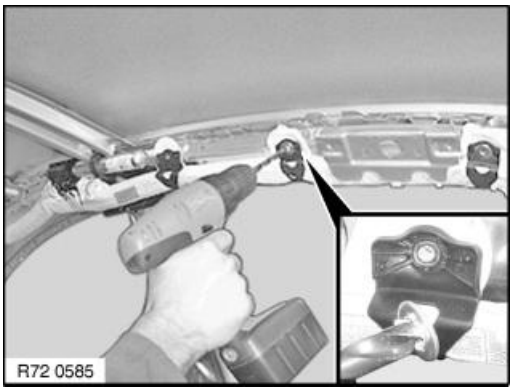


Important!

Lay out protective mats to protect the interior equipment against swarf from the drilled-out rivets and damage.

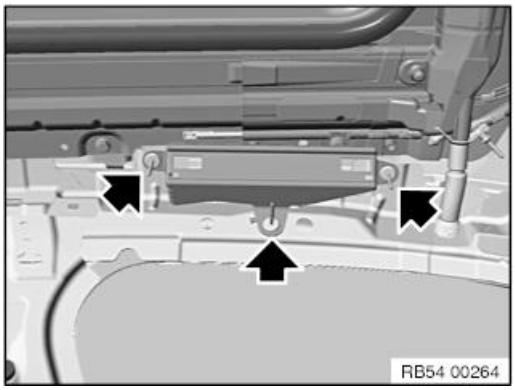
Lay out protective mats in the relevant working area:

- Instrument panel
- Entrance area
- Passenger compartment



Schematic diagram of folding pack holder for head airbag:

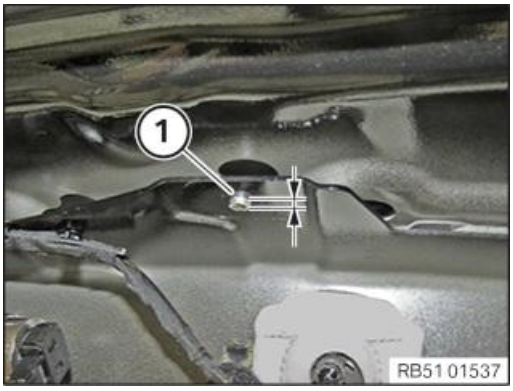
Drill off rivet plate down to rivet shank with a 10 mm twist drill bit.



Described for grab handle holder:

Drill off rivet plate down to rivet shank with a 10 mm twist drill bit.

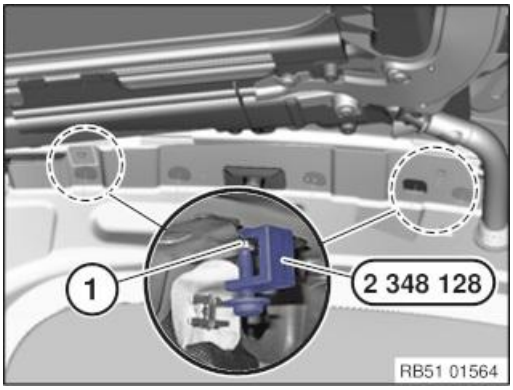
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Drill out all blind rivet protusions (1) up to the body.

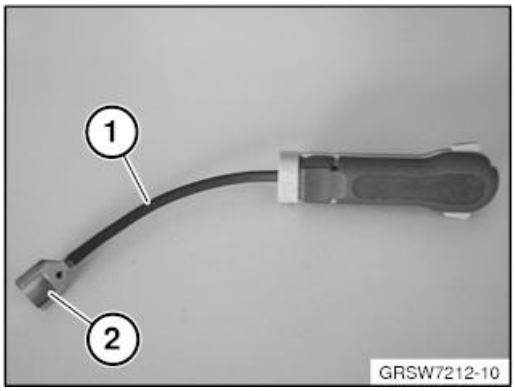
Installation note:
Apply primer to paintwork damages on side frame.
Note:
Depending on accessibility, the rivet heads will have to be removed using special tool 2 348 128 or 72 1 210 .

In areas that cannot be reached using special tools, cavity foam HS3must first be applied around the rivet head before the rivet head is then punched out immediately..



Removal of rivet head with special tool 2 348 128:

Press off rivet heads (1) using special tool 2 348 128 and remove.



Removal of rivet head with special tool 72 1 210:

Shank (1) of special tool 72 1 210 is flexible and can be adapted to the relevant body contours.

Note:
Insert butyl in the collecting tray (2) to secure rivet heads and prevent them from falling out.

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Insert special tool 72 1 210 through bore hole in body next to attachment points.

Position special tool from rear on rivet head in cavity.

Note:
A second person will be needed to help hold the special tool on the rivet head during the driving-out operation.

Make sure collecting tray is correctly fitted on rivet head.

Drive out stem with hammer and 6 mm punch.

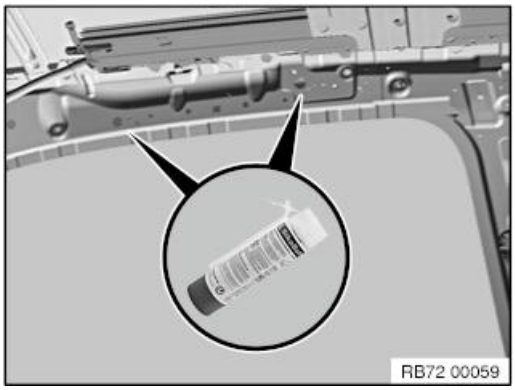
Carefully feed special tool out of body so that rivet head does not fall out of collecting tray.

Note:
If the rivet falls out of the collecting tray into the side frame when the special tool is fed out, this area must be generously filled with foam.

For details of procedure for filling cavities with foam, see further operations.

Use cavity preservation (refer to BMW Group Parts) for foam filling.

Cavity foam (refer to BMW Group Parts) may also be used if required.



Fit tube to foam can.

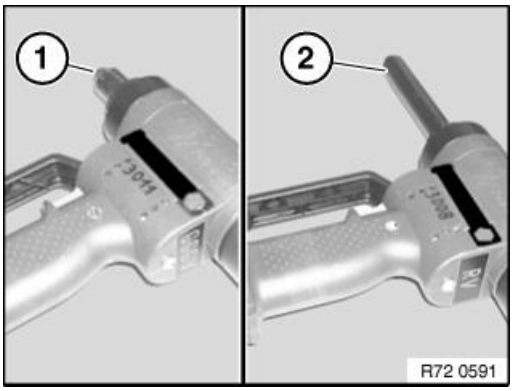
Push the hose in through the pillar holes.

Fill cavity with a filling material.

Warning!

Empty foam can completely onto cardboard and after hardening dispose of foam and can in residual waste.

Can may burst if not completely emptied.



Overview of rivet gun:

Riveting of gas generator housing and holders for folding pack with rivet gun (refer to BMW Workshop Catalogue).

The interchangeable head is changed for the different work operations.

Riveting of gas generator housing with:

1.) 17/36 nosepiece and short shank

Riveting of holders for folding pack:

2.) 17/40 nosepiece and long shank

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41 00 ... Safety at work

Note national regulations.

1.0 Compressed air:

- Air guns must not be pointed at individuals. "Blowing off" the body with compressed air may lead to serious injury.
- The devices are not permitted to be cleaned with compressed air due to dust contamination.

2.0 Electrical systems/devices:

- Only perfectly functioning systems and devices may be used.
- Repairs on electrical systems and devices must only be performed by certified electricians.

3.1 Working with aluminium dust:

- Wear a fine dust mask.
- The following applies only to E52 and BMWi: Use explosion-proof exhaust extraction unit.
- Note national regulations.

3.2 Removing sealant.

- Hydrochloric acid is created when PVC sealing material is heated to temperatures in excess of 180 °C.
- Remove PVC sealant with a rotating wire brush only or heat material with a hot air blower to maximum 180 °C and remove with a spatula.
- For good ventilation or direct extraction.

3.3 Arc welding and brazing solder:

Important!

> The extremely bright arc during welding may cause serious injury to the eyes if appropriate protective measures are not taken.

- Use a welding screen suitable for the relevant welding method (metal active gas or metal inert gas).
- Separation of workbays with protective curtains.
- Use a welding-emissions extractor facility.
- Wear protective clothing and gloves suitable for welding (not combustible).
- A fire extinguisher must be located within reach of the welding area.
- Do not carry out any welding work in the proximity of a fuel tank e.g. when it is installed.
- Note national regulations.

3.4 Working with chemical products (adhesive, cleaning agents, fillers, etc.):

Heed the manufacturer's material safety data sheets.

Important!

> Handling chemical products may result in allergic skin and breathing reactions.

- Do not eat, drink or smoke while working with these products.
- Avoid direct contact with eyes and skin.
- Wear safety goggles, protective gloves and if necessary an apron.
- For good ventilation or direct extraction.
- Use a breathing apparatus with a suitable filter type when ventilation is insufficient.
- Wear impermeable protective clothing.
- Immediately change contaminated work clothing.
- After finishing work, thoroughly clean your hands and apply protective skin cream.
- Always keep an eye douche on hand, change the water regularly (once a month).
- Store bonding products in a secure cabinet only.

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- Keep bonding products away from naked flames and other ignition sources.
- Protect bonding products against strong heat sources and direct sunlight.
- Note national regulations.

First Aid:

If product comes in contact with eyes, immediately flush with running water for about 10 -15 minutes. Seek the advice of eye specialist.

In the event of skin contact and where applicable an allergic skin reaction, clean the affected areas immediately with soap and water and then apply silicone-free skin cream. If necessary, consult a doctor.

If an adhesive product is swallowed, rinse mouth/parts of mouth thoroughly with running water. Drink 1-2 glasses of water. Do not induce vomiting. Consult a doctor.

After inhaling adhesive vapours ensure ample supply of fresh air. Stay calm. Keep air passages open. Consult a doctor.

3.5 Working with carbon dust:

- Do not eat, drink or smoke while working with these products.
  After finishing work, thoroughly clean your hands. Use protective hand cream.
- Fire, smoking and naked flames are forbidden.
- Wear work clothes, safety shoes, safety goggles and protective gloves.
- Only carry out grinding and cutting work with explosion-proof extraction (BMWi only).
- Wear ear protectors.
- Wear a dust mask (minimum protection class FFP2).
- Avoid carbon dust contact with skin, eyes and clothing.
- Regularly clean the working area with a vacuum cleaner and wipe the surfaces with a damp cloth.
- Separate workbay by means of mobile partition walls or protective curtains.

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00 Safety information for working on vehicles with automatic engine start-stop function (MSA)



Warning!

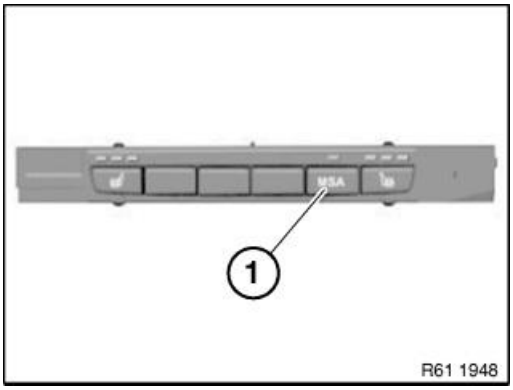
If the engine hood/bonnet contact is pulled upwards (workshop mode), the information "switch closed" is output. The automatic engine start-stop function is active.

An automatic engine start is possible.

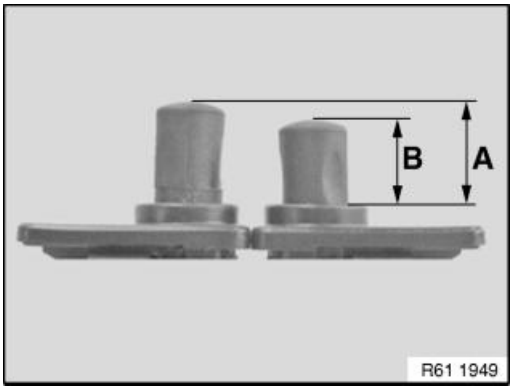
Observe safety precautions when working on MSA vehicles.

Before carrying out practical work on the engine, always ensure that the MSA functionality is deactivated so as to prevent automatic engine starting while work is being carried out in the engine compartment.

MSA function is deactivated by:



- Deactivate MSA by means of button (1) in passenger compartment
- Open seat belt buckle and driver's door



- Open engine bonnet/hood and ensure that engine hood/bonnet contact is not in workshop mode
  - Workshop mode

    A = 10 mm
  - Basic setting (engine hood/bonnet open)

    B = 7 mm

  To make sure that the engine hood/bonnet contact is at the basic setting, if necessary press the hood/bonnet contact up to the limit position before starting work and slowly release.



When working with diagnosis tools:

- Observe instructions in diagnosis tool

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Note:
For further information on automatic engine start-stop function (MSA):

- Refer to the Service Information (bulletin) (for manual transmissions) Service Information (bulletin) 61 01 07 335
- Refer to the Service Information (bulletin) (for automatic transmissions or twin-clutch gearboxes) Service Information (bulletin) 61 01 10 629

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41 00 ... Safety instructions for handling magnets

Precautionary measures are necessary when handling magnets in order to exclude any potential danger.

If the distance between the magnets falls below the minimum distance, the magnets will be abruptly attracted to each other. The brittle magnets will then collide with each other at high speed.

Very sharp splinters (similar to glass splinters) may then be chipped off.

Crush or cut injuries may also be caused.

Observe the manufacturer's safety data sheets.

Warning!

- Danger of crush injuries
- Danger of injury due to splinters
- Danger of injury due to magnetic fields

Handling instructions

- Wear safety goggles and protective gloves.
- Persons with heart pacemakers must not use the magnets.
- Do not store any iron parts (tools, small parts) close to the magnets.
- Keep magnets away from magnetic data media (credit cards, memory cards).
- Do not machine the magnets.
- Keep the magnets away direct heat and naked flames.
- Do not eat, drink or smoke while working with these products.

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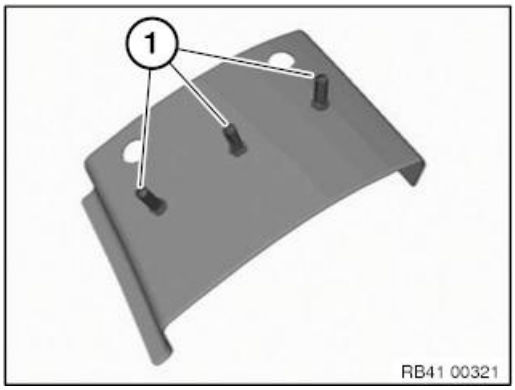
41 00 ... Separating cut determination with a template

In the case of a partial replacement piece, a body component is cut at a point described in the repair instructions.

A template may be used for the exact position determination for the separating cut.

The template is made from the reinforcement plate and can be reused.

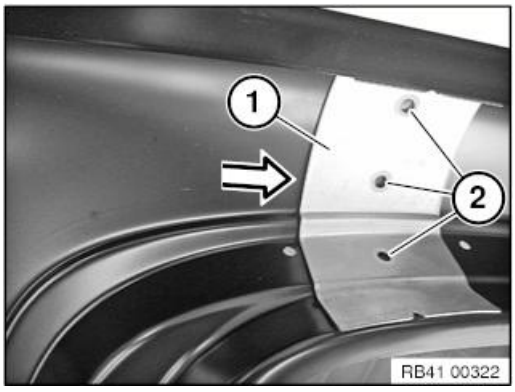
Carry over schematic diagram at the separation cut C-pillar to the relevant vehicle type.



Remove stud bolts (1).

Set bore holes Ø 4 mm at the positions of the removed stud bolts.

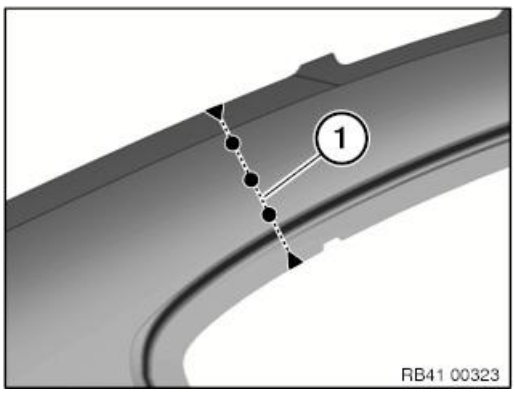
If applicable, place additional bore holes in the area of the edges.



Insert the template (1) into the new part (in direction of arrow) until it is flush (without gap).

Carry over the positions of the holes (2) to the new part.

Remove reinforcement plate again.



Connect marks (positions of holes) to the separating cut line (1).

Carry out the separating cut.

Tear and separate the separating cut on the vehicle according to the new part.

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41 00 ... Setting blind rivet nuts and bolts

- Studs welded as standard are always replaced by blind rivet bolts.
- Drill holes (0.2 mm larger than the outside diameter of the blind rivet nuts or blind rivet bolts).
- Blind rivet nuts and studs must have a special coating for anti-corrosion purposes (sourcing reference: BMW Parts Department).

Use the blind rivet nuts and bolts supplied in the case of the manual riveting tool for steel only!

- It will no longer be possible to set a blind rivet nut if the drilled hole is too big. In this event, set a clip nut (sourcing reference: BMW Parts Department). This nut tightens itself automatically when screwed to the component.
- Insert blind rivet nuts or bolts and tighten down with rivet tool .
- Seal blind rivet nuts and blind rivet bolts with sealantD1 (risk of corrosion).

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41 00 ... Soldering steel components

Attention!

Comply with the following topics from ”Body, General”:

Safety regulations.

Handling electrical system, electronics, airbags and restraint systems.

1. General information

- For repair cases the following procedure will implemented:
  - Autogenous brazing solder
- The MIG soldering procedure is not used in repairs for strength reasons. MIG soldered/brazed seams used in standard production are replaced in repairs by MAG weld seams.
- Brazed areas from vehicle production are bonded following the same procedure.

2. Work materials

- Tube pack and torch (autogenous torch)
- Brazing solder
- Gas bottles (oxygen and acetylene)
- Welding goggles

3. Preparation

- Remove the paint and zinc layer in an area of approx. 30 mm around the seam to be soldered.

4. Implementation

- Execute brazed seam without overheating the solder and with low heat dissipation. If necessary, use heat protecting paste.

5. Subsequent treatment of brazed connections:

- Remove burnt residual zinc completely. Align and grind visible connection faces.
- Remove burnt paint with a stainless steel wire brush.

6. Notes on melting/tinning:

Only applicable within the European Union!

The European End-of-life Vehicles Act prohibits the use of leaded tin in vehicles introduced after 01.07.2003!

Even out unevenness smaller than 2 mm with filler according to painting handbook.

Only perform in visible areas of the outer skin and on the carrier support.

All areas which have covers on the vehicle are not to be processed.

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41 00 ... Spot-weld bonding steel components

Important!

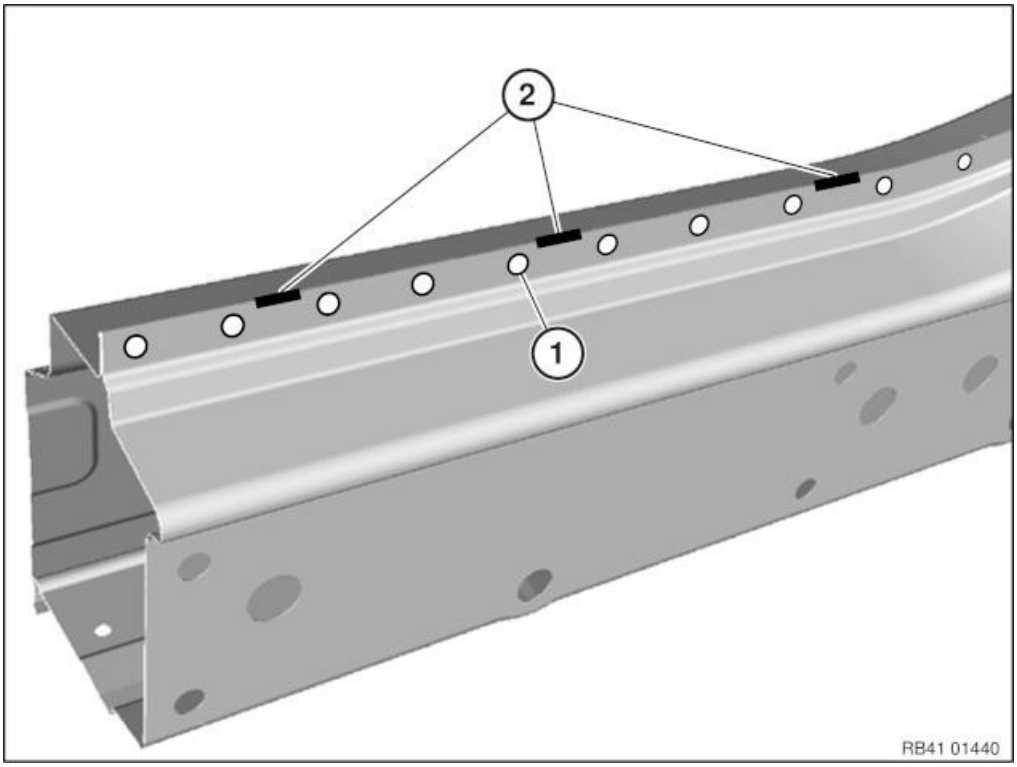
Comply with the following topics from "Body, General":

Safety regulations .

Handling electrical system, electronics, airbags and restraint systems.

Welding steel components.

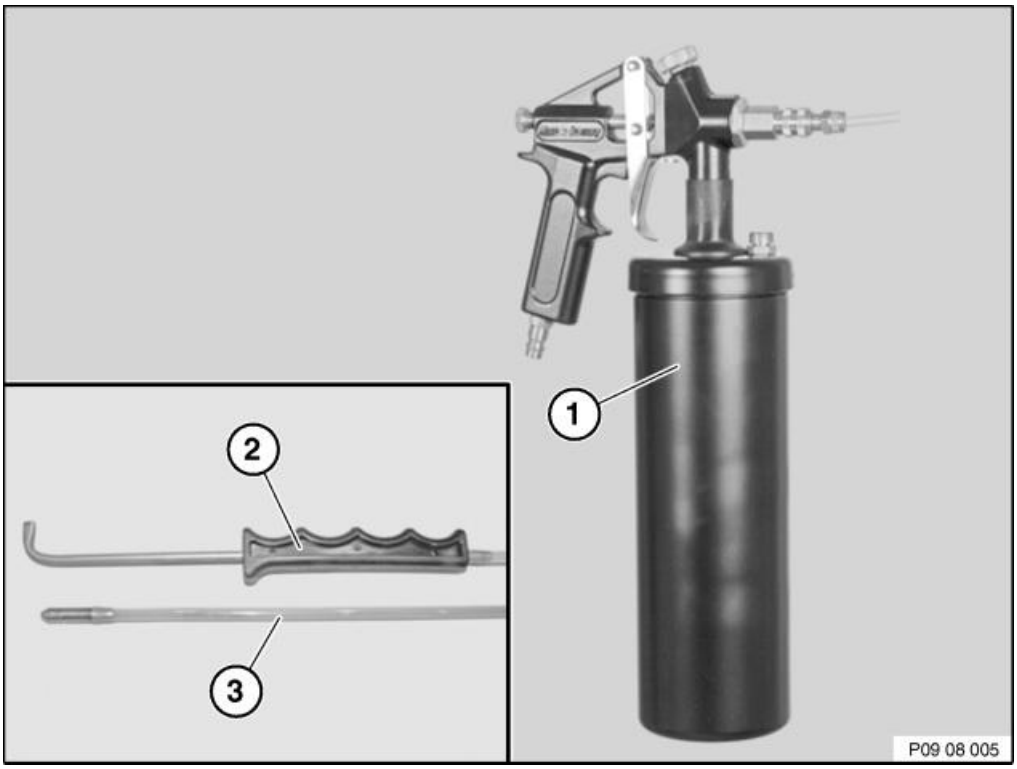
- Beginning with E65 the spot-weld bonding process is used to increase vehicle rigidity. In partial body areas, a 1-component adhesive is applied to the spot flanges and this is followed by resistance pressure spot welding. The adhesive is hardened only after the paint drying process (at approx. 180 °C).
- In the case of repairs, adhesive is **not** applied to the spot flanges. The number of welding spots is **doubled** as a substitute for the omitted adhesive.
- Minimum distance between welding spots (1) is 25 mm. Important! The minimum distance must not be undershot! If there is not enough space for twice the number of resistance weld points, each non-made resistance weld point must be replaced by a MAG weld seam (2). Length of a MAG weld seam = 20 mm. Set the MAG weld seams at equal intervals distributed on the face.



- The following procedures are used as a substitute for spot-weld bonding:
  - MAG welding (**M**etal **Ac**tive **G**as welding)
  - Resistance pressure spot welding (referred to in the following and in the repair instructions as spot welding).
- Adhesive is not applied between the spot flanges on new parts in the case of 2- or multi-sheet joints. Areas which cannot be reached by the spot-welding tongs can be joined by MAG plug welding. The number of welding spots is doubled as a substitute for the omitted adhesive.
- **Exceptions** (e.g.E65) are described in the relevant repair instructions. Apply welding spots to existing welding spots on new part. This is necessary because the adhesive between the spot flanges of the new part acts as an insulator.
- **Caution:** Extract smoke and fumes during welding work.

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41 00 ... Spray gun for cavity sealant



1.0 Delivery specification:

- Owner's Handbook
- Pressure reservoir spray gun (1) for cavity sealant
- Spray set, consisting of spray hoses: Angle nozzle (2) and round spray nozzle (3)

Important!
Prior to start-up read and familiarise yourself with the manufacturer's operating and safety instructions.

2.0 Start-up:

- Open the pressure reservoir and insert the cavity sealant in the form of a 1-litre can.
  Close the pressure reservoir.
- Connect the spray hose to the quick-release coupling.
- Connect the device to the compressed air supply.
  Operating pressure 2-6 bar, max. 8 bar!

3.0 Operating principle:

Note:
Unlike previous devices you can alter the spray pattern on this device with the air volume regulating screw (large knurled screw).

- Twisting the air volume regulating screw in decreases the air volume and thus reduces the formation of material mist.
  This facilitates optimum working when preserving open components/surfaces.

- Twisting the air volume regulating screw out increases the air volume and thus increases the formation of material mist. (For closed cavities)
- The trigger has two settings.
  1st setting - air discharge only.
  2nd setting - air and material discharge.

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- After finishing work, press the first setting to clean the spray hose with compressed air.
- Prior to storing, remember to twist the air volume regulating screw closed to reduce the risk of the material drying out.
- Prior to an extended period of non-use (2 weeks and more), clean the gun.
- To ensure that the spray hoses function properly, do not store them coiled up e.g. in the side member area!
  Store the spray hoses stretched out.

4.0 Application examples:

- Use the appropriate spray hoses for the different types of cavity and surface.
- Example - doors, lids and hatches:
  Spray hose with angle nozzle. Reduce air volume to keep the formation of mist low.
- Example - side members:
  Long spray hose with round spray nozzle. The air volume must be increased a little, depending on the type used.
- Basically, keep the formation of mist low to avoid fouling and unpleasant odours.

5.0 Safety instructions:

- Do not inhale spray mist.
- Use in well ventilated rooms only.
- Operating pressure max. 8 bar.

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41 00 ... Stamping vehicle identification number

Special tools required:

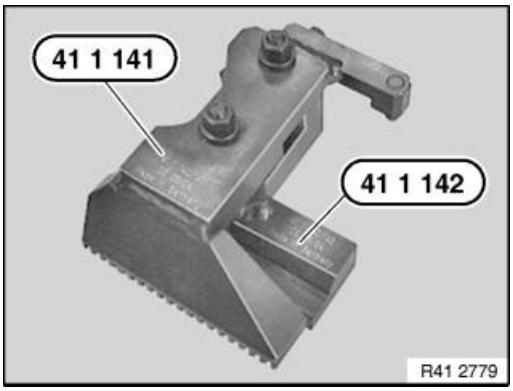
- 41 0 000
- 41 1 140
- 41 1 141
- 41 1 142

Note:
If the stamped vehicle identification number is removed during repair work, it must be stamped in again.

Read and comply with General Notes.

Necessary preliminary tasks:

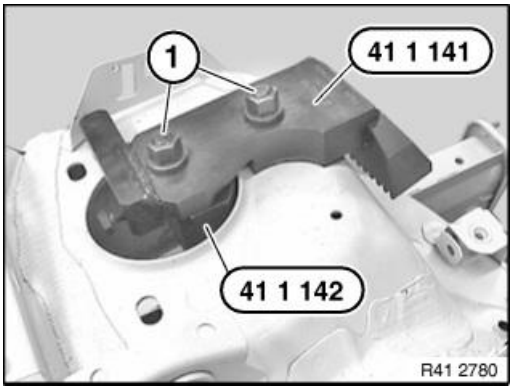
- Remove front right spring strut
- Remove rubber base from guide plate 41 1 141



The set of special tools 41 1 140 for stamping the vehicle identification number consists of:

Guide plate 41 1 141

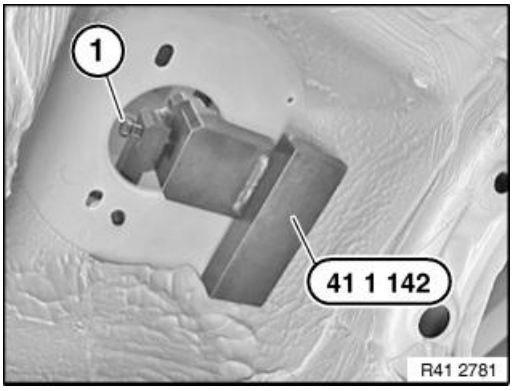
Counter-support plate 41 1 142



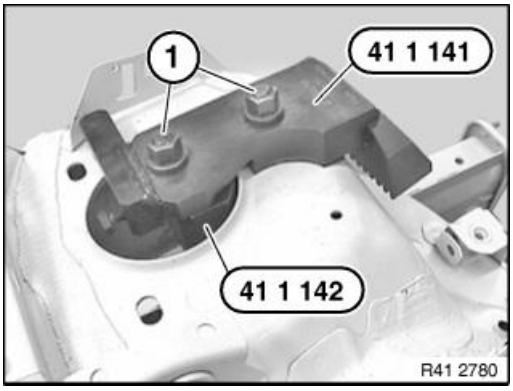
Position counter-support plate 41 1 142 at bottom on spring strut dome.

Position guide plate 41 1 141 at top on spring strut dome and tighten screws (1) by hand.

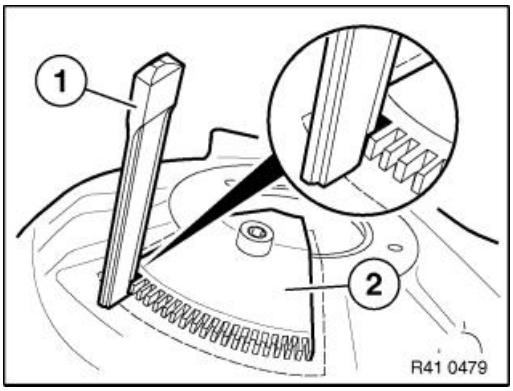
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Tighten screw (1) until counter support 41 1 142 rests on spring strut dome.



Tighten down screws (1).



Note:
The illustration is a schematic diagram and is to be applied to the relevant vehicle type.

Insert punch numbers 41 0 000 (1) individually into guide plate (2) and stamp vehicle identification number.

Note:
In the event of component or body replacement by the workshops/garages, clearly delimit the vehicle identification number at front and rear by stamping a ”+” in place of the BMW emblem.

Note national regulations.

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41 00 ... Straightening aluminium component on the outer skin

1.0 Prerequisites

The component must be replaced if there are cracks and it is neither possible to drill into the end of the crack, nor to weld it.

2.0 Recommended tools

- Only use tools specifically designed for aluminium repairs.
- Do not use tools and operating fluids that have already been used for steel repairs (e. g. grinding wheel). Danger of contact corrosion.
- Do not use any sharp-edged tools (notch effect).
- We recommend the "Alu Slimliner A (6106)" tool to repair minor and moderate body damage. Sourcing reference BMW Workshop Equipment Catalogue.

3.0 Straightening outer skin.

- "Cold" straightening: Press dents out from their centre and smooth in an outwards direction with gentle taps.
  In the case of small, soft dents (hail and parking damage), this is also possible without damaging the paintwork. This requires special tools and trained employees.
- "Hot" straightening: Heat the component in the damaged area with a hot air blower to approx. 60 °C. This significantly reduces the force that needs to be applied for straightening.
- Avoid notching and cracking.
- Avoid hardening and overstretching.
- Avoid heating and excess temperature the outer skin over large areas.

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41 00 ... Straightening aluminium components in structure

- **Reshaping or heating extruded profiles and cast parts is not permitted!**
  Failure to comply with this requirement would have the following results:
  In the case of reshaping, weld seams (E52) or bonded connections (E60, E61, E63, E64) tear in the surrounding area.
  In the case of reshaping, the material loses up to 40 % of its original strength.
  In the case of heating, the material loses up to 40 % of its original strength.
  The adhesive is destroyed at temperatures ≥120 °C (E60, E61, E63, E64).

  Extruded profiles and cast parts which show visible or measurable signs of deformation must be replaced.
  Perform the check for deformation with the aid of the straightening system.
  For optical testing, strip adjoining components in cases of doubt.
  Extruded profiles are used in the E52 as engine supports, door posts, side members, etc.
  Extruded profiles are used in the E60, E61, E63, E64 as engine supports.
  Cast parts are used in the E60, E61, E63, E64, E70, E71 as spring supports.
- Reshaping of extruded profiles and cast parts may only be used to achieve optimum joining of connection faces (e.g. when bulkhead is damaged). Reshaped parts must be replaced.
- Repairs which affect the attachment points of mechanical assemblies and chassis/suspension components must be carried out on the straightening bench. Use the vehicle-specific set of attachments set or vehicle-specific data sheet.
  Straightening attachment supports and data sheets are also available for the top section, e.g.: door posts, soft top mounts, cowl panel, tailgate hinges, etc.
- Check windscreen and rear window apertures for curvature by inserting the original glass.
- Take the gap dimensions for doors, engine compartment lid and tailgate from the vehicle-specific gap dimension diagram.
- Exceptions on the E60, E61, E63, E64:
  Carrier support and bulkhead may be straightened if they do not have any cracks, sharp-edged damage or holes. After repair work, check parts again for cracks.
  Examine adjoining adhesive flanges for peeling off. If necessary, seal and preserve with sealant.
  Observe the frame reference dimension for the carrier support.
  Any repairs to the bulkhead if cracked outside the approved scope of repair work are only permitted after consultation with and approval by BMW. Should you have any questions, please contact the country-specific Hotline.

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41 00 ... Straightening steel components in the structure

- High-strength and super-high-strength steel plates as a rule cannot be reshaped. Reshaping only serves as a preparatory measure to replacing the component in order to achieve optimal joining of the connection points.
- Bearing body components such as e.g. engine supports, door pillars, side members etc. with deformations which can no longer be returned to their original shape by ”cold straightening” must be replaced.
  Heating bearing body components for better reshaping is not permitted!
  Failure to comply with this requirement would result in a loss of original strength of up to 40 %.
- **The body must be anchored as follows for reshaping:**
  If using vehicle-specific/universal straightening attachment sets (Carbench/ Celette/ Car-O-Liner), it is necessary to secure the body **additionally** with 4 retaining clips to the spot flange of the entrance or to the 4 jacking points. The spot flange (if available) is to be preferred.
  If using universal electronic or mechanical straightening systems (Car-O-liner/ Celette), it is necessary to secure the body with 4 retaining clips to the spot flange of the entrance or to the 4 jacking points. The spot flange (if available) is to be preferred. **In addition** anchor at least 2 points with the securing set.
  Failure to comply with these instructions will result in damage to the body during reshaping in non-damaged areas. Vehicle-specific straightening attachments and universal mounts may be damaged.
- Repairs affecting the mounting points of assemblies and chassis/suspension components must be carried out on the straightening bench with the matching straightening attachment set or specification sheet for the vehicle.
  Straightening attachments and specification sheets are also available for the top section, e.g.: door pillars, convertible top mounts, cowl, rear lid hinges, etc.
- Check windshield and rear window apertures for curvature by inserting the original glass.
- Take the gap dimensions for doors, engine hood and rear lid from the vehicle-specific gap dimension diagram.

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41 00 ... Straightening steel components on the outer skin

1.0 Recommended tools.

Only use those tools designed for steel repairs (sourcing reference BMW Workshop Equipment Catalogue).

2.0 Straightening outer skin.

- "Cold" straightening: Press dents out from their centre and smooth in an inwards direction with gentle taps. In the case of small, soft dents (hail and parking damage), this is also possible without damaging the paintwork. This requires special tools and trained employees.
- In the event of damage that is only accessible from one side it is possible to use a dent removal system featuring welding.
- Avoid cracking.
- Avoid hardening and overstretching.
- Prevent overheating small areas of the outer skin.
- When the surface exhibits an unevenness no greater than 2 mm after straightening, putty compound can be used to even out the area (see Painting Handbook).
  Only applicable within the European Union!
  European used-vehicle regulations prohibit the use of tin containing lead in vehicles introduced after 01.07.2003!
- For high-security vehicle, note the special information in the repair instructions!

2.1 Straightening the wheel arch (rear side panel).

Vehicles in which the wheel arch is not welded but bonded and bordered can be straightened.

This is possible in the following situations:

- Rear side panel (wheel arch) is not torn in the area of the bonding. Welding in this area is not permissible.
- The outer skin has not become separated from the outer wheel arch section.

In general, the following applies:

When performing straightening work on the wheel arch, apply sealant to the inside. After straightening, the area must be primed and resealed with sealant D1. Protect from the inside using cavity preservation.

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99 00 ... Touching up paintwork damage

These notes apply to paintwork damage on the body aperture that occurred when detaching bonded window glass.

To ensure long-term corrosion protection, it is absolutely essential to touch up damage to paintwork!

The "BMW Color System" painting handbook forms the basis of these repair instructions and must be observed without fail.

Ground down damage to paintwork on body aperture and touch up with BMW multibase filler.

Grind larger areas or damage down to the bare sheet metal and coat with BMW multibase filler (layer thickness 30 to 40 µm).

Hardening time:

- With infrared, at least 10 minutes
- Without infrared for at least 60 °C, at least 30 minutes
- Without infrared for at least 20 °C, at least 24 hours

If a complete build-up of paint is required in the visible area:

- Tape off primed adhesive flange before applying top coat

Important!

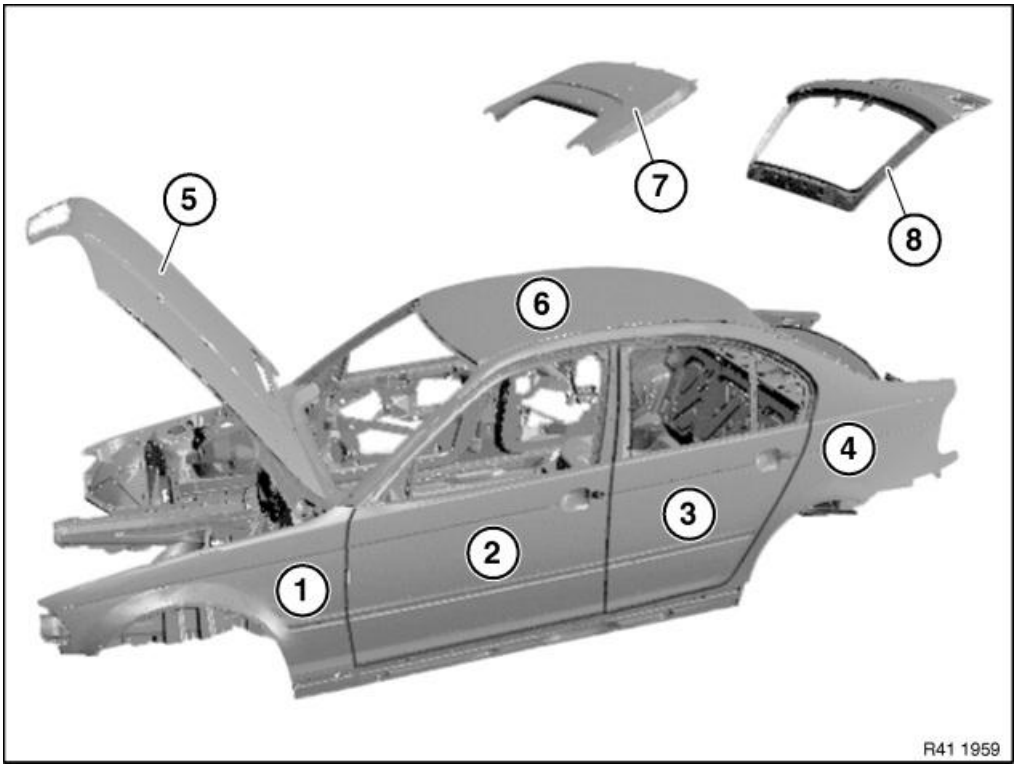
Observe hardening time of BMW multibase filler otherwise a perfect bond cannot be guaranteed!

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41 00 ... Use of materials in outer skin

The following illustration is a schematic diagram of all the body variants.

Apply this illustration to the relevant vehicle.



All components not listed in the table below are composed of established sheet steel qualities.

Component	Vehicle	Material
(1) Side wall, front	E52 (Z8)	Aluminium
	E60, E61	Aluminium
	E63, E64	Plastic (thermoplastic)
	E65, E66	Aluminium
	E70, E71,E90 (M3), E92, E93	Plastic (thermoplastic)
	E89 (Z4)	Aluminium
(2) Front door	E36/C (M3)	Aluminium or steel
	E36/2 (M3)	Aluminium or steel
	E52 (Z8)	Aluminium
	E63, E64	Aluminium
(4) Side wall, rear	E52 (Z8)	Aluminium
(5) Engine compartment lid	E38 (750i)	Aluminium or steel
(5) Engine compartment lid	E46/C (M3)	Aluminium
	E46/2 (M3)	Aluminium
	E52 (Z8)	Aluminium
	E60, E61, E63, E64	Aluminium
	E65, E66, E70, E71	Aluminium
	E85 (Z4)	Aluminium

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	E90 (M3), E92 (M3)	Aluminium
	E89 (Z4)	Aluminium
(6) Hardtop/ roof	E36/C	Aluminium
	E36/7 (Z3)	Plastic (glass fibre / epoxy resin)
	E46/C	Aluminium
	E46/2 (M3 CSL)	Plastic (CFK)
	E52 (Z8)	Plastic (PU)
	E85 (Z4)	Plastic (SMC)
	E63 (M6)	Plastic (CFK)
	E89 (Z4)	Aluminium
(7) Soft top compartment lid	E46/C	Magnesium
	E64	Plastic (SMC)
(8) Tailgate	E46/2 (M3 CSL)	Plastic (SMC)
	E52 (Z8)	Aluminium
	E63, E64	Plastic (SMC)

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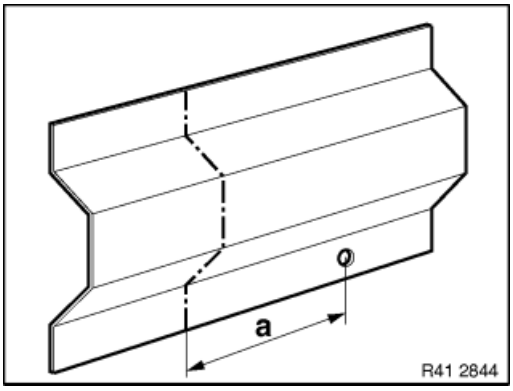
41 00 ... Welding in reinforcement plate (sheet steel)

In the case of a partial replacement piece, a body component is cut at a point described in the repair instructions.

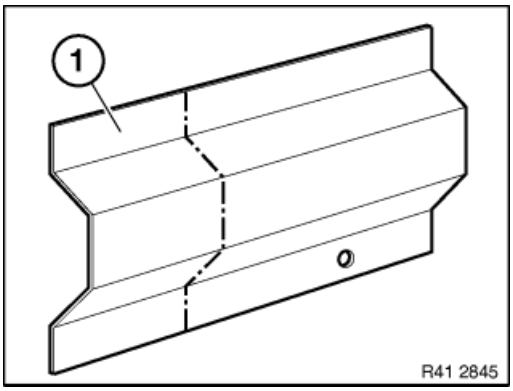
A reinforcement plate is welded in to ensure sufficient strength.

Follow notes for welding steel components.

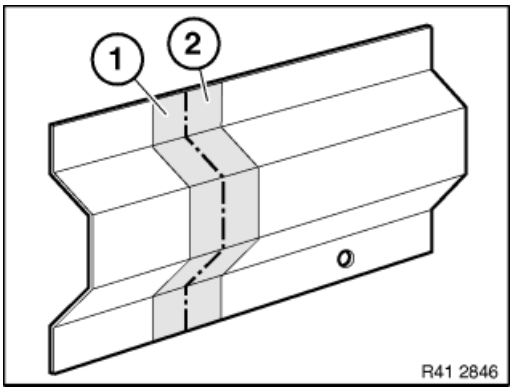
Note:
The following graphics serve as general illustrations of reinforcement plate repair work. They are applicable to all sectional repairs.



Mark component in accordance with dimension A and cut.



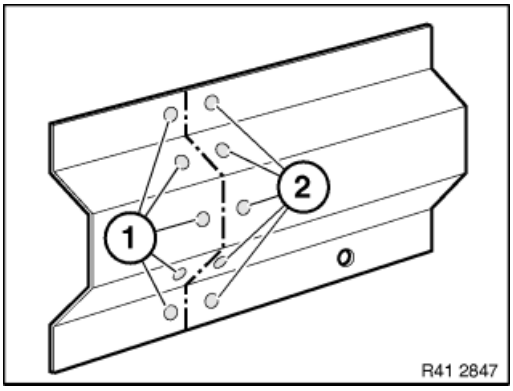
Cut new part (1) in accordance with cut and if necessary adjust to fit with alignment bracket or universal mount.*Installation note:*
Maintain a distance of approximately one to no more than two material thicknesses at the severance cut to ensure welding with the reinforcement metal and enable more tolerant adjustment.



Clean inner and outer sides of connection faces (1) on new part and (2) on body.

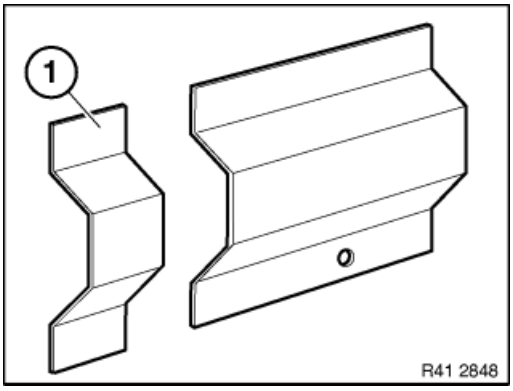
Coat insides with welding primer.

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Drill bore holes (1) and (2) at distance of 25 mm to each other.

Hole diameter approx. 8 mm.

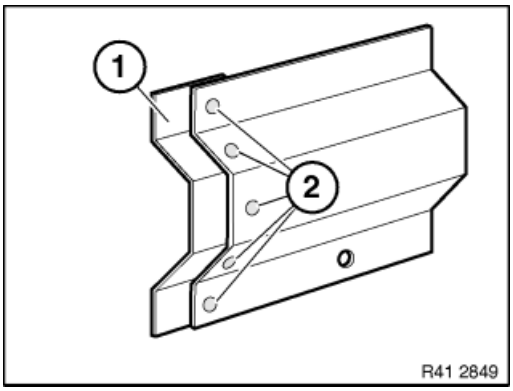


Make reinforcement plate (1) from trim of new part.

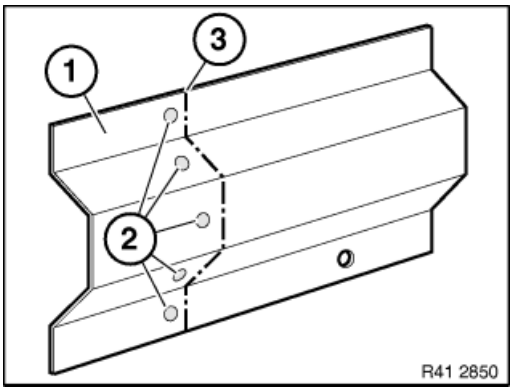
If applicable, produce more reinforcement plates.

Length of reinforcement plates is min. 40 mm.

Coat reinforcement plates (1) and (2) on both sides with welding primer.



Push reinforcement plate (1) into component on body up to half way and plug-weld (2).



If applicable, adjust the new part (1) with the alignment bracket or universal tool and plug-weld (2)

MAG weld the joint (3).

Grind and clean weld seam and plug weld spots.

Only visible areas of the outer skin and on the carrier support must be tinned.

All areas which have covers on the vehicle are not to be tinned.

Note:
Only applicable within the European Union!

European used-vehicle regulations prohibit the use of tin containing lead in motor vehicles introduced after 01.07.2003!

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41 00 ... Welding steel components

Important!

Comply with the following topics from "Body, General":

Safety regulations.

Handling electrical system, electronics, airbags and restraint systems.

1. General information

- The following procedures are used for repairs:
  - MAG welding (**M**etal **Ac**tive **G**as welding)
  - Resistance pressure spot welding (referred to in the following and in the repair instructions as spot welding).
- Take the number and position of welding spots and MAG weld seams from the separated part. Replace areas inaccessible to spot-welding tongs with MAG plug weldings at the same distance. Diameter of bore holes for plug weldings 8 mm.
- In the case of emissions extraction, observe a minimum distance of 30 cm for MAG welding during the welding process. Otherwise the inert gas would be drawn off.
- Follow the equipment manufacturer's instructions for use.

2. Work materials

- MAG welding:
  - Steel welder (see Workshop Equipment).
  - Steel welding wire - G3SI1 (SG2) or alternatively G4SI1 (SG3)
  - Welding mask
  - Gas bottle containing inert gas (82 % argon, 18 % CO_2)
- Resistance pressure spot welding:
  - Spot-welding apparatus (see Workshop Equipment).
  - Safety goggles

3. Preparations for MAG and spot-welding

- Remove the paint coating in an area of approx. 30 mm around the weld seam or spot.
  - The zinc layer underneath must be removed during the MAG welding method.
  - It is not necessary to remove the zinc layer underneath during spot-welding.
- Remove the paint coating on the reverse side of the weld seam or spot.
  - Contaminants will otherwise enter the weld pool via the root of the weld seam.
  - An insufficient electron flow prevents an optimum spot-weld joint.
- Coat all metal overlaps and weld spot flanges with welding primer.
- To determine the optimum electrode contact force for spot-welding, carry out spot-weld shear tests on sample sheet metal.
- In order to keep the electron flow short during MAG welding on the body, you must if possible attach the ground terminal directly to the component to be welded.

4. Welding

- During MAG welding, the weld gap must be kept as small as possible. The larger the weld gap, the lower will be the strength of the joint.
- During spot-welding, the sheet metal flanges to be joined must be placed as close together as possible without gaps.
  The larger the gap, the lower will be the strength of the joint.
  Minimum distance between welding spots 25 mm.

5. Subsequent treatment of welded connections:

- When grinding a weld seam, do not grind thin the base material next to the seam.

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- After joining, clean all weld seams and spots with a stainless steel wire brush.
- Remove burnt paint with a stainless steel wire brush.
- All welded connections sealed off with body sealing compound in original condition must be primed and sealed off again thoroughly after repairing. Replace damaged or removed anti-drumming layers.

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41 00 ... Working with 2-component PU cavity foam

Sourcing reference for cavity foam, refer to BMW Parts Service.

Properties of cavity foam:

- 2-component PU foam, solvent-free.
- Excellent flow capacity, enabling complete sealing of cavities.
- Good strength, preventing slipping in cavities.
- Low water absorption, preventing corrosion.
- Ideal for use as insulating and sealing compound

Information on dangers/hazards:

- Avoid eye and skin contact.
  Wear protective goggles, solvent-resistant protective gloves and protective clothing.
- Do not inhale.
  Apply in well ventilated rooms only.

- **Warning!**
  Application time after mixing: within **8 minutes!**
  Completely empty open can after use.
- Remaining amounts which are not used can cause the **can to explode** on account of a chemical reaction (buildup of heat)!
  Alternatively, cool the can containing the non-removed remaining amount for several hours in cold water.
- Do not eat, drink or smoke during this operation.
- Keep heat and ignition sources well away.
- Read the manufacturer's information on hazards/dangers (printed on the can) prior to application.

Application instructions:

- Use by date on can.
  Do not use the spray can after the Use by date on the can has expired. After the Use by date the properties of the cavity foam will no longer meet the requirements of the BMW Group.
- Cavity sealing of repair area possible after an air drying time of 1 hour.
- Backing surface must be
  clean and free from
  dust,
  grease,
  oil and stripping agent.
- Application temperature at least 15 °C. Optimally 20 °C.
- Remove fresh, non-hardened PU foam with adhesive cleaner 208.
  Sourcing reference: BMW Parts Service.
  Hardened PU foam can only be removed by mechanical means (machine).
- Excess, hardened PU foam can be disposed of as residual waste.
  Cans which are not entirely empty and unused whose Use by date has expired are classed as hazardous waste.
  Observe country-specific waste-disposal regulations.
- Observe the manufacturer's application instructions (printed on the can).
- Important!
  Foam expands many times over as it sets (change in volume).
- Setting takes approx. 30 minutes. Mechanical processing (e.g. drilling, cutting, etc.) is then possible.

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41 00 ... Workshop equipment (BMW and MINI vehicles)

Minimum requirements for workshop equipment to guarantee professional body repairs:

The tools listed below **must be used**.

Repair stage 1a:

Tool*	Sourcing reference	Screwed parts (steel or plastic)	Screwed parts (aluminium)
Body tool trolley	81 64 2 153 204 or 81 64 2 410 578	x	x
Drill	conventional Span width 0 to min. 10 mm	x	x
Blind riveting tongs	81 43 0 301 744	x	x
Manual riveting machine for blind rivet nuts	81 43 2 155 739 (up to M12) or 81 43 9 429 204 (up to M8)	x	x

Repair stage 1b:

Tool*	Sourcing reference	Screwed parts (steel or plastic)	Screwed parts (aluminium)
Aluminium bodywork tool assortment	81642336755		x
Pressure cup spray gun for cavity preservation	81452148795	x	x
Drill	conventional Span width 0 to min. 10 mm	x	x
Blind riveting tongs Electrical or pneumatic With rivet head extension	81430301744 with extension 81432158706 or 81432159003	x	x
Manual riveting machine for blind rivet nuts	81432155739 (up to M12) or 81439429204 (up to M8)	x	x

Repair stage 2:

		Steel		Aluminium	
Tool*	Sourcing reference	Structure	Outer skin	Structure	Outer skin
Body tool trolley accessory set	81642334947	x	x		
Bodywork saw	81432156415 or 81432410594	x	x		
Belt sander	81432236488 (230V) or 81432333873 (100-115V)	x	x	x	x
Single-handed grinder	81430303336	x	x	x	x
Welding spot remover	81439428600	x	x		
Punch riveting tool	8132158708	x	x	x	

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MAG welding apparatus	conventional	x	x		
Cartridge gun for adhesives		x	x	x	x
Infrared heater	81442211107 (220V) or 81452211615 (110V)		x		
Thermometer	81312211265		x		

In addition, the repair stage 1 tools are required.

Repair stage 3:

	Steel		Aluminium	
Tool*	**Structure**	**Outer skin**	**Structure**	**Outer skin**
Spot welding apparatus	x	x		
Straightening system	x		x	
Stud welding apparatus	x		x	
Flame coating set			x	
MIG welding apparatus			x (E52 only)	

In addition, the repair stage 1 and 2 tools are required.

*Sourcing reference BMW Workshop Equipment Catalogue

Attention!

In vehicles from model year 2001, higher-tensile and high-tensile steels are used in certain areas.

It is essential to check whether the spot-welding apparatus used conforms to the technical requirements of the currently recommended welding sets. Should you have any questions, please contact the country-specific Hotline.

The use of technically obsolete equipment may have serious consequences for the structure of the vehicle (e.g. in the event of an accident). In the end, this can result in safety and product liability risks which cannot be calculated.

Use and restrictions:

Definition of recommendation:

All currently recommended spot welding sets comply according to the *latest* information with the requirements relating to reliable welding of today's and future BMW Group vehicles. A spot welding unit will lose its recommendation as soon as tests with materials and material combinations designated for future use in BMW Group vehicles return negative results (see Table Group 1). All previous application before the withdrawal of the recommendation shall remain unaffected.

	Device designation	Manufacturer
Group 1 Devices currently *no* longer recommended	CR500	CAR-O-LINER
	Spot9000	Tecna
	ATL 400V	Wieländer&Schill
	MIDIspot QSVM12000T	CAR-O-LINER
	MIDIspot QSVM12000T	Elmatech
	MIDIspot QSVM9000	CELETTE
	MIDIspot QSVM9000	Elmatech
	CR600 QSM	CAR-O-LINER

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Group 2 Devices currently *recommended*	Multispot MI-100 Control	Elektron
	Inverta Spot GT BM	Wieländer&Schill
	3664 BM	Tecna
	CTR12000T	CAR-O-LINER

Application options and restrictions of above devices.

Vehicle	Group 1	Group 2
All BMW convertibles from E64	x Except A-pillar, B-pillar, sill	x
All BMW model ranges from E70	x Except B-pillar	x

Note:

As at May 2016

All BMW and MINI vehicles not mentioned can be repaired with the equipment of Group 1 and Group 2.

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41 ... 0 Notes on the repair technique used in the main group 41

Two different repair techniques are used in body repair.

These are welding and bonding/riveting.

If the repair instructions do not specify a repair technique, then welding must **always** be used.

The bonding/riveting repair technique is **always** described in detail in the repair instructions.

Quality standards must be met.

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41 11 150 Cover for frame side member (part replacement between A and B pillar)

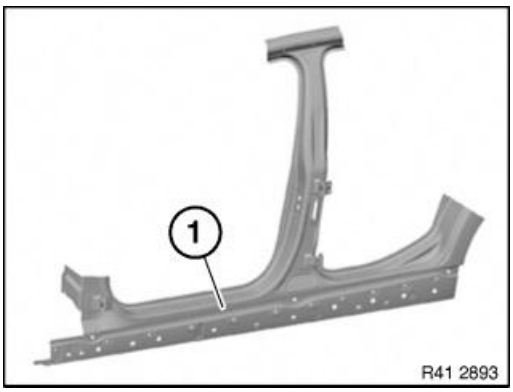
Observe procedure for repair stage 3.

Read contents of Body, General.

For set-up work, see the surrounding texts on KSD CD (FRU number 41 11 150).

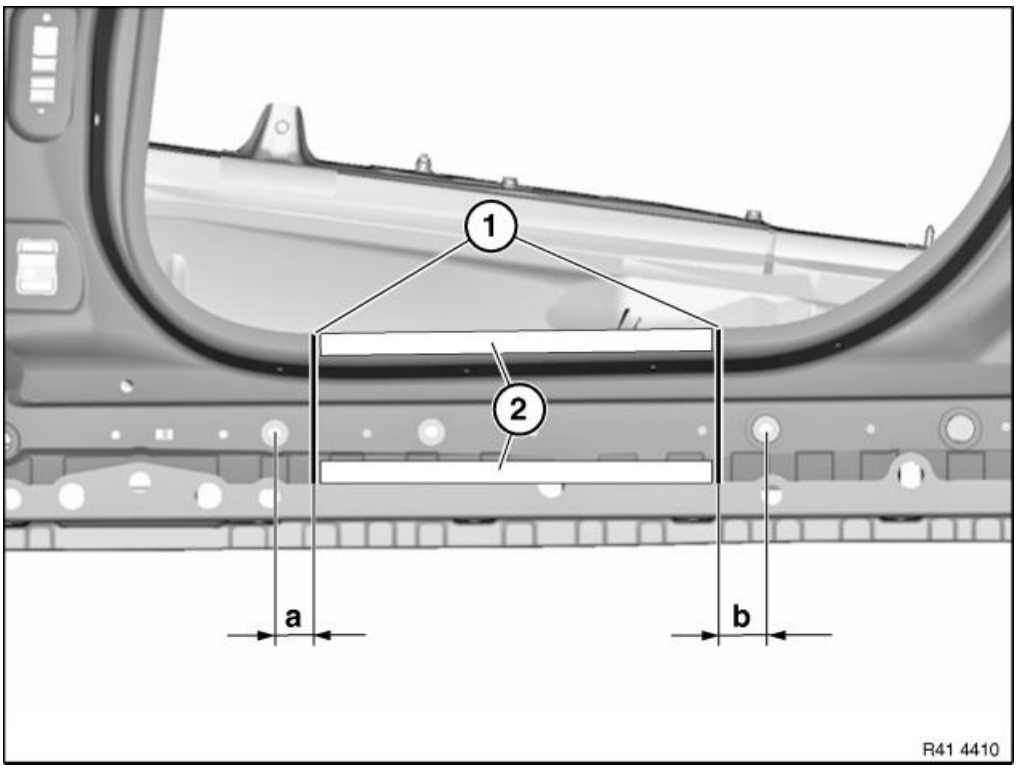
Spot-weld bonding is used on this vehicle. Observe specific procedure.

Use only an approved spot-welding apparatus for repairs!



Following new body parts are required (see Electronic Parts Catalogue):

- (1) B-pillar with entrance



Mark severance cuts (1) in accordance with specified measurements and cut.

Attention!
Cut outer panel only for following severance cuts.

Dimension a = approx. 40 mm behind 25 mm dia. hole.

Dimension b = approx. 40 mm before hole dia. 25 mm.

Open welded connections in areas (2).

Installation note:
Mark severance cuts on new part in accordance with severance cuts on vehicle and cut.

Weld in reinforcing panels at all severance cuts.

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41 11 300 Replacing entrance with door post, left and right (partial replacement, B-pillar)

Observe procedure for repair stage 3.

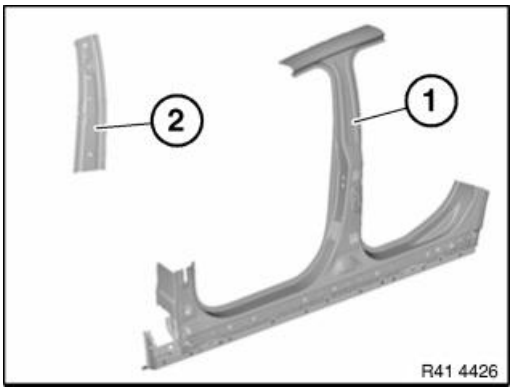
Read contents of Body, General.

For set-up work, see the surrounding texts on KSD CD (FRU number 41 11 300).

Spot-weld bonding is used on this vehicle. Observe specific procedure.

Use only an approved spot-welding apparatus for repairs!

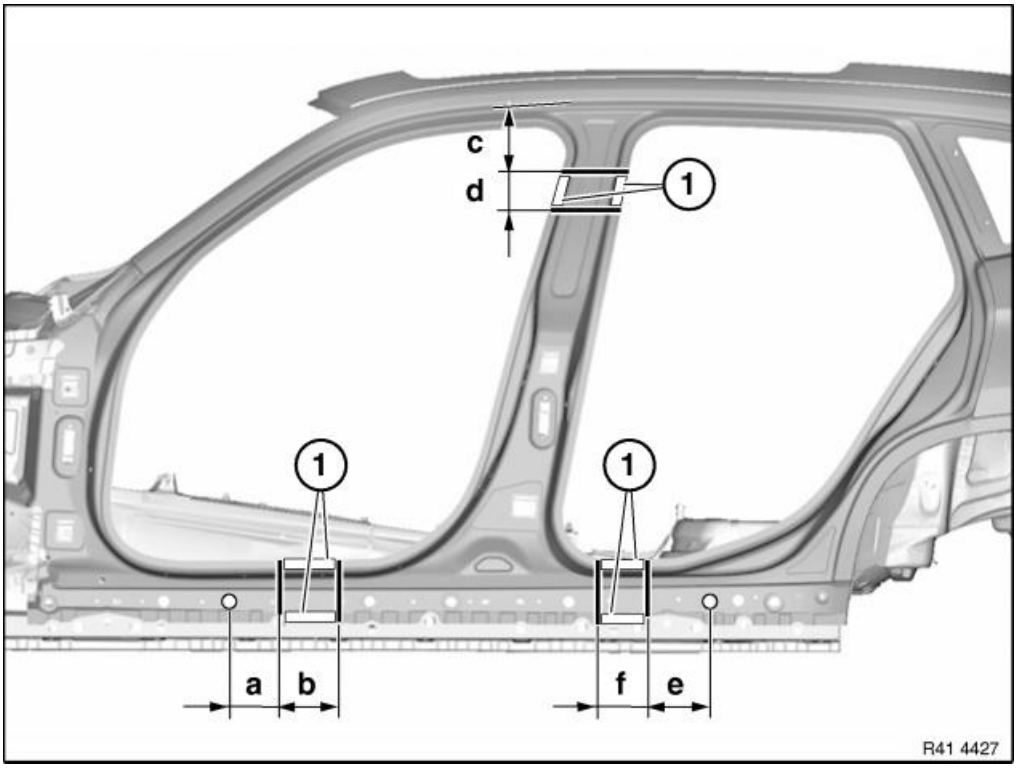
Place vehicle on straightening bench.



Following new body parts are required (see Electronic Parts Catalogue):

- (1) B-pillar with entrance
  (2) B-pillar, inner

Removal



Mark severance cuts in accordance with specified dimensions and cut.

Attention!
Cut outer panel only for following severance cuts.

Dimension a = approx. 110 mm from centre-point of 25 mm dia. hole.

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Dimension b = approx. 130 mm after cut a.

Dimension c = approx. 150 mm from roof edge.

Dimension d = approx. 100 mm below cut c.

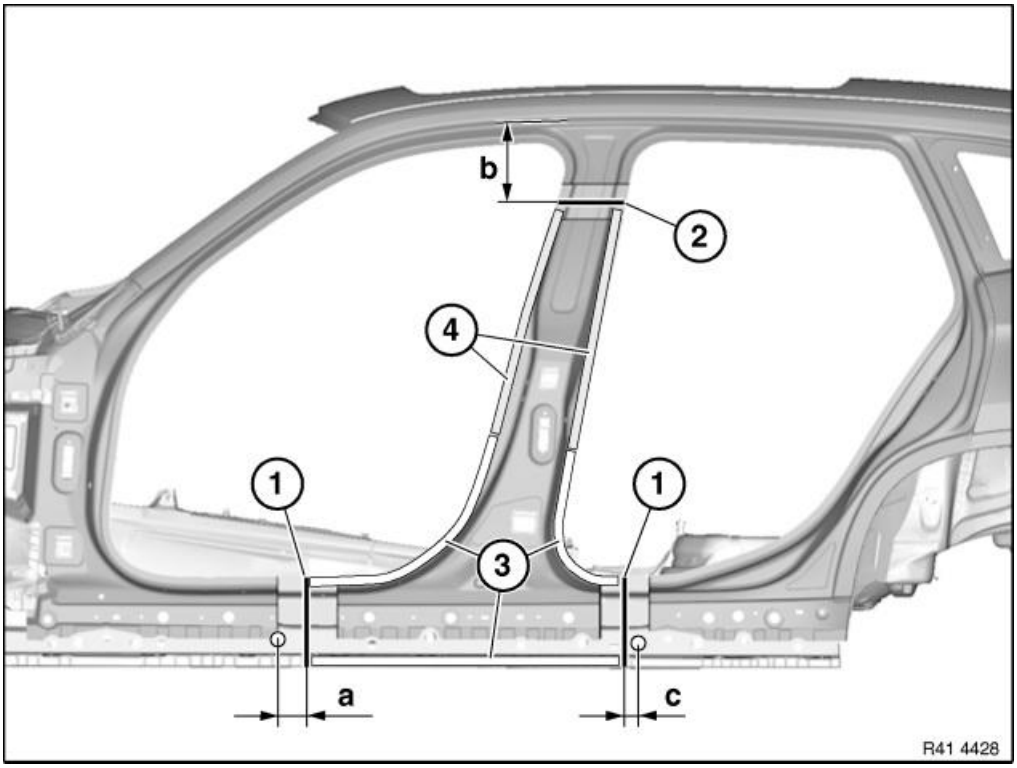
Dimension e = approx. 140 mm from centrepoint of 25 mm dia. hole.

Dimension f = approx. 130 mm before section e.

Open welded connections in areas (1).

Remove sheet sections.

Note:
Cut-out metal sections are required again for sealing.



Mark severance cuts in accordance with specified dimensions and cut.

Attention!
Cut outer plate only for the severance cuts (1).

For severance cut (2) cut all the way through B-pillar.

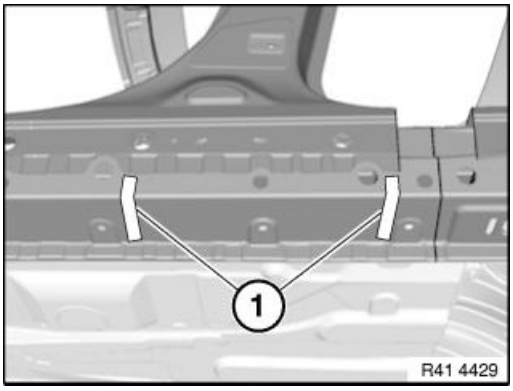
Dimension a = approx. 80 mm past centrepoint of 25 mm dia. hole.

Dimension b = approx. 200 mm from roof edge.

Dimension c = approx. 35 mm before centrepoint of hole dia. 25 mm.

Open welded connections in areas (3).

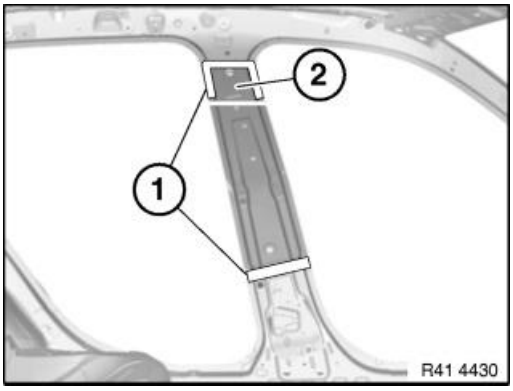
Installation note:
During installation weld new parts in areas (4).



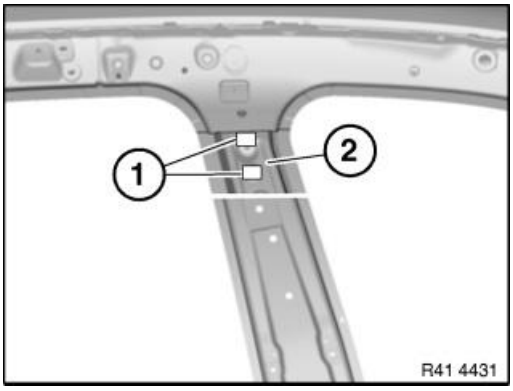
View from below.

Open welded connections in areas (1).

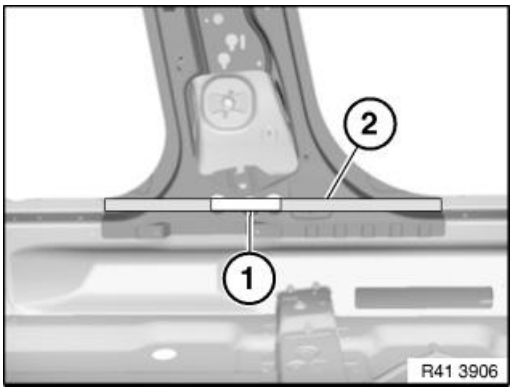
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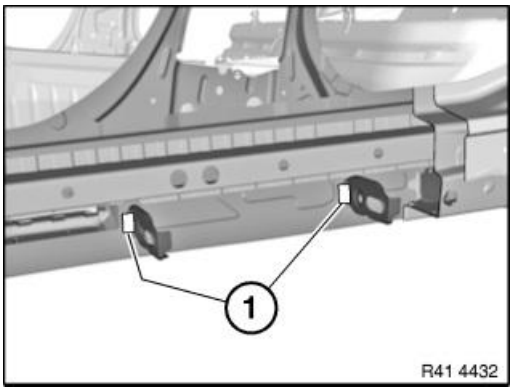
View from inside.
Open welded connections in areas (1).
Remove metal section (2).



Open welded connections (1).
Remove metal section (2).



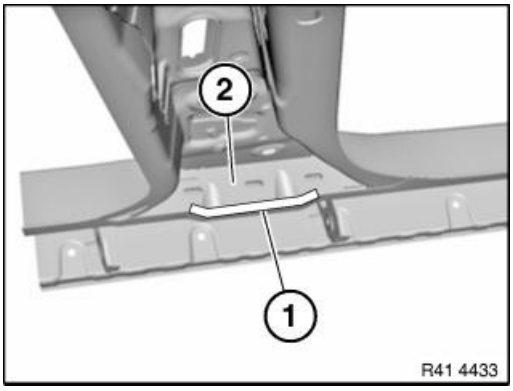
Loosen spot-welded adhesive joints in area (1).
Open bonded connection in area (2).
Remove B-pillar.



Open welded connections (1) and remove bulkhead.

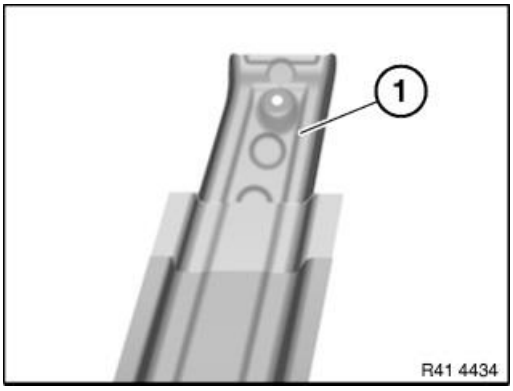
New part preparation

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Risk of fire!

Slightly remove adhesive foam of cavity sealing (2) in area (1).

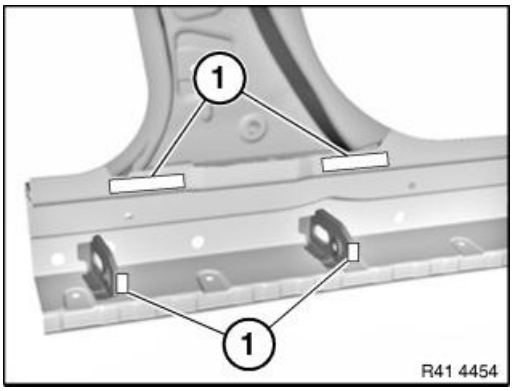


Mark severance cuts on new parts in accordance with the severance cuts on the vehicle and cut.

Attention!

Do not cut through B-pillar (1) reinforcement!

Prepare reinforcement plates at severance cuts.



Attention!

Structure bonding!

Observe preparation of bonding surfaces (1)!

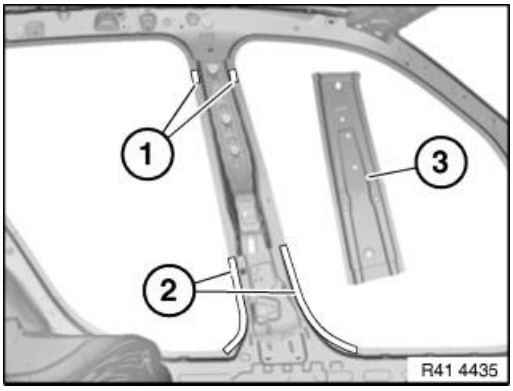
Adjust new parts to fit with alignment bracket or universal mounting.

Installation

Clean bonding surfaces with cleaning agent R1.

Apply adhesive K1 to bonding surfaces.

Install new parts and reinforcement plates with alignment bracket or universal mount and weld.



Also MAG weld B-pillar reinforcement in areas (1). (2 fillet welds, length 10 mm)**Attention!**

Only weld new parts in the areas (2) after installation of B-pillar (3)!

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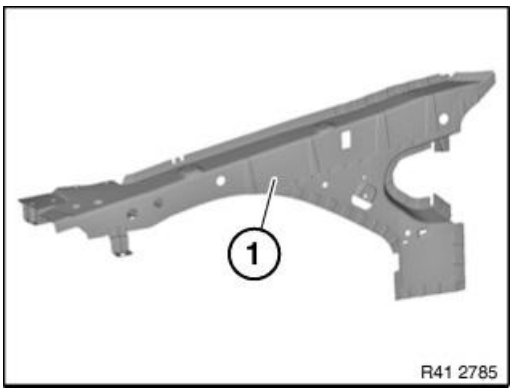
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41 11 516 Replacing front left or right carrier support (partial replacement, front side panel removed)

Read contents of Body, General.

Strip down vehicle.

Observe repair stage procedure.



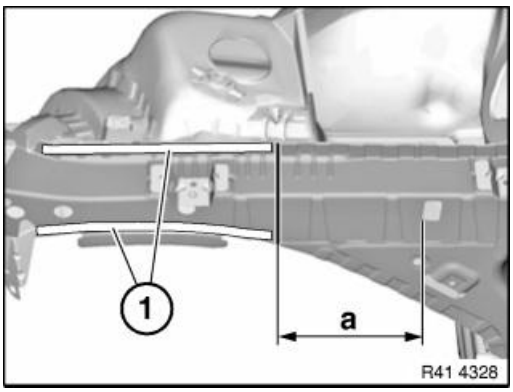
Following new body parts are required (see Electronic Parts Catalogue):

- (1) Carrier support, outer wheel arch section

Following consumables are required:

Material	Quantity
Adhesive K5a	1
Blind rivet N1	3
Blind rivet N3	6
Punch rivetN5	14
Cleaning agent R1	1
Cavity sealing wax remover	1
Sealant D1	

Removal

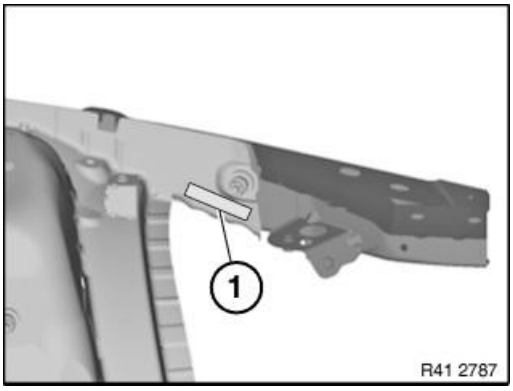


Mark severance cut in accordance with measurement a and cut carrier support.

Measurement a=165 mm from edge of rectangular hole.

Open welded connections in areas (1).

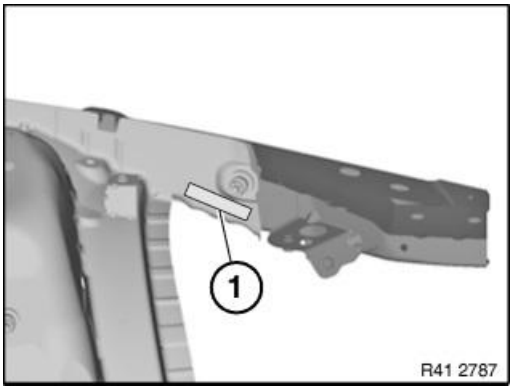
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Open welded connections in area (1).

Remove carrier support section.

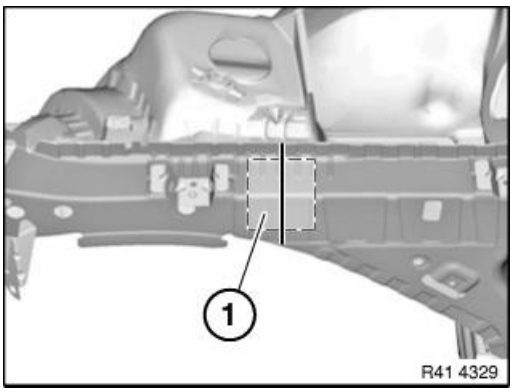
New part preparation



Make severance cut on new part in accordance with severance cut on vehicle.

Adjust new parts with add-on parts to fit and secure.

In area (1), set 2 ⌀ 6.8 mm bore holes for blind rivets N1.



In area of reinforcement plate (1) set 6 ⌀ 4.3 mm bore holes for blind rivets N3.

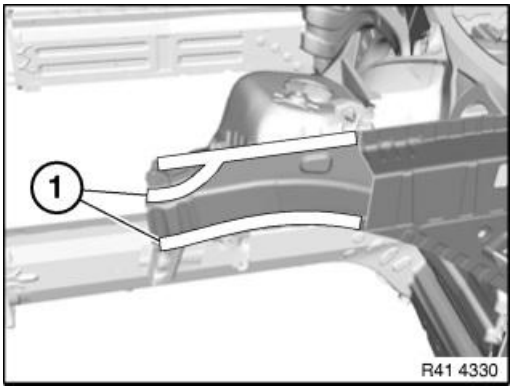
Remove new part again and deburr bore holes.

Attention!

Do not grind new part and body in area of bonding surfaces.

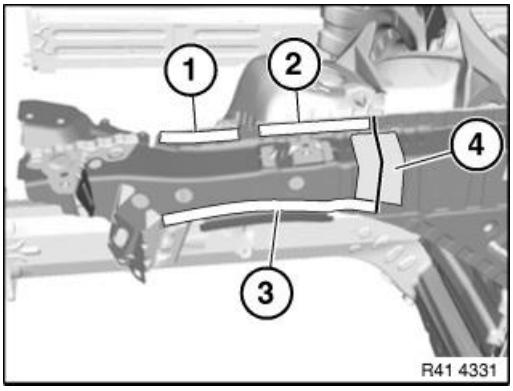
Installation

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Clean <u>all</u> bonding surfaces (1) on vehicle and on new part with cleaning agent R1.

Apply adhesive K5a to bonding surfaces.



Install new part with add-on parts and rivet.

Attention!

Three-plate connection (1)!

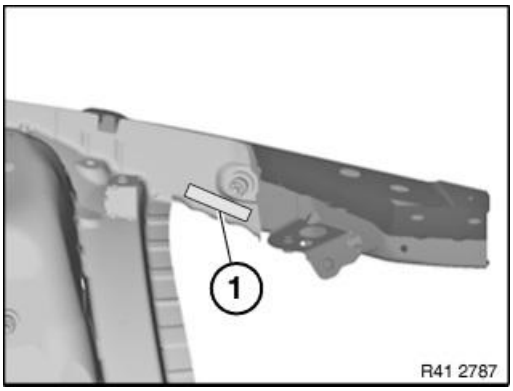
In area (1) rivet new part on both sides offset with 4 punch rivets N5.

In area (2) rivet new part with 4 punch rivets N5.

In area (2) at the level of the side wall holder, use 1 blind rivet N1.

In area (3) use 7 punch rivets N5.

In area of reinforcement plate (4) use 6 blind rivets N3.



In area (1) rivet new part with 2 blind rivets N1.

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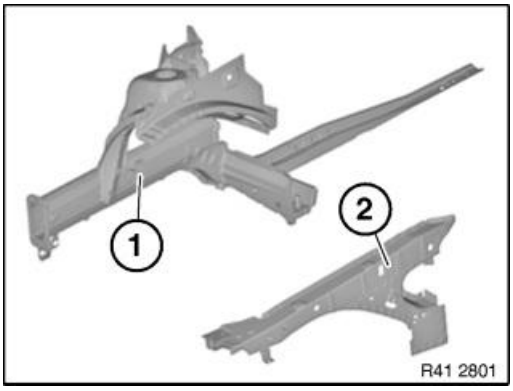
41 14 021 Replacing front left wheel arch

Read contents of Body, General.

Procedure Observe repair stage 3!

Strip down vehicle.

Place vehicle on straightening bench.



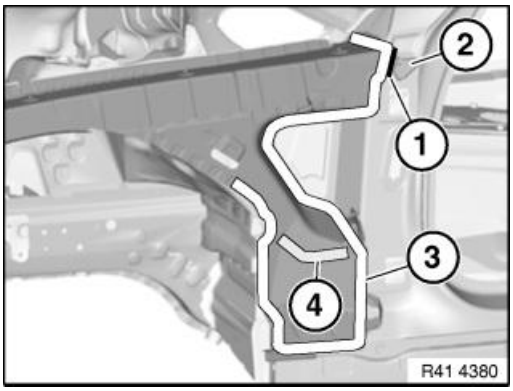
Following new body parts are required (see Electronic Parts Catalogue):

- (1) Wheel arch, front
- (2) Carrier support, outer wheel arch section

Following consumables are required:

Material	Quantity
Adhesive K1	1
Blind rivet N1	56
Punch rivetN5	39
EMC screw	4
Cleaning agent R1	1
Cavity sealing wax remover	1
Sealant D1	

Removal



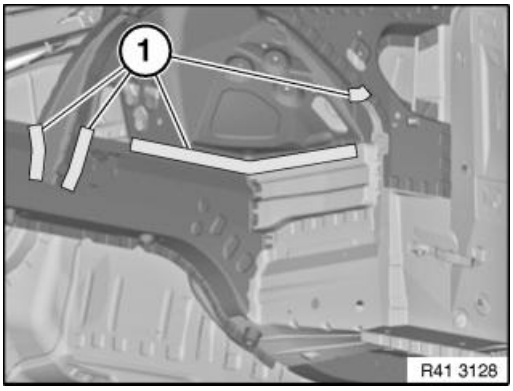
Mark severance cut (1) in front of holder (2) and cut (Holder (2) remains on vehicle).

Open welded connections in area (3).

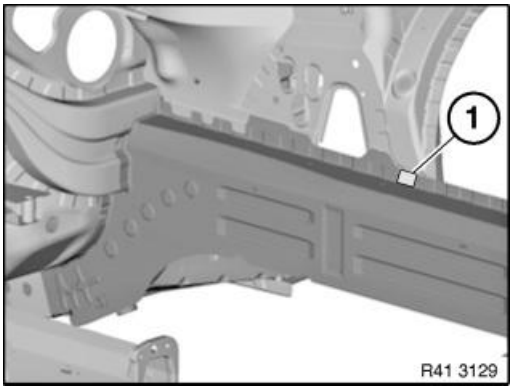
Installation note:
Mark severance cut (1) in on new part and cut. Take off holder (2).

Apply sealant to cavity sealing (4).

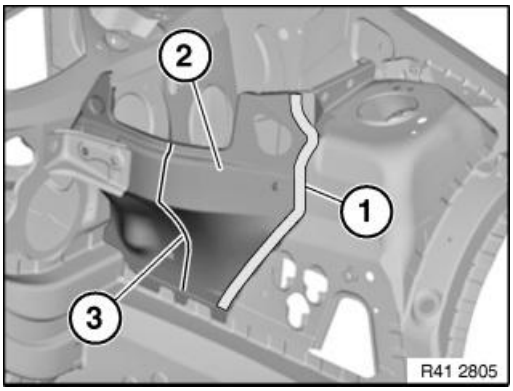
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Open welded connections in areas (1).



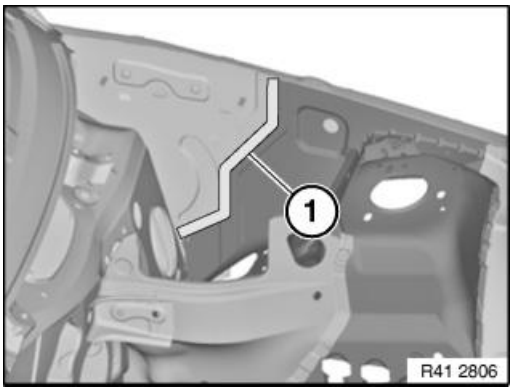
Open welded connections in area (1).



Open welded connections in area (1).*Installation note:*
If engine bulkhead (2) is damaged, cut along line (3).

Mark severance cut on new part according to severance cut on vehicle + 20 mm material extra and cut.

Bond both parts overlapping and rivet. Depending on accessibility, use punch rivets N4 and blind rivets N3.

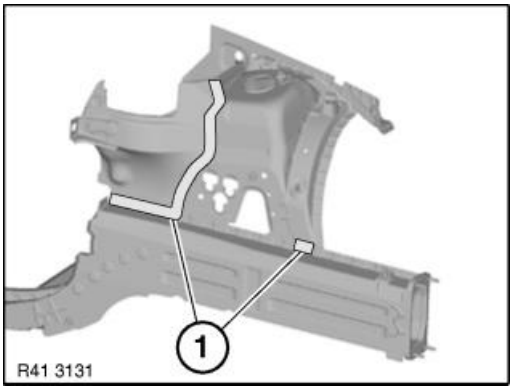


Open welded connections in area (1).

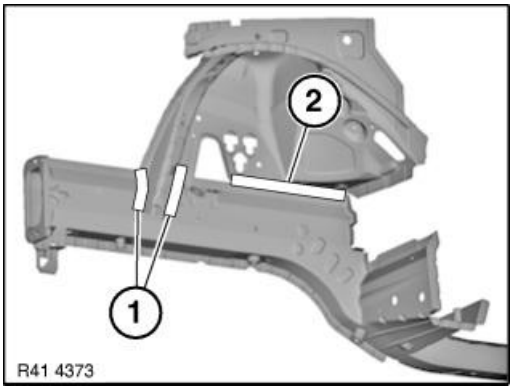
Remove the wheel arch.

New part preparation

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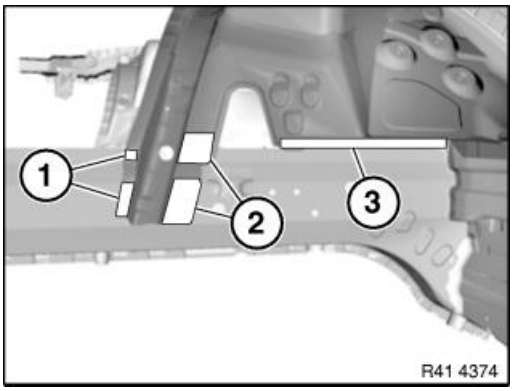


Open welded connections in area (1).



In areas (1) cut open engine support from opposite side and open welded connections.

In area (2) open welded connections from inside.

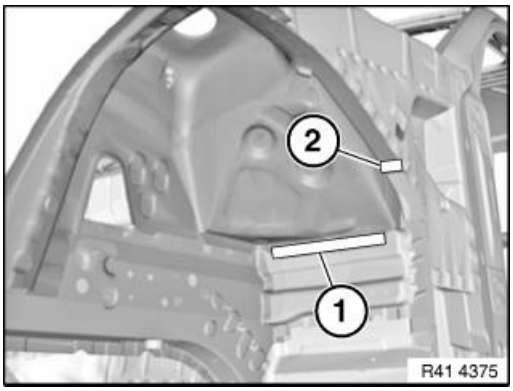


Adjust new parts to fit with alignment bracket or universal mount and secure.

Produce bore holes dia. 6.8 mm for blind rivet N1 in the areas (1) to (3):

- Area (1): 3 bore holes
- Area (2): 8 bore holes
- Area (3): 6 bore holes

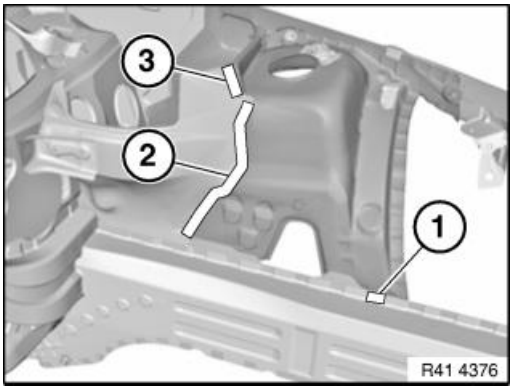
Installation note:
After hardening of adhesive install 2 EMC screws in areas (1) and (2).



In areas (1) and (2), produce bore holes dia. 6.8 mm for blind rivet N1:

- Area (1): 3 bore holes
- Area (2): 2 bore holes

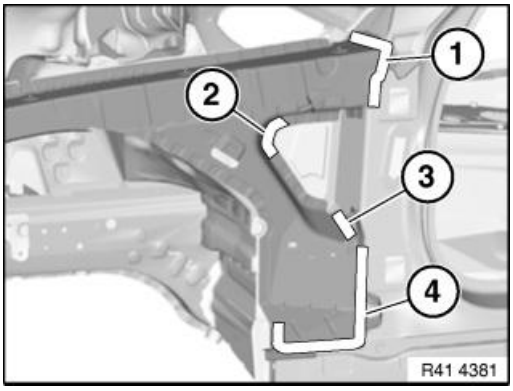
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In areas (1) and (2), produce bore holes dia. 6.8 mm for blind rivet N1:

- Area (1): 1 bore hole
- Area (2): 7 bore holes

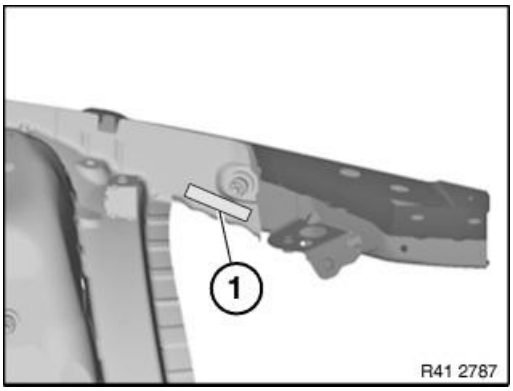
Installation note:
In area (3), 2 punch rivets N5 are used later.



Produce bore holes dia. 6.8 mm for blind rivet N1 in the areas (1) to (4):

- Area (1): 5 bore holes
- Area (2): 2 bore holes
- Area (3): 1 bore hole
- Area (4): 9 bore holes

Installation note:
After hardening of adhesive, install 2 EMC screws in areas (1) and (4).



Produce 2 bore holes dia. 6.8 mm for blind rivet N1 in area (1).

Remove all new parts and deburr holes.



Attention!

Structure bonding!

Observe preparation of bonding surfaces.



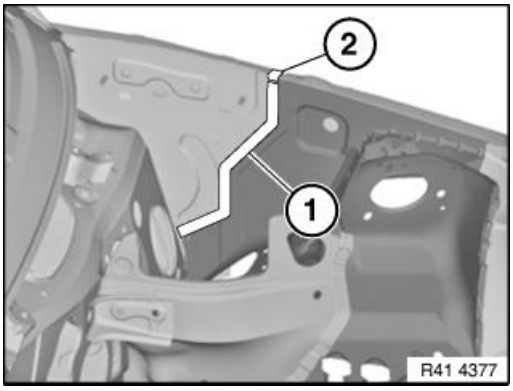
Installation

Clean bonding surfaces with cleaning agent R1.

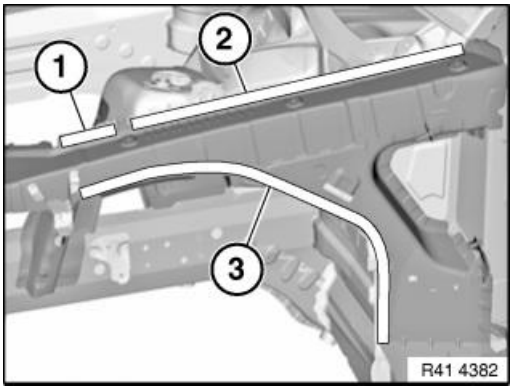
Apply adhesive K1 to bonding surfaces.

Install new parts with alignment bracket or universal mount and rivet with blind rivets.

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In area (1), weld new part to terminal 31 (ground).*Installation note:*
In area (2) 1 N5 punch rivet is used later.



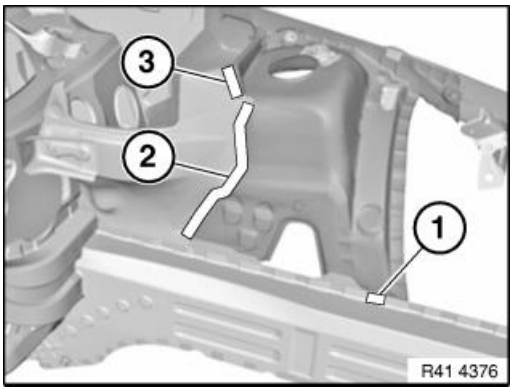
Attention!

Three-sheet-metal combination in area (1)!

In area (1) rivet new part on both sides offset with 4 punch rivets N5.

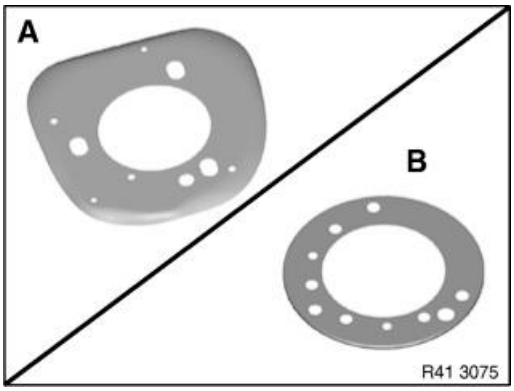
In area (2), use 14 punch rivets N5.

In area (3), use 18 punch rivets N5.



Rivet new parts with blind rivets in areas (1) and (2).

In area (3), use 2 punch rivets N5.



Installation note:
<u>Vehicles with spring strut dome plate insert:</u>

Different plate inserts are fitted, depending on the model.

- Version (A) riveted or glued
- Version (B) screwed

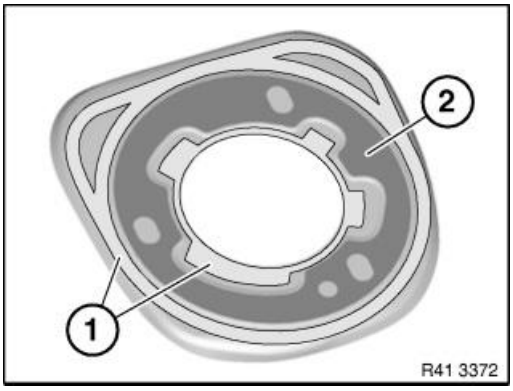
Attention!

Use only identical plate inserts on both sides of the vehicle.

Riveted version:

If damaged, the plate inserts must always be replaced with glued versions on both sides of the vehicle.

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Glued version:

Adhesive/contact surfaces of plate insert must be free of sealant, top coat and underbody protection.

Do not grind off primer.

Use adhesive gun 41 3 102 in conjunction with adhesive K3.

Apply K3 adhesive in areas (1). Do not apply any adhesive in area (2).

Secure plate insert with 3 screws and nuts for 2 hours at min. 20 °C.

Attention!

Operational strength is only achieved after 12 hours!

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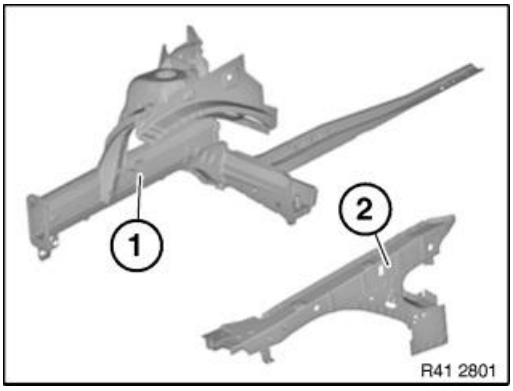
41 11 023 Replacing front section of engine support to left wheel arch

Observe procedure for repair stage 3.

Read contents of Body, General.

Strip down vehicle.

Place vehicle on straightening bench.



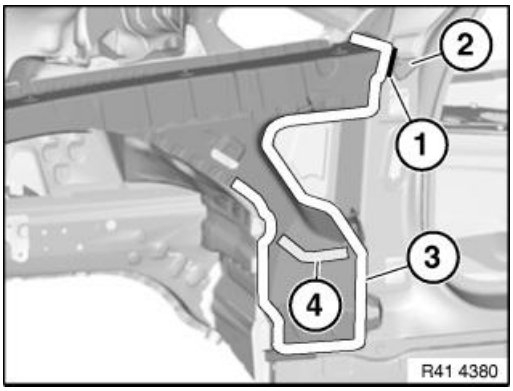
Following new body parts are required (see Electronic Parts Catalogue):

- (1) Wheel arch, front
- (2) Carrier support, outer wheel arch section

Following consumables are required:

Material	Quantity
Adhesive K1	1
Blind rivet N1	41
Punch rivetN5	39
EMC screw	2
Cleaning agent R1	1
Cavity sealing wax remover	1
Sealant D1	

Removal



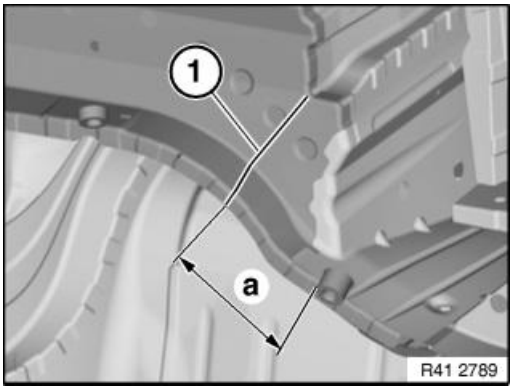
Mark severance cut (1) in front of holder (2) and cut (holder (2) remains on vehicle):

Open welded connections in area (3).

Installation note:
Mark severance cut (1) in on new part and cut. Take off holder (2).

Apply sealant to cavity sealing (4).

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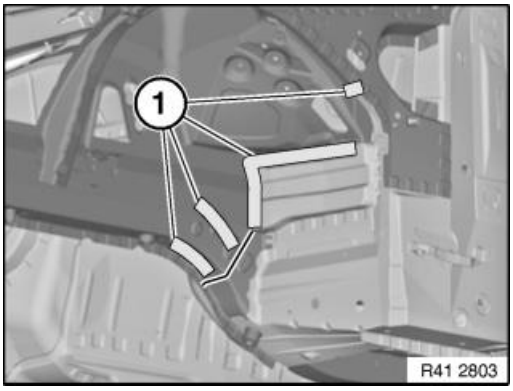


Mark severance cut (1) in accordance with dimension a and cut engine support.

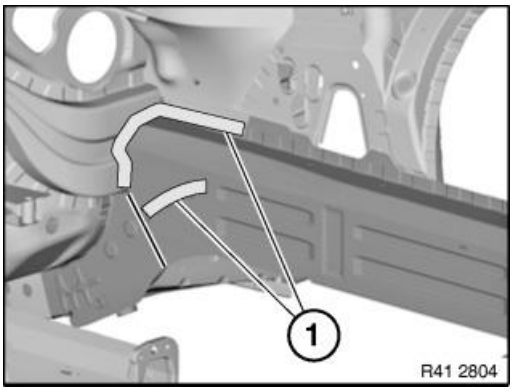
Attention!

Cut outer metal panel only.

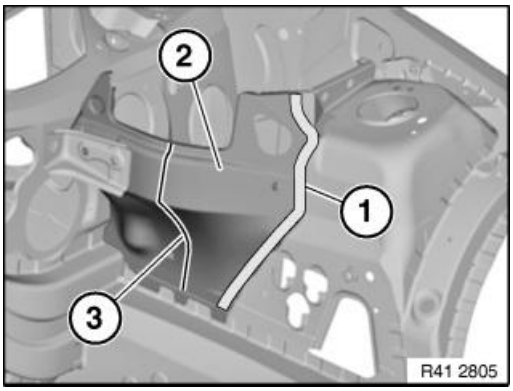
Dimension a=130 mm from front edge of bush



Open welded connections in areas (1).



Open welded connections in areas (1).

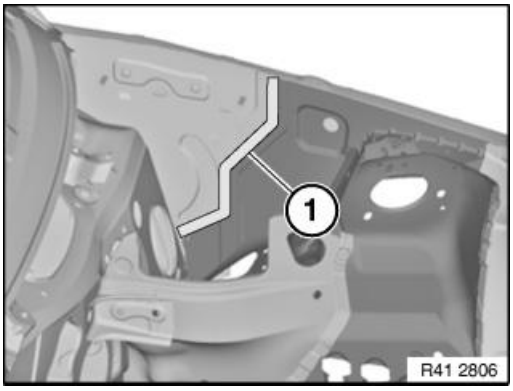


Open welded connections in area (1).*Installation note:*
If engine bulkhead (2) is damaged, cut along line (3).

Mark severance cut on new part according to severance cut on vehicle + 20 mm material extra and cut.

Bond both parts overlapping and rivet. Depending on accessibility, use punch rivets N4 and blind rivets N3.

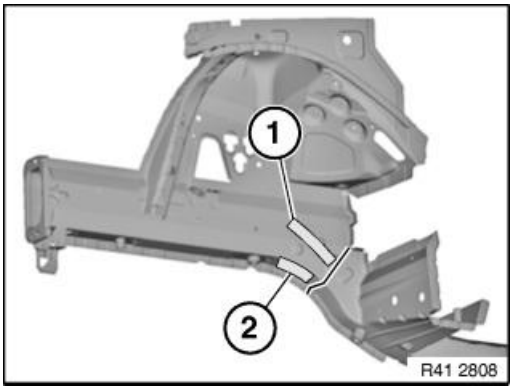
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Open welded connections in area (1).

Remove front section of engine support with wheel arch.

New part preparation



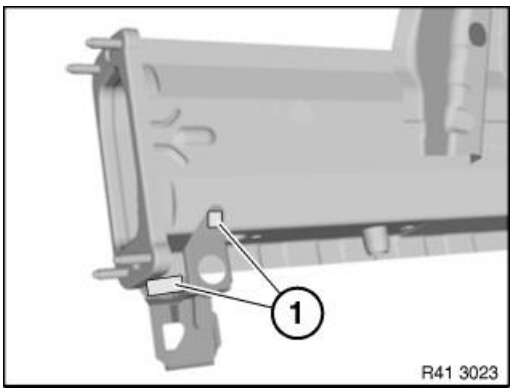
Mark and cut the severance cut on new part as per the severance cut on the vehicle.

Prepare reinforcement plates at severance cut.

Open welded connections in areas (1) on both sides.

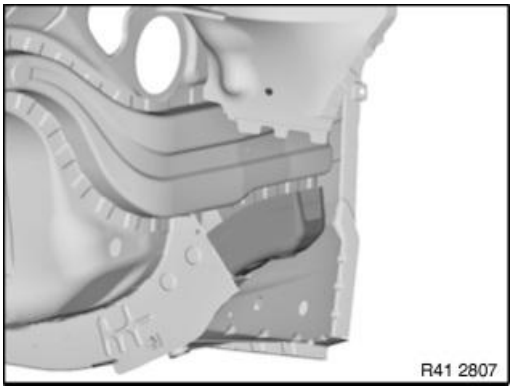
Open welded connections in area (2).

Detach remainder of reinforcement from engine support.



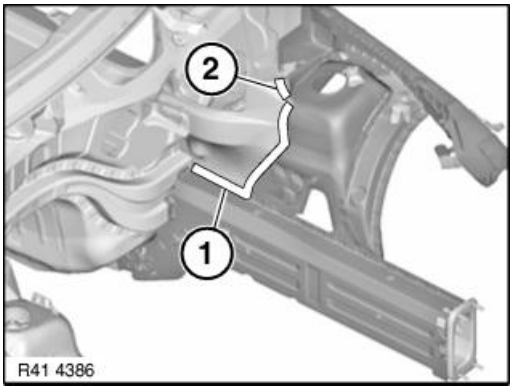
Open welded connections in areas (1).

Take off holder.



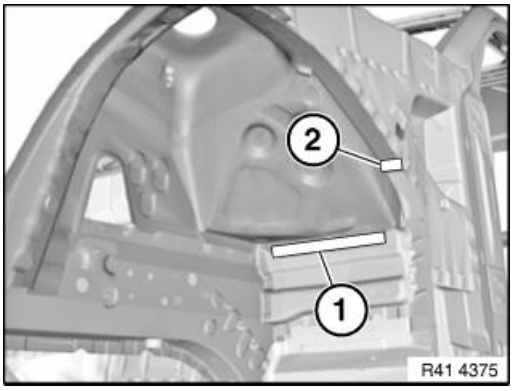
Adjust new parts to fit with alignment bracket or universal mount and secure.

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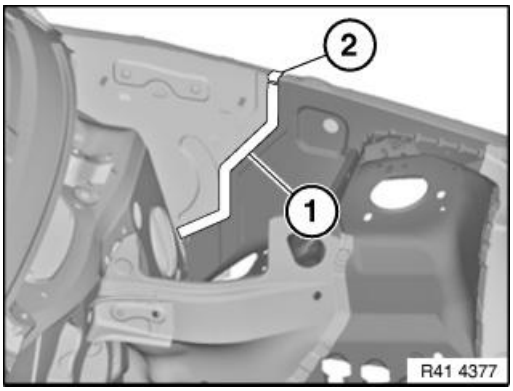
In area (1), produce 10 bore holes dia. 6.8 mm for blind rivets N1.

Installation note:
2 punch rivets N5 are used later in area (2).



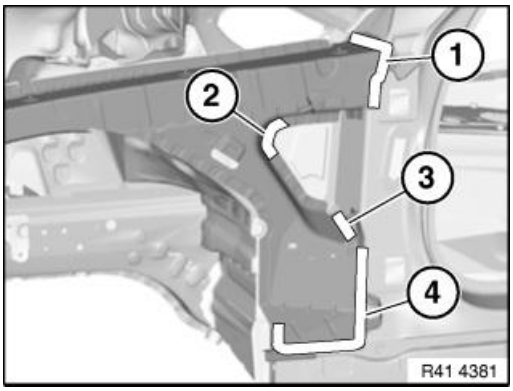
In areas (1) and (2), set ⌀ 6.8 mm bore holes for blind rivets N1:

- Area (1): 3 bore holes
- Area (2): 2 bore holes



In area (1), produce 7 bore holes dia. 6.8 mm for blind rivets N1.

Installation note:
In area (2) 1 N5 punch rivet is used later.

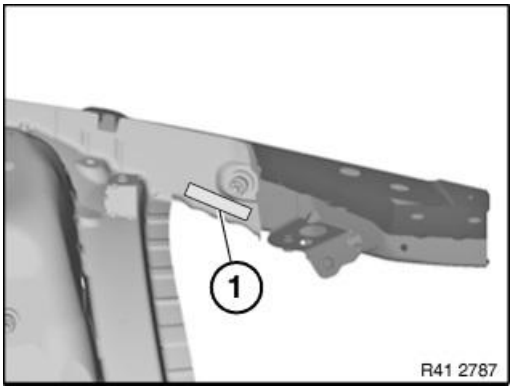


In areas (1) to (4), set ⌀ 6.8 mm bore holes for blind rivets N1:
Open welded connections in area (1).

- Area (1): 5 bore holes
- Area (2): 2 bore holes
- Area (3): 1 bore hole
- Area (4): 9 bore holes

Installation note:
After adhesive has hardened, install 2 EMC screws in areas (1) and (4).

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In area (1), set 2 ⌀ 6.8 mm bore holes for blind rivets N1.

Remove all new parts and deburr holes.

Attention!

Structure bonding!

Observe preparation of bonding surfaces.

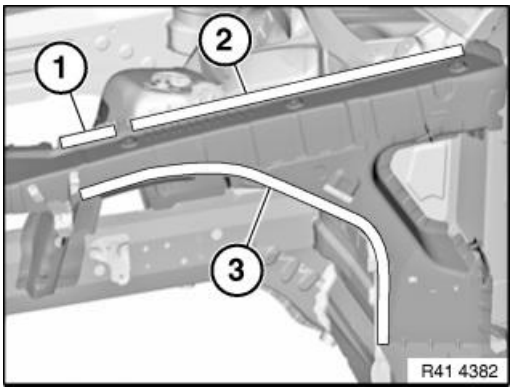
Installation

Clean bonding surfaces with cleaning agent R1.

Apply adhesive K1 to bonding surfaces.

Install new parts and reinforcement plates with alignment bracket or universal mount.

Rivet new parts with blind rivets.



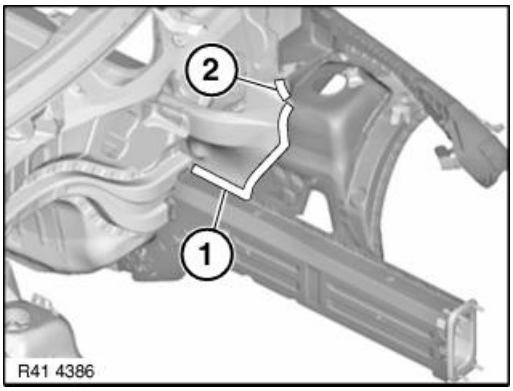
Attention!

Three-sheet-metal combination in area (1)!

In area (1) rivet new part on both sides offset with 4 punch rivets N5.

Use 14 punch rivets N5 in area (2).

Use 18 punch rivets N5 in area (3).

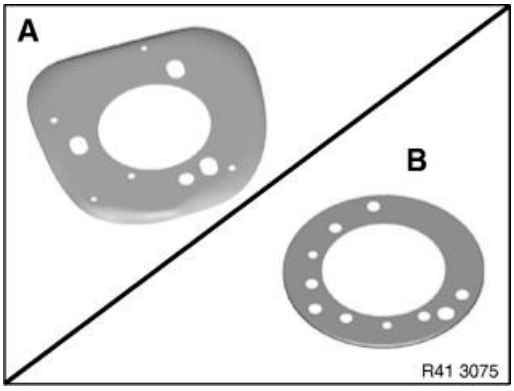


In area (1) rivet new part with blind rivets N1.

Use 2 punch rivets N5 in area (2).

In area of separating cut, weld new part of engine support and reinforcement plates.

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Note:
Vehicles with spring strut dome plate insert:

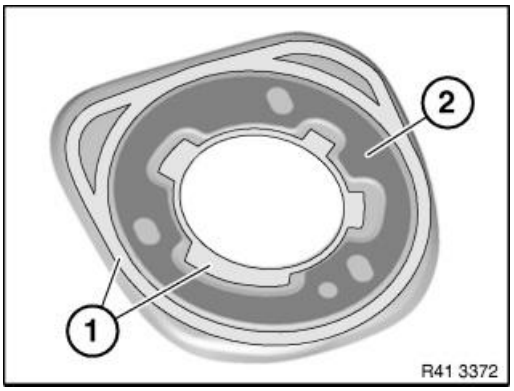
Different plate inserts are fitted, depending on the model.

- Version (A) riveted
- Version (B) screwed

Attention!
Use only identical plate inserts on both sides of the vehicle.

Riveted version:

If damaged, the plate inserts must always be replaced with screwed versions on both sides of the vehicle.



Glued version:

Adhesive/contact surfaces of plate insert must be free of sealant, top coat and underbody protection.

Do not grind off primer.

Use adhesive gun 41 3 102 in conjunction with adhesive K3.

Apply K3 adhesive in areas (1). Do not apply any adhesive in area (2).

Secure plate insert with 3 screws and nuts for 2 hours at min. 20 °C.

Attention!
Operational strength is only achieved after 12 hours!

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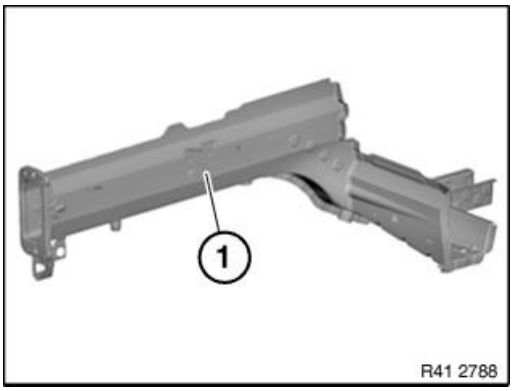
41 11 043 Replacing front section of left engine support

Observe procedure for repair stage 3.

Read contents of Body, General.

For set-up work, see the surrounding texts on KSD CD (FRU number 41 11 043).

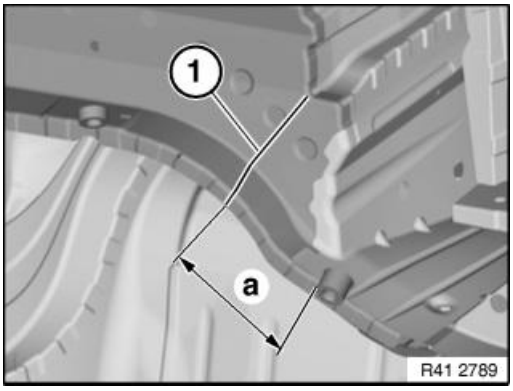
Place vehicle on straightening bench.



Following new body parts are required (see Electronic Parts Catalogue):

- (1) Engine support, front

Removal

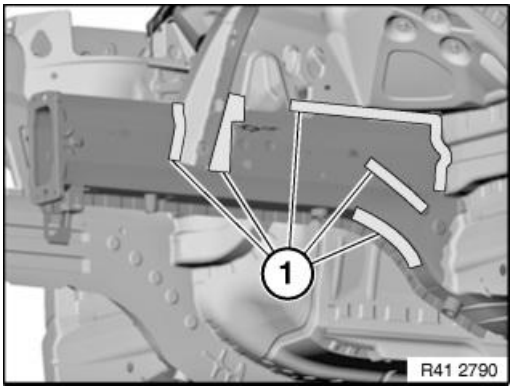


Mark severance cut (1) in accordance with dimension a and cut engine support.

Attention!

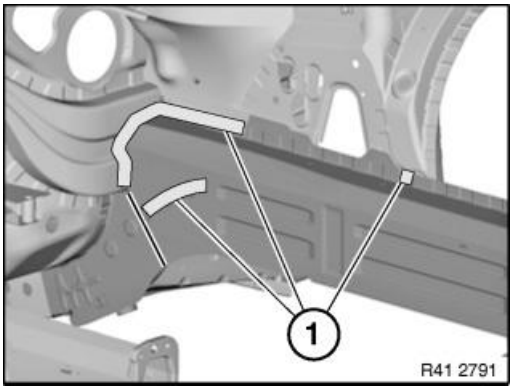
Cut outer metal panel only.

Measurement a=130 mm from front edge of bushing



Open welded connections in areas (1).

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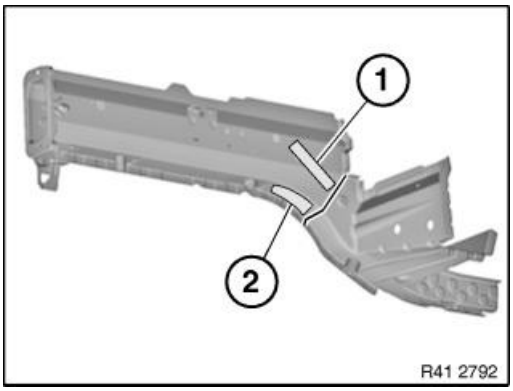
Open welded connections in areas (1).

Remove engine support front section.

New part preparation

Mark and cut the severance cut on new part as per the severance cut on the vehicle.

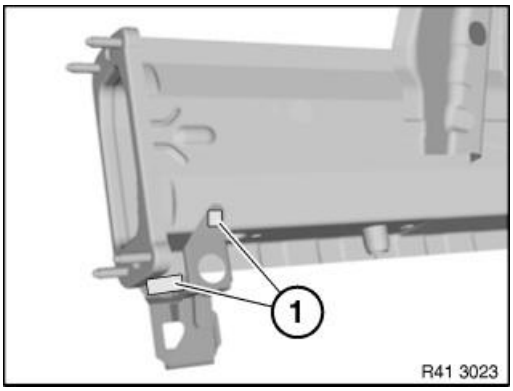
Prepare reinforcement plates at severance cuts.



Open welded connections in areas (1) on both sides.

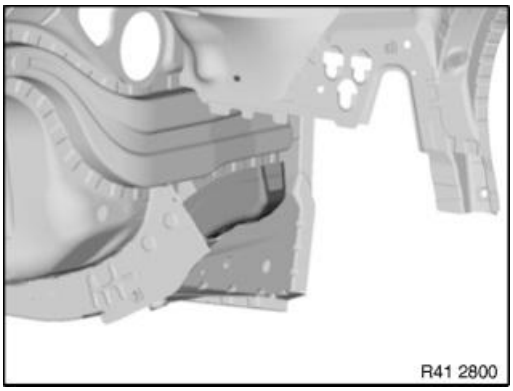
Open welded connections in area (2).

Detach remainder of reinforcement from engine support.



Open welded connections in areas (1).

Take off holder.

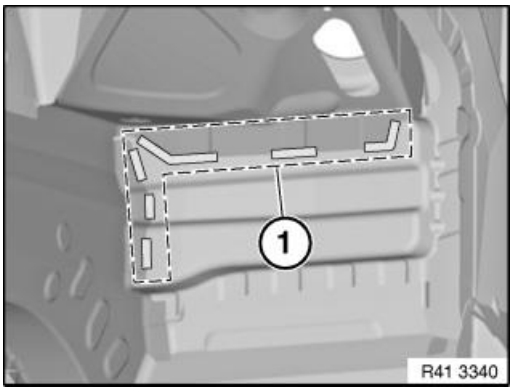


Adjust new part to fit with set of attachments or universal mount.

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Installation

Install new parts and reinforcement plates with alignment bracket or universal mount and weld.



Weld new part in area (1) with additional MAG weld seams.

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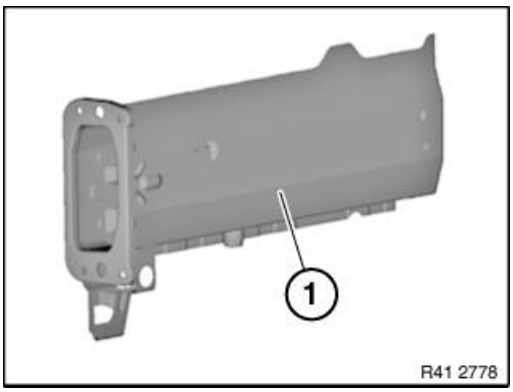
41 11 028 Replacing left engine support (partial replacement before front axle)

Observe procedure for repair stage 3.

Read contents of Body, General.

Strip down vehicle.

Place vehicle on straightening bench.



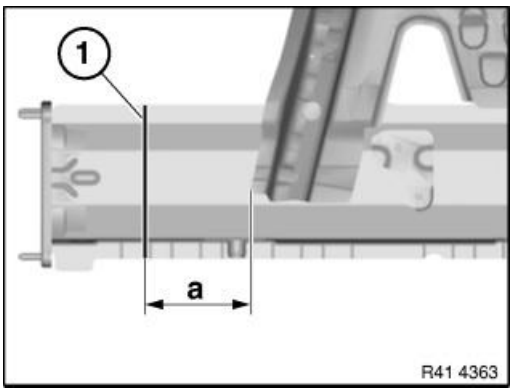
Following new body parts are required (see Electronic Parts Catalogue):

- (1) Partial section, engine support
- (2) Repair element (not shown)
- (3) Screw (not shown)

Following consumables are required:

Material	Quantity
Adhesive K1	1
Blind rivet N2	8
Cleaning agent R1	1
Cavity sealing wax remover	1
Sealant D1	

Removal



Mark severance cut (1) in accordance with dimension a and cut.

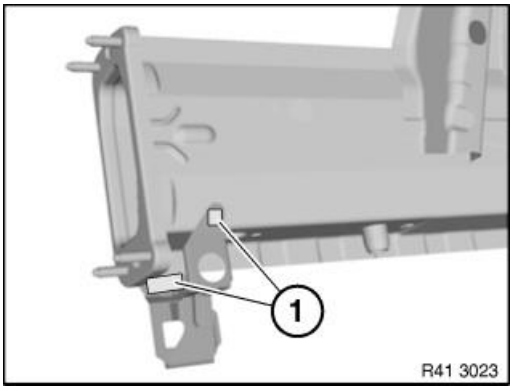
Dimension a=125 mm

Attention!

Clean engine support - measured min. 50 mm from cutting edge - thoroughly with cavity protection wax remover.

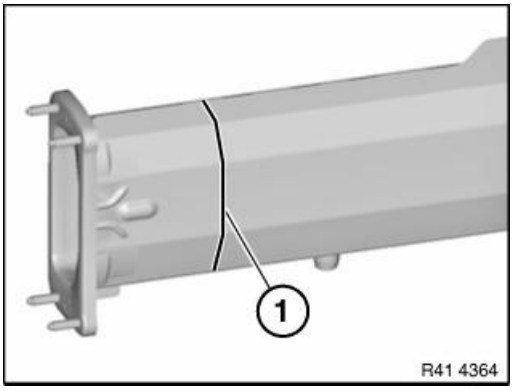
New part preparation

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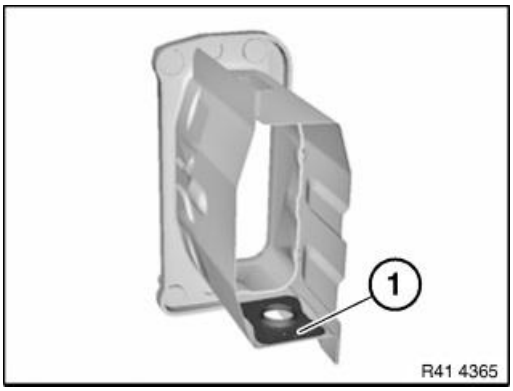


Open welded connections in areas (1).

Take off holder.



Mark severance cut (1) in accordance with severance cut on vehicle and cut.



Open welded connections on holder (1) by grinding with a belt grinder from inside.

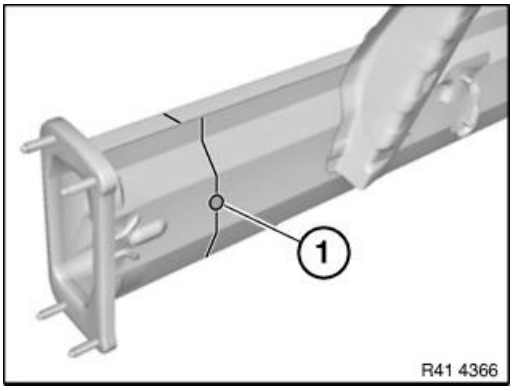
Take off holder (1).

Note:

- The inner surfaces of the engine support must be smooth. If necessary, surface-grind existing raised areas.
- Belt grinder, see Aftersales Assistance Portal (ASAP)

  Service /Technology - Workshop Equipment - Start BMW

  Or at: www.bmwbroup-wep.com



Adjust new part to fit with set of attachments or universal mount.

Drill hole (1) at side.

Take hole position from repair element.

Hole diameter 12 mm

Remove new parts.

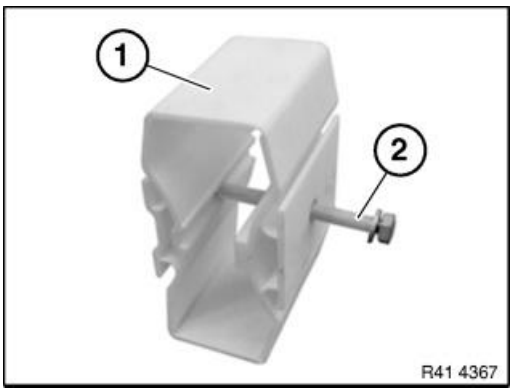
Installation *Note:*
Display without alignment bracket or universal mount.

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Attention!

To avoid contact corrosion, do not sand the repair element in the area of the bonding surfaces.

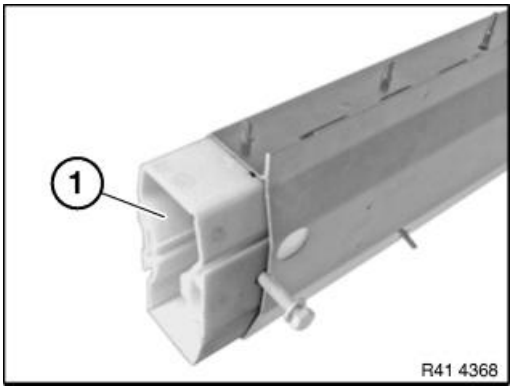
Grind bonding surfaces in engine support blank.



Insert screw (2) in repair element (1).

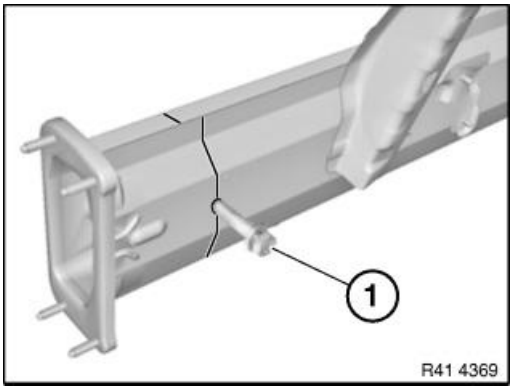
Clean all bonding surfaces with cleaning agent R1.

Apply adhesive to repair elements.



Carefully slide repair element (1) into body engine support.

Make sure there is sufficient adhesive on the bonding surfaces.

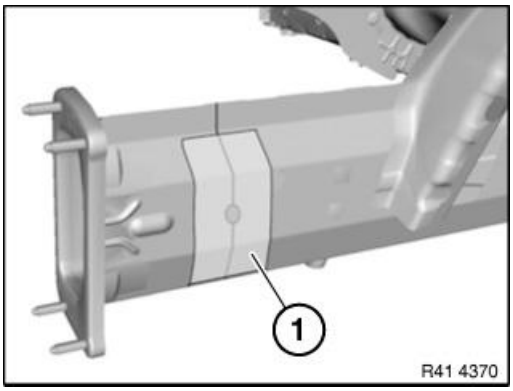


Push new part onto repair element and secure with alignment bracket or universal fixture.

Expand repair element with screw until it rests on the engine support and adhesive can be seen to emerge.

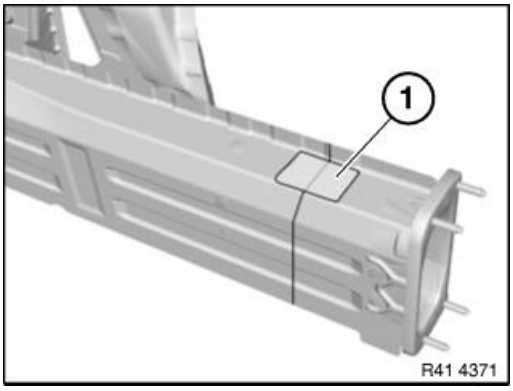
Note:
Do not tighten bolt too tightly!

Make sure the bonding surfaces are correctly aligned, especially on the engine end.



In area (1), install 6 blind rivets N2.

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In area (1), install 2 blind rivets N2.

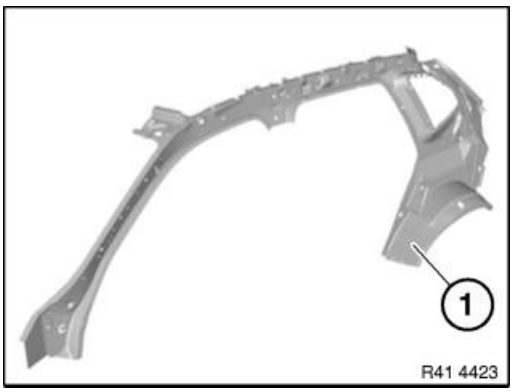
Note:
Remove the screw after the adhesive has hardened.
Seal separation point and hole with sealant.

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41 14 505 Replacing rear left outer wheel arch section partial replacement (side wall removed)

Procedure Observe repair stage 2!

Read contents of Body, General.



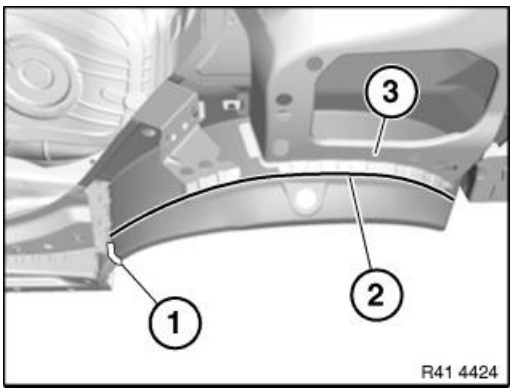
Following new body parts are required (see Electronic Parts Catalogue):

- (1) Inner side frame
- (2) Shaped part, wheel arch (not shown)

Following consumables are required:

Material	Quantity
Adhesive K5a	1
Blind rivet N3	9
Punch rivet N4	2
Cleaning agent R1	1
Cavity sealing wax remover	1
Sealant D1	

Removal



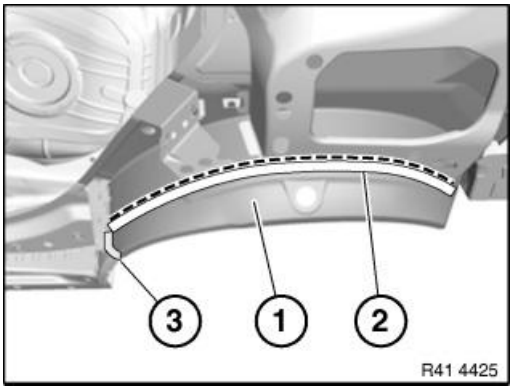
Open welded connections in area (1).

Mark severance cut (2) next to reinforcement (3) and disconnect.

New part preparation

Mark new part in accordance with severance cut on vehicle +20 mm extra material and cut (1).

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Note:
Side panel omitted for clarity.

Adjust new part (1) in combination with side wall to fit and secure.

Set 9 ⌀ 4.2 mm bore holes in the area of bonding surface (2).

Remove new part and deburr holes.

Installation note:
In area (3), use 2 punch rivets N4.

Installation

Attention!
Do not grind/sand new part in area of bonding surfaces.

Clean all bonding surfaces on new part and on vehicle with cleaning agent R1.

Apply adhesive K5a to bonding surfaces.

Install and rivet wheel arch outer part in connection with side panel.

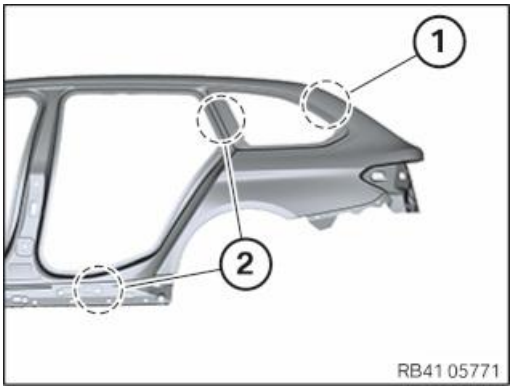
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41 35 101 Replacing rear left side panel

Read contents of Body, General.

Procedure Observe repair stage 2!

Strip down vehicle.



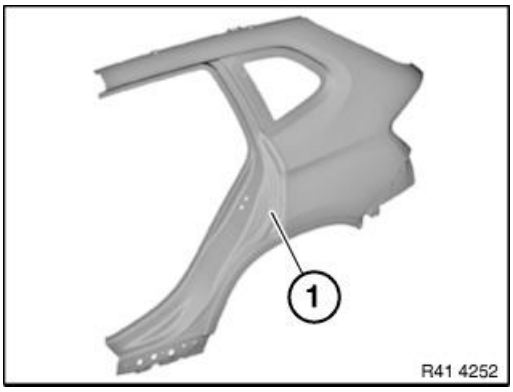
Example figure.

Due to ever increasing geometrical complexity as well as demanding reworking steps on visible separating cuts, the joining method of the reinforcement plate has changed from adhesion to welding. This change is applicable across all BMW and MINI series.

Welding is done in area (1) (incl. water channel).

Bonding is done in areas (2).

Note changed procedure.



Following new body parts are required (see Electronic Parts Catalogue):

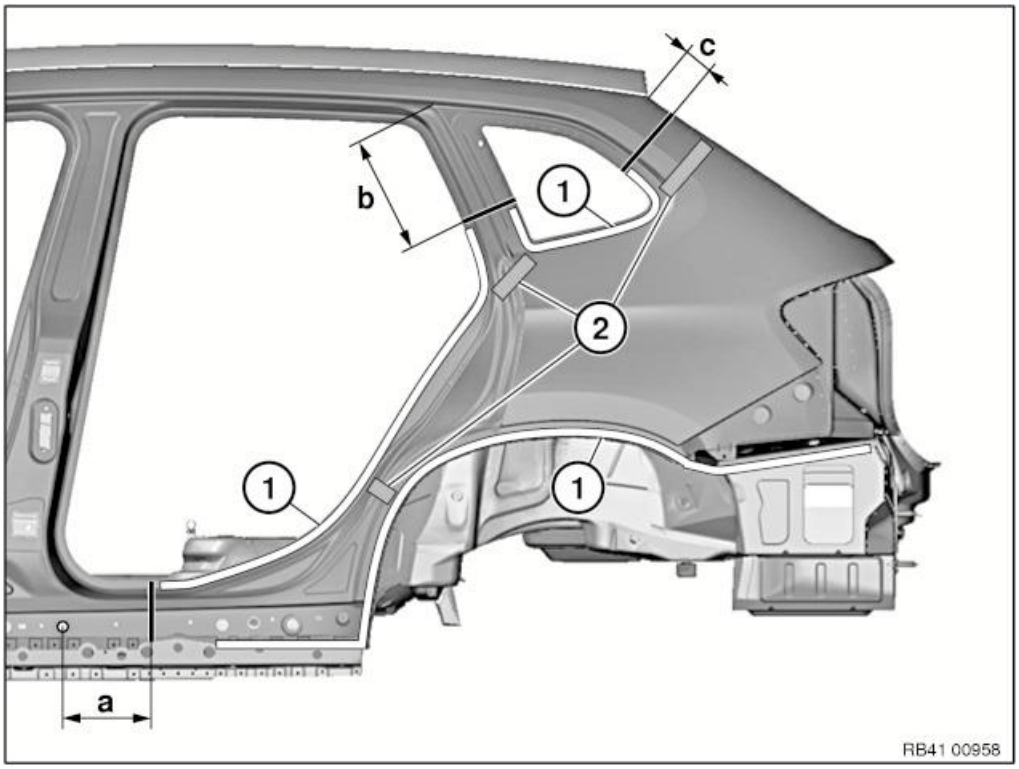
- (1) Rear side wall
- (2) Reinforcement plate, universal (not shown)
- (3) Reinforcement plate, side sill (not shown)
- (4) Reinforcement plate, C-pillar (not shown)
- (5) Reinforcement plate, D-pillar (not shown)
- (6) Mounting nut (not shown)

Following consumables are required:

Material	Quantity
Adhesive K5b	1
Adhesive K5a	1
Blind rivet N3	17
Punch rivet N4	32
Cleaning agent R1	1
Sealant D1	1
EMC screw	3

Removal

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Mark severance cuts in accordance with specified dimensions and cut.

Attention!
Cut outer panel only.

Compare position of severance cuts with reinforcement plates.

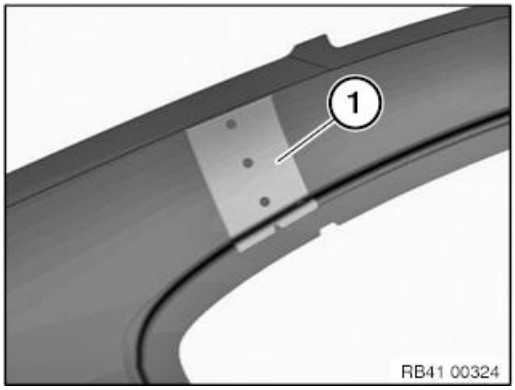
Dimension a = approx. 180 mm from centrepoint of 25 mm diameter hole.

Dimension b = approx. 220 mm from top corner of side window.

Dimension c = approx. 100 mm from corner of roof outer skin.

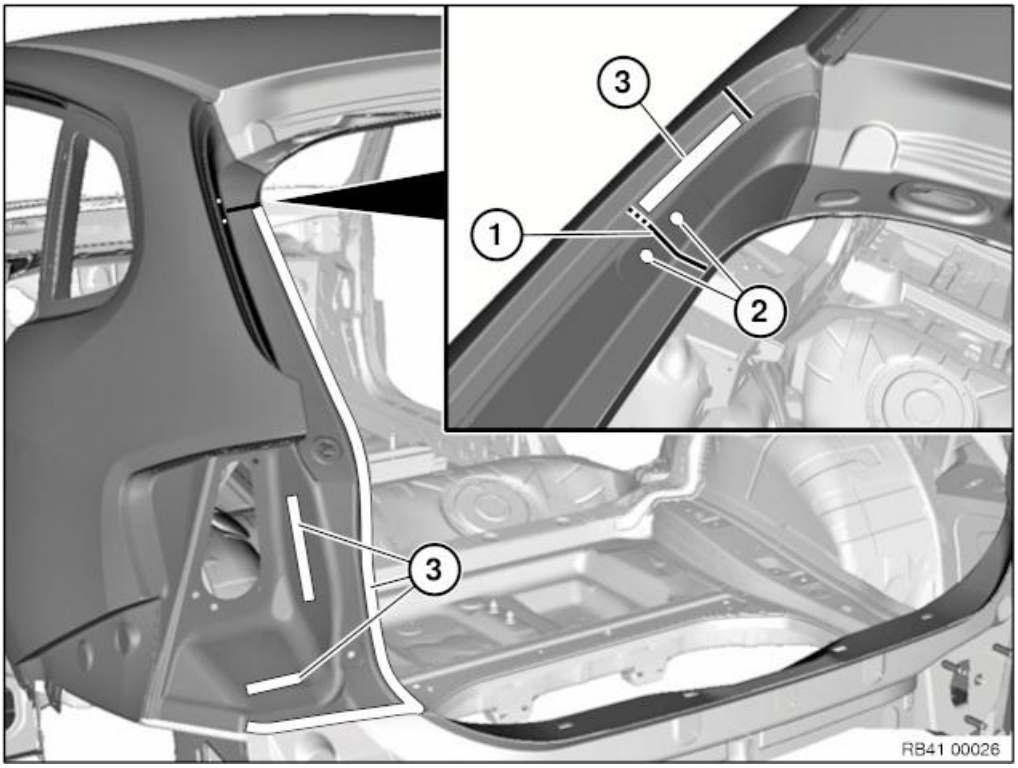
Open welded connections in areas (1).

Release side wall from cavity acoustic baffles (2).



Note:
In addition to the dimensions, the position of the separating cut can be determined with a template (1).

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Mark severance cut (1) as pictured and cut.

Attention!
Cut outer panel only.

The severance cut (1) runs down the middle between the attachment points (2) of the gas pressure spring.

Open welded connections in areas (3).

Release side wall from cavity sealing and remove.

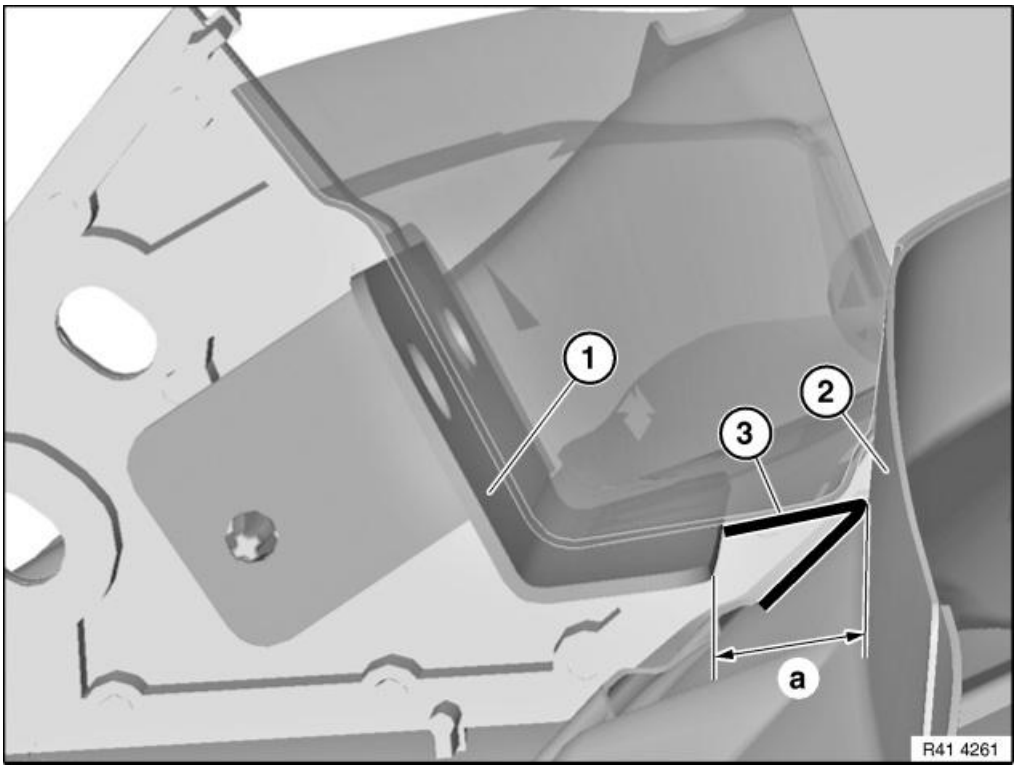
New part preparation

Remove mounting plate of gas pressure spring from new component.

Remove sill section from new part.

Mark severance cuts on the new part according to vehicle and cut.

Prepare reinforcement plates at all severance cuts.



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Detail view of D-pillar water channel with removed side wall:

(1) Mounting plate of the gas pressure spring

(2) Side frame, inside rear

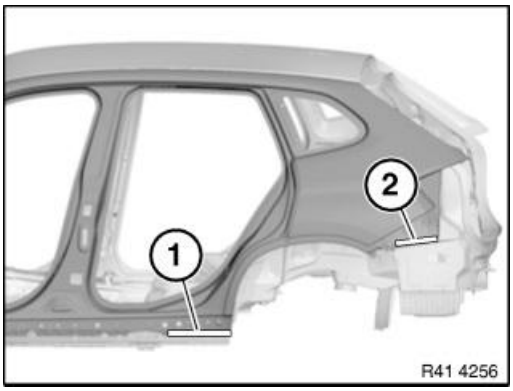
(3) Support bracket made of universal reinforcement plate

Make support bracket (3) from universal reinforcement plate for the water channel in area a between mounting plate of gas pressure spring (1) and inner side frame (2).

Adjust the support bracket as pictured.

Drill 2 ⌀ 4.2 mm diameter bore holes for the blind rivet through the inner side frame and support bracket.

Rivet the support bracket to the inner side frame.

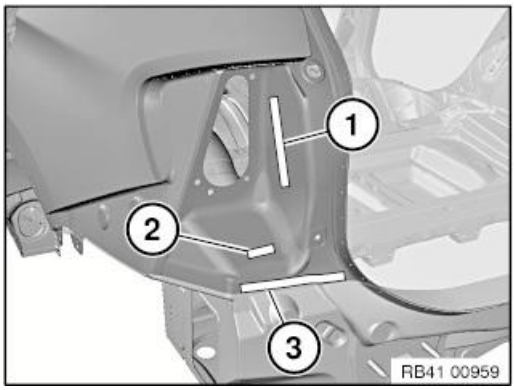


Adjust new part to fit and secure.

In areas (1) and (2), drill ⌀ 4.2 mm bore holes for blind rivet:

Area (1): 5 bore holes

Area (2): 3 bore holes



Set bore holes ⌀ 4.2 mm for blind rivet in areas (1) to (3):

Area	Number
1	3
2	1
3	3

Remove new part and deburr holes.



Attention!

Do not grind/sand new part in area of bonding surfaces.

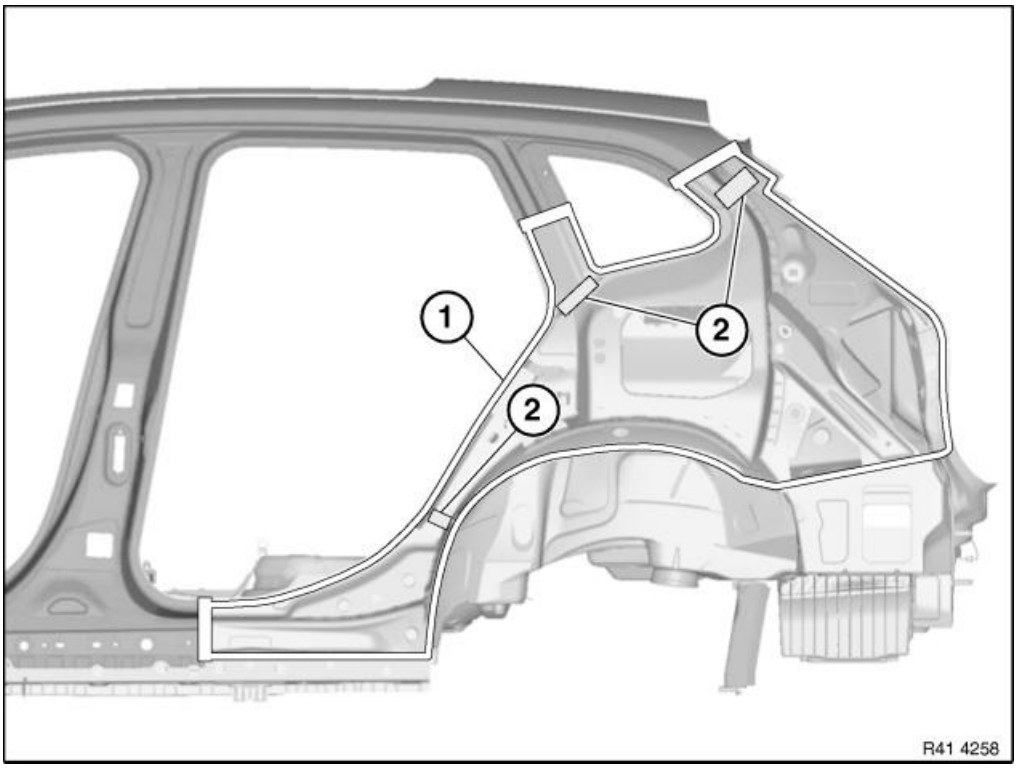


Installation

Clean all bonding surfaces on vehicle, on the new part and on the reinforcement plates with cleaning agent R1.

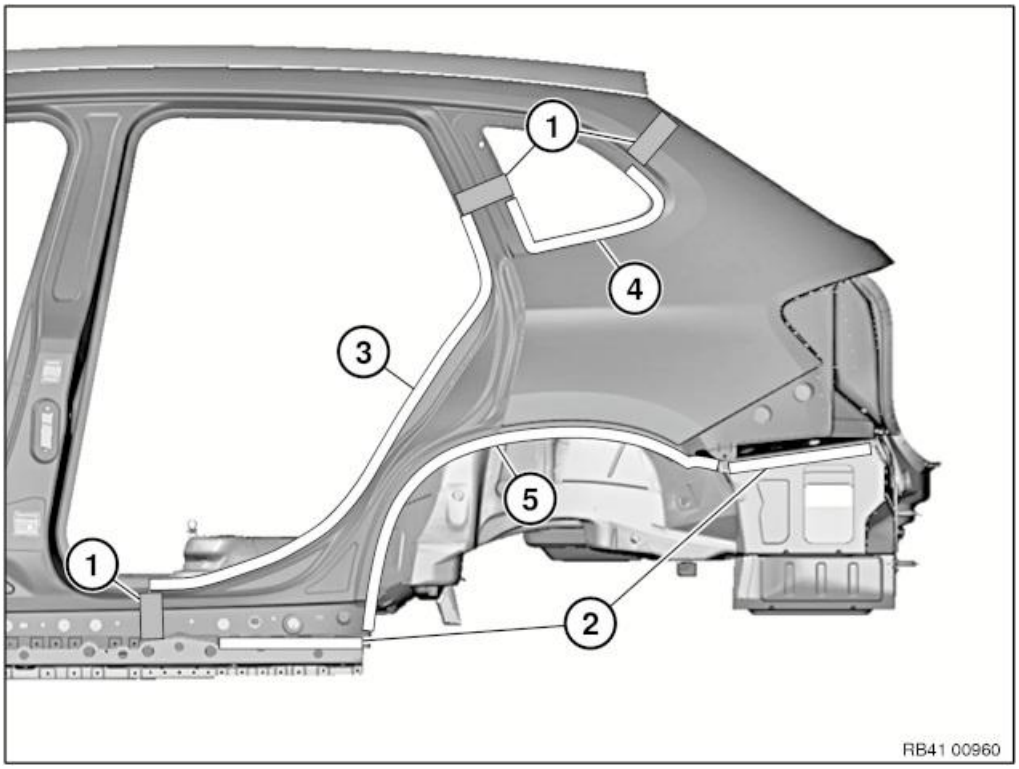
Apply adhesive to reinforcement plates. Install reinforcement plates.

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Apply adhesive in areas (1).

Apply sealant to D1cavity sealing in areas (2).



Install side panel with a second person helping.

Note:
When installing side panel, make sure there is sufficient adhesive on bonding surfaces.

After adjusting side panel to fit, tighten nuts of reinforcement plates (1).

Secure side wall next to the reinforcement plates with gripping pliers.

Rivet side panel with blind rivets in areas (2).

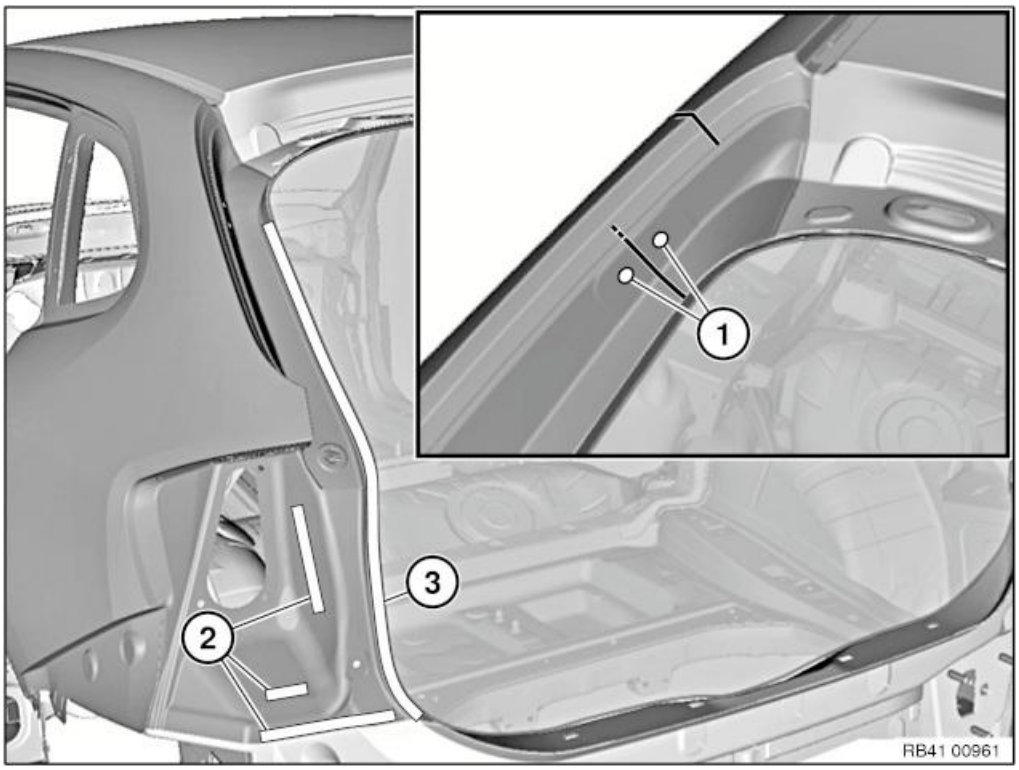
In areas (3) to (5), use punch rivet N4.

Area	Number
3	10

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4	5
5	8

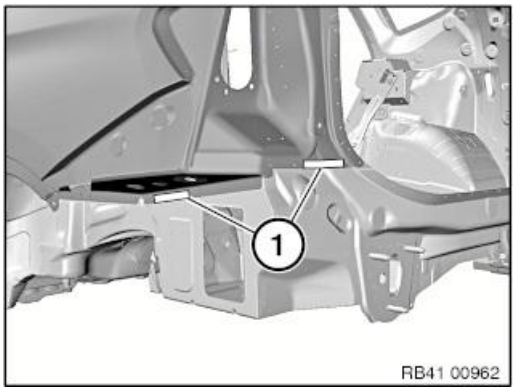
Weld the separation point on the D-pillar.



To secure side wall, insert screws (1) in mounting plate.

Rivet side panel with blind rivets in areas (2).

Use 9 punch rivets N4 in area (3).



After adhesive has hardened, install one EMC screw in each case in areas (1).

Additionally, install EMC screw in sill area.

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41 11 023 Stripping down - Replacing front section of engine support with left wheel arch

Note:
Owing to the different engine variants and equipment specifications, not all the components are taken into consideration.

The following list essentially represents the disassembly sequence.

- Disconnect battery earth lead (flat rate unit number: 61 20 900)
- Detach bumper panel (FRU number: 51 11 156)
- Remove headlight (flat rate unit number: 63 12 010)
- Remove bumper support (flat rate unit number: 51 11 050)
- Remove front panel (flat rate unit number: 41 33 040)
- Remove radiator (flat rate unit number: 17 11 000)
- Remove capacitor for air conditioning (flat rate unit number: 64 53 550)
- If necessary, remove charge air cooler (flat rate unit number: 17 51 000)
- If necessary, remove coolant expansion tank (flat rate unit number: 17 10 000)
- If required, remove air filter housing.
- Remove cooling loop for hydraulic steering (flat rate unit number: 17 11 370)
- Remove cowl panel cover (flat rate unit number: 51 13 116)
- Remove left wheel arch cover (front section) (flat rate unit number: 51 71 038)
- Remove left wheel arch cover (rear section) (flat rate unit number: 51 71 039)
- Remove left side panel (flat rate unit number: 41 35 010)
- Remove engine (flat rate unit number: 11 00 050)
- Remove and install complete front axle (flat rate unit number: 31 10 000)
- Remove brake booster (flat rate unit number: 34 33 505)
- Release left wiring harness

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41 11 028 Stripping down - Replacing left engine support (partial replacement before front axle)

Note:
Owing to the different engine variants and equipment specifications, not all the components are taken into consideration.

The following list essentially represents the disassembly sequence.

- Clamp off battery cable from negative terminal
- Detach bumper panel (FRU number: 51 11 156)
- Remove bumper support (flat rate unit number: 51 11 050)
- Remove and install intake filter housing (flat rate unit number: 13 71 000)
- Remove front panel (flat rate unit number: 41 33 040)
- Remove and install left wheel arch cover (front section) (flat rate unit number: 51 71 038)
- Remove and install condenser for air conditioning (flat rate unit number: 64 53 550)
- Remove and install cooling loop for hydraulic steering (flat rate unit number: 17 11 370)
- If necessary, remove and install charge air cooler (flat rate unit number: 17 51 000)
- Partially release left wiring harness

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41 11 516 Stripping operations - Replacing left carrier support

Note:
Owing to the different engine variants and equipment specifications, not all the components are taken into consideration.

The following list basically represents the removal sequence.

- Disconnect battery negative lead (FR number: 6120900)
- Remove bumper trim (FR flat rate number: 51 11 156)
- Remove headlight (FR number: 63 12 010)
- Remove support for bumper trim (FR flat rate number:51 11 050)
- Remove front panel (FR number: 41 33 040)
- Remove radiator (FR number: 17 11 000)
- Remove A/C system condenser (FR number: 64 53 550)
- If necessary, remove intercooler (FR number: 17 51 000)
- Remove hydraulic steering cooling coil (FR number: 17 11 370)
- Remove left wheel arch cover (front section) (FR number: 51 71 038)
- Remove left wheel arch cover (rear section) (FR number: 51 71 039)
- If necessary, remove intake silencer housing (FR number: 41 35 111)
- If necessary, remove coolant expansion tank (FR number: 17 11 100)
- Partially release left wiring harness

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41 ... 0 Notes on the repair technique used in the main group 41

Two different repair techniques are used in body repair.

These are welding and bonding/riveting.

If the repair instructions do not specify a repair technique, then welding must **always** be used.

The bonding/riveting repair technique is **always** described in detail in the repair instructions.

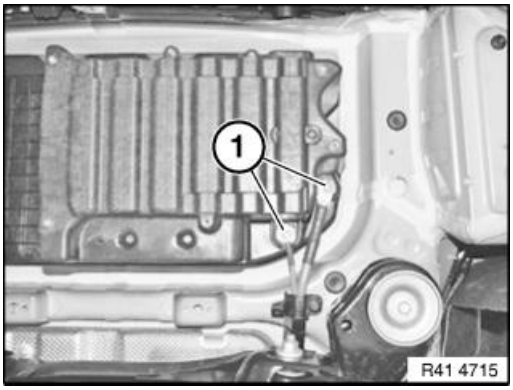
Quality standards must be met.

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51 71 ... Removing and installing/replacing multifunction pan

Necessary preliminary tasks:

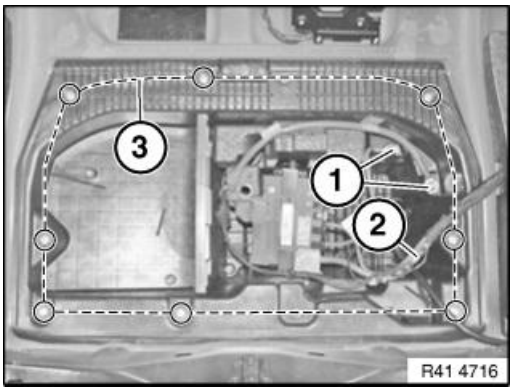
- Remove top trim from tail panel
- Remove battery
- Remove bottom covers
- Remove underbody panelling



View from below:

Unscrew nuts (1).

Tightening torque 61 12 3AZ .

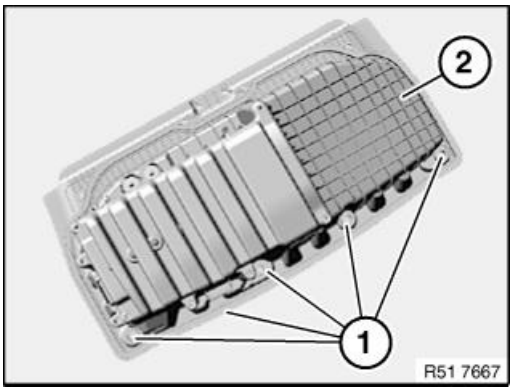


Unscrew nuts (1).

Release battery wiring harness (2) and lay to one side.

Tightening torque 61 12 3AZ .

Release rivet joints (3) and remove multifunction pan.



Installation:
Seals (1) on multifunction pan (2) must be replaced each time they are removed.

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41 12 535 Replacing complete rear luggage compartment floor (tail panel removed)

Read contents of Body, General.

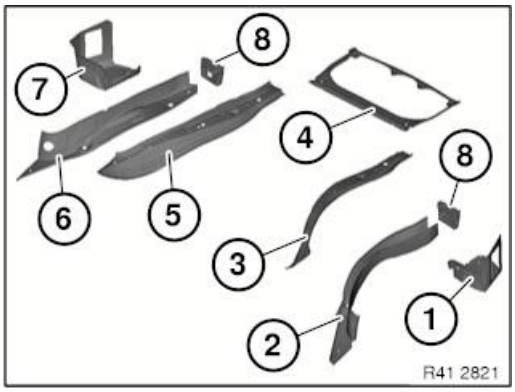
Strip down vehicle.

Remove or cover those vehicle components in the repair area which are susceptible to heat or dust.

Use only an approved spot-welding apparatus for repairs!

Place vehicle on straightening bench.

Observe procedure for repair stage 3.



Following new body parts are required (see Electronic Parts Catalogue):

- (1) Luggage compartment floor, left section
- (2) Frame side member, left
- (3) Frame side member, top left
- (4) Frame, luggage compartment floor
- (5) Frame side member, top right
- (6) Frame side member, right
- (7) Luggage compartment floor, right
- (8) Bumper mounting, left and right

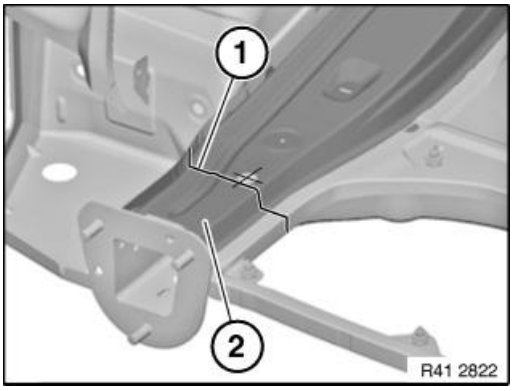
Following consumables are required:

Material	Quantity
Adhesive K5b	1
Cleaning agent R1	1
Blind rivet N3	16
Punch rivet N5	8
EMC screw	8
Sealant D1	
Cavity sealing wax remover	

Removal

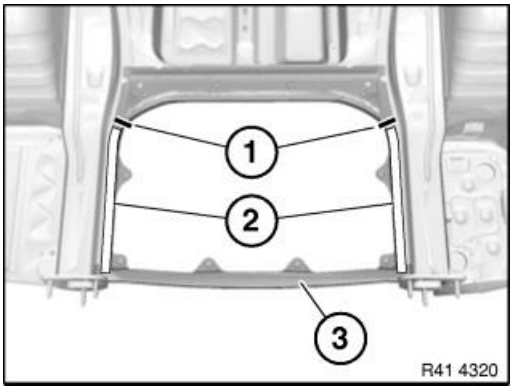
Carry over the work steps shown symmetrically to the other side of the car.

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Mark severance cuts (1) at edge of 20 mm dia. bore hole.

Cut side member (2).

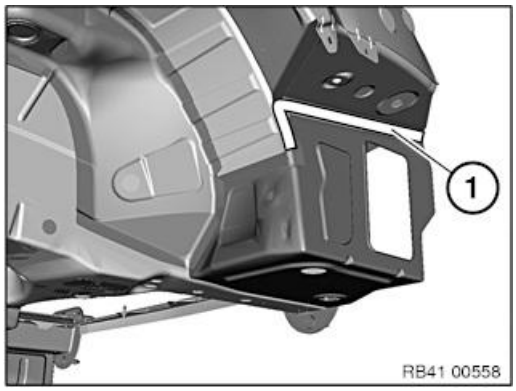


Mark severance cuts (1) and cut.

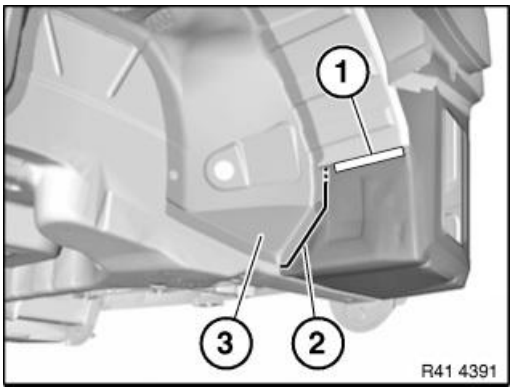
Attention!

Cut only outer plates.

Open welded connections in areas (2) and remove luggage compartment floor (3).



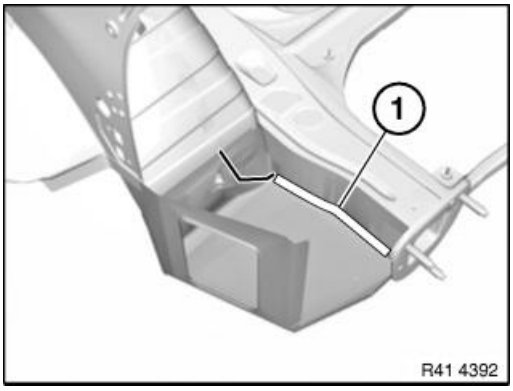
Open welded connections in area (1).



Open welded connections in area (1).

Mark severance cut (2) next to reinforcement (3) and disconnect.

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Open welded connections in area (1).

Remove luggage compartment floor and side member.

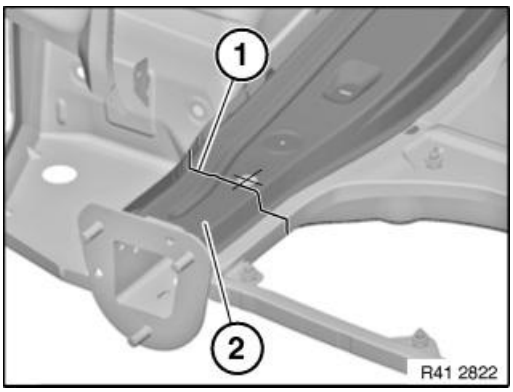
Note:
Side wall hidden for purposes of clarity.

Installing side members

Carry over the work steps shown symmetrically to the other side of the car.

Adjust new parts to fit with alignment bracket or universal mounting.

Before welding in side member, also adjust tail panel, tailgate and rear lights to fit.



Weld reinforcement plates at the severance cuts (1).

Cut side member (2).

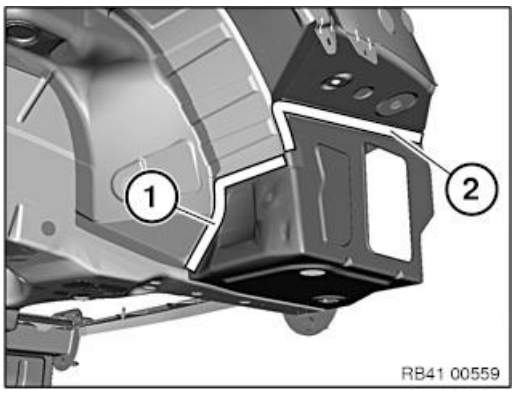
New part preparation process for bonding

Carry over the work steps shown symmetrically to the other side of the car.

Mark severance cut on luggage compartment floor frame in accordance with severance cut on vehicle + 15 mm extra material and cut.

Mark severance cuts on outer luggage compartment floor in accordance with severance cuts on vehicle + 15 mm extra material and cut.

Adjust new part in combination with tail panel to fit and secure.



In areas (1) and (2), produce 4 bore holes dia. 4.2 mm in each case for blind rivets.

Remove new parts and deburr bore holes.

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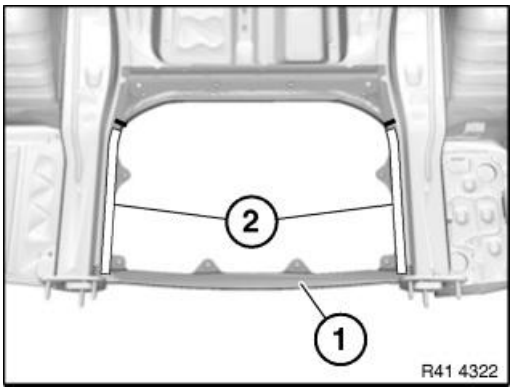
Attention!

Do not grind new parts and body in area of bonding surfaces.

Installing luggage compartment floor

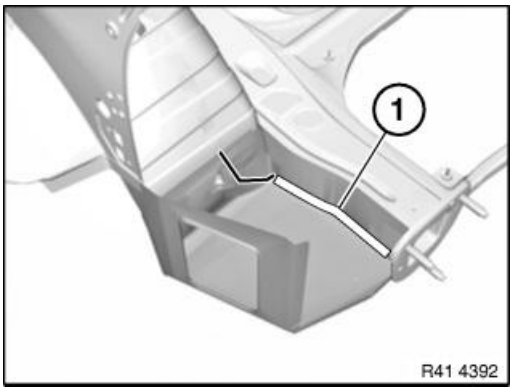
Clean all bonding surfaces on new part and on vehicle with cleaning agent R1.

Apply adhesive to bonding surfaces.



Luggage compartment floor frame:

Install luggage compartment floor (1) and rivet in the areas (2) with 8 punch rivetsN5.



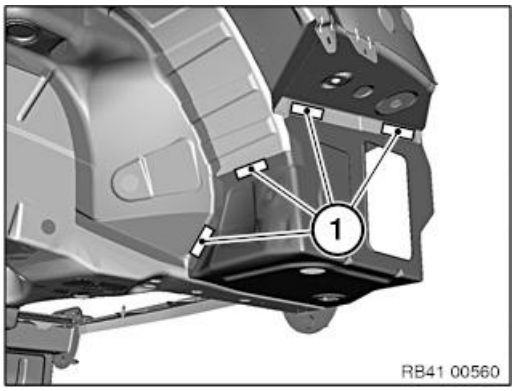
Luggage compartment floor, left and right:

Ensure to apply sufficient adhesive to the bonding surfaces when installing the new part!

Install new part and rivet with blind rivets.

In area (1) secure luggage compartment floor until adhesive has hardened at side member.

Note:
Side wall hidden for purposes of clarity.



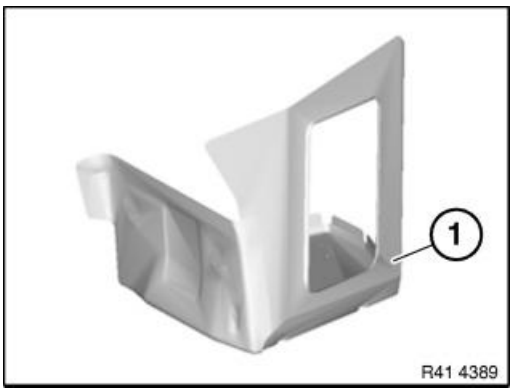
After hardening of the adhesive install 4 EMC screws in the areas (1).

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41 12 651 Replacing left luggage compartment floor (tail panel or side wall removed)

Read contents of Body, General.
Strip down vehicle.

Procedure Observe repair stage 2!



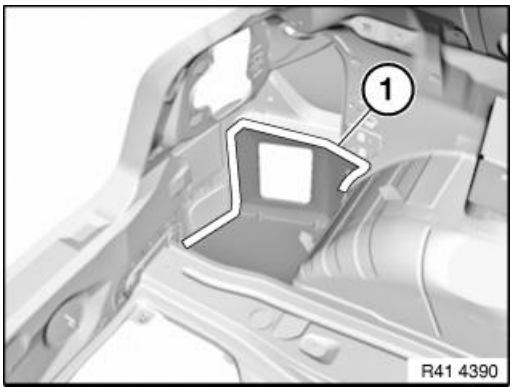
Following new body parts are required (see Electronic Parts Catalogue):

- (1) Luggage compartment floor, left section

Following consumables are required:

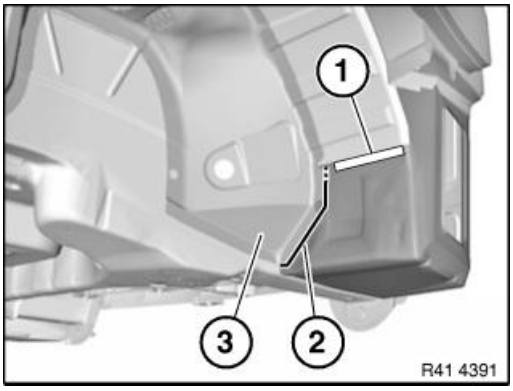
Material	Quantity
Adhesive K5a	1
Blind rivet N3	13
EMC screws	4
Cleaning agent R1	1
Sealant D1	

Removal



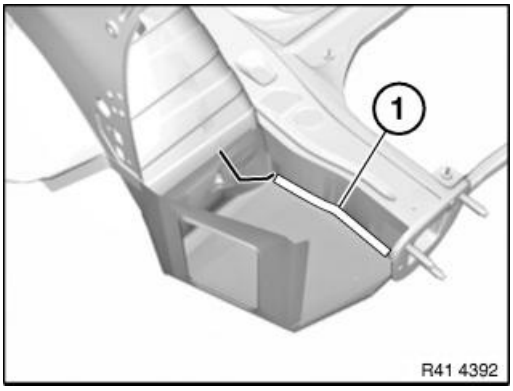
Open welded connections in area (1).

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Open welded connections in area (1).

Mark severance cut (2) next to reinforcement (3) and disconnect.



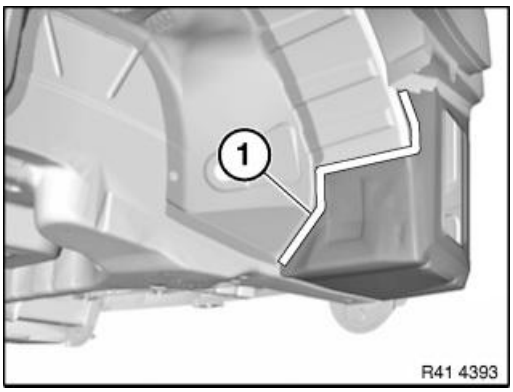
Open welded connections in area (1).

Remove the luggage compartment floor.

Note:
Tail panel and side wall have been hidden for clarity.

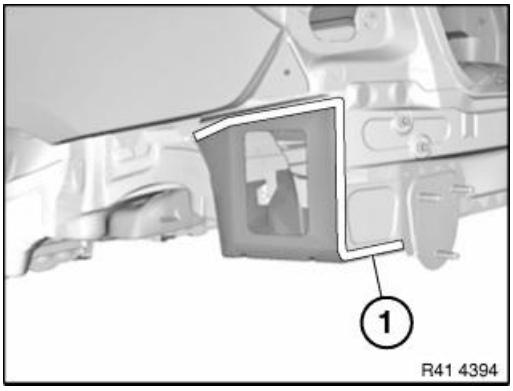
New part preparation

Mark severance cut on new part in accordance with severance cut on vehicle +15 mm for extra material and cut.



Adjust new part in combination with tail panel and side wall to fit and secure.

In area (1), produce 5 bore holes dia. 4.2 mm for blind rivet N3.



In area (1), produce 8 bore holes dia. 4.2 mm for blind rivet N3.

Remove new part again and deburr bore holes.

On vehicle, clean the connection faces for bonding with cavity protection wax remover.

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Attention!

Do not grind new part and body in area of bonding surfaces.

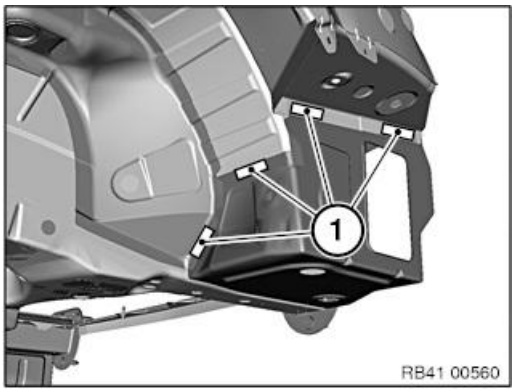
Installation

Clean all bonding surfaces on new part and on vehicle with cleaning agent R1.

Apply adhesive on all bonding and riveting surfaces.

Install new part and rivet with blind rivets N3.

Ensure to apply sufficient adhesive to the bonding surfaces when installing the new part!



After hardening of the adhesive install 4 EMC screws in the areas (1).

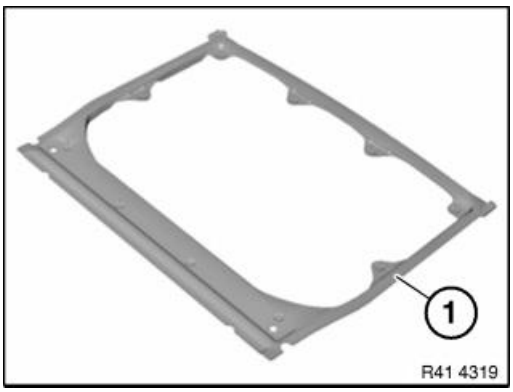
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41 12 557 Replacing middle luggage compartment floor (tail panel has been removed)

Read contents of Body, General.

Strip down vehicle.

Procedure Observe repair stage 2!



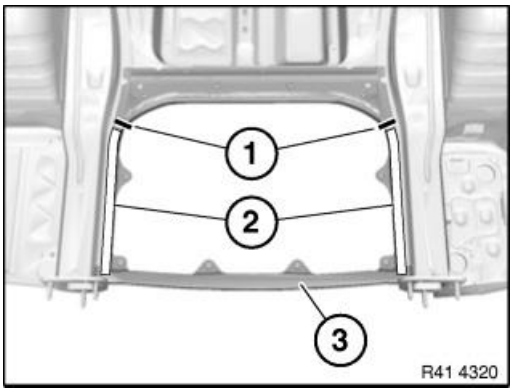
Following new body parts are required (see Electronic Parts Catalogue):

- (1) Frame, luggage compartment floor

Following consumables are required:

Material	Quantity
Adhesive K5a	1
Punch rivetN5	8
Cleaning agent R1	1
Sealant D1	

Removal



Mark severance cuts (1) and cut.

Attention!

Cut only outer panels.

Open welded connections in areas (2) and remove luggage compartment floor (3).

New part preparation

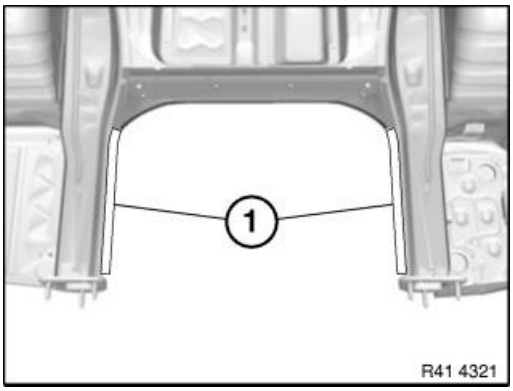
Mark new part in accordance with severance cuts on vehicle and cut.

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Attention!

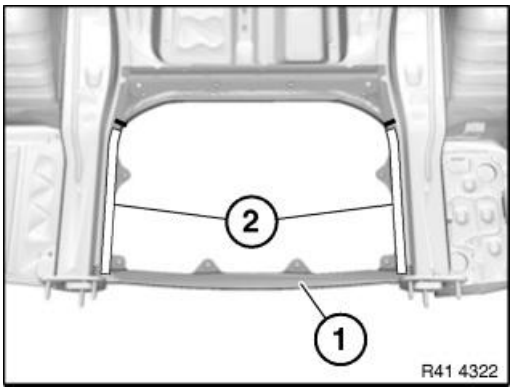
Do not grind new parts and body in area of bonding surfaces.

Installation



Clean all bonding surfaces (1) on vehicle and on new part with cleaning agent R1.

Apply adhesive to bonding surfaces.



Adjust luggage compartment floor (1) to fit in conjunction with tail panel and secure.

Rivet luggage compartment floor with 8 punch rivets N5 in areas (2).

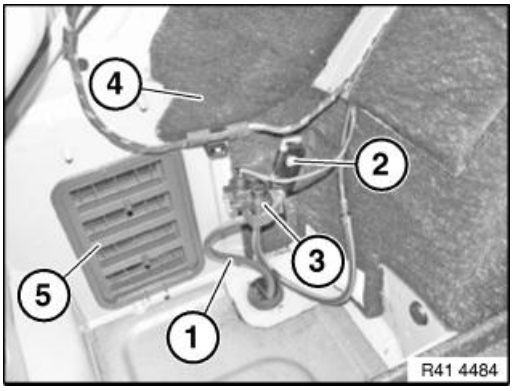
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41 12 535 Stripping down - replacing complete rear luggage compartment floor (tail panel removed)

Note:
Owing to the different engine variants and equipment specifications, not all the components are taken into consideration.

The following list essentially represents the disassembly sequence.

- Remove exhaust system. Petrol engine 18 00 020, diesel engine 18 00 018)
- Remove heat shield
- Remove carbon canister (flat rate unit number: 16 12 010)
- Remove battery (flat rate unit number: 61 21 010)
- Remove luggage compartment floor storage tub.
- Remove the left luggage compartment wheel arch panel (FRU number: 51 47 151)
- Remove the right luggage compartment wheel arch panel (FRU number: 51 47 161)
- Partially detach wiring harness and tie to one side



Pull off hose (1).

Release screw (2).

Release wiring harness and place with changeover valve (3) to one side.

Partially detach sound insulation (4) and place to one side.

Remove rear ventilation (5).

Installation note:
The rear ventilation (5) must not be damaged. (watertightness).

All latch mechanisms must engage audibly.

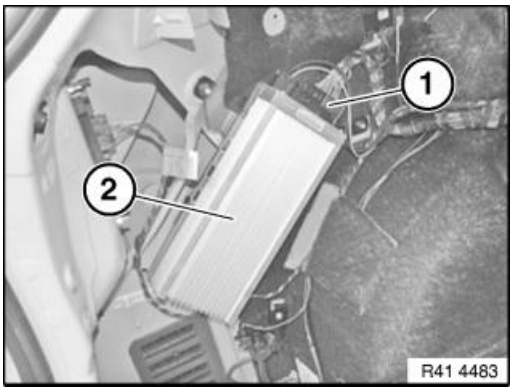
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41 12 651 Stripping down - replacing left luggage compartment floor (tail panel or side wall removed)

Note:
Owing to the different engine variants and equipment specifications, not all the components are taken into consideration.

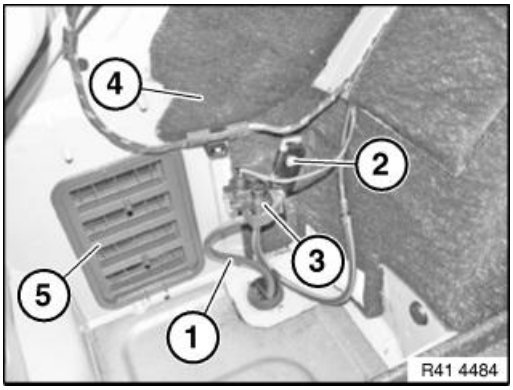
The following list essentially represents the disassembly sequence.

- Disconnect battery earth lead (flat rate unit number: 61 20 600)
- Remove exhaust system. Petrol engine 18 00 020, diesel engine 18 00 018)
- Remove heat shield
- Remove luggage compartment floor storage tub.
- Remove rear left wheel arch cover (flat rate unit number: 51 71 041)
- Remove the left luggage compartment wheel arch panel (FRU number: 51 47 151)



Unlock connector (1) and pull off.

Release screws and remove audio amplifier (2).



Pull off hose (1).

Release screw (2).

Release wiring harness and place with changeover valve (3) to one side.

Partially detach sound insulation (4) and place to one side.

Remove rear ventilation (5).

Installation note:
The rear ventilation (5) must not be damaged. (watertightness).

All latch mechanisms must engage audibly.

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41 12 557 Stripping down - replacing middle luggage compartment floor (tail panel removed)

Note:
Owing to the different engine variants and equipment specifications, not all the components are taken into consideration.

The following list essentially represents the disassembly sequence.

- Remove luggage compartment floor storage tub.
- Partially detach wiring harness and tie to one side.

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41 ... 0 Notes on the repair technique used in the main group 41

Two different repair techniques are used in body repair.

These are welding and bonding/riveting.

If the repair instructions do not specify a repair technique, then welding must **always** be used.

The bonding/riveting repair technique is **always** described in detail in the repair instructions.

Quality standards must be met.

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41 14 511 Replacing complete rear left wheel arch (rear left side panel removed)

Observe procedure for repair stage 3.

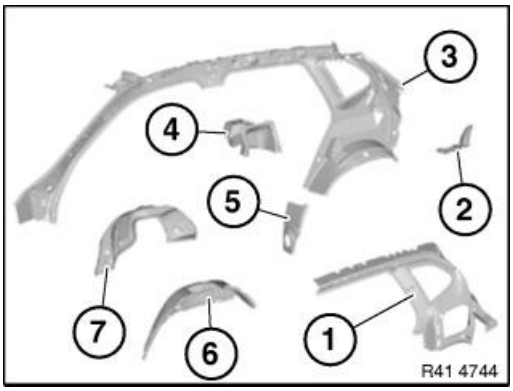
Read contents of Body, General.

For set-up work, see the surrounding texts on KSD CD (FRU number 41 14 511).

Spot-weld bonding is used on this vehicle. Observe specific procedure.

Use only an approved spot-welding apparatus for repairs!

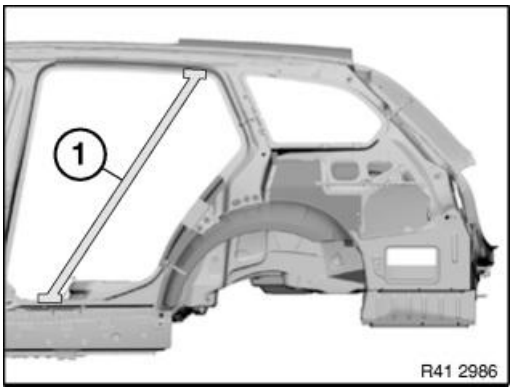
Place vehicle on straightening bench.



Following new body parts are required (see Electronic Parts Catalogue):

- (1) C-pillar reinforcement
- (2) Support, frame side member
- (3) Inner side frame
- (4) Fixture, belt end fitting
- (5) Closing plate, wheel arch
- (6) Wheel arch, rear, inner half
- (7) Support, wheel arch
- (8) Rear entrance shaped part (not shown)
- (9) Shaped part, C-pillar, outer (not shown)
- (10) Shaped part, D-pillar, rear (not shown)

Removal

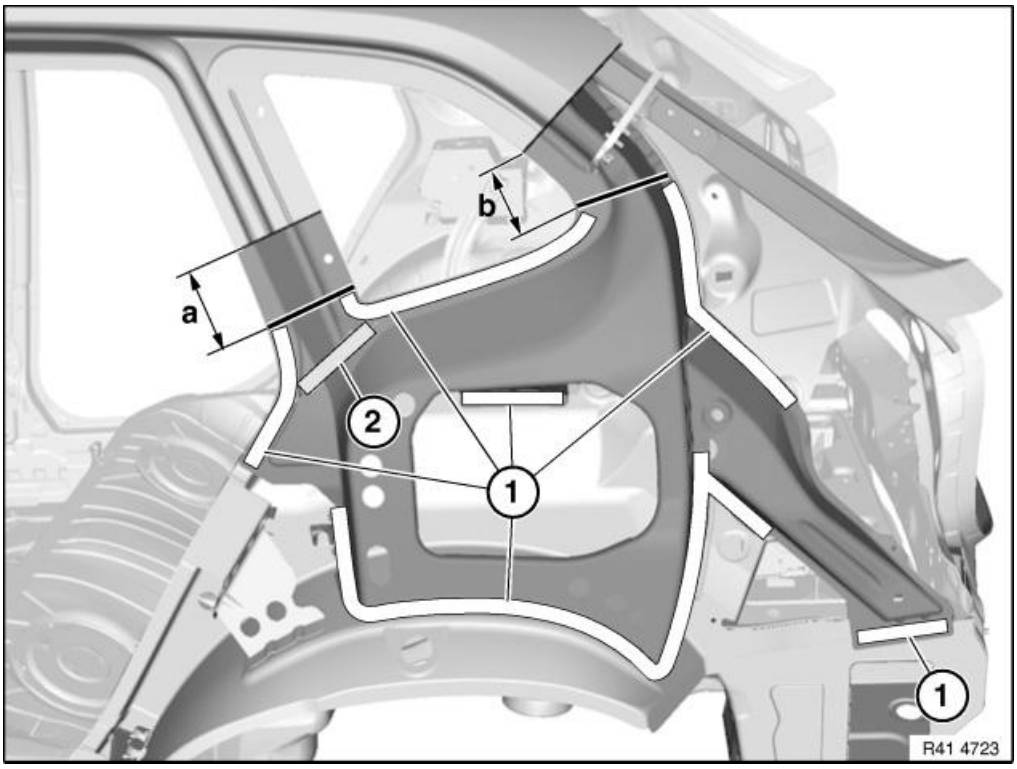


Fix door aperture on the spot-welding flanges with support rods (1).

Sourcing reference:

BMW Workshop Equipment Catalogue

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Mark severance cuts in accordance with specified dimensions and cut.

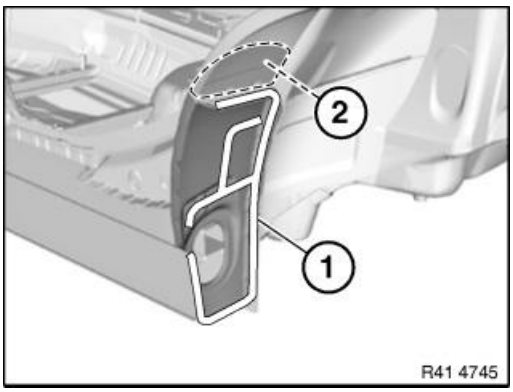
Measurement a = approx. 90 mm from side panel severance cut.

Measurement b = approx. 100 mm from side panel severance cut.

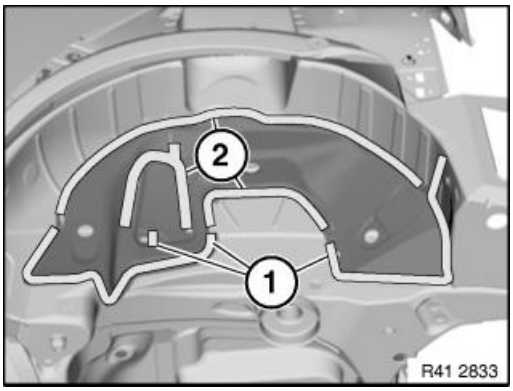
Open welded connections in areas (1).

Remove reinforcement on C pillar.

Installation note:
Replace cavity acoustic baffle (2).



Open welded connections in area (1).*Installation note:*
Replace cavity acoustic baffle (2).

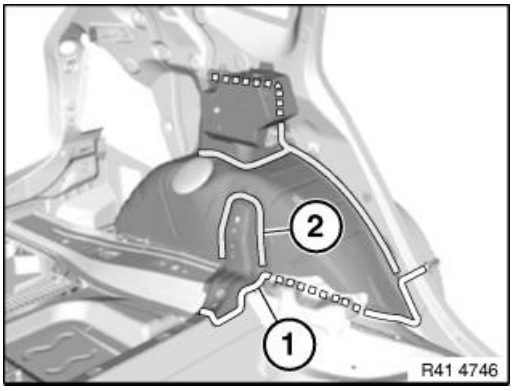


View from below.

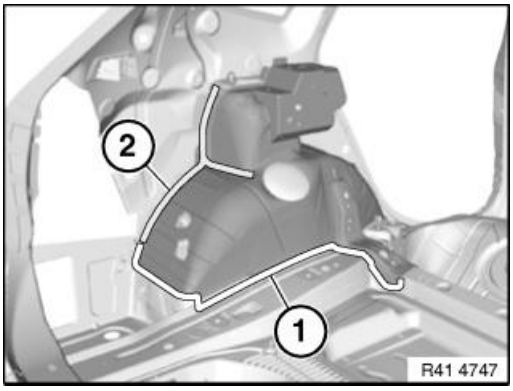
Open welded connections in areas (1).

Installation note:
Weld new components in areas (2) additionally.

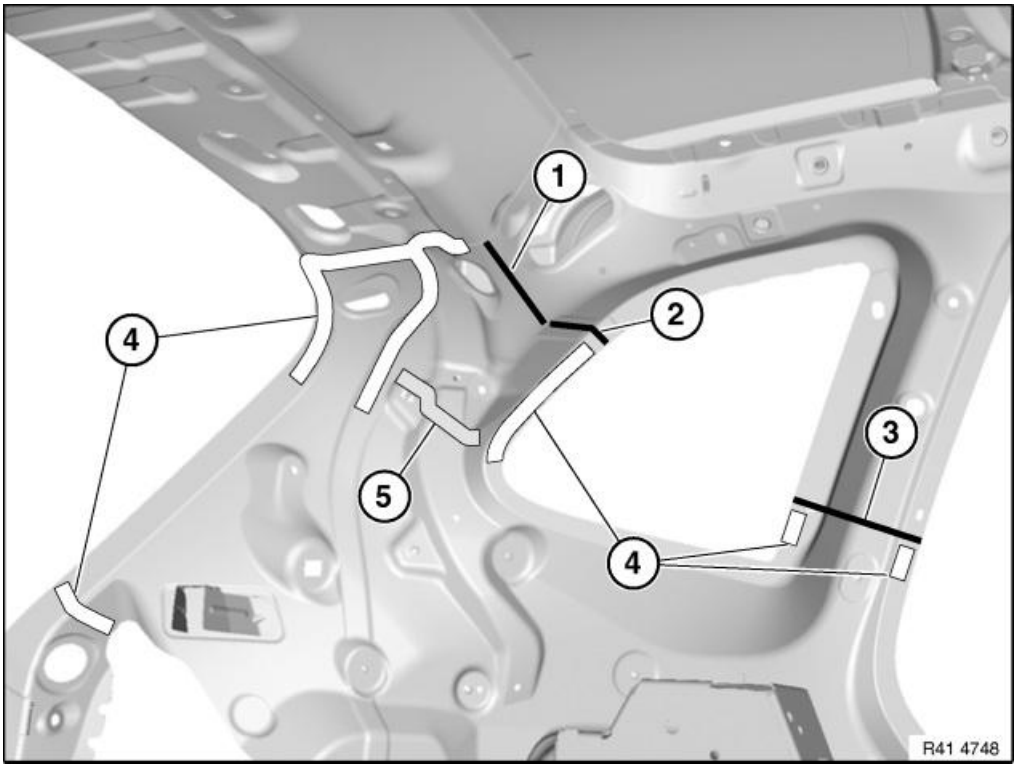
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Open welded connections in area (1).*Installation note:*
Weld new components in areas (2) additionally.



Open welded connections in area (1).*Installation note:*
Weld new components in area (2) additionally.



View of passenger compartment.

Mark severance cuts (1) to (3) and cut.

Attention!
Cut only outer plates.

Open welded connections in areas (4).

Installation note:
New part is welded in area (1).

Apply sealant to cavity acoustic baffle (5).

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New part preparation

Mark severance cuts on new parts according to severance cuts on vehicle and sever.

Prepare reinforcement plates at severance cuts.

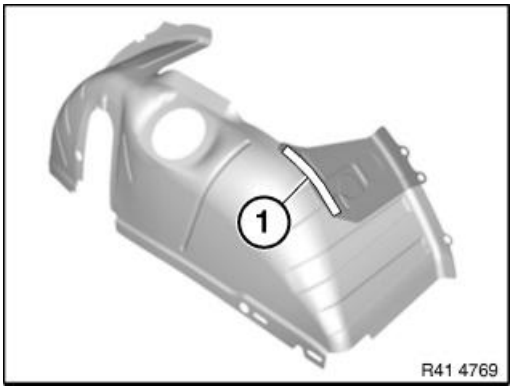
Adjust new parts to fit with alignment bracket or universal mounting.

Before welding new parts, also adjust rear side panel to fit.

Installation

Apply sealant to cavity sealing.

Install and weld new parts and reinforcement plates.



Right side of vehicle only:

Weld new part in area (1) same as per series.

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41 14 531 Replacing engine support side frame connection, front left

Prerequisite

- Left engine support removed.

TECHNICAL INFORMATION

- Observe the procedure for repair stage 3.

For additional information see: 41 00 ... Repair method for repair stage 3

- For information about stripping and rebuilding operations, refer to the surrounding text of the KSD. See the flat rate unit number.

Additional Information

Links

General repair instructions	Used in step
41 00 ... Repair techniques, repair stage 3	

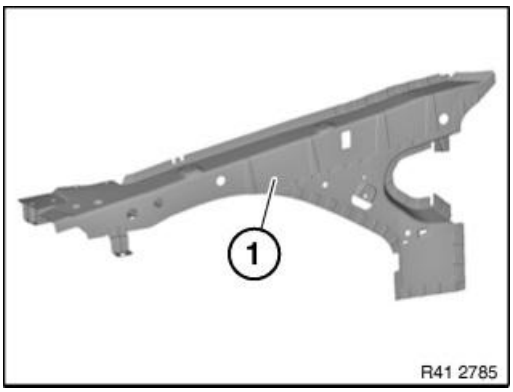
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41 11 516 Replacing front left or right carrier support (partial replacement, front side panel removed)

Read contents of Body, General.

Strip down vehicle.

Observe repair stage procedure.



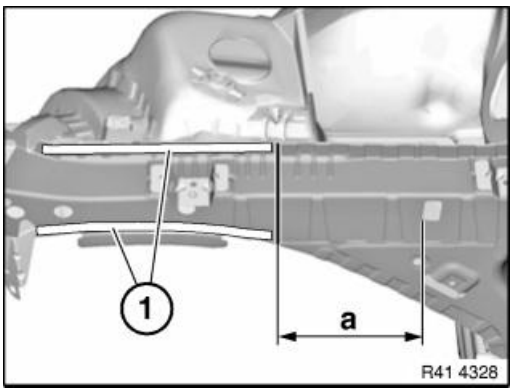
Following new body parts are required (see Electronic Parts Catalogue):

- (1) Carrier support, outer wheel arch section

Following consumables are required:

Material	Quantity
Adhesive K5a	1
Blind rivet N1	3
Blind rivet N3	6
Punch rivetN5	14
Cleaning agent R1	1
Cavity sealing wax remover	1
Sealant D1	

Removal

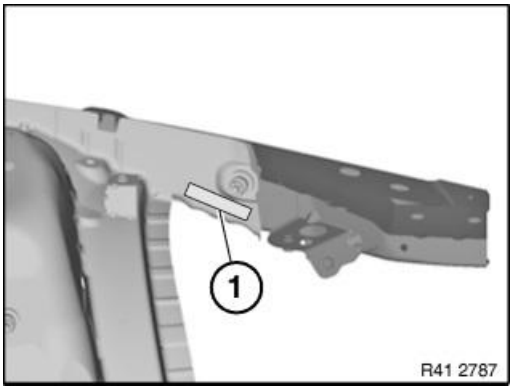


Mark severance cut in accordance with measurement a and cut carrier support.

Measurement a=165 mm from edge of rectangular hole.

Open welded connections in areas (1).

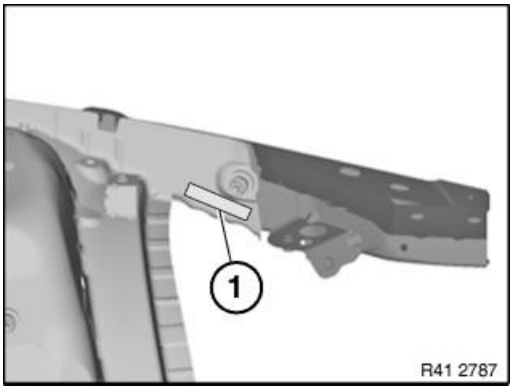
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Open welded connections in area (1).

Remove carrier support section.

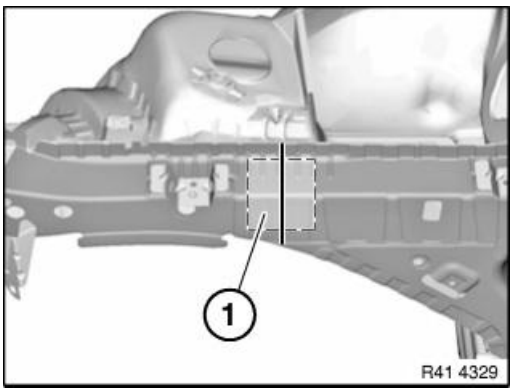
New part preparation



Make severance cut on new part in accordance with severance cut on vehicle.

Adjust new parts with add-on parts to fit and secure.

In area (1), set 2 ⌀ 6.8 mm bore holes for blind rivets N1.



In area of reinforcement plate (1) set 6 ⌀ 4.3 mm bore holes for blind rivets N3.

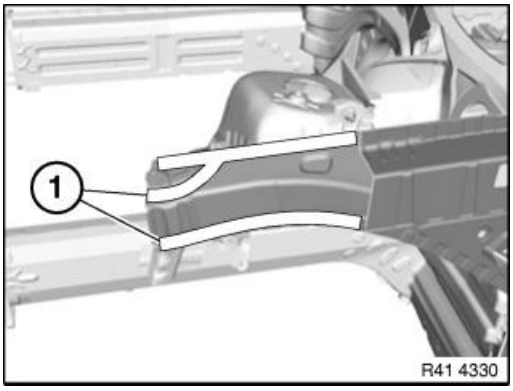
Remove new part again and deburr bore holes.

Attention!

Do not grind new part and body in area of bonding surfaces.

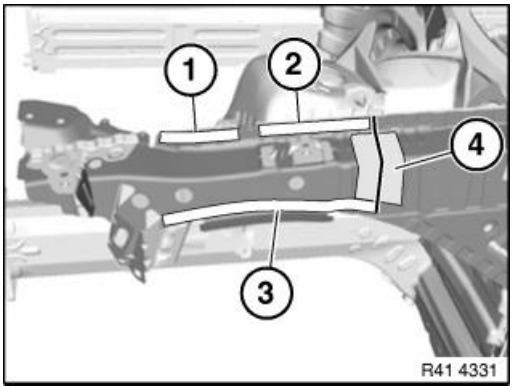
Installation

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Clean <u>all</u> bonding surfaces (1) on vehicle and on new part with cleaning agent R1.

Apply adhesive K5a to bonding surfaces.



Install new part with add-on parts and rivet.

Attention!

Three-plate connection (1)!

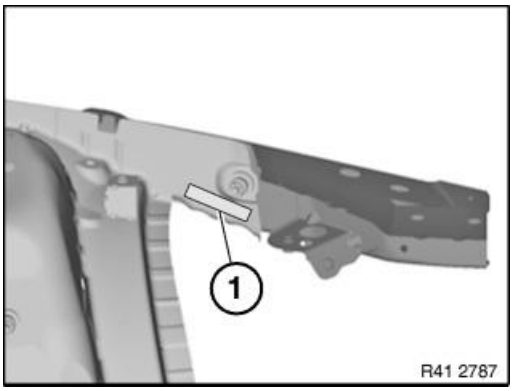
In area (1) rivet new part on both sides offset with 4 punch rivets N5.

In area (2) rivet new part with 4 punch rivets N5.

In area (2) at the level of the side wall holder, use 1 blind rivet N1.

In area (3) use 7 punch rivets N5.

In area of reinforcement plate (4) use 6 blind rivets N3.



In area (1) rivet new part with 2 blind rivets N1.

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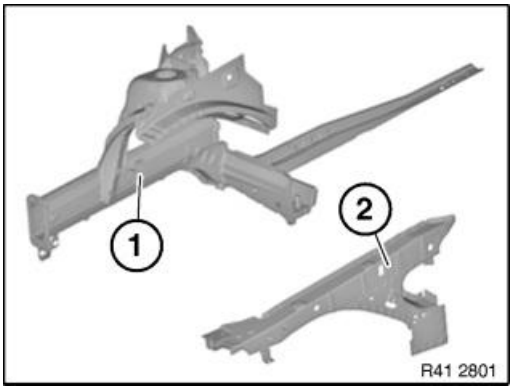
41 14 021 Replacing front left wheel arch

Read contents of Body, General.

Procedure Observe repair stage 3!

Strip down vehicle.

Place vehicle on straightening bench.



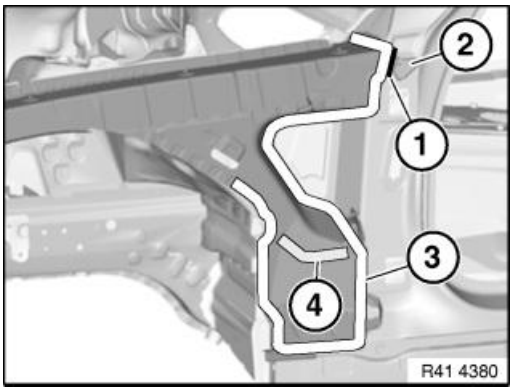
Following new body parts are required (see Electronic Parts Catalogue):

- (1) Wheel arch, front
- (2) Carrier support, outer wheel arch section

Following consumables are required:

Material	Quantity
Adhesive K1	1
Blind rivet N1	56
Punch rivetN5	39
EMC screw	4
Cleaning agent R1	1
Cavity sealing wax remover	1
Sealant D1	

Removal



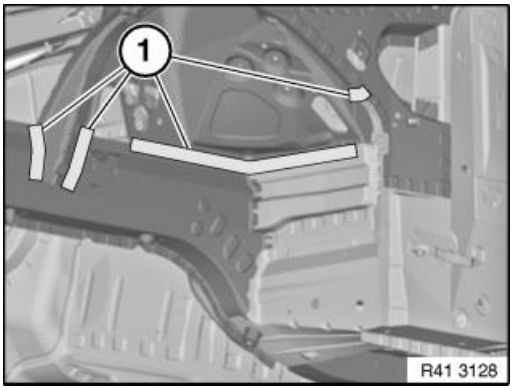
Mark severance cut (1) in front of holder (2) and cut (Holder (2) remains on vehicle).

Open welded connections in area (3).

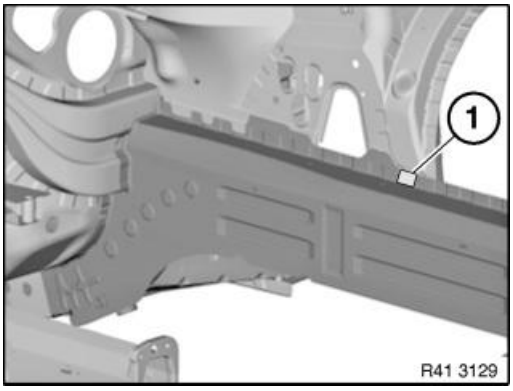
Installation note:
Mark severance cut (1) in on new part and cut. Take off holder (2).

Apply sealant to cavity sealing (4).

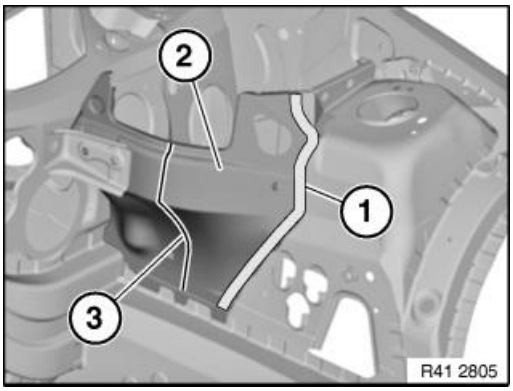
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Open welded connections in areas (1).



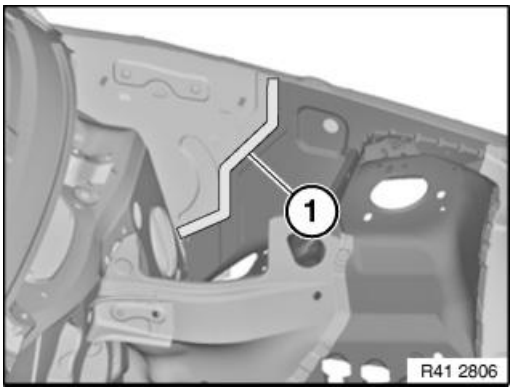
Open welded connections in area (1).



Open welded connections in area (1).*Installation note:*
If engine bulkhead (2) is damaged, cut along line (3).

Mark severance cut on new part according to severance cut on vehicle + 20 mm material extra and cut.

Bond both parts overlapping and rivet. Depending on accessibility, use punch rivets N4 and blind rivets N3.

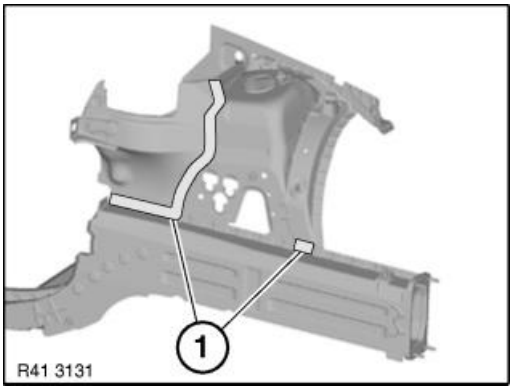


Open welded connections in area (1).

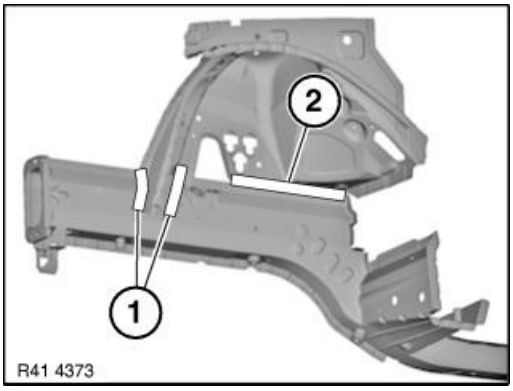
Remove the wheel arch.

New part preparation

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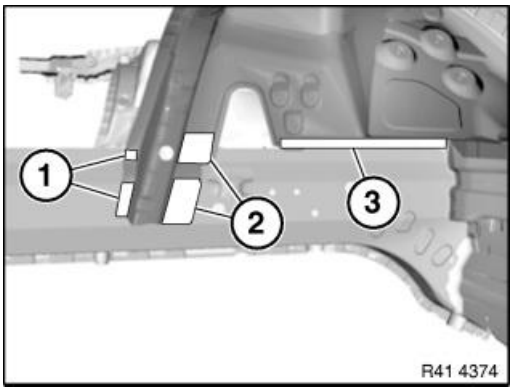


Open welded connections in area (1).



In areas (1) cut open engine support from opposite side and open welded connections.

In area (2) open welded connections from inside.

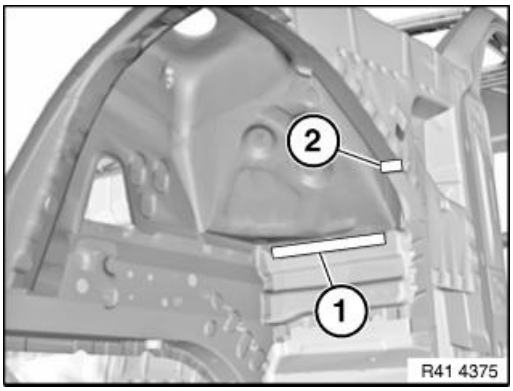


Adjust new parts to fit with alignment bracket or universal mount and secure.

Produce bore holes dia. 6.8 mm for blind rivet N1 in the areas (1) to (3):

- Area (1): 3 bore holes
- Area (2): 8 bore holes
- Area (3): 6 bore holes

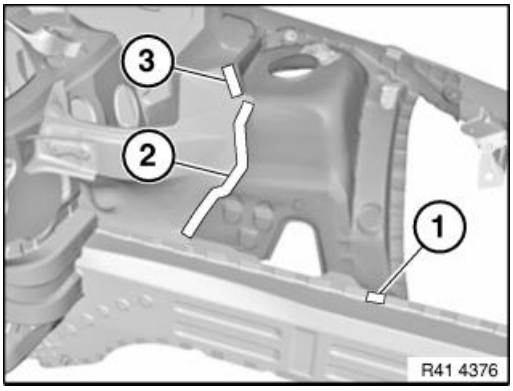
Installation note:
After hardening of adhesive install 2 EMC screws in areas (1) and (2).



In areas (1) and (2), produce bore holes dia. 6.8 mm for blind rivet N1:

- Area (1): 3 bore holes
- Area (2): 2 bore holes

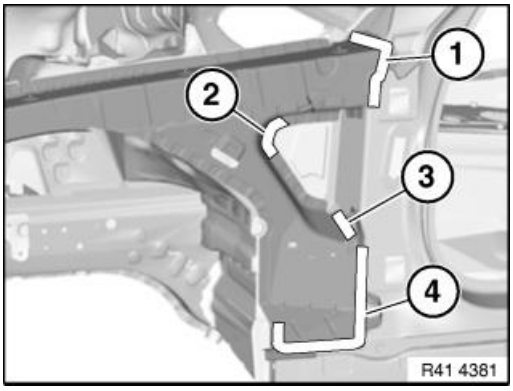
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In areas (1) and (2), produce bore holes dia. 6.8 mm for blind rivet N1:

- Area (1): 1 bore hole
- Area (2): 7 bore holes

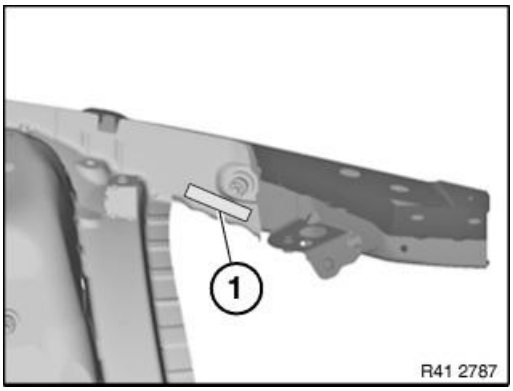
Installation note:
In area (3), 2 punch rivets N5 are used later.



Produce bore holes dia. 6.8 mm for blind rivet N1 in the areas (1) to (4):

- Area (1): 5 bore holes
- Area (2): 2 bore holes
- Area (3): 1 bore hole
- Area (4): 9 bore holes

Installation note:
After hardening of adhesive, install 2 EMC screws in areas (1) and (4).



Produce 2 bore holes dia. 6.8 mm for blind rivet N1 in area (1).

Remove all new parts and deburr holes.



Attention!

Structure bonding!

Observe preparation of bonding surfaces.



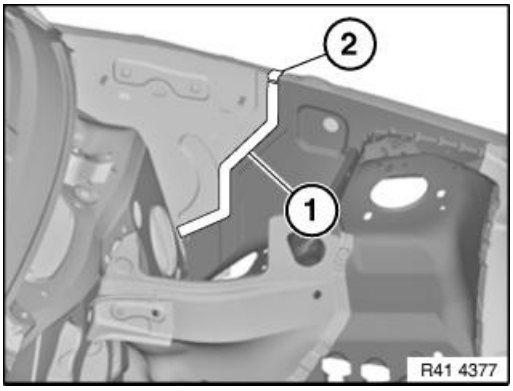
Installation

Clean bonding surfaces with cleaning agent R1.

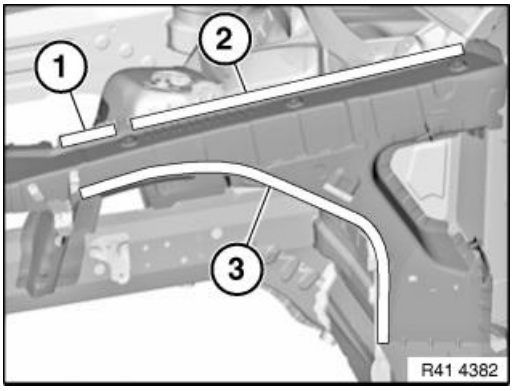
Apply adhesive K1 to bonding surfaces.

Install new parts with alignment bracket or universal mount and rivet with blind rivets.

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In area (1), weld new part to terminal 31 (ground).*Installation note:*
In area (2) 1 N5 punch rivet is used later.



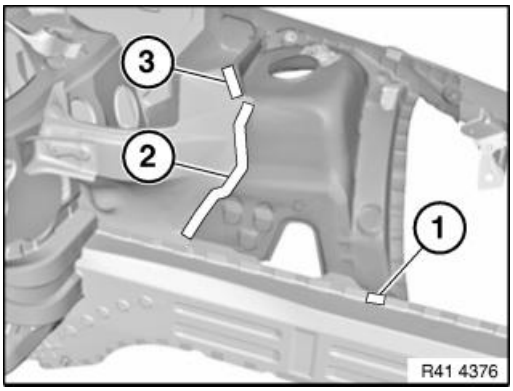
Attention!

Three-sheet-metal combination in area (1)!

In area (1) rivet new part on both sides offset with 4 punch rivets N5.

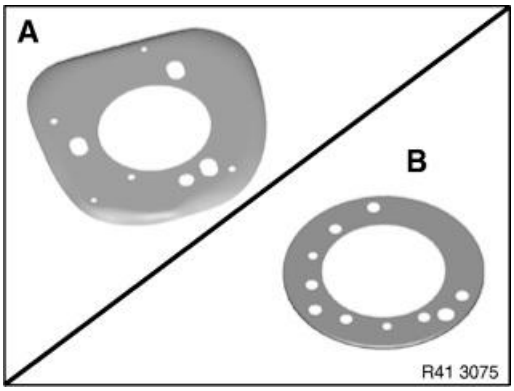
In area (2), use 14 punch rivets N5.

In area (3), use 18 punch rivets N5.



Rivet new parts with blind rivets in areas (1) and (2).

In area (3), use 2 punch rivets N5.



Installation note:
<u>Vehicles with spring strut dome plate insert:</u>

Different plate inserts are fitted, depending on the model.

- Version (A) riveted or glued
- Version (B) screwed

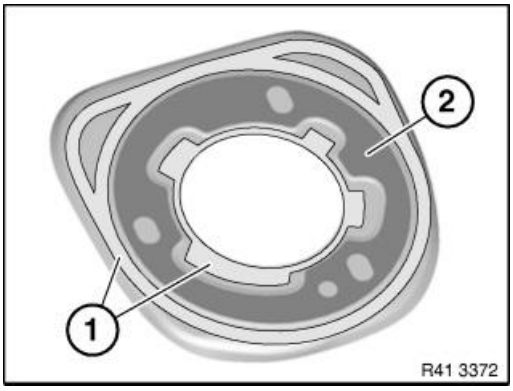
Attention!

Use only identical plate inserts on both sides of the vehicle.

Riveted version:

If damaged, the plate inserts must always be replaced with glued versions on both sides of the vehicle.

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Glued version:

Adhesive/contact surfaces of plate insert must be free of sealant, top coat and underbody protection.

Do not grind off primer.

Use adhesive gun 41 3 102 in conjunction with adhesive K3.

Apply K3 adhesive in areas (1). Do not apply any adhesive in area (2).

Secure plate insert with 3 screws and nuts for 2 hours at min. 20 °C.

Attention!

Operational strength is only achieved after 12 hours!

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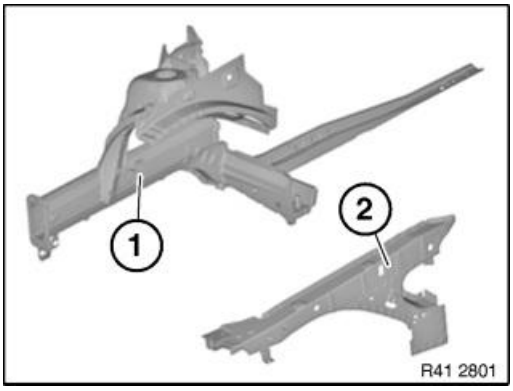
41 11 023 Replacing front section of engine support to left wheel arch

Observe procedure for repair stage 3.

Read contents of Body, General.

Strip down vehicle.

Place vehicle on straightening bench.



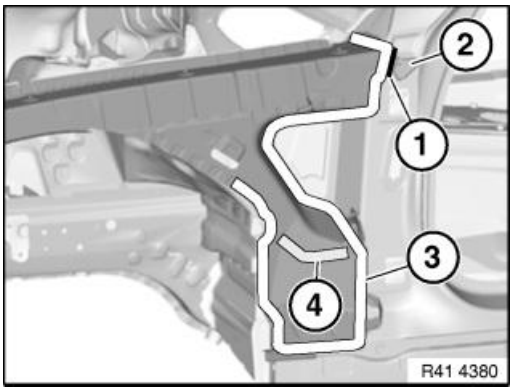
Following new body parts are required (see Electronic Parts Catalogue):

- (1) Wheel arch, front
- (2) Carrier support, outer wheel arch section

Following consumables are required:

Material	Quantity
Adhesive K1	1
Blind rivet N1	41
Punch rivetN5	39
EMC screw	2
Cleaning agent R1	1
Cavity sealing wax remover	1
Sealant D1	

Removal



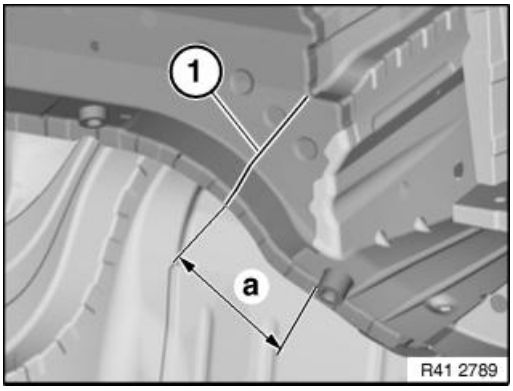
Mark severance cut (1) in front of holder (2) and cut (holder (2) remains on vehicle):

Open welded connections in area (3).

Installation note:
Mark severance cut (1) in on new part and cut. Take off holder (2).

Apply sealant to cavity sealing (4).

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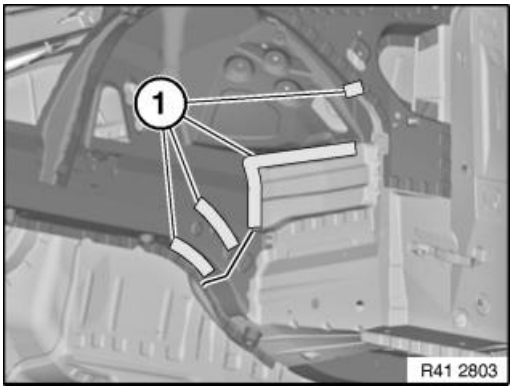


Mark severance cut (1) in accordance with dimension a and cut engine support.

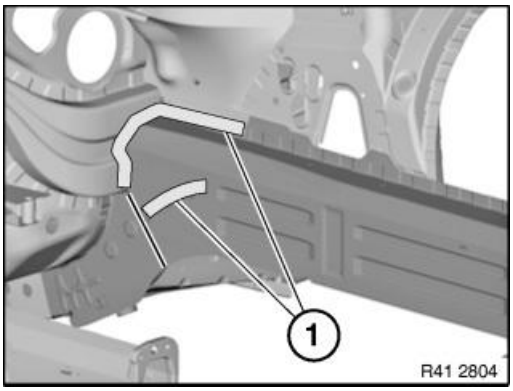
Attention!

Cut outer metal panel only.

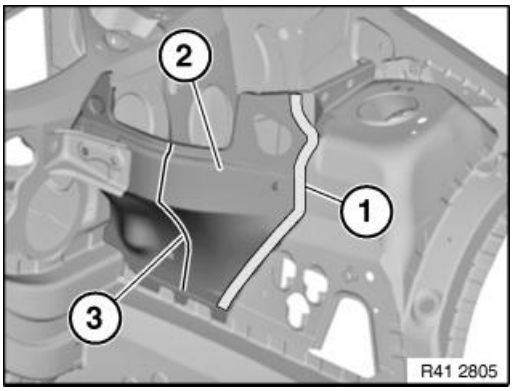
Dimension a=130 mm from front edge of bush



Open welded connections in areas (1).



Open welded connections in areas (1).

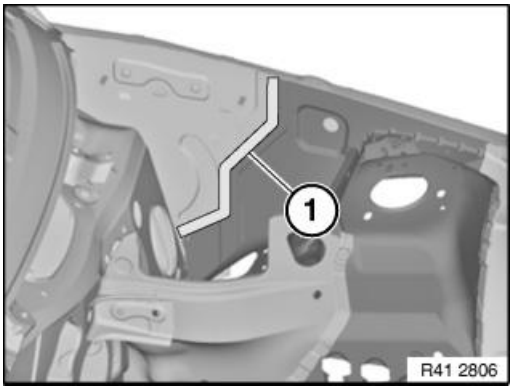


Open welded connections in area (1).*Installation note:*
If engine bulkhead (2) is damaged, cut along line (3).

Mark severance cut on new part according to severance cut on vehicle + 20 mm material extra and cut.

Bond both parts overlapping and rivet. Depending on accessibility, use punch rivets N4 and blind rivets N3.

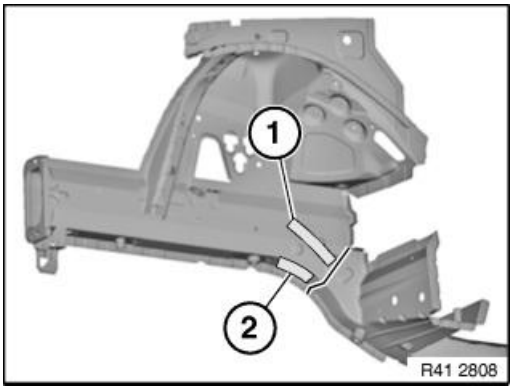
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Open welded connections in area (1).

Remove front section of engine support with wheel arch.

New part preparation



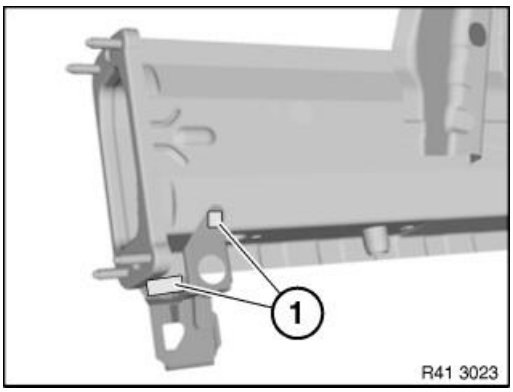
Mark and cut the severance cut on new part as per the severance cut on the vehicle.

Prepare reinforcement plates at severance cut.

Open welded connections in areas (1) on both sides.

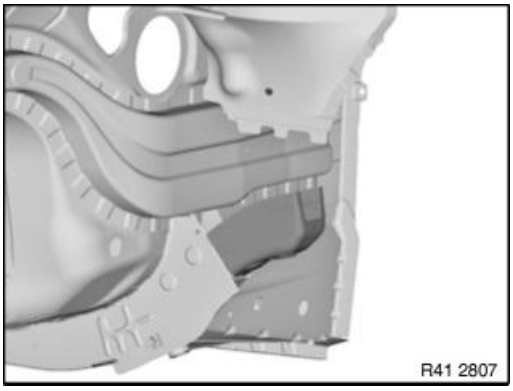
Open welded connections in area (2).

Detach remainder of reinforcement from engine support.



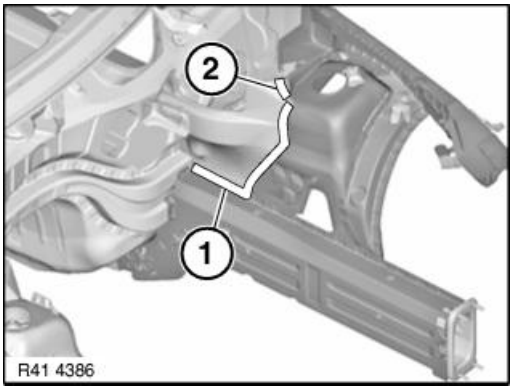
Open welded connections in areas (1).

Take off holder.



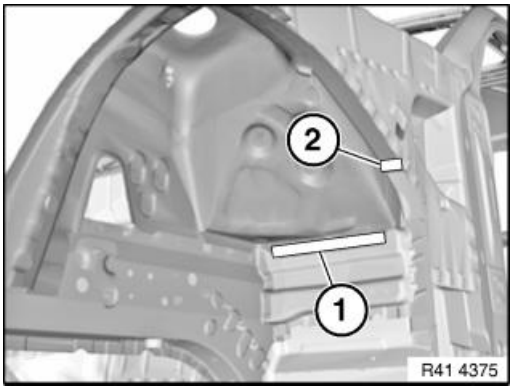
Adjust new parts to fit with alignment bracket or universal mount and secure.

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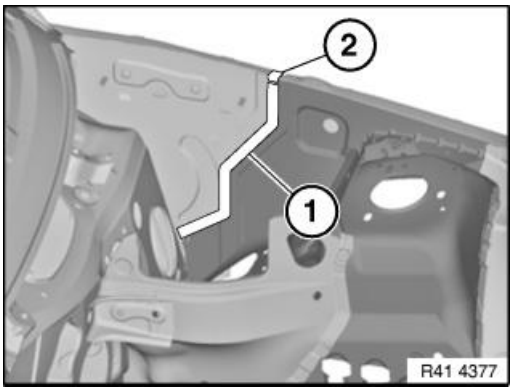
In area (1), produce 10 bore holes dia. 6.8 mm for blind rivets N1.

Installation note:
2 punch rivets N5 are used later in area (2).



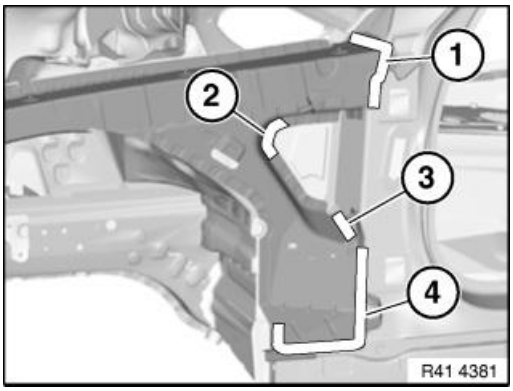
In areas (1) and (2), set ⌀ 6.8 mm bore holes for blind rivets N1:

- Area (1): 3 bore holes
- Area (2): 2 bore holes



In area (1), produce 7 bore holes dia. 6.8 mm for blind rivets N1.

Installation note:
In area (2) 1 N5 punch rivet is used later.

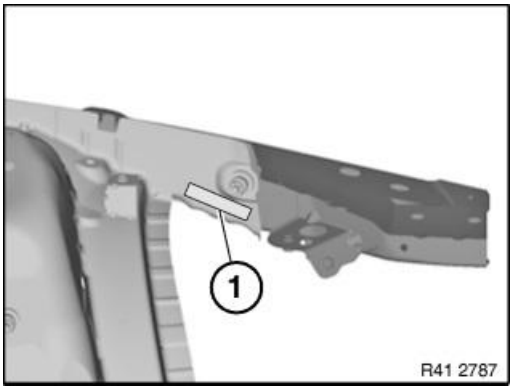


In areas (1) to (4), set ⌀ 6.8 mm bore holes for blind rivets N1:
Open welded connections in area (1).

- Area (1): 5 bore holes
- Area (2): 2 bore holes
- Area (3): 1 bore hole
- Area (4): 9 bore holes

Installation note:
After adhesive has hardened, install 2 EMC screws in areas (1) and (4).

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In area (1), set 2 ⌀ 6.8 mm bore holes for blind rivets N1.

Remove all new parts and deburr holes.

Attention!

Structure bonding!

Observe preparation of bonding surfaces.

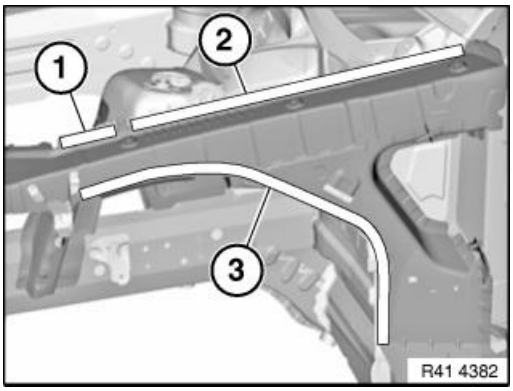
Installation

Clean bonding surfaces with cleaning agent R1.

Apply adhesive K1 to bonding surfaces.

Install new parts and reinforcement plates with alignment bracket or universal mount.

Rivet new parts with blind rivets.



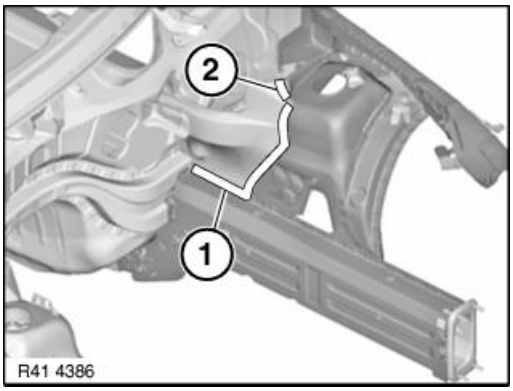
Attention!

Three-sheet-metal combination in area (1)!

In area (1) rivet new part on both sides offset with 4 punch rivets N5.

Use 14 punch rivets N5 in area (2).

Use 18 punch rivets N5 in area (3).

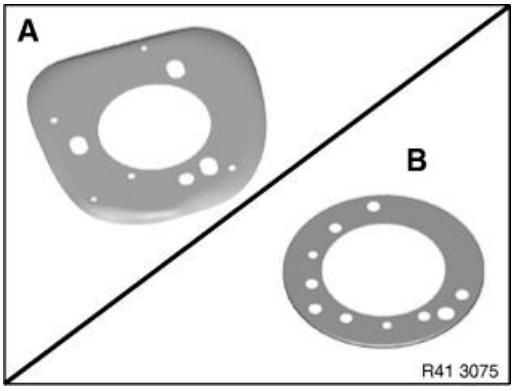


In area (1) rivet new part with blind rivets N1.

Use 2 punch rivets N5 in area (2).

In area of separating cut, weld new part of engine support and reinforcement plates.

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Note:
Vehicles with spring strut dome plate insert:

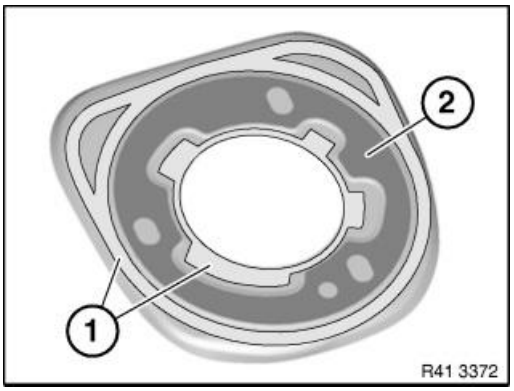
Different plate inserts are fitted, depending on the model.

- Version (A) riveted
- Version (B) screwed

Attention!
Use only identical plate inserts on both sides of the vehicle.

Riveted version:

If damaged, the plate inserts must always be replaced with screwed versions on both sides of the vehicle.



Glued version:

Adhesive/contact surfaces of plate insert must be free of sealant, top coat and underbody protection.

Do not grind off primer.

Use adhesive gun 41 3 102 in conjunction with adhesive K3.

Apply K3 adhesive in areas (1). Do not apply any adhesive in area (2).

Secure plate insert with 3 screws and nuts for 2 hours at min. 20 °C.

Attention!
Operational strength is only achieved after 12 hours!

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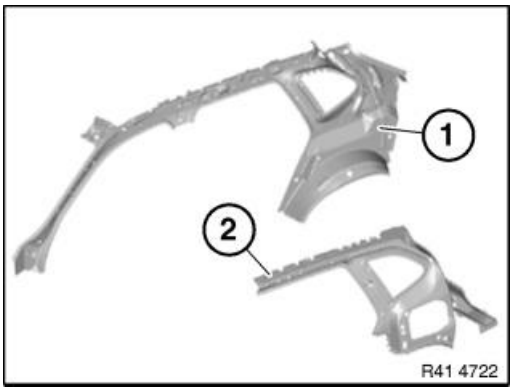
41 14 502 Replacing rear left outer wheel arch section (rear left side panel removed)

Follow procedure for repair stage 3.

Read contents of Body, General.

For set-up work, see the surrounding texts on KSD CD (FRU number 41 14 502).

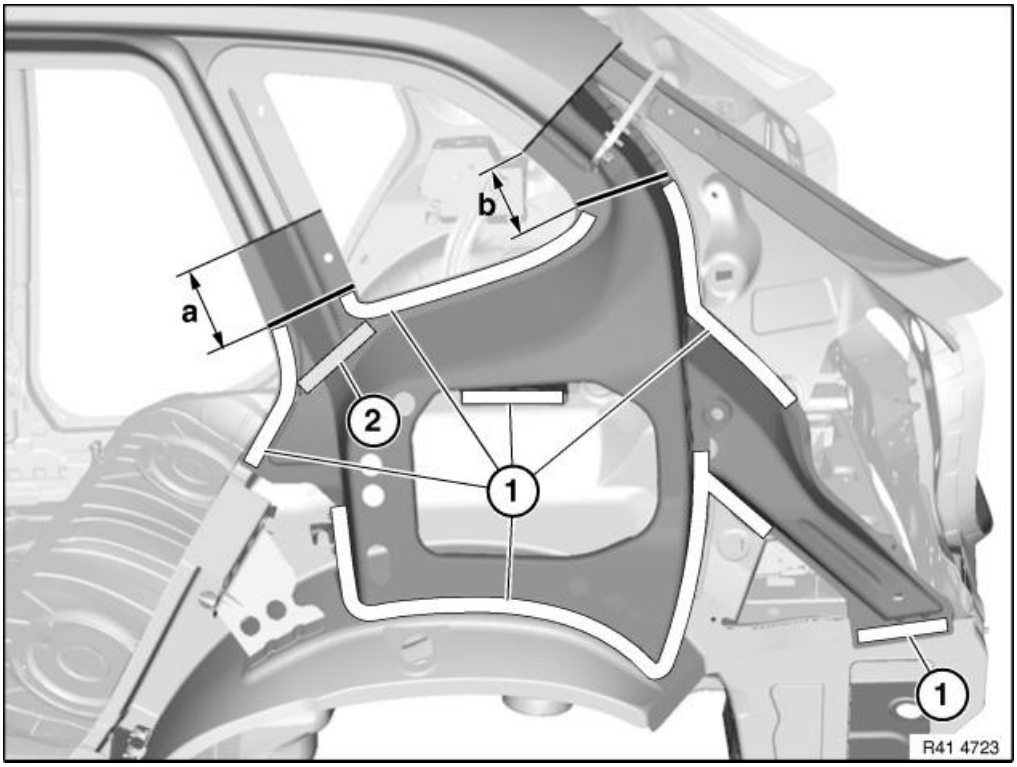
Use only an approved spot-welding apparatus for repairs!



Following new body parts are required (see Electronic Parts Catalogue):

- (1) Inner side frame
- (2) C-pillar reinforcement
- (3) Shaped part, entrance (not pictured)
- (4) Shaped part, C-pillar, outer (not shown)

Removal



Mark severance cuts in accordance with specified dimensions and cut.

Attention!
Cut outer panel only.

Measurement a = approx. 90 mm from side panel severance cut.

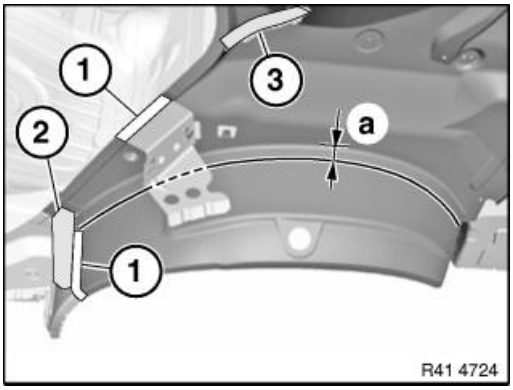
Measurement b = approx. 100 mm from side panel severance cut.

Open welded connections in areas (1).

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Remove reinforcement on C pillar.

Installation note:
Replace outer cavity sealing (2).



Mark severance cut in accordance with specified dimension and cut.

Measurement a = 20 mm from radius.

Open welded connections in areas (1).

Remove section for outer wheel arch section.

Installation note:
Install new part overlapping in area of severance cut.

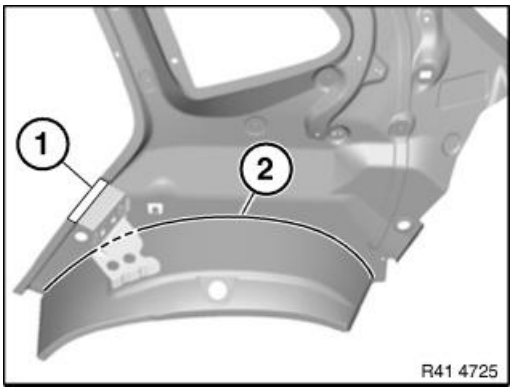
Replace cavity acoustic baffle (2).

Apply sealant to cavity sealing (3).

New part preparation

Mark severance cuts on new parts according to severance cuts on vehicle and sever.

Prepare reinforcement plates at severance cuts.



Open welded connections in area (1).

Mark new part in radius (2) and cut.

Adjust new part in conjunction with side panel to fit.

Installation

Apply sealant to cavity sealing.

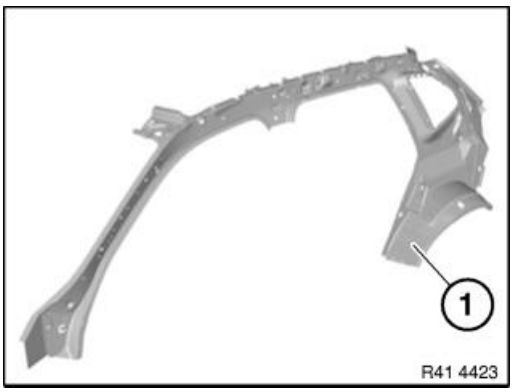
Fit new parts with reinforcement plates and weld.

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41 14 505 Replacing rear left outer wheel arch section partial replacement (side wall removed)

Procedure Observe repair stage 2!

Read contents of Body, General.



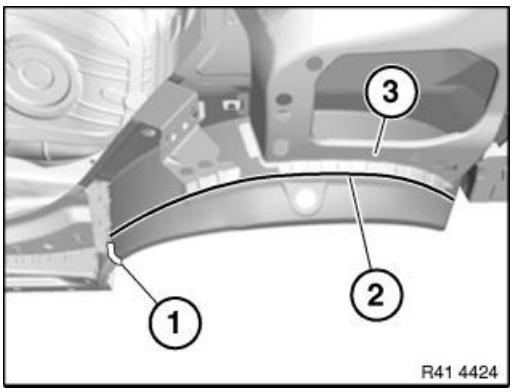
Following new body parts are required (see Electronic Parts Catalogue):

- (1) Inner side frame
- (2) Shaped part, wheel arch (not shown)

Following consumables are required:

Material	Quantity
Adhesive K5a	1
Blind rivet N3	9
Punch rivet N4	2
Cleaning agent R1	1
Cavity sealing wax remover	1
Sealant D1	

Removal



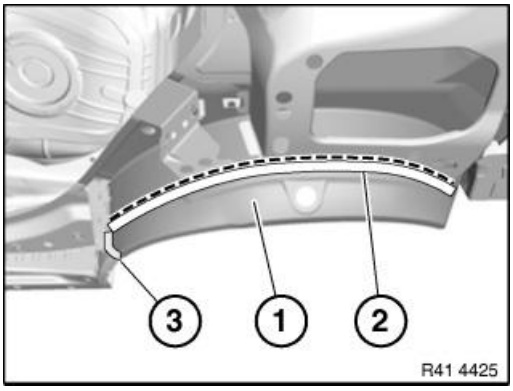
Open welded connections in area (1).

Mark severance cut (2) next to reinforcement (3) and disconnect.

New part preparation

Mark new part in accordance with severance cut on vehicle +20 mm extra material and cut (1).

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Note:
Side panel omitted for clarity.

Adjust new part (1) in combination with side wall to fit and secure.

Set 9 ⌀ 4.2 mm bore holes in the area of bonding surface (2).

Remove new part and deburr holes.

Installation note:
In area (3), use 2 punch rivets N4.

Installation

Attention!
Do not grind/sand new part in area of bonding surfaces.

Clean all bonding surfaces on new part and on vehicle with cleaning agent R1.

Apply adhesive K5a to bonding surfaces.

Install and rivet wheel arch outer part in connection with side panel.

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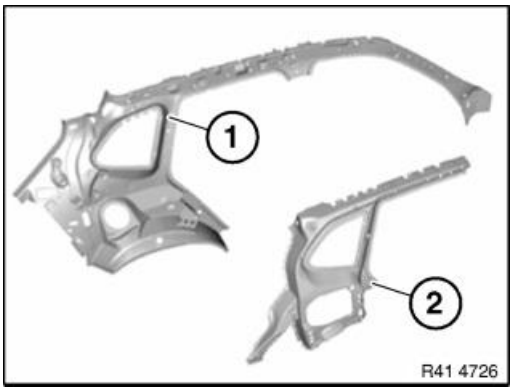
41 14 503 Replacing rear right outer wheel arch section (rear right side panel removed)

Follow procedure for repair stage 3.

Read contents of Body, General.

For set-up work, see the surrounding texts on KSD CD (FRU number 41 14 503).

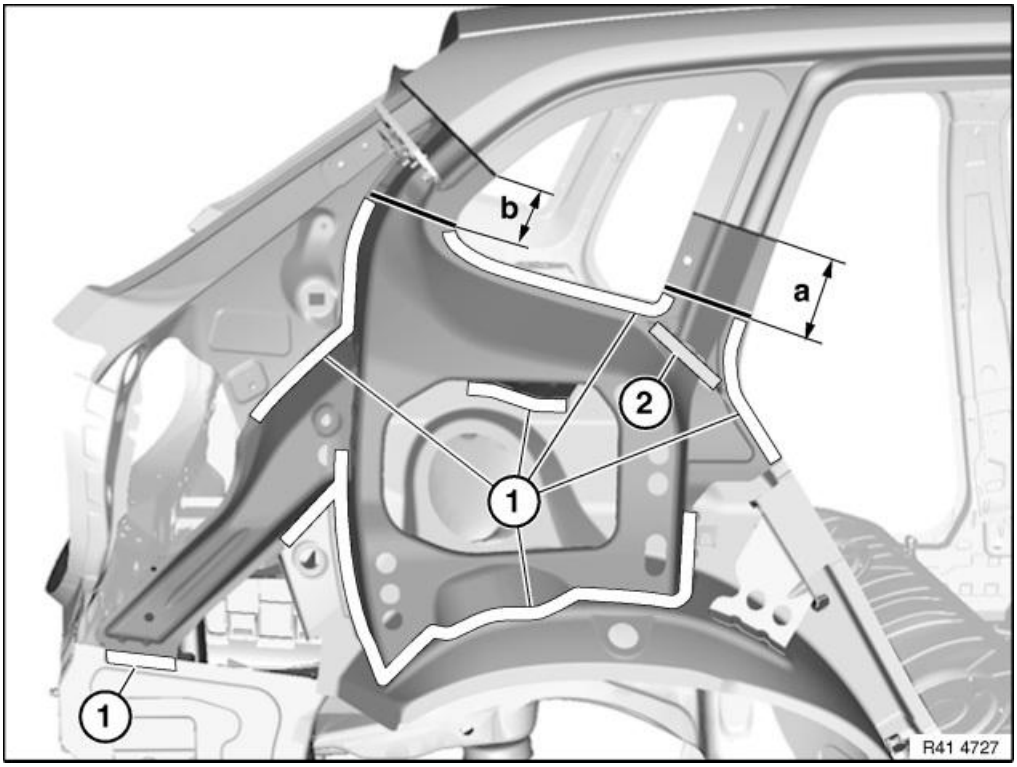
Use only an approved spot-welding apparatus for repairs!



Following new body parts are required (see Electronic Parts Catalogue):

- (1) Inner side frame
- (2) C-pillar reinforcement
- (3) Shaped part, entrance (not pictured)
- (4) Shaped part, C-pillar, outer (not shown)

Removal



Mark severance cuts in accordance with specified dimensions and cut.

Attention!
Cut outer panel only.

Measurement a = approx. 90 mm from side panel severance cut.

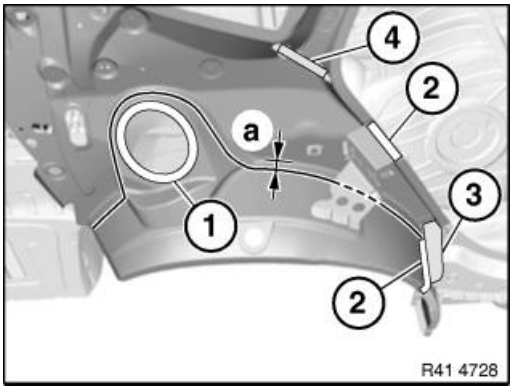
Measurement b = approx. 100 mm from side panel severance cut.

Open welded connections in areas (1).

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Remove reinforcement on C pillar.

Installation note:
Replace outer cavity sealing (2).



Mark severance cut in accordance with specified dimension and cut.

Measurement a = 20 mm distance from radius.

Attention!

Severance cut in area (1) not permitted!

Open welded connections in areas (2).

Remove section for outer wheel arch section.

Installation note:
Install new part overlapping in area of severance cut.

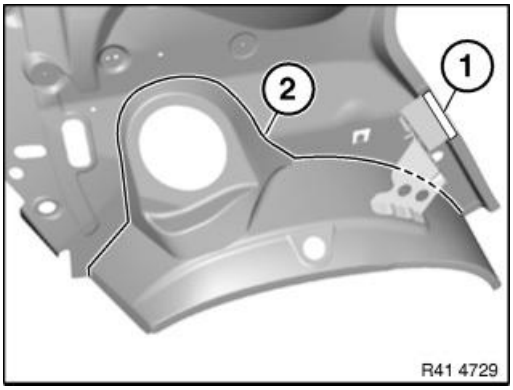
Replace cavity sealing (3).

Apply sealant to cavity sealing (4).

New part preparation

Mark severance cuts on new parts according to severance cuts on vehicle and sever.

Prepare reinforcement plates at severance cuts.



Open welded connections in area (1).

Mark new part in radius (2) and cut.

Adjust new part in conjunction with side panel to fit.

Installation

Apply sealant to cavity sealing.

Fit new parts with reinforcement plates and weld.

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41 00 ... Stamping vehicle identification number

Special tools required:

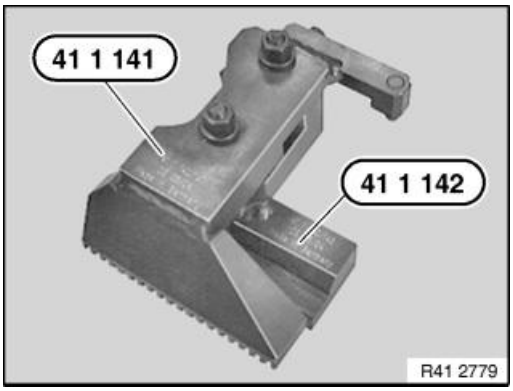
- 41 0 000
- 41 1 140
- 41 1 141
- 41 1 142

Note:
If the stamped vehicle identification number is removed during repair work, it must be stamped in again.

Read and comply with General Notes.

Necessary preliminary tasks:

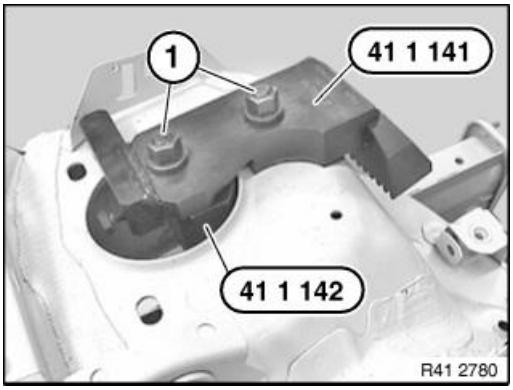
- Remove front right spring strut
- Remove rubber base from guide plate 41 1 141



The set of special tools 41 1 140 for stamping the vehicle identification number consists of:

Guide plate 41 1 141

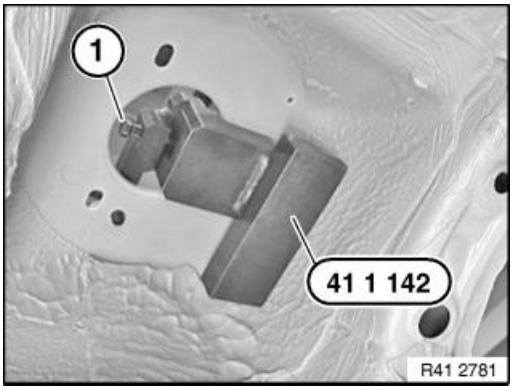
Counter-support plate 41 1 142



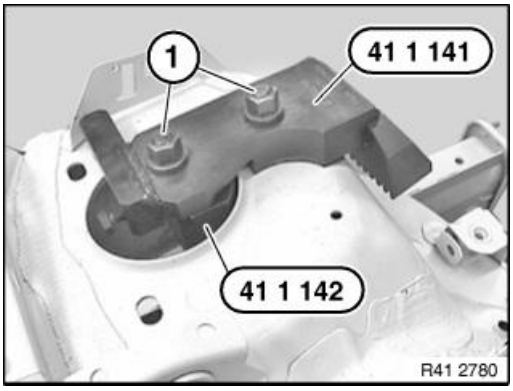
Position counter-support plate 41 1 142 at bottom on spring strut dome.

Position guide plate 41 1 141 at top on spring strut dome and tighten screws (1) by hand.

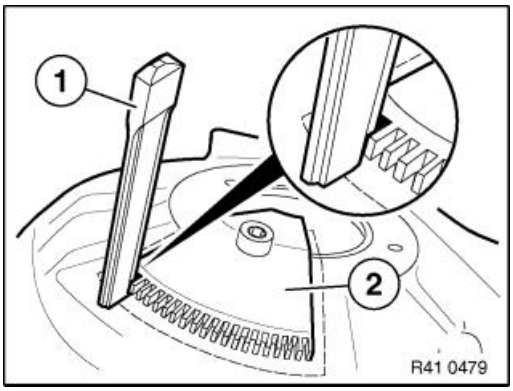
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Tighten screw (1) until counter support 41 1 142 rests on spring strut dome.



Tighten down screws (1).



Note:
The illustration is a schematic diagram and is to be applied to the relevant vehicle type.

Insert punch numbers 41 0 000 (1) individually into guide plate (2) and stamp vehicle identification number.

Note:
In the event of component or body replacement by the workshops/garages, clearly delimit the vehicle identification number at front and rear by stamping a ”+” in place of the BMW emblem.

Note national regulations.

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41 11 023 Stripping down - Replacing front section of engine support with left wheel arch

Note:
Owing to the different engine variants and equipment specifications, not all the components are taken into consideration.

The following list essentially represents the disassembly sequence.

- Disconnect battery earth lead (flat rate unit number: 61 20 900)
- Detach bumper panel (FRU number: 51 11 156)
- Remove headlight (flat rate unit number: 63 12 010)
- Remove bumper support (flat rate unit number: 51 11 050)
- Remove front panel (flat rate unit number: 41 33 040)
- Remove radiator (flat rate unit number: 17 11 000)
- Remove capacitor for air conditioning (flat rate unit number: 64 53 550)
- If necessary, remove charge air cooler (flat rate unit number: 17 51 000)
- If necessary, remove coolant expansion tank (flat rate unit number: 17 10 000)
- If required, remove air filter housing.
- Remove cooling loop for hydraulic steering (flat rate unit number: 17 11 370)
- Remove cowl panel cover (flat rate unit number: 51 13 116)
- Remove left wheel arch cover (front section) (flat rate unit number: 51 71 038)
- Remove left wheel arch cover (rear section) (flat rate unit number: 51 71 039)
- Remove left side panel (flat rate unit number: 41 35 010)
- Remove engine (flat rate unit number: 11 00 050)
- Remove and install complete front axle (flat rate unit number: 31 10 000)
- Remove brake booster (flat rate unit number: 34 33 505)
- Release left wiring harness

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41 11 028 Stripping down - Replacing left engine support (partial replacement before front axle)

Note:
Owing to the different engine variants and equipment specifications, not all the components are taken into consideration.

The following list essentially represents the disassembly sequence.

- Clamp off battery cable from negative terminal
- Detach bumper panel (FRU number: 51 11 156)
- Remove bumper support (flat rate unit number: 51 11 050)
- Remove and install intake filter housing (flat rate unit number: 13 71 000)
- Remove front panel (flat rate unit number: 41 33 040)
- Remove and install left wheel arch cover (front section) (flat rate unit number: 51 71 038)
- Remove and install condenser for air conditioning (flat rate unit number: 64 53 550)
- Remove and install cooling loop for hydraulic steering (flat rate unit number: 17 11 370)
- If necessary, remove and install charge air cooler (flat rate unit number: 17 51 000)
- Partially release left wiring harness

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41 14 021 Stripping work - replacing front left wheel arch

Note:
Owing to the different engine variants and equipment specifications, not all the components are taken into consideration.

The following list essentially represents the disassembly sequence.

- Disconnect battery earth lead (flat rate unit number: 61 20 900)
- Detach bumper panel (FRU number: 51 11 156)
- Remove bumper support (flat rate unit number: 51 11 050)
- Remove headlight (flat rate unit number: 63 12 010)
- Remove front panel (flat rate unit number: 41 33 040)
- Remove radiator (flat rate unit number: 17 11 000)
- Remove capacitor for air conditioning (flat rate unit number: 64 53 550)
- If necessary, remove charge air cooler (flat rate unit number: 17 51 000)
- Remove cooling loop for hydraulic steering (flat rate unit number: 17 11 370)
- If necessary, remove intake filter housing (flat rate unit number: 41 35 111)
- If necessary, remove coolant expansion tank (flat rate unit number: 17 11 100)
- Remove left wheel arch cover (front section) (flat rate unit number: 51 71 038)
- Remove left wheel arch cover (rear section) (flat rate unit number: 51 71 039)
- Remove left side panel (flat rate unit number: 41 35 010)
- Remove left spring strut (flat rate unit number: 31 31 000)
- Remove left wishbone (flat rate unit number: 31 12 000)
- Remove sill strip (flat rate unit number: 51 71 447)
- Release left wiring harness

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41 ... 0 Notes on the repair technique used in the main group 41

Two different repair techniques are used in body repair.

These are welding and bonding/riveting.

If the repair instructions do not specify a repair technique, then welding must **always** be used.

The bonding/riveting repair technique is **always** described in detail in the repair instructions.

Quality standards must be met.

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41 11 150 Cover for frame side member (part replacement between A and B pillar)

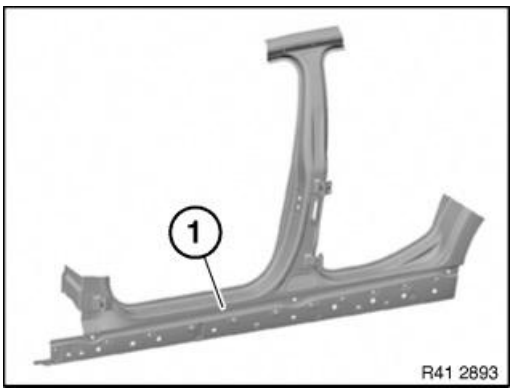
Observe procedure for repair stage 3.

Read contents of Body, General.

For set-up work, see the surrounding texts on KSD CD (FRU number 41 11 150).

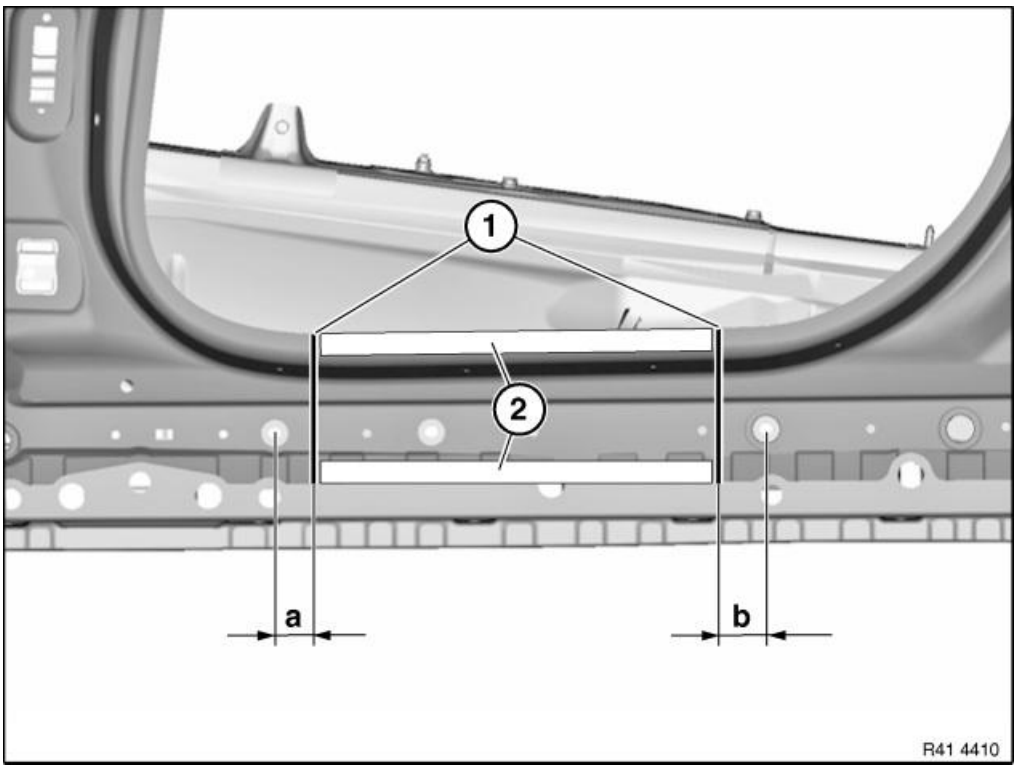
Spot-weld bonding is used on this vehicle. Observe specific procedure.

Use only an approved spot-welding apparatus for repairs!



Following new body parts are required (see Electronic Parts Catalogue):

- (1) B-pillar with entrance



Mark severance cuts (1) in accordance with specified measurements and cut.

Attention!
Cut outer panel only for following severance cuts.

Dimension a = approx. 40 mm behind 25 mm dia. hole.

Dimension b = approx. 40 mm before hole dia. 25 mm.

Open welded connections in areas (2).

Installation note:
Mark severance cuts on new part in accordance with severance cuts on vehicle and cut.

Weld in reinforcing panels at all severance cuts.

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41 11 300 Replacing entrance with door post, left and right (partial replacement, B-pillar)

Observe procedure for repair stage 3.

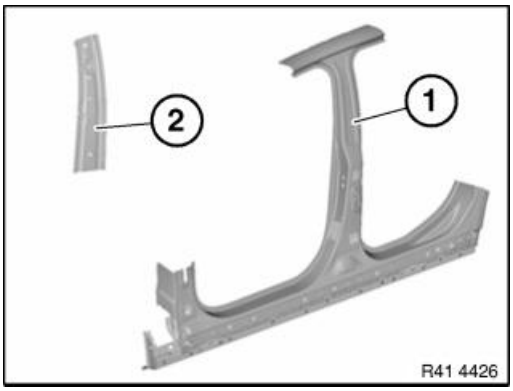
Read contents of Body, General.

For set-up work, see the surrounding texts on KSD CD (FRU number 41 11 300).

Spot-weld bonding is used on this vehicle. Observe specific procedure.

Use only an approved spot-welding apparatus for repairs!

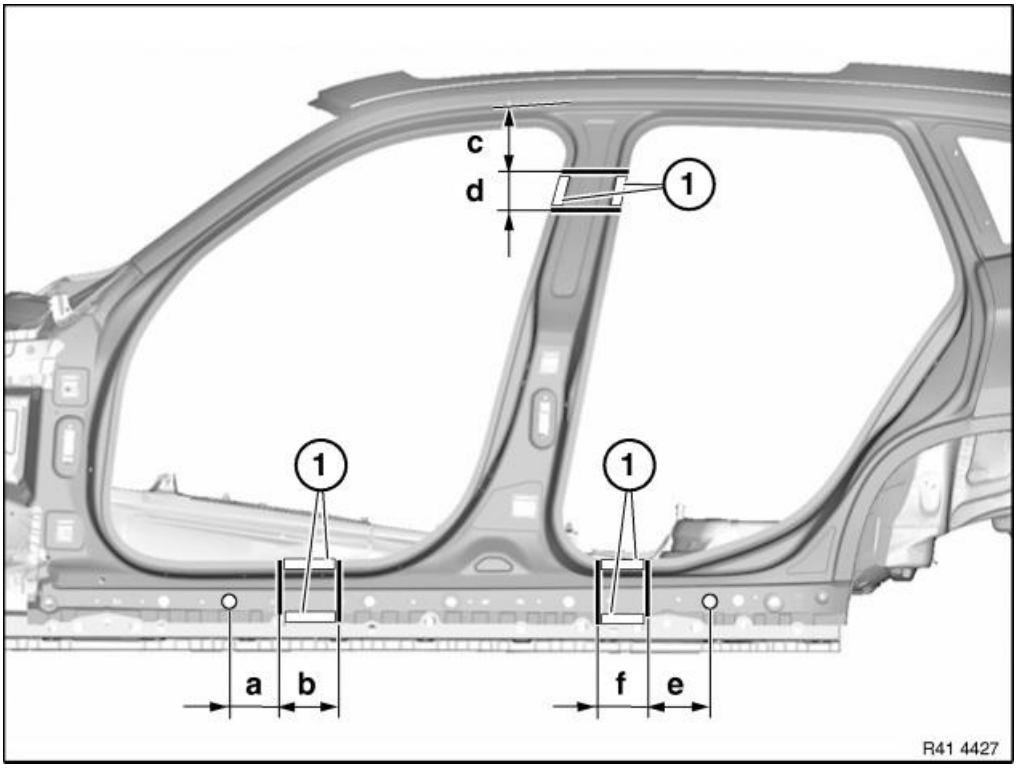
Place vehicle on straightening bench.



Following new body parts are required (see Electronic Parts Catalogue):

- (1) B-pillar with entrance
  (2) B-pillar, inner

Removal



Mark severance cuts in accordance with specified dimensions and cut.

Attention!
Cut outer panel only for following severance cuts.

Dimension a = approx. 110 mm from centre-point of 25 mm dia. hole.

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Dimension b = approx. 130 mm after cut a.

Dimension c = approx. 150 mm from roof edge.

Dimension d = approx. 100 mm below cut c.

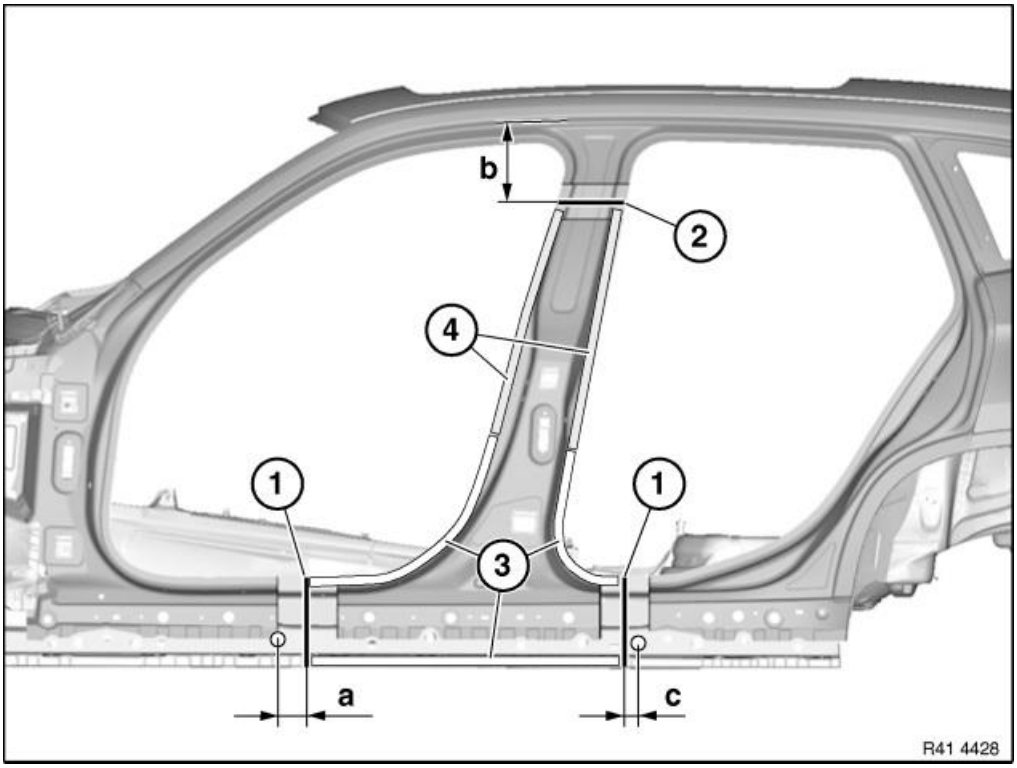
Dimension e = approx. 140 mm from centrepoint of 25 mm dia. hole.

Dimension f = approx. 130 mm before section e.

Open welded connections in areas (1).

Remove sheet sections.

Note:
Cut-out metal sections are required again for sealing.



Mark severance cuts in accordance with specified dimensions and cut.

Attention!
Cut outer plate only for the severance cuts (1).

For severance cut (2) cut all the way through B-pillar.

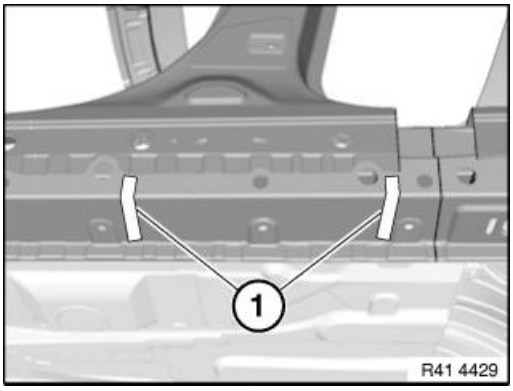
Dimension a = approx. 80 mm past centrepoint of 25 mm dia. hole.

Dimension b = approx. 200 mm from roof edge.

Dimension c = approx. 35 mm before centrepoint of hole dia. 25 mm.

Open welded connections in areas (3).

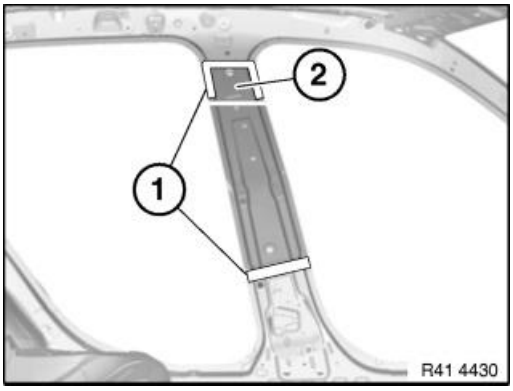
Installation note:
During installation weld new parts in areas (4).



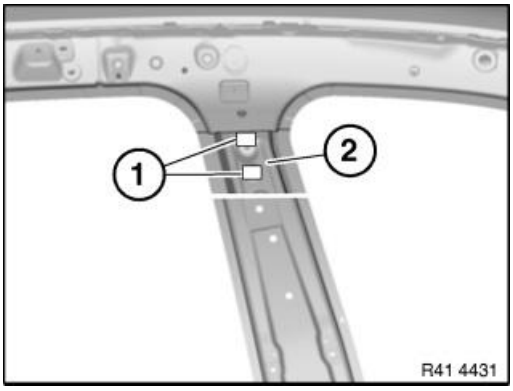
View from below.

Open welded connections in areas (1).

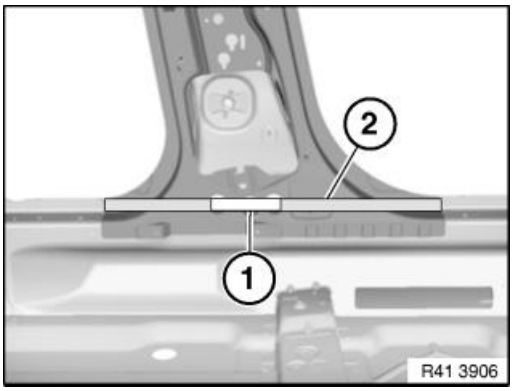
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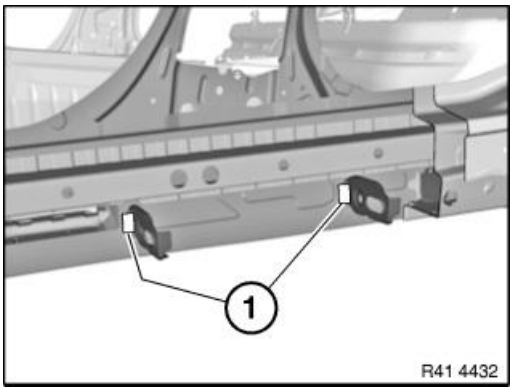
View from inside.
Open welded connections in areas (1).
Remove metal section (2).



Open welded connections (1).
Remove metal section (2).



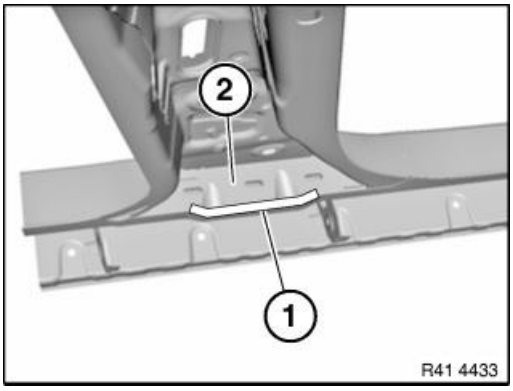
Loosen spot-welded adhesive joints in area (1).
Open bonded connection in area (2).
Remove B-pillar.



Open welded connections (1) and remove bulkhead.

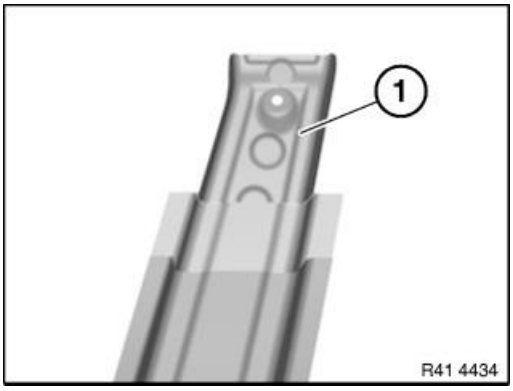
New part preparation

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Risk of fire!

Slightly remove adhesive foam of cavity sealing (2) in area (1).

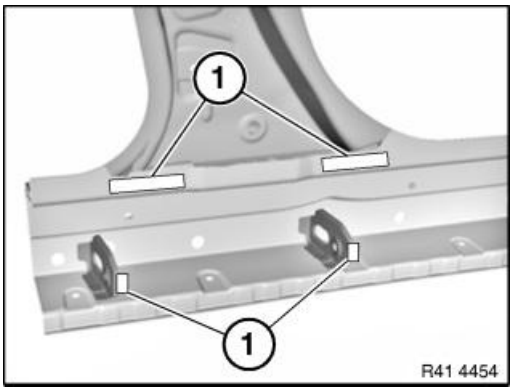


Mark severance cuts on new parts in accordance with the severance cuts on the vehicle and cut.

Attention!

Do not cut through B-pillar (1) reinforcement!

Prepare reinforcement plates at severance cuts.



Attention!

Structure bonding!

Observe preparation of bonding surfaces (1)!

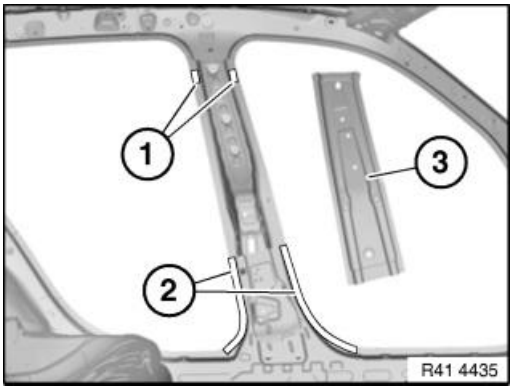
Adjust new parts to fit with alignment bracket or universal mounting.

Installation

Clean bonding surfaces with cleaning agent R1.

Apply adhesive K1 to bonding surfaces.

Install new parts and reinforcement plates with alignment bracket or universal mount and weld.



Also MAG weld B-pillar reinforcement in areas (1). (2 fillet welds, length 10 mm)**Attention!**

Only weld new parts in the areas (2) after installation of B-pillar (3)!

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41 21 510 Replacing front left door post (front side panel removed)

Observe procedure for repair stage 3.

Read contents of Body, General.

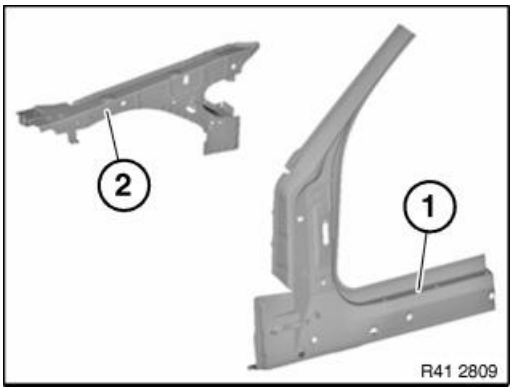
For set-up work, see the surrounding texts on KSD CD (FRU number 41 21 510).

Spot-weld bonding is used on this vehicle. Observe specific procedure.

Remove or cover those vehicle components in the repair area which are susceptible to heat or dust.

Use only an approved spot-welding apparatus for repairs!

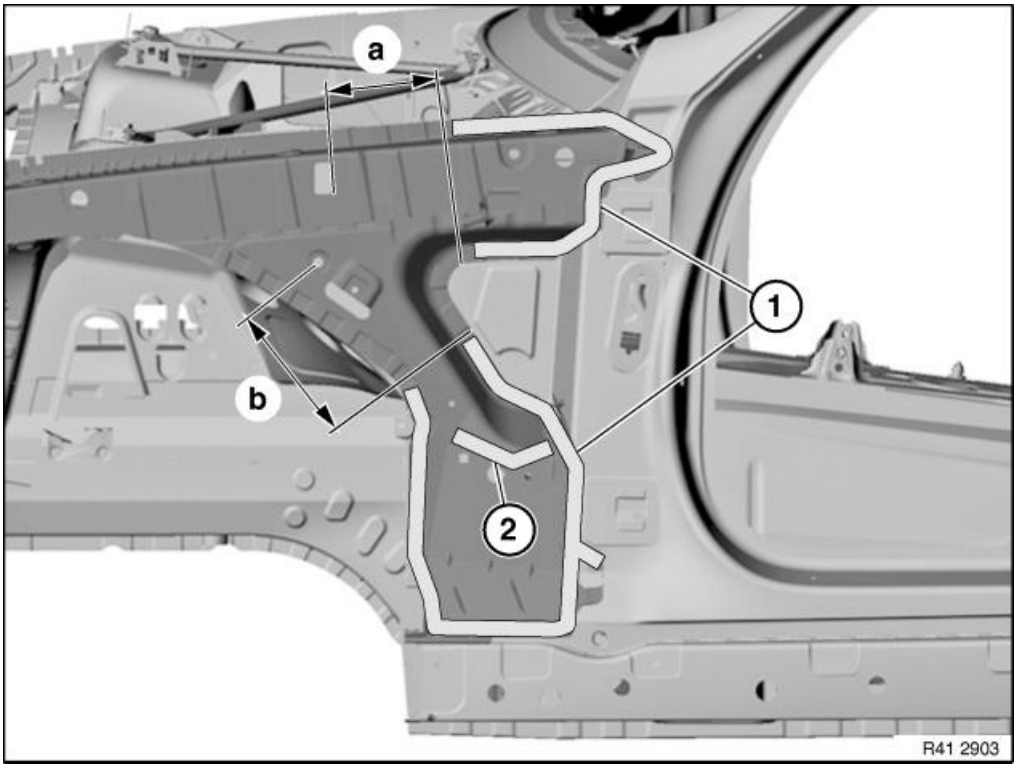
Place vehicle on straightening bench.



Following new body parts are required (see Electronic Parts Catalogue):

- (1) A-pillar, outer
- (2) Carrier support, outer wheel arch section
- (3) Shaped part, carrier support (not shown)
- (4) Shaped part, A-pillar, bottom inner (not shown)

Removal



Mark severance cuts in accordance with specified dimensions and cut.

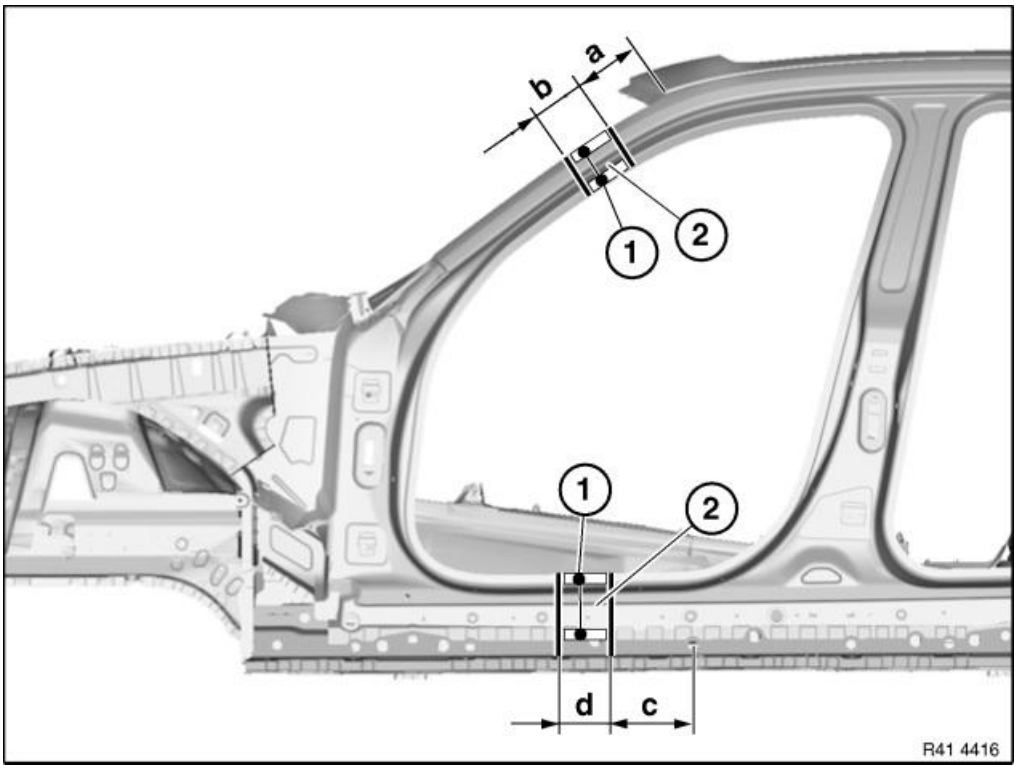
Attention!
Cut outer panel only for following severance cuts.

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Dimension a = approx. 130 mm from edge of rectangular hole.

Dimension b = approx. 160 mm from centrepoint of 12 mm dia. bore hole.

Open welded connections in areas (1).



Mark severance cuts in accordance with specified dimensions and cut.

Attention!
Cut outer panel only for following severance cuts.

Dimension a = 200 mm from roof edge.

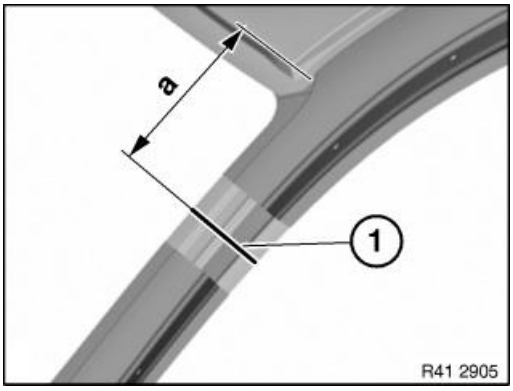
Dimension b = 120 mm below severance cut a.

Measurement c = approx. 170 mm before centrepoint of hole dia. 20 mm.

Dimension d = 100 mm before severance cut c.

Open welded connections in areas (1).

Note:
Cut-out metal sections (2) are required again for sealing.



Attention!

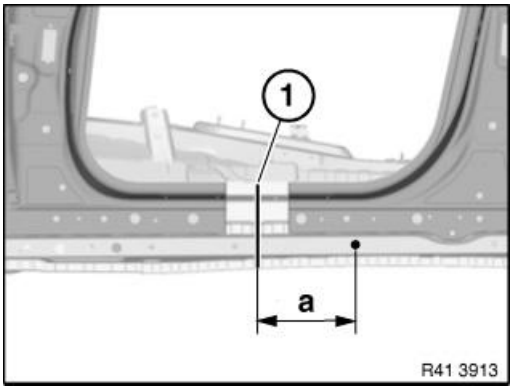
For the following severance cut, do not damage the slide/tilt sunroof water drain hose.

Cut outer panel only.

Mark severance cut (1) in accordance with dimension and cut.

Dimension a = approx. 260 mm from roof edge.

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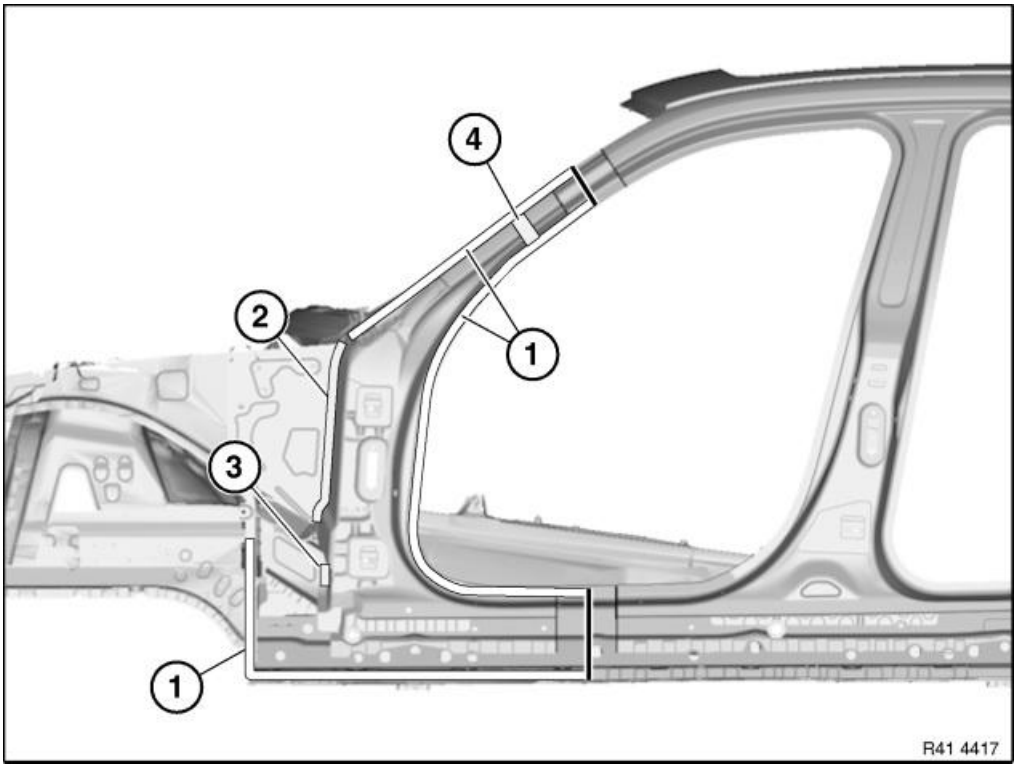


Mark severance cut (1) in accordance with dimension and cut.

Attention!

Cut outer panel only.

Dimension a= 225 mm before centrepoint of 20 mm dia. hole.



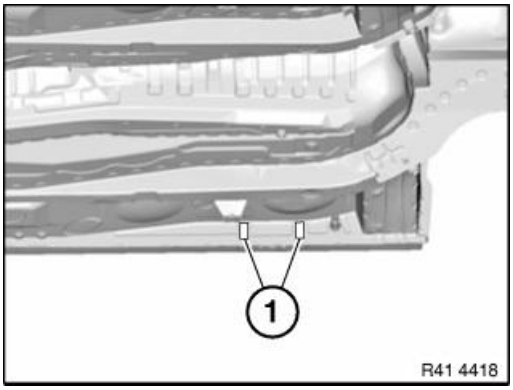
Open welded connections in areas (1).

Open spot-welded adhesive joints in area (2).

Open bonded connection in area (3).

Loosen door post of cavity sealing (4).

Note:
Replace bonded connection in area (3) with MAG weld seam.



View from below.

Release welded connections (1) and remove the door post.

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New part preparation

Mark severance cuts on new parts in accordance with the severance cuts on the vehicle and cut.

Prepare reinforcement plates at severance cuts.

Adjust A-pillar to fit with alignment bracket or universal mount.



Installation

Apply sealant to cavity sealing.

Install door post and reinforcement plates with alignment bracket or universal mount and weld.

Note:
Make sure slide/tilt sunroof water drain hose is correctly fitted.

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41 32 000 Replacing left or right cowl

Follow procedure for repair stage 3.

Read contents of Body, General.

For set-up work, see the surrounding texts on KSD CD (FRU number 41 32 000).

Use only an approved spot-welding apparatus for repairs!

Attention!

Operations on pyrotechnical devices may only be carried out by authorised experts.

Improper, unauthorised operations may result in serious dangers.

Unauthorized persons are strictly prohibited from performing any operations on this system.

Warning!

Read and comply with safety information for handling airbag modules and pyrotechnical belt tensioners.

Incorrect handling can activate airbag and cause injury.

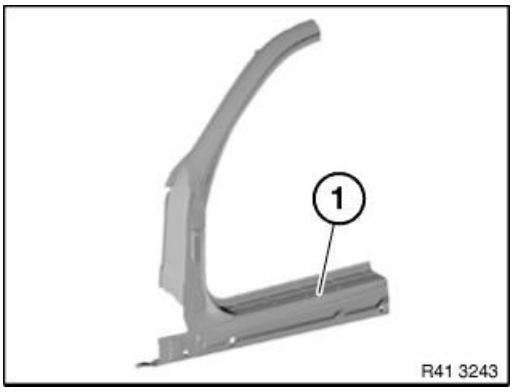
A damaged head airbag must be replaced.

A damaged head airbag exhibits an impaired protective function and in extreme cases loses its protective function altogether.

Necessary preliminary work

Disconnect battery earth lead.

Remove trim panel for roof pillar.

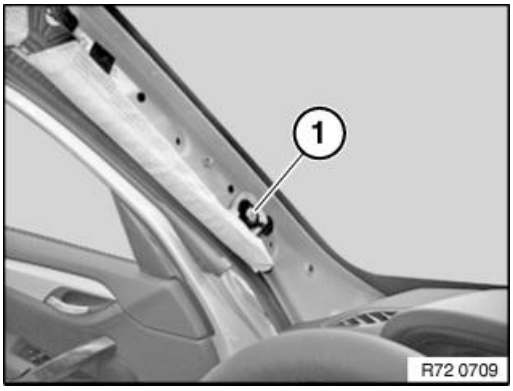


Following new body parts are required (see Electronic Parts Catalogue):

- (1) A-pillar, outer

Removal

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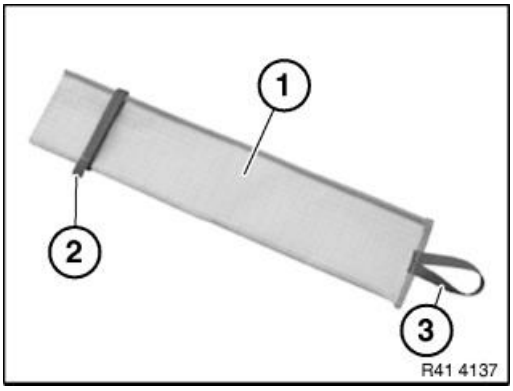


Release rivet connection (1) for airbag.**Attention!**
Risk of damage!
Airbag must not be kinked or bent!

Installation note:
The remainder of the blind rivet can not be removed from the A-pillar.

To prevent rattling noise when driving, additionally apply cavity wax to the A-pillar between the door hinges.

Access via plug connection for door wiring harness.



Note:
Use protective sleeve (1) to protect the airbag.

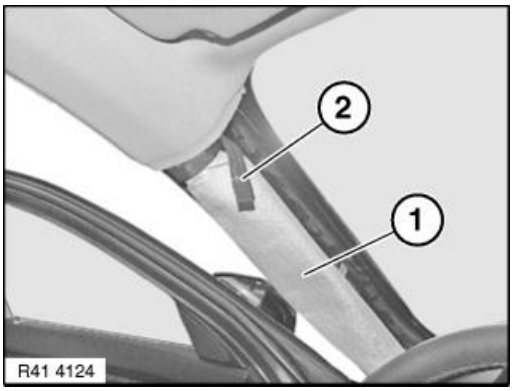
Check protective sleeve for damage prior to use.

A damaged protective sleeve must not be used!

(2) Velcro fastener

(3) Loop

- Order number, protective sleeve: 81 47 2 159 578
  Sourcing reference:
  BMW Workshop Equipment Catalogue

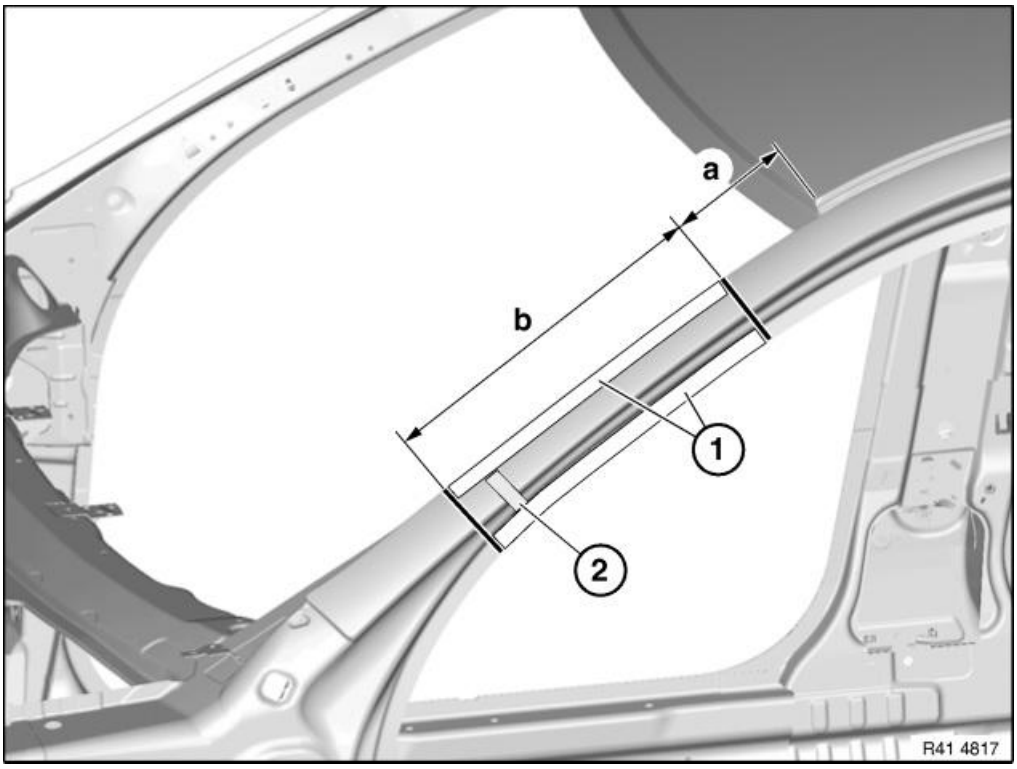


Slide protective sleeve (1) onto airbag under roofliner so that airbag is completely covered.

Fasten protective sleeve with Velcro fastener (2).

Secure protective sleeve with airbag against kinking.

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Mark severance cuts in accordance with specified dimensions and cut.

Attention!
Cut outer panel only for following severance cuts.

Dimensions a = approx. 150 mm from roof edge.

Dimension b = approx. 350 mm below severance cut a.

Open welded connections in areas (1).

Release part section of cowl panel from cavity sealing (2) and remove it.

New part preparation

Mark severance cuts on new parts in accordance with vehicle and cut.

Prepare reinforcement plates at severance cuts.

Fit in new part.

Installation

Apply sealant to cavity seal.

Install and weld new parts and reinforcement plates.

After completing welding work:

Check airbag in area of protective sleeve for damage, replace if necessary.

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41 ... 0 Notes on the repair technique used in the main group 41

Two different repair techniques are used in body repair.

These are welding and bonding/riveting.

If the repair instructions do not specify a repair technique, then welding must **always** be used.

The bonding/riveting repair technique is **always** described in detail in the repair instructions.

Quality standards must be met.

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41 ... 0 Notes on the repair technique used in the main group 41

Two different repair techniques are used in body repair.

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41 31 010 Disassembly work - replacing roof outer skin (version with slide/tilt sunroof)

Note:
Owing to the different engine variants and equipment specifications, not all the components are taken into consideration.

The following list essentially represents the disassembly sequence.

- Disconnect and connect battery earth lead (flat rate unit number: 61 20 900)
- Remove and install windscreen (flat rate unit number: 51 31 000)
- Remove and install tailgate (flat rate unit number: 41 62 000)
- Remove and install headlining (flat rate unit number: 51 44 011)
- If necesaary remove roof rails
- Remove the slide/tilt sunroof (flat rate unit number: 54 12 211)
- Remove and install left roof trim strip (flat rate unit number: 51 13 280)
- Remove and install right roof trim strip (flat rate unit number: 51 13 280)
- Removing and installing/renewing roof-mounted aerial (FRU number: 65 20 035)
- Release seal for rear lid

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41 31 010 Disassembly work - replacing roof outer skin (version without slide/tilt sunroof)

Note:
Owing to the different engine variants and equipment specifications, not all the components are taken into consideration.

The following list essentially represents the disassembly sequence.

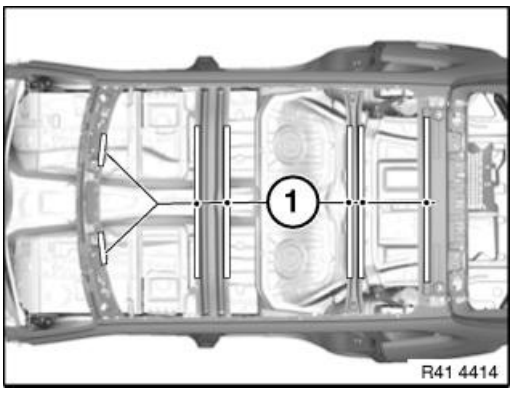
- Disconnect and connect battery earth lead (flat rate unit number: 61 20 900)
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- Remove and install tailgate (flat rate unit number: 41 62 000)
- Remove and install headlining (flat rate unit number: 51 44 001)
- If necessary, remove roof rails.
- Remove and install left roof trim strip (flat rate unit number: 51 13 280)
- Remove and install right roof trim strip (flat rate unit number: 51 13 280)
- Removing and installing/renewing roof-mounted aerial (FRU number: 65 20 035)
- Release seal for rear lid

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41 31 000 Replacing roof outer skin (normal roof)

Refer to repair instructions Roof outer skin with slide/tilt sunroof for procedure and carry over schematically to the vehicle.

Strip down vehicle.



Installing roof outer skin

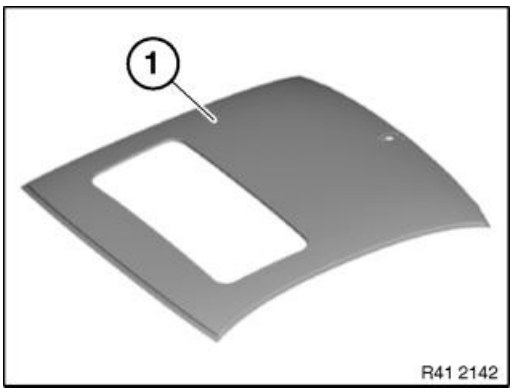
Apply D2 sealant in areasÂ (1) in the same way as in series standard.

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41 31 010 Replacing roof outer skin (version with slide/tilt sunroof)

Read contents of Body, General.
Strip down vehicle.

Observe procedure for repair stage 2.



Following new body parts are required (see Electronic Parts Catalogue):

- (1) Roof outer skin, slide/tilt sunroof

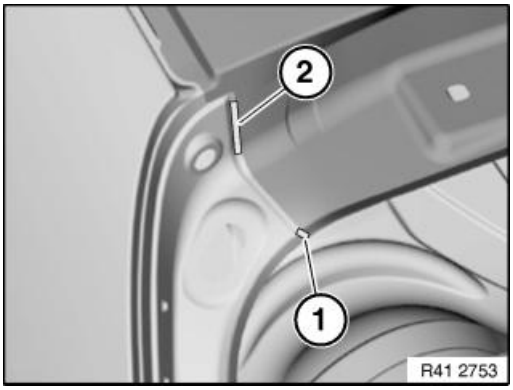
Following consumables are required:

Material	Quantity
Adhesive K5b	1
Adhesive K5a	1
Punch rivets N4	23
EMC screws	2
Cleaning agent R1	1
Sealant D2	1

Tools also required:

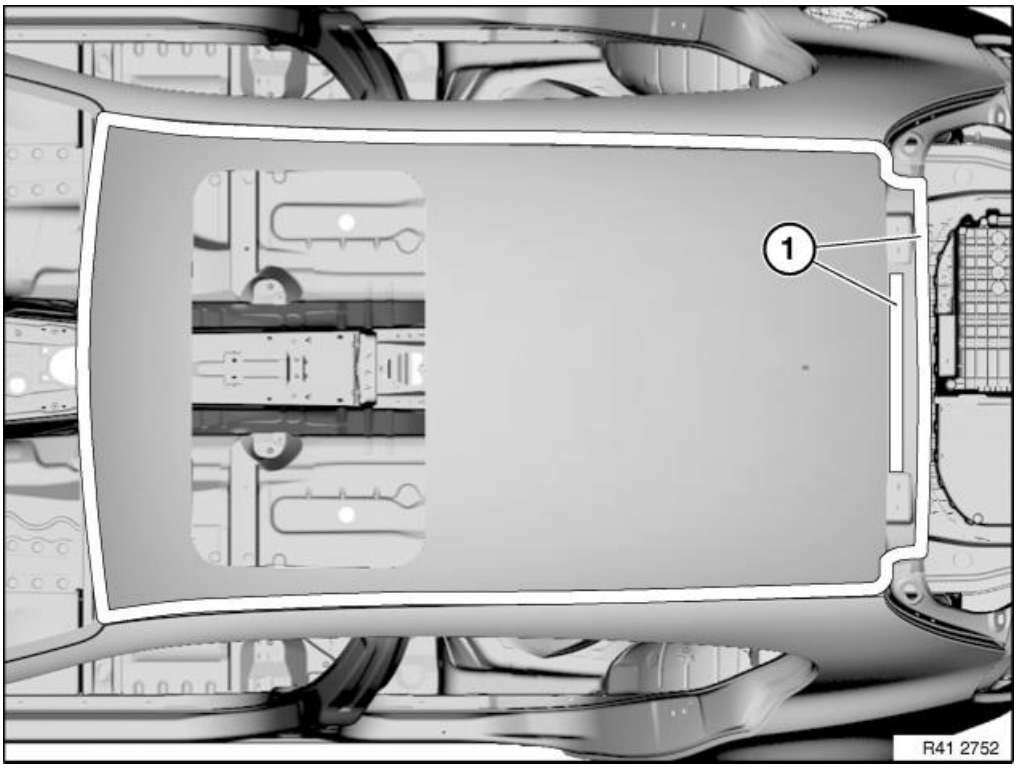
- Roof pliers set, order number: 81 43 2 158 707
  Sourcing reference:
  BMW Workshop Equipment Catalogue

Removal



Operation is described on the left side. Right side identical.
Open brazed connections in areas (1) and (2) by grinding.

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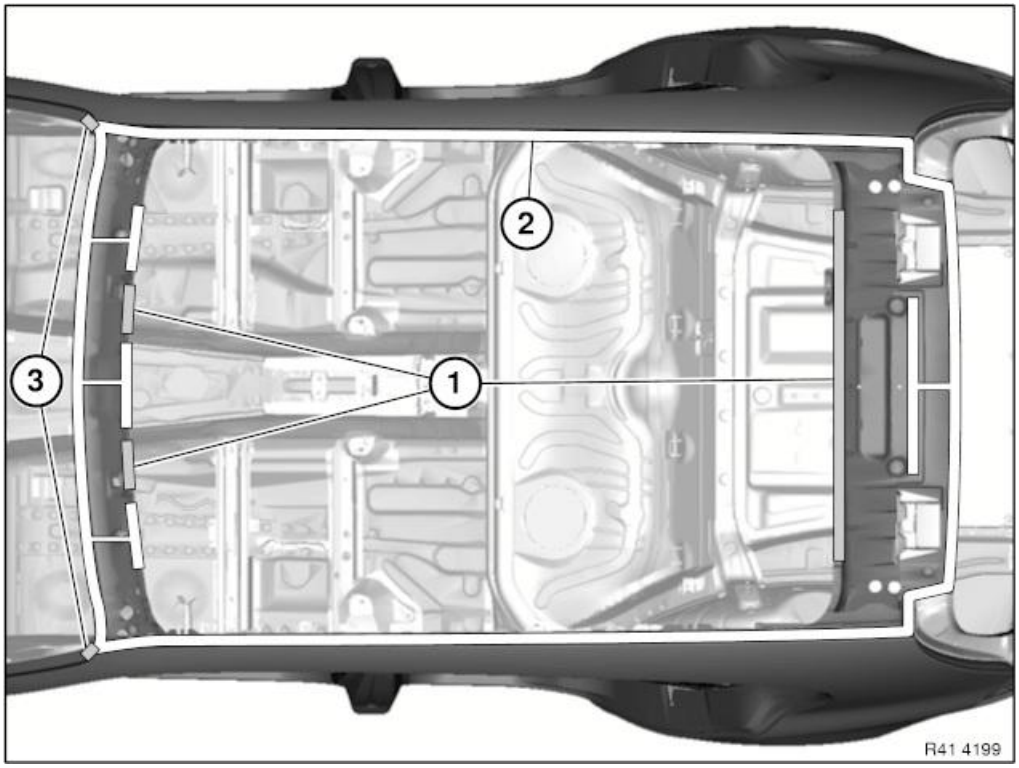
Open welded connections in areas (1).
Break into sealant (for arrangement, see figure R41 4199) and remove roof outer skin.

New part preparation

Attention!
Do not grind/sand new part in area of bonding surfaces.

Installation

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Clean all bonding surfaces on vehicle and on new part with cleaning agent R1.

Apply sealant D2 in areas (1) analogously to Series.

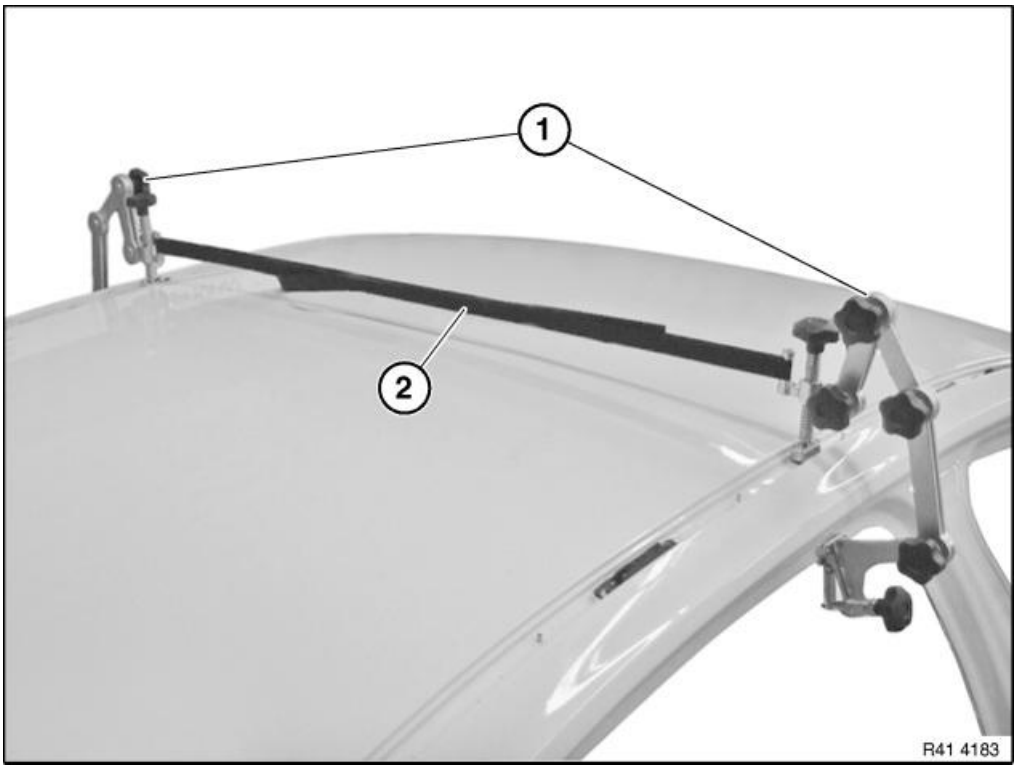
Apply adhesive in areas (2).

Apply a little more adhesive to nodes (3) of A-pillar.

Note:
Excess material is later used for spreading to side frame.

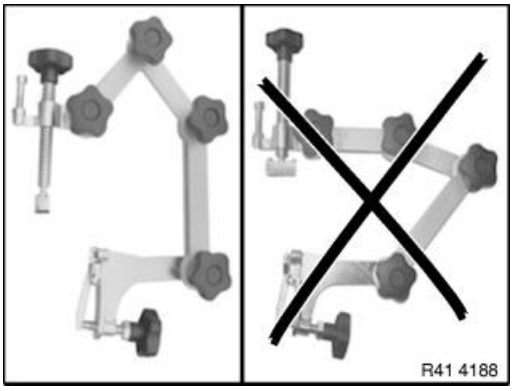
Place roof outer skin with helpers evenly and centrally on vehicle.

Fit roof strips for positioning.

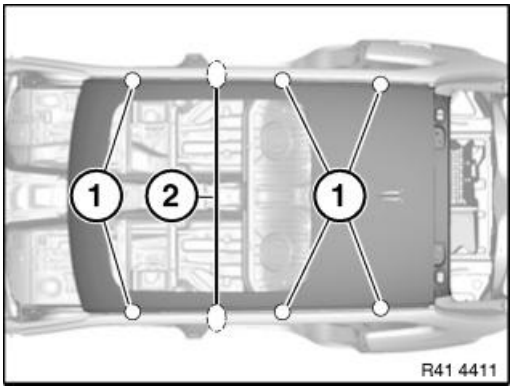


Mount roof pliers (1) and secure with tensioning strap (2). Note:
Pictured on version without slide/tilt sunroof.

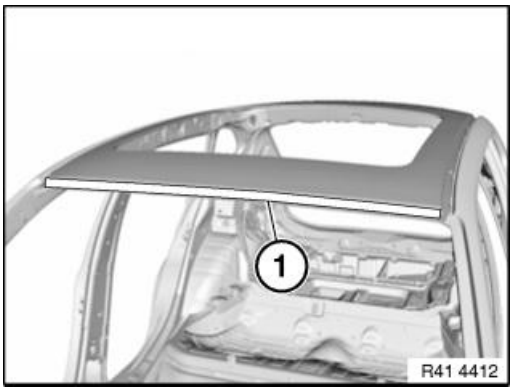
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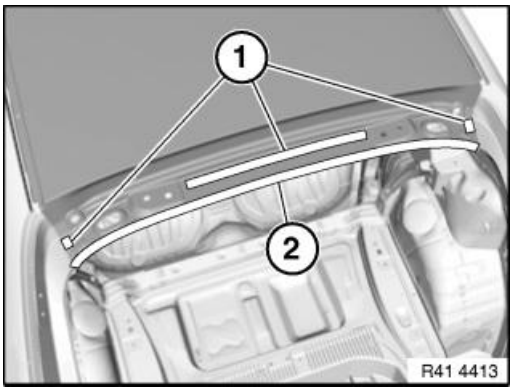
Note:
To generate an optimum contact pressure, mount roof pliers according to the graphics as left.



Fix roof outer skin in areas (1) with screws and nuts M6.
(2) Roof pliers and tensioning strap.

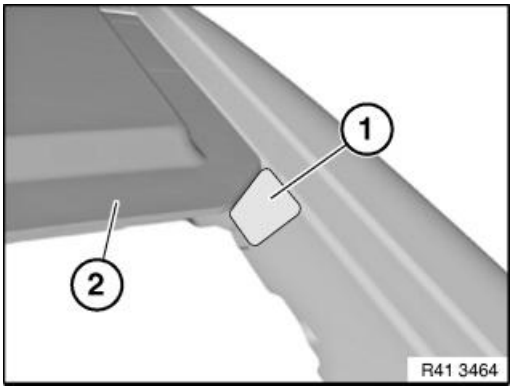


In area (1) rivet roof outer skin with 7 N4 punch rivets.
Set punch rivets in corners starting at a distance of approx. 200 mm.



In area (1) rivet roof outer skin with 8 N4 punch rivets.
In this area (2) use 8 N4 punch rivets.

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Adapt step (1) between roof outer skin (2) and A-pillar with emerging adhesive. Remove excess adhesive.

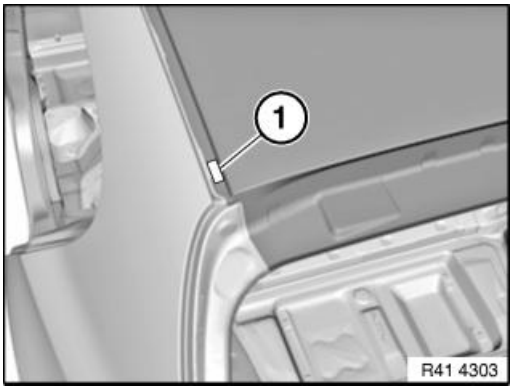
Attention!

Do not use any cleaning agents containing solvents.

Do not leave any sharp edges as this could compromise the tightness of the subsequent bonding of the windscreens.

Attention!

Spread excess adhesive in roof trim strip channel. Mounting surfaces of clips for roof trim strips must not be coated with adhesive.



Operation is described on the left side. Right side identical.

Fit an EMC screw after adhesive has hardened in area (1).

In so doing, bear in mind subsequent fitting of roof trim strip.

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41 ... 0 Notes on the repair technique used in the main group 41

Two different repair techniques are used in body repair.

These are welding and bonding/riveting.

If the repair instructions do not specify a repair technique, then welding must **always** be used.

The bonding/riveting repair technique is **always** described in detail in the repair instructions.

Quality standards must be met.

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41 21 510 Replacing front left door post (front side panel removed)

Observe procedure for repair stage 3.

Read contents of Body, General.

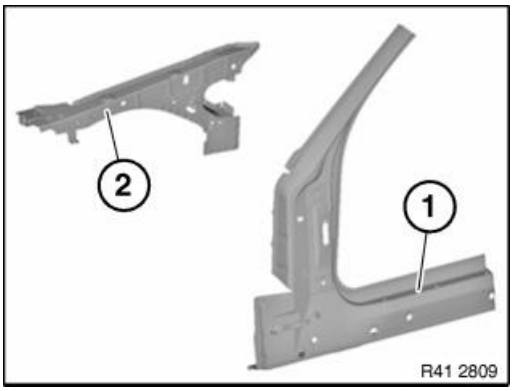
For set-up work, see the surrounding texts on KSD CD (FRU number 41 21 510).

Spot-weld bonding is used on this vehicle. Observe specific procedure.

Remove or cover those vehicle components in the repair area which are susceptible to heat or dust.

Use only an approved spot-welding apparatus for repairs!

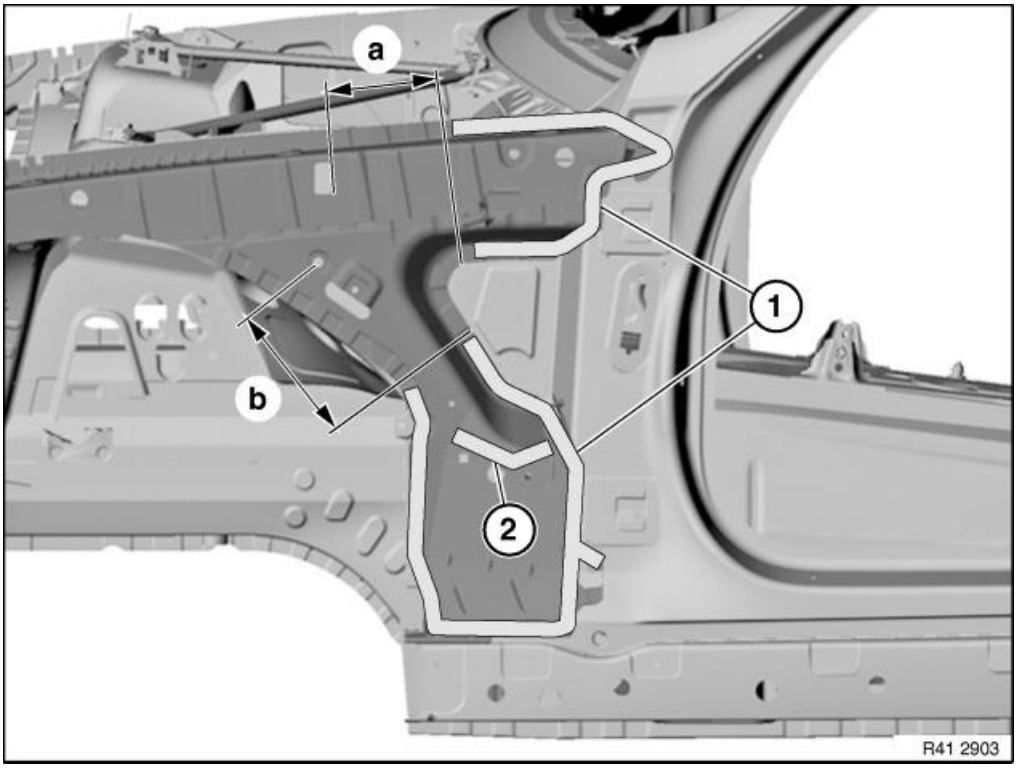
Place vehicle on straightening bench.



Following new body parts are required (see Electronic Parts Catalogue):

- (1) A-pillar, outer
- (2) Carrier support, outer wheel arch section
- (3) Shaped part, carrier support (not shown)
- (4) Shaped part, A-pillar, bottom inner (not shown)

Removal



Mark severance cuts in accordance with specified dimensions and cut.

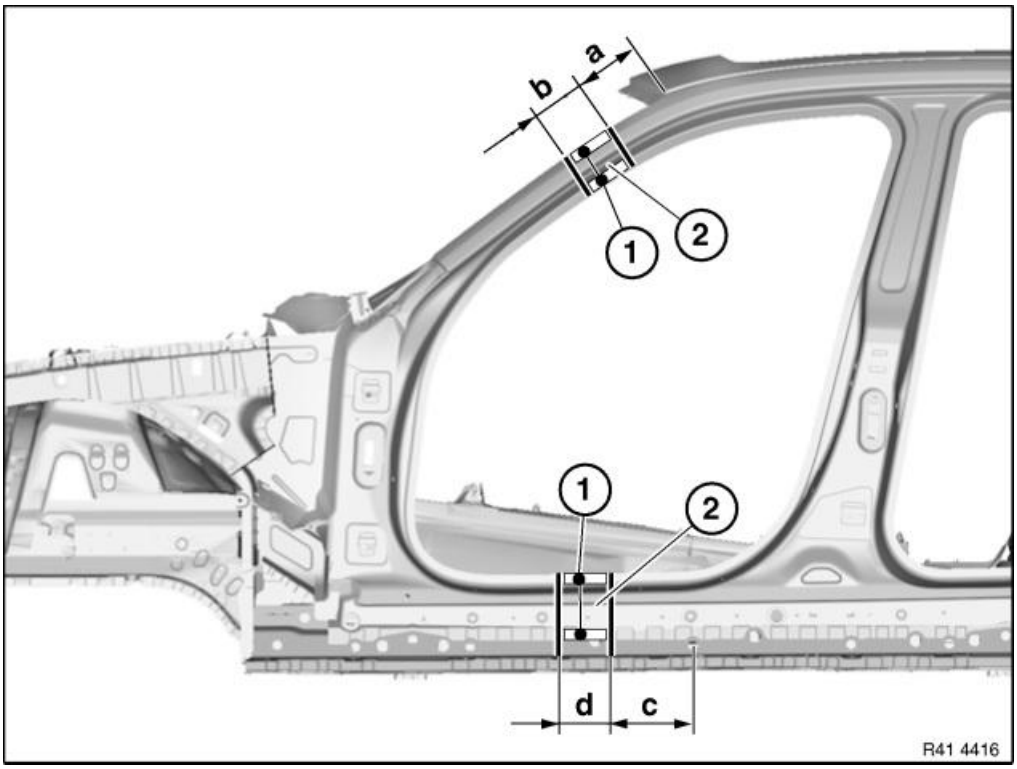
Attention!
Cut outer panel only for following severance cuts.

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Dimension a = approx. 130 mm from edge of rectangular hole.

Dimension b = approx. 160 mm from centrepoint of 12 mm dia. bore hole.

Open welded connections in areas (1).



Mark severance cuts in accordance with specified dimensions and cut.

Attention!
Cut outer panel only for following severance cuts.

Dimension a = 200 mm from roof edge.

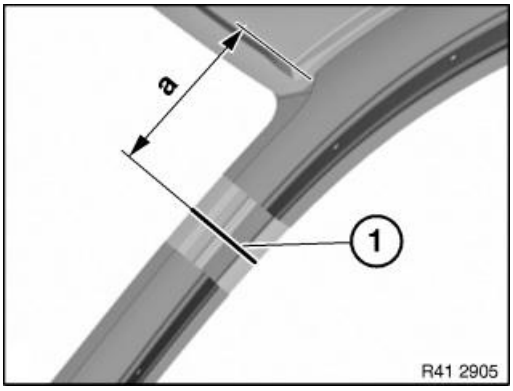
Dimension b = 120 mm below severance cut a.

Measurement c = approx. 170 mm before centrepoint of hole dia. 20 mm.

Dimension d = 100 mm before severance cut c.

Open welded connections in areas (1).

Note:
Cut-out metal sections (2) are required again for sealing.



Attention!

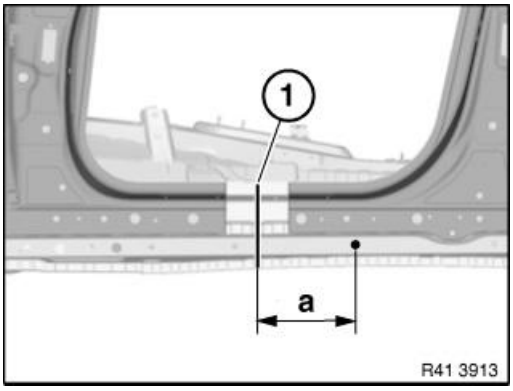
For the following severance cut, do not damage the slide/tilt sunroof water drain hose.

Cut outer panel only.

Mark severance cut (1) in accordance with dimension and cut.

Dimension a = approx. 260 mm from roof edge.

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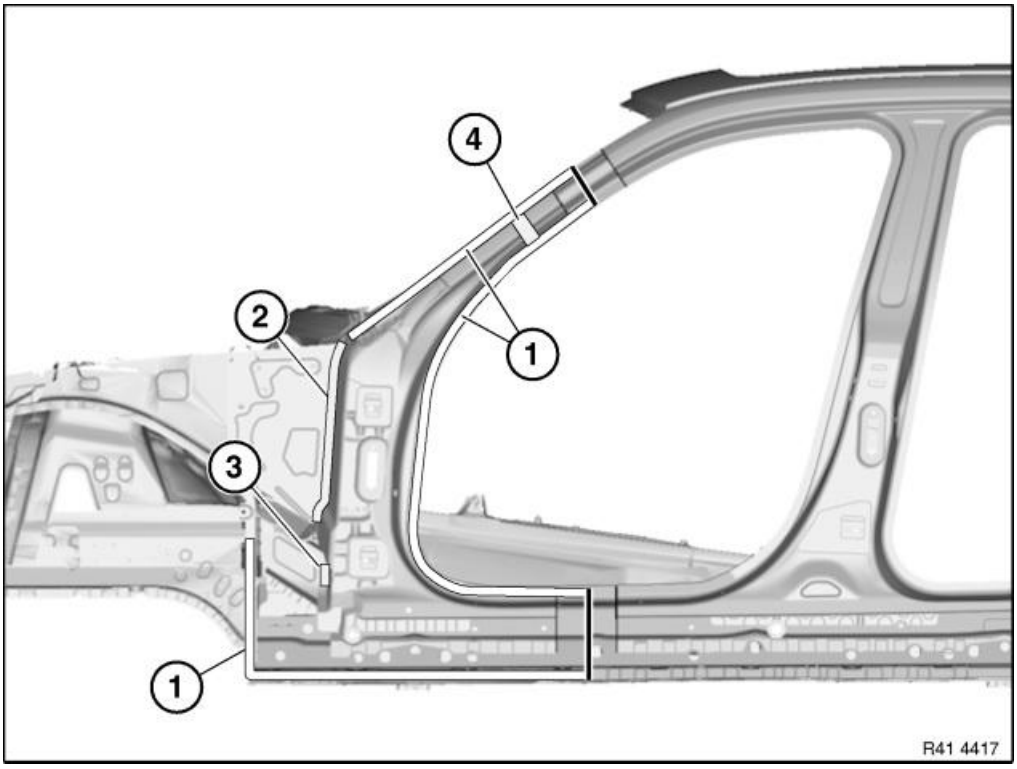


Mark severance cut (1) in accordance with dimension and cut.

Attention!

Cut outer panel only.

Dimension a= 225 mm before centrepoint of 20 mm dia. hole.



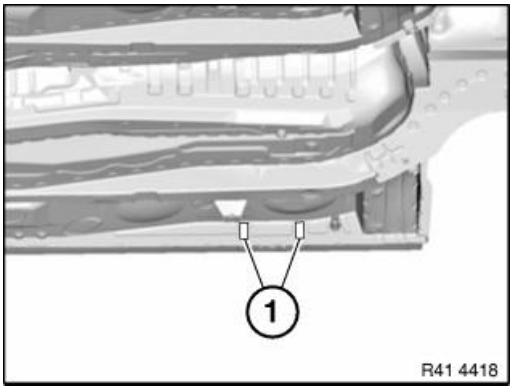
Open welded connections in areas (1).

Open spot-welded adhesive joints in area (2).

Open bonded connection in area (3).

Loosen door post of cavity sealing (4).

Note:
Replace bonded connection in area (3) with MAG weld seam.



View from below.

Release welded connections (1) and remove the door post.

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New part preparation

Mark severance cuts on new parts in accordance with the severance cuts on the vehicle and cut.

Prepare reinforcement plates at severance cuts.

Adjust A-pillar to fit with alignment bracket or universal mount.



Installation

Apply sealant to cavity sealing.

Install door post and reinforcement plates with alignment bracket or universal mount and weld.

Note:
Make sure slide/tilt sunroof water drain hose is correctly fitted.

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41 32 000 Replacing left or right cowl

Follow procedure for repair stage 3.

Read contents of Body, General.

For set-up work, see the surrounding texts on KSD CD (FRU number 41 32 000).

Use only an approved spot-welding apparatus for repairs!

Attention!

Operations on pyrotechnical devices may only be carried out by authorised experts.

Improper, unauthorised operations may result in serious dangers.

Unauthorized persons are strictly prohibited from performing any operations on this system.

Warning!

Read and comply with safety information for handling airbag modules and pyrotechnical belt tensioners.

Incorrect handling can activate airbag and cause injury.

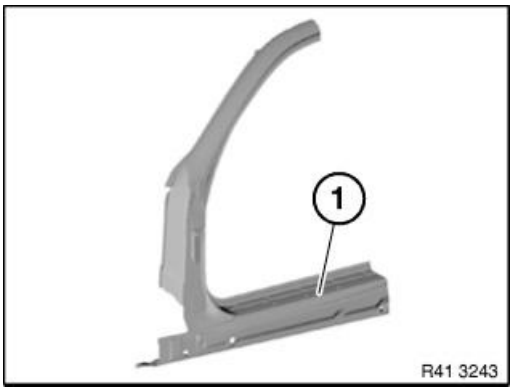
A damaged head airbag must be replaced.

A damaged head airbag exhibits an impaired protective function and in extreme cases loses its protective function altogether.

Necessary preliminary work

Disconnect battery earth lead.

Remove trim panel for roof pillar.

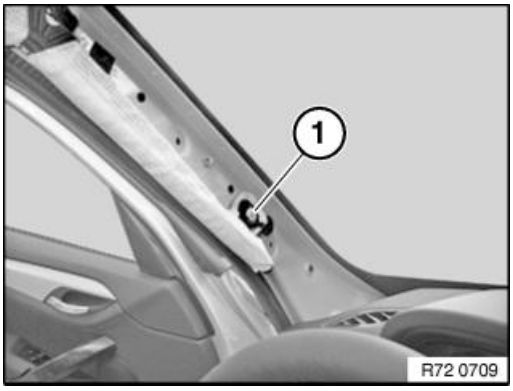


Following new body parts are required (see Electronic Parts Catalogue):

- (1) A-pillar, outer

Removal

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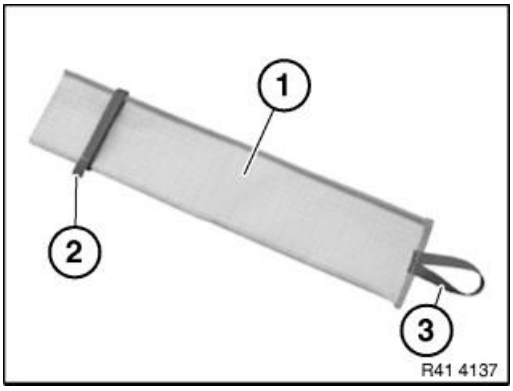


Release rivet connection (1) for airbag.**Attention!**
Risk of damage!
Airbag must not be kinked or bent!

Installation note:
The remainder of the blind rivet can not be removed from the A-pillar.

To prevent rattling noise when driving, additionally apply cavity wax to the A-pillar between the door hinges.

Access via plug connection for door wiring harness.



Note:
Use protective sleeve (1) to protect the airbag.

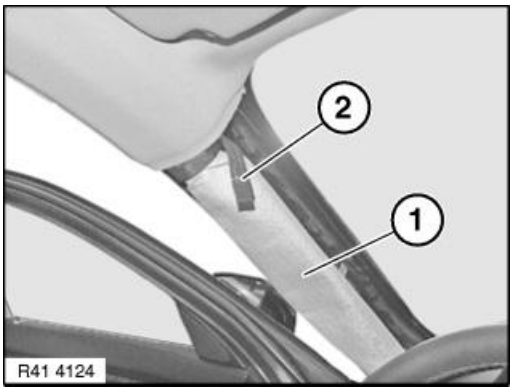
Check protective sleeve for damage prior to use.

A damaged protective sleeve must not be used!

(2) Velcro fastener

(3) Loop

- Order number, protective sleeve: 81 47 2 159 578
  Sourcing reference:
  BMW Workshop Equipment Catalogue

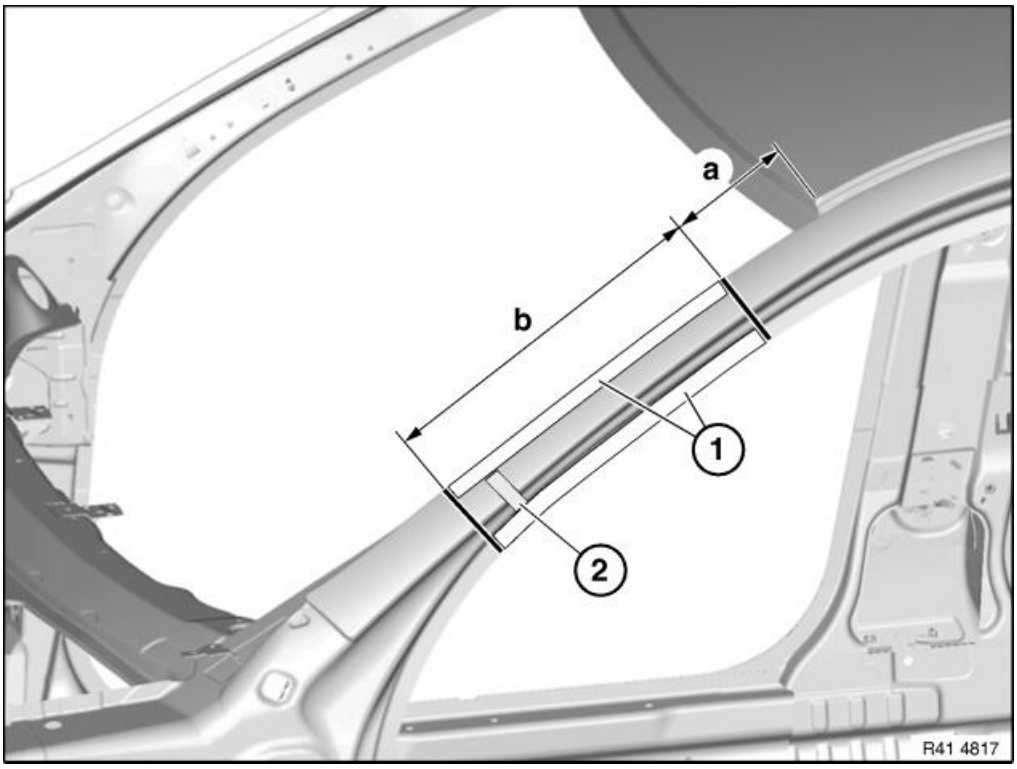


Slide protective sleeve (1) onto airbag under roofliner so that airbag is completely covered.

Fasten protective sleeve with Velcro fastener (2).

Secure protective sleeve with airbag against kinking.

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Mark severance cuts in accordance with specified dimensions and cut.

Attention!
Cut outer panel only for following severance cuts.

Dimensions a = approx. 150 mm from roof edge.

Dimension b = approx. 350 mm below severance cut a.

Open welded connections in areas (1).

Release part section of cowl panel from cavity sealing (2) and remove it.

New part preparation

Mark severance cuts on new parts in accordance with vehicle and cut.

Prepare reinforcement plates at severance cuts.

Fit in new part.

Installation

Apply sealant to cavity seal.

Install and weld new parts and reinforcement plates.

After completing welding work:

Check airbag in area of protective sleeve for damage, replace if necessary.

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41 ... 0 Notes on the repair technique used in the main group 41

Two different repair techniques are used in body repair.

These are welding and bonding/riveting.

If the repair instructions do not specify a repair technique, then welding must **always** be used.

The bonding/riveting repair technique is **always** described in detail in the repair instructions.

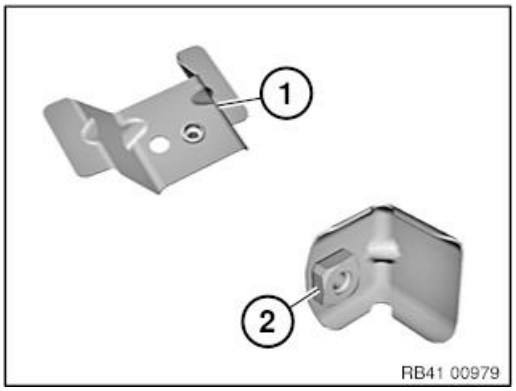
Quality standards must be met.

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41 33 040 Replacing front left or right side wall holder

Note:
Read contents of Body, General.
Side wall removed.
Transfer the systematic diagram onto the respective holder version.

General information:
Procedure Observe repair stage 2!



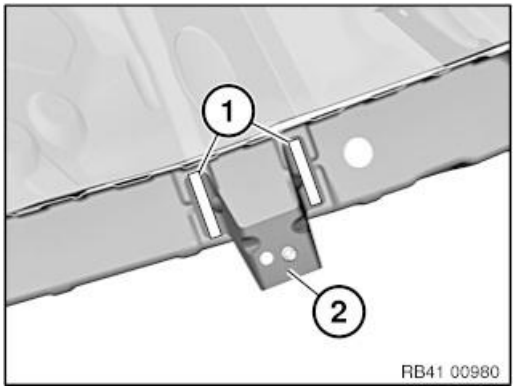
Following new body parts are required (refer to Electronic Parts Catalogue):

- (1) Holder, side wall, front (variant 1)
- (2) Holder, side wall, front (variant 2)

Following consumables are required:

Material	Quantity
Adhesive K5a	1
Blind rivets N3	2
Cleaning agent R1	1

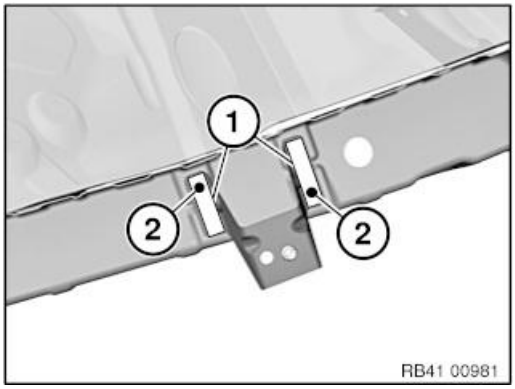
Removal of side wall holder (variant 1):



Release welded connections in areas (1) and remove holder (2).

Preparation of new part:

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Adjust new part in conjunction with side panel in front to fit.

In area of bonding surfaces (1), set 2 4.2 mm dia. bore holes (2) for blind rivetsN3.

Remove new part and deburr holes.

Important!

Do not grind bonding surfaces down or off.

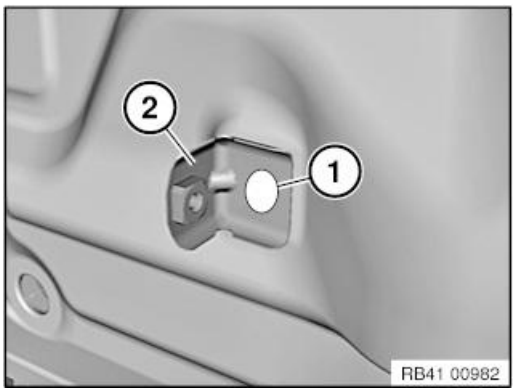
Installation of side wall holder:

Clean all bonding surfaces with cleaning agent R1.

Apply adhesive to bonding surfaces.

Install new part and rivet with blind rivets.

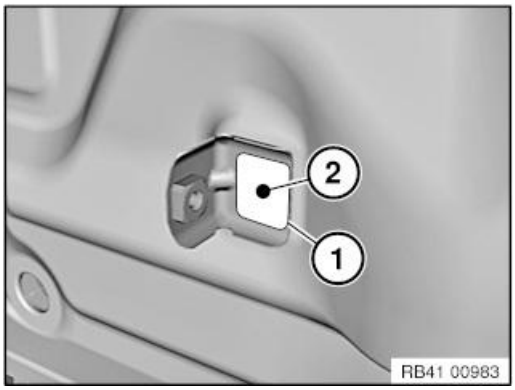
Removal of side wall holder (variant 2):



Release welded connection in area (1) and remove holder (2).

Preparation of new part:

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Fit in new part.

In area of adhesive surface (1), drill a 4.2 mm dia. bore hole (2) for blind rivet N3.

Remove new part and deburr holes.

Important!

Do not grind bonding surfaces down or off.

Installation of side wall holder:

Clean all bonding surfaces with cleaning agent R1.

Apply adhesive to bonding surface.

Install new part and rivet with blind rivet.

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41 33 040 Replacing front wall

Read contents of Body, General.

For stripping and rigging operations, refer to texts on KSD CD (FR number 41 33 040).

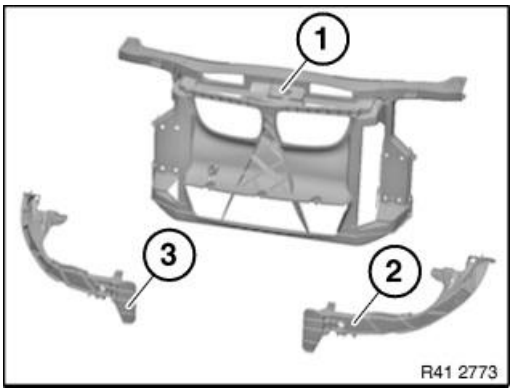
Necessary preliminary tasks:

- Remove carrier for bumper trim

Important!

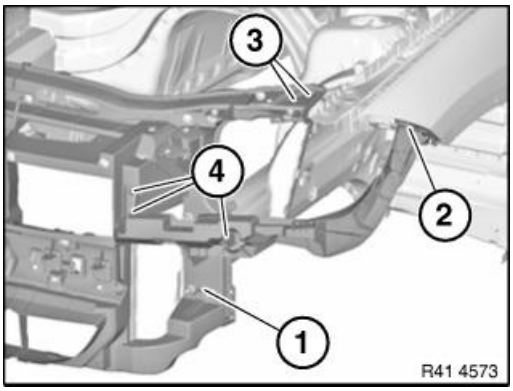
Car must not be driven without the front wall.

Driving without the front wall may damage the body structure.



Following new body parts are required (refer to Electronic Parts Catalogue):

- (1) Front panel
- (2) Headlight holder, left
- (3) Headlight holder, right



Operation is described on the left side. Right side identical.

Release rivet connection (1).

Release screw (2).

Tightening torque 41 33 3AZ.

Release screws (3).

Tightening torque 41 33 1AZ.

Remove front wall together with headlight holders.

Replacement:

Release screws (4) and remove headlight holder.

Tightening torque 41 33 2AZ.

Installation:

Plastic lugs on the headlight holders must not be damaged.

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41 ... 0 Notes on the repair technique used in the main group 41

Two different repair techniques are used in body repair.

These are welding and bonding/riveting.

If the repair instructions do not specify a repair technique, then welding must **always** be used.

The bonding/riveting repair technique is **always** described in detail in the repair instructions.

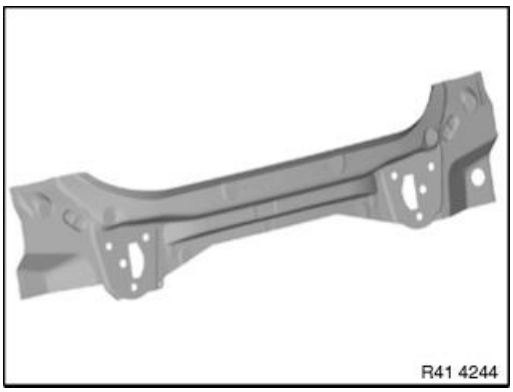
Quality standards must be met.

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41 34 041 Replacing the complete tail panel

Read contents of Body, General.
Strip down vehicle.

Procedure Observe repair stage 2!



Following new body parts are required (see Electronic Parts Catalogue):

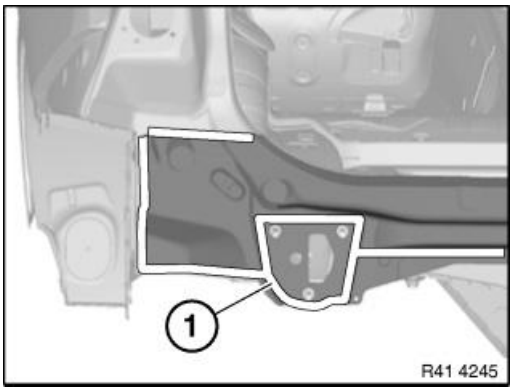
- (1) Rear trim panel

Following consumables are required:

Material	Quantity
Adhesive K5b	1
Cleaning agent R1	1
Blind rivet N3	20
Punch rivet N5	8
EMC screw	9
Sealant D1	
Cavity sealing wax remover	

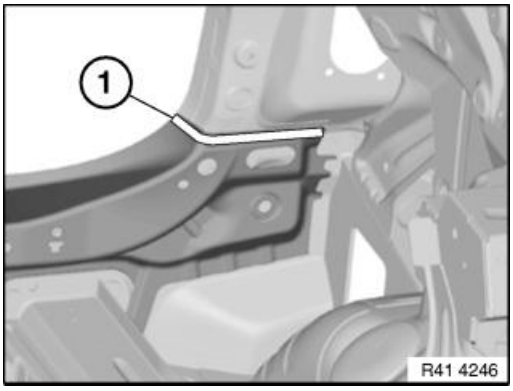
Removal

Operation is partially described on the left side. Right side identical.



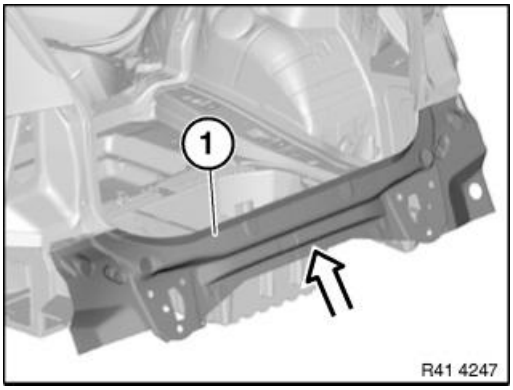
Open welded connections in area (1).

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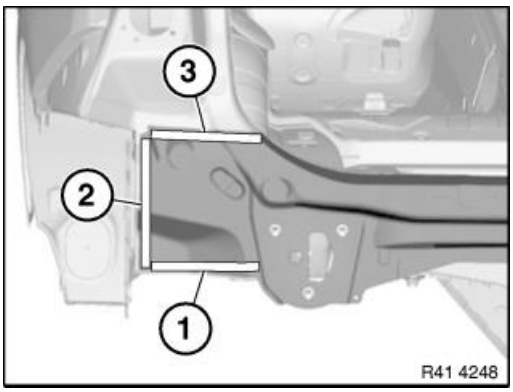


Open welded connections in area (1) and remove tail panel.

New part preparation

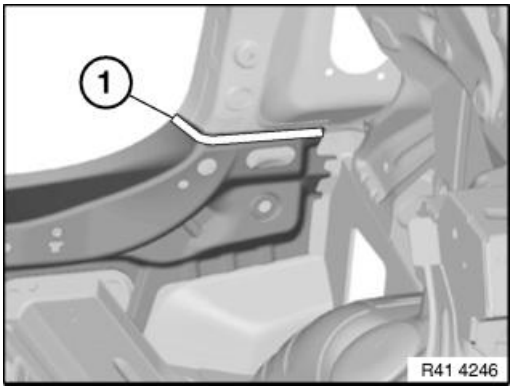


Install rear trim panel (1) and adjust in combination with tailgate and rear lights to fit and secure.



In areas (1) to (3), set 4.2 mm dia. holes for blind rivets:

Area	Number
1	2
2	3
3	2



In area (1), set 3 ⌀ 4.2 mm holes for blind rivets.

Remove new part and deburr holes.

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Attention!

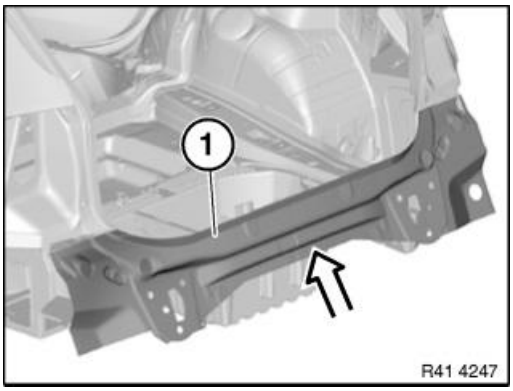
Do not grind/sand new part in area of bonding surfaces.

Installation

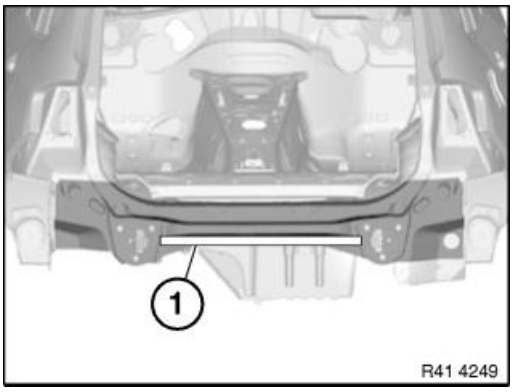
Clean all bonding surfaces on new part and on vehicle with cleaning agent R1.

Apply adhesive to bonding surfaces.

When inserting new parts, make sure there is sufficient adhesive on bonding surfaces.



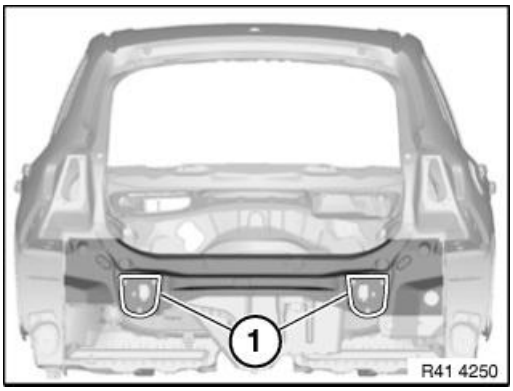
Mount rear trim panel (1) and secure with blind rivets.



Attention!

Three-plate connection!

In area (1), alternately set 8 punch rivets N5.



Press rear trim panel in areas (1) and remove emerging adhesive.

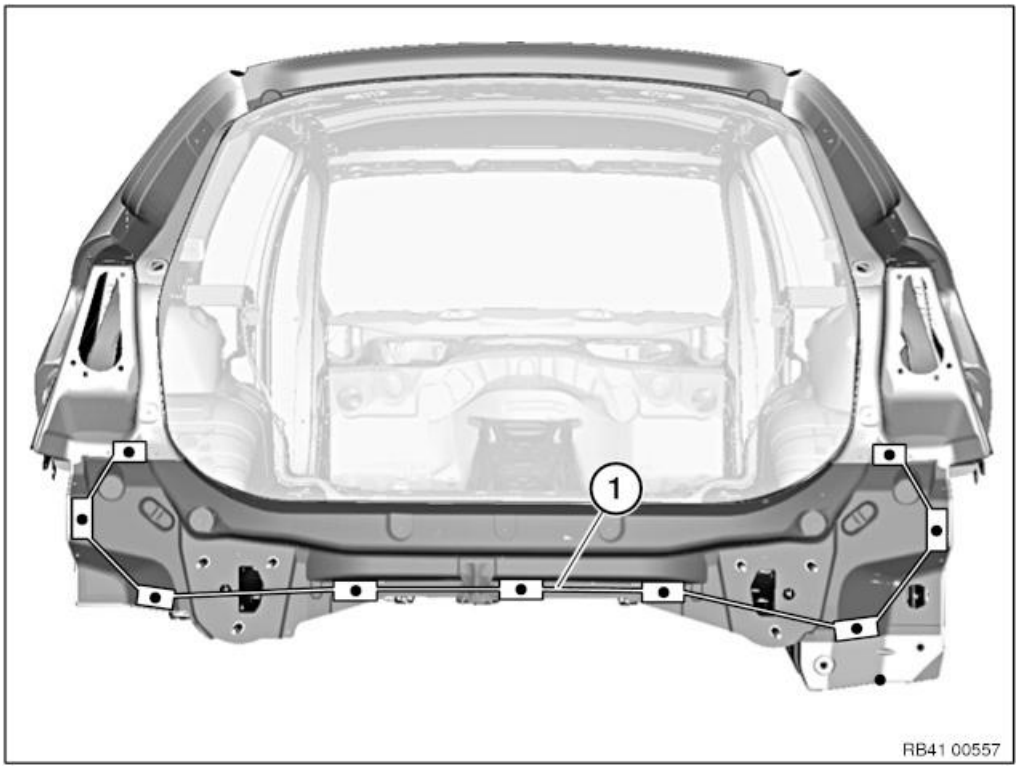
Then install carrier for bumper panel to secure rear trim panel.

Attention!

Prevent emerging adhesive from coming into contact with support.

Do not use any cleaning agents containing solvents.

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After hardening of the adhesive install 9 EMC screws in the areas shown.

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41 34 041 Stripping down - replace tail panel

Note:
Owing to the different engine variants and equipment specifications, not all the components are taken into consideration.

The following list essentially represents the disassembly sequence.

- Detach bumper panel (FRU number: 51 12 156)
- Detach bumper support (flat rate unit number: 51 12 050)
- Remove both rear lights (flat rate unit number: 63 21 180)
- Remove and install luggage compartment floor trim panel (flat rate unit number: 51 47 101)
- Remove and install left luggage compartment wheel arch trim panel (flat rate unit number: 51 47 151)
- Remove and install right luggage compartment wheel arch trim panel (flat rate unit number: 51 47 161)
- Remove trim on rear tail panel top (FRU number: 51 46 050)
- Remove and install tailgate striker (flat rate unit number: 51 24 130)
- Remove and install battery (flat rate unit number: 61 21 010)
- Remove rear ventilation
- Release wiring harness on tail panel and tie to one side
- Release seal for rear lid

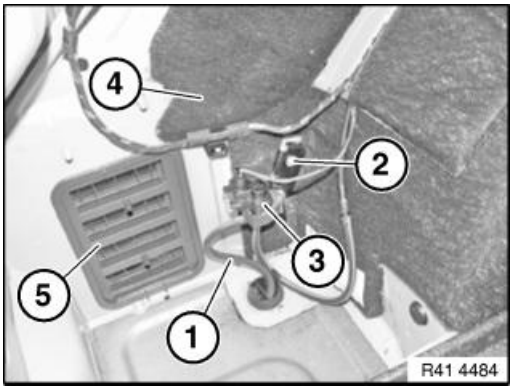
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41 12 535 Stripping down - replacing complete rear luggage compartment floor (tail panel removed)

Note:
Owing to the different engine variants and equipment specifications, not all the components are taken into consideration.

The following list essentially represents the disassembly sequence.

- Remove exhaust system. Petrol engine 18 00 020, diesel engine 18 00 018)
- Remove heat shield
- Remove carbon canister (flat rate unit number: 16 12 010)
- Remove battery (flat rate unit number: 61 21 010)
- Remove luggage compartment floor storage tub.
- Remove the left luggage compartment wheel arch panel (FRU number: 51 47 151)
- Remove the right luggage compartment wheel arch panel (FRU number: 51 47 161)
- Partially detach wiring harness and tie to one side



Pull off hose (1).

Release screw (2).

Release wiring harness and place with changeover valve (3) to one side.

Partially detach sound insulation (4) and place to one side.

Remove rear ventilation (5).

Installation note:
The rear ventilation (5) must not be damaged. (watertightness).

All latch mechanisms must engage audibly.

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41 11 028 Stripping down - Replacing left engine support (partial replacement before front axle)

Note:
Owing to the different engine variants and equipment specifications, not all the components are taken into consideration.

The following list essentially represents the disassembly sequence.

- Clamp off battery cable from negative terminal
- Detach bumper panel (FRU number: 51 11 156)
- Remove bumper support (flat rate unit number: 51 11 050)
- Remove and install intake filter housing (flat rate unit number: 13 71 000)
- Remove front panel (flat rate unit number: 41 33 040)
- Remove and install left wheel arch cover (front section) (flat rate unit number: 51 71 038)
- Remove and install condenser for air conditioning (flat rate unit number: 64 53 550)
- Remove and install cooling loop for hydraulic steering (flat rate unit number: 17 11 370)
- If necessary, remove and install charge air cooler (flat rate unit number: 17 51 000)
- Partially release left wiring harness

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41 12 557 Stripping down - replacing middle luggage compartment floor (tail panel removed)

Note:
Owing to the different engine variants and equipment specifications, not all the components are taken into consideration.

The following list essentially represents the disassembly sequence.

- Remove luggage compartment floor storage tub.
- Partially detach wiring harness and tie to one side.

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41 11 516 Stripping operations - Replacing left carrier support

Note:
Owing to the different engine variants and equipment specifications, not all the components are taken into consideration.

The following list basically represents the removal sequence.

- Disconnect battery negative lead (FR number: 6120900)
- Remove bumper trim (FR flat rate number: 51 11 156)
- Remove headlight (FR number: 63 12 010)
- Remove support for bumper trim (FR flat rate number:51 11 050)
- Remove front panel (FR number: 41 33 040)
- Remove radiator (FR number: 17 11 000)
- Remove A/C system condenser (FR number: 64 53 550)
- If necessary, remove intercooler (FR number: 17 51 000)
- Remove hydraulic steering cooling coil (FR number: 17 11 370)
- Remove left wheel arch cover (front section) (FR number: 51 71 038)
- Remove left wheel arch cover (rear section) (FR number: 51 71 039)
- If necessary, remove intake silencer housing (FR number: 41 35 111)
- If necessary, remove coolant expansion tank (FR number: 17 11 100)
- Partially release left wiring harness

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41 ... 0 Notes on the repair technique used in the main group 41

Two different repair techniques are used in body repair.

These are welding and bonding/riveting.

If the repair instructions do not specify a repair technique, then welding must **always** be used.

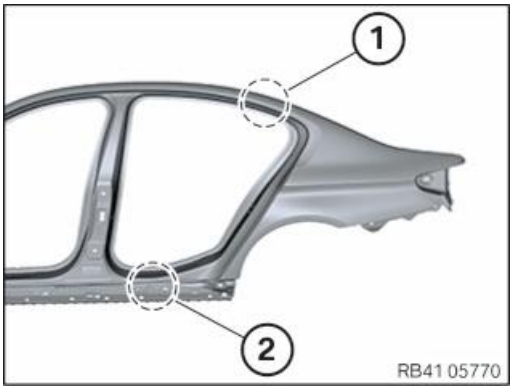
The bonding/riveting repair technique is **always** described in detail in the repair instructions.

Quality standards must be met.

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41 00 ... Reinforcement plate with stud bolt (bonded or welded)

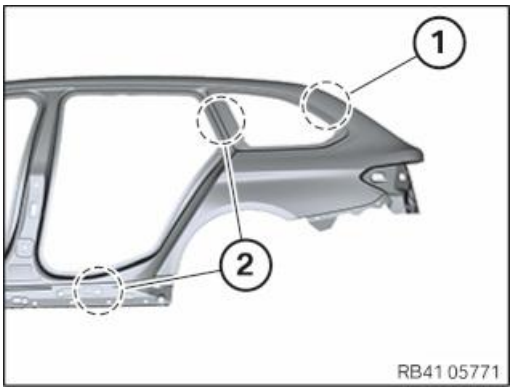
When replacing the rear side panel, reinforcement plates are bonded or welded on the separation points.



Applicable to Saloon, hatchback, Coupé.

Welding is done in area (1) (incl. water channel).

Bonding is done in area (2).

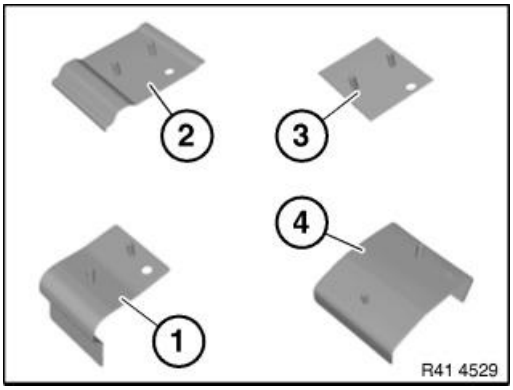


Applicable to Touring, X models, Gran Coupé, Gran Turismo.

Welding is done in area (1) (incl. water channel).

Bonding is done in areas (2).

Note:
The following graphics serve as general illustrations of reinforcement plate repair work. They apply to sectional repairs on the outer skin which are produced using the adhesive joining method.



Overview of the reinforcement plates (for sourcing reference, see Electronic Parts Catalogue):

(1) Reinforcement plate, sill

(2) Reinforcement plate, C-pillar

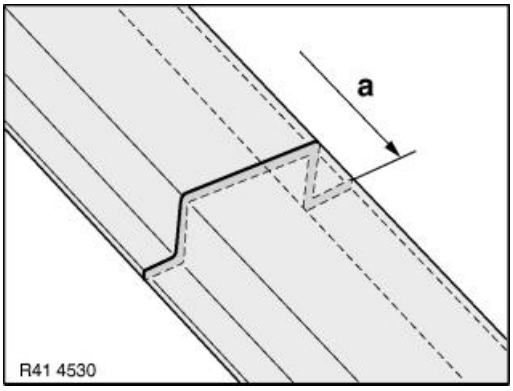
(3) Reinforcement plate, universal

(4) Reinforcement plate, C- or D-pillar

(5) Nuts (not shown)

- Plastic nut dia. 18 mm, part number 07 14 1 943 122
- Plastic nut ⌀ 22 mm, part number 07 14 7 169 847

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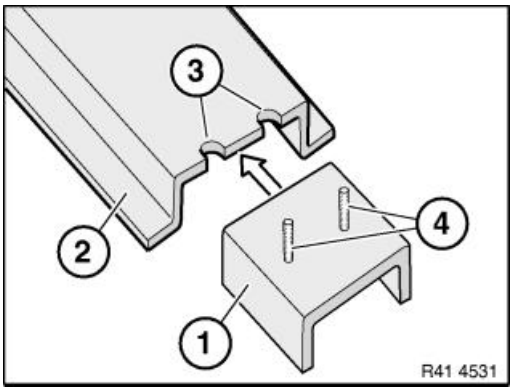


Mark side panel according to dimension a and detach it.

Preparation of the reinforcement plate (bonded or welded)

Some reinforcement plates are oversized.

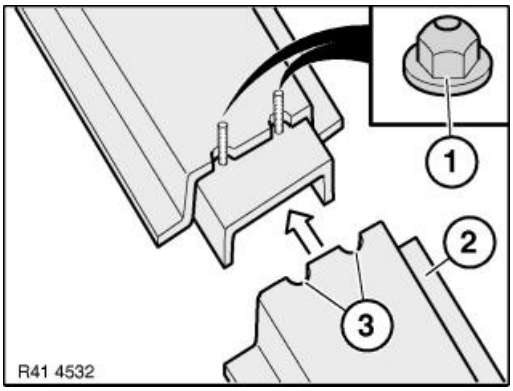
It may be necessary to rework the reinforcement plates at the edges or cut them to size until they rest against the outer skin free of tension.



Adjust reinforcement plate (1) to fit in component (2) on vehicle.

Make semicircular recesses (3) for the stud bolts (4).

Diameter of recesses approx. 10 - 12 mm.



Fix the reinforcement plate using plastic nuts (1).

Fit new part (2).

Make semi-circular recesses (3) in the new part.

Diameter of recesses approx. 10 - 12 mm.

Remove reinforcement plate.

Note:

Bonded reinforcement plates:

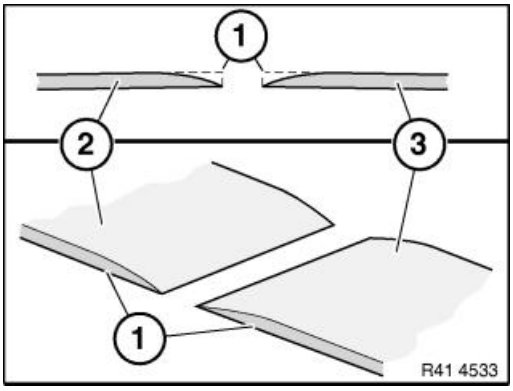
Width of joint between new part and component on vehicle approx. 5 - 8 mm (at least 30 mm flange width per side).

Welded reinforcement plates:

Width of joint between new part and component on vehicle approx. 2 - 3 mm.

Grind down to the metal in the area of the joint.

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Carry out the following step only if the reinforcement plates are bonded.

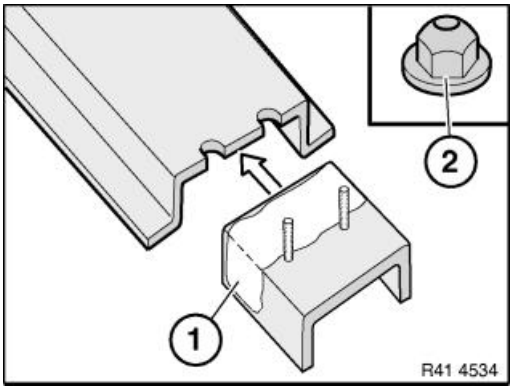
Chamfer cutting edges (1) on joint by grinding.

(2) Component on vehicle

(3) New part

If the cutting edges have not been sufficiently chamfered, there may be voids in the paintwork after painting.

Installing bonded reinforcement plate



Clean <u>all</u> bonding surfaces.

Apply the adhesive in area (1) on the reinforcement plate.

Apply more adhesive in the radii to avoid air pockets.

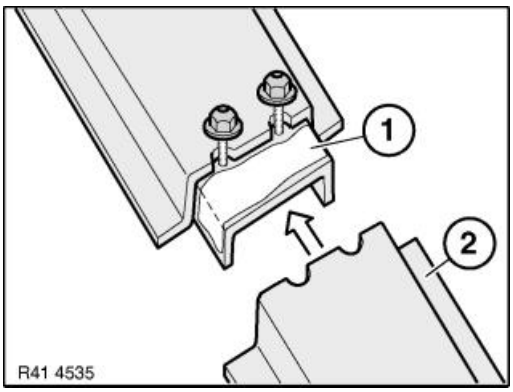
Apply additional adhesive to the outer skin around radii.

Slide the reinforcement plate carefully into the component on the vehicle and fix plastic nuts (2).

Screw on the nuts with only a few turns.

Attention!

When joining the reinforcement plate, make sure that there is sufficient adhesive on the bonding surfaces!



Apply the adhesive on bonding surface (1) of the reinforcement plate.

Apply more adhesive in the radii to avoid air pockets.

Apply additional adhesive to the outer skin around radii.

Fit new part (2).

Align new part to adjoining component and secure with gripping pliers.

First tighten the plastic nuts at the radii.

Only then tighten all the plastic nuts in the flat areas.

Tightening torque 41 14 1AZ.

Attention!

Check that the transition of the components is OK at the separation point. Corrections can only be made <u>before</u> the adhesive has hardened. Straightening at a later stage is not possible.

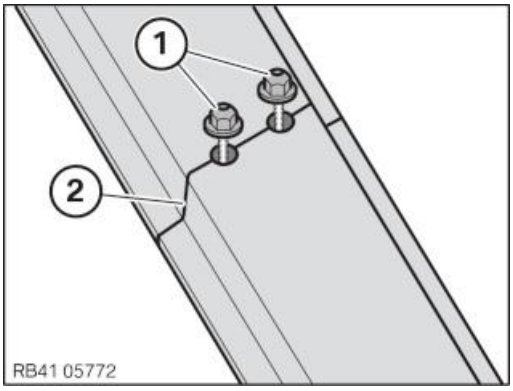
<u>After adhesive has hardened:</u>

Grind off stud bolts and surplus adhesive flush.

Paint area as specified in BMW Painting Handbook.

Installing welded reinforcement plate

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Attention!

Risk of damage!

Protect the adjacent components from heat and flying sparks.

Align new part to adjoining component and secure with gripping pliers.

First tighten the plastic nuts at the radii.

Only then tighten all the plastic nuts in the flat areas.

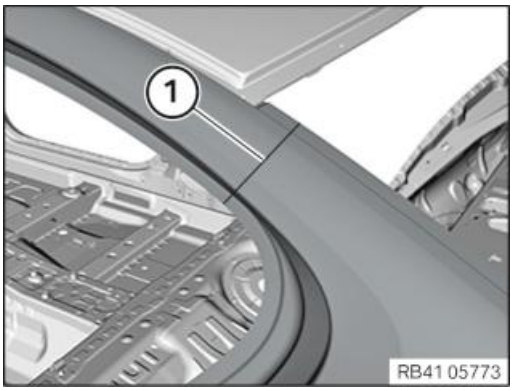
Tightening torque 41 14 1AZ.

Weld joint (2) between plastic nuts (1).

Release plastic nuts (1).

Grind down stud bolt until flush.

Weld joint (2) in the remaining areas.



Grind weld seam (1) until flush.

If necessary, straighten area (1) and level it with a multi-functional spatula.

Paint area as specified in BMW Painting Handbook.

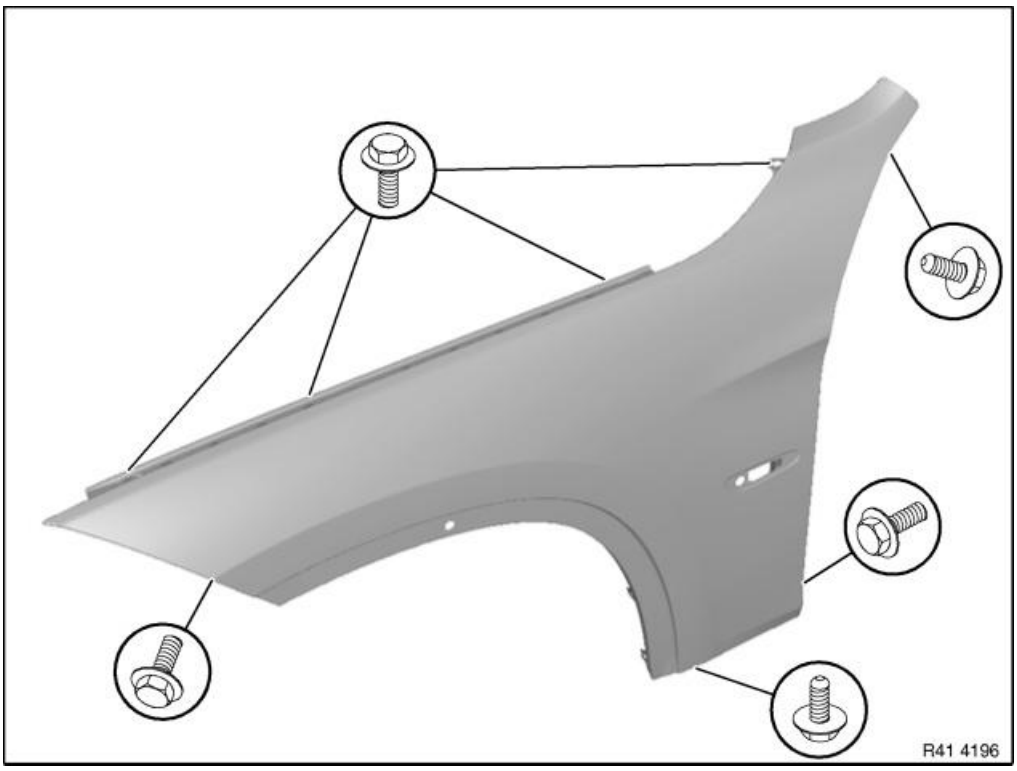
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41 35 010 Removing and installing/replacing side panel, front left or right

For stripping and rigging operations, refer to texts on KSD CD (job number 41 35 010).

Important:
Do not damage adjoining body components.

Installation information:
Gap dimensions serve as basis for adjustment tasks.



Release screws.

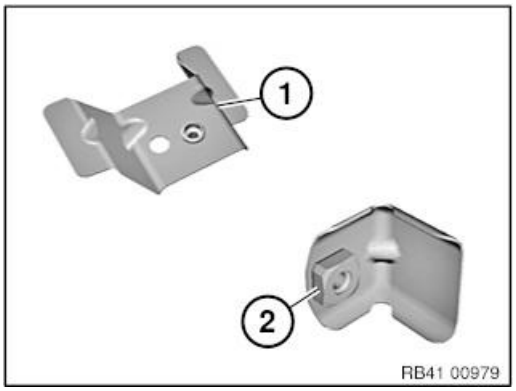
Tightening torque 41 35 1AZ.

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41 33 040 Replacing front left or right side wall holder

Note:
Read contents of Body, General.
Side wall removed.
Transfer the systematic diagram onto the respective holder version.

General information:
Procedure Observe repair stage 2!



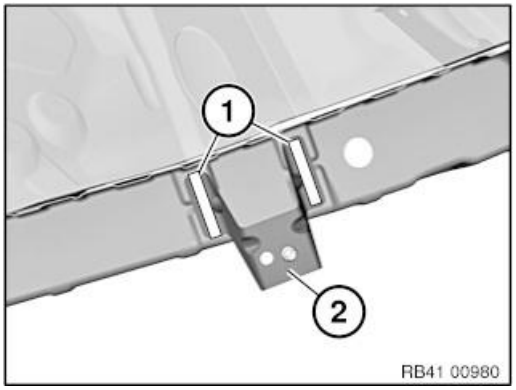
Following new body parts are required (refer to Electronic Parts Catalogue):

- (1) Holder, side wall, front (variant 1)
- (2) Holder, side wall, front (variant 2)

Following consumables are required:

Material	Quantity
Adhesive K5a	1
Blind rivets N3	2
Cleaning agent R1	1

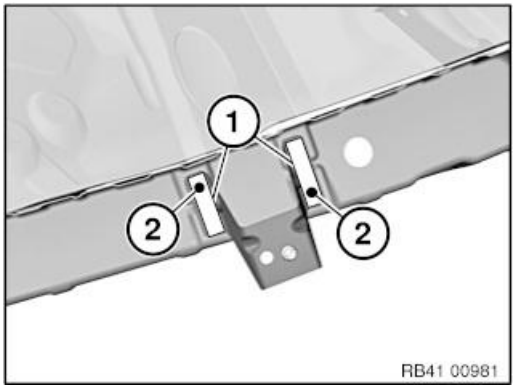
Removal of side wall holder (variant 1):



Release welded connections in areas (1) and remove holder (2).

Preparation of new part:

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Adjust new part in conjunction with side panel in front to fit.

In area of bonding surfaces (1), set 2 4.2 mm dia. bore holes (2) for blind rivetsN3.

Remove new part and deburr holes.

Important!

Do not grind bonding surfaces down or off.

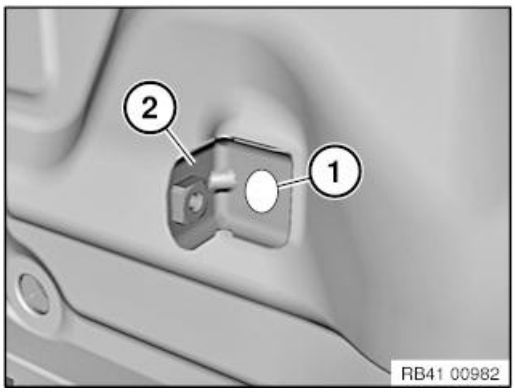
Installation of side wall holder:

Clean all bonding surfaces with cleaning agent R1.

Apply adhesive to bonding surfaces.

Install new part and rivet with blind rivets.

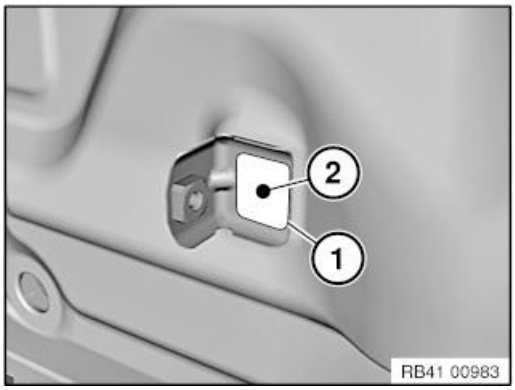
Removal of side wall holder (variant 2):



Release welded connection in area (1) and remove holder (2).

Preparation of new part:

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Fit in new part.

In area of adhesive surface (1), drill a 4.2 mm dia. bore hole (2) for blind rivet N3.

Remove new part and deburr holes.

Important!

Do not grind bonding surfaces down or off.

Installation of side wall holder:

Clean all bonding surfaces with cleaning agent R1.

Apply adhesive to bonding surface.

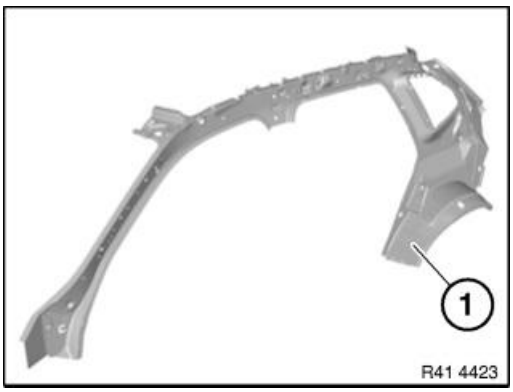
Install new part and rivet with blind rivet.

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41 14 505 Replacing rear left outer wheel arch section partial replacement (side wall removed)

Procedure Observe repair stage 2!

Read contents of Body, General.



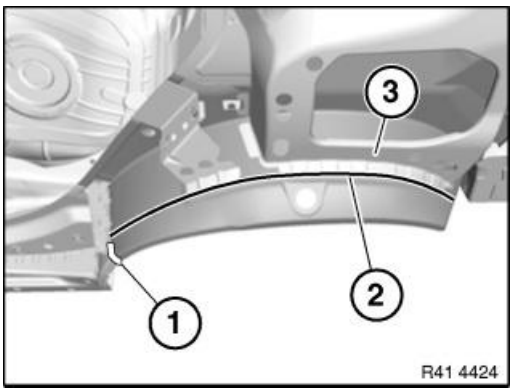
Following new body parts are required (see Electronic Parts Catalogue):

- (1) Inner side frame
- (2) Shaped part, wheel arch (not shown)

Following consumables are required:

Material	Quantity
Adhesive K5a	1
Blind rivet N3	9
Punch rivet N4	2
Cleaning agent R1	1
Cavity sealing wax remover	1
Sealant D1	

Removal



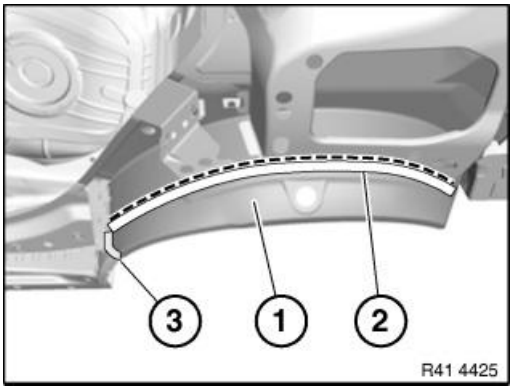
Open welded connections in area (1).

Mark severance cut (2) next to reinforcement (3) and disconnect.

New part preparation

Mark new part in accordance with severance cut on vehicle +20 mm extra material and cut (1).

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Note:
Side panel omitted for clarity.

Adjust new part (1) in combination with side wall to fit and secure.

Set 9 ⌀ 4.2 mm bore holes in the area of bonding surface (2).

Remove new part and deburr holes.

Installation note:
In area (3), use 2 punch rivets N4.

Installation

Attention!
Do not grind/sand new part in area of bonding surfaces.

Clean all bonding surfaces on new part and on vehicle with cleaning agent R1.

Apply adhesive K5a to bonding surfaces.

Install and rivet wheel arch outer part in connection with side panel.

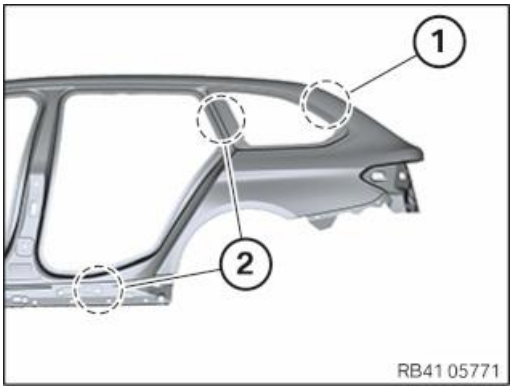
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41 35 101 Replacing rear left side panel

Read contents of Body, General.

Procedure Observe repair stage 2!

Strip down vehicle.



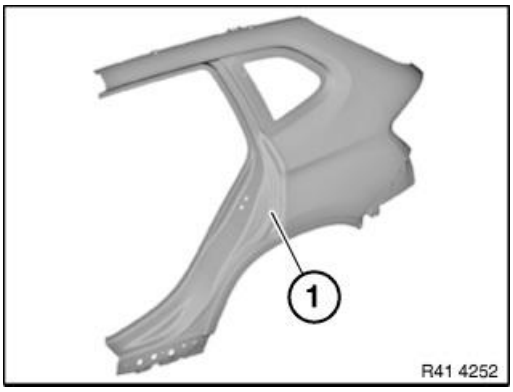
Example figure.

Due to ever increasing geometrical complexity as well as demanding reworking steps on visible separating cuts, the joining method of the reinforcement plate has changed from adhesion to welding. This change is applicable across all BMW and MINI series.

Welding is done in area (1) (incl. water channel).

Bonding is done in areas (2).

Note changed procedure.



Following new body parts are required (see Electronic Parts Catalogue):

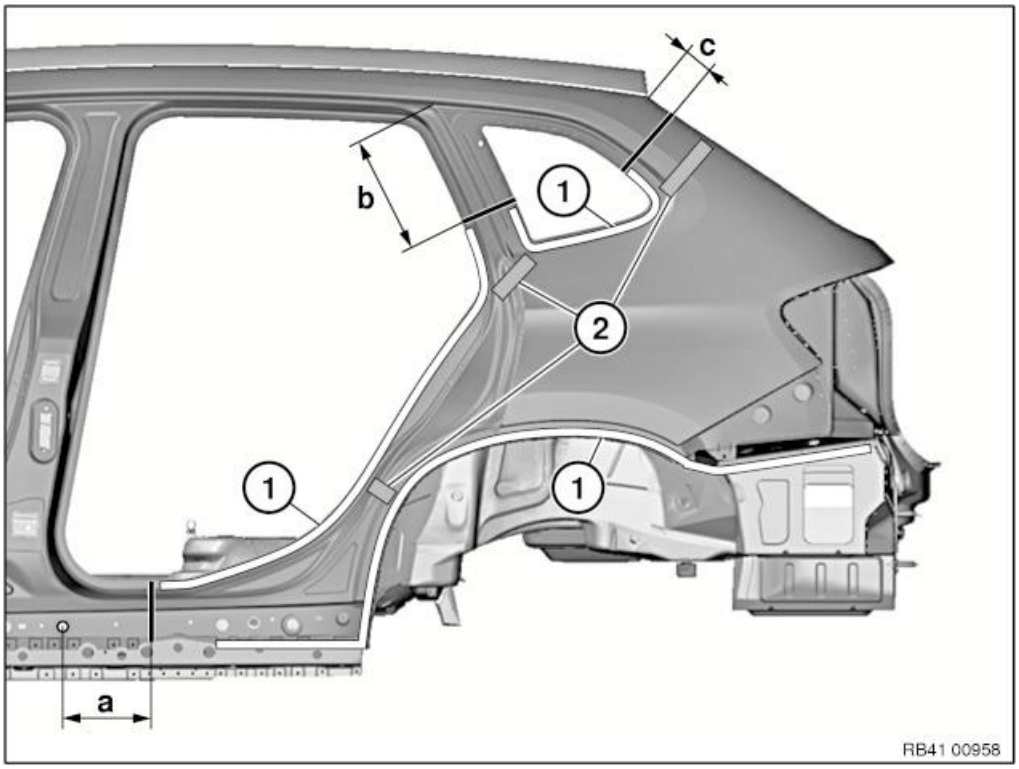
- (1) Rear side wall
- (2) Reinforcement plate, universal (not shown)
- (3) Reinforcement plate, side sill (not shown)
- (4) Reinforcement plate, C-pillar (not shown)
- (5) Reinforcement plate, D-pillar (not shown)
- (6) Mounting nut (not shown)

Following consumables are required:

Material	Quantity
Adhesive K5b	1
Adhesive K5a	1
Blind rivet N3	17
Punch rivet N4	32
Cleaning agent R1	1
Sealant D1	1
EMC screw	3

Removal

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Mark severance cuts in accordance with specified dimensions and cut.

Attention!
Cut outer panel only.

Compare position of severance cuts with reinforcement plates.

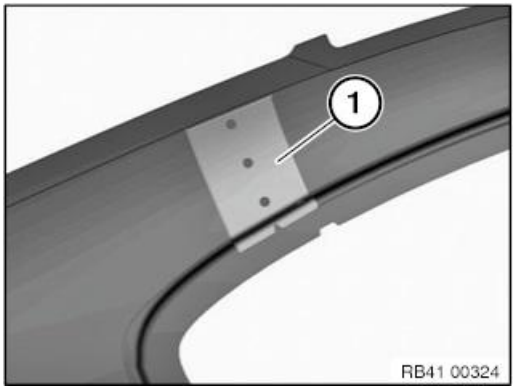
Dimension a = approx. 180 mm from centrepoint of 25 mm diameter hole.

Dimension b = approx. 220 mm from top corner of side window.

Dimension c = approx. 100 mm from corner of roof outer skin.

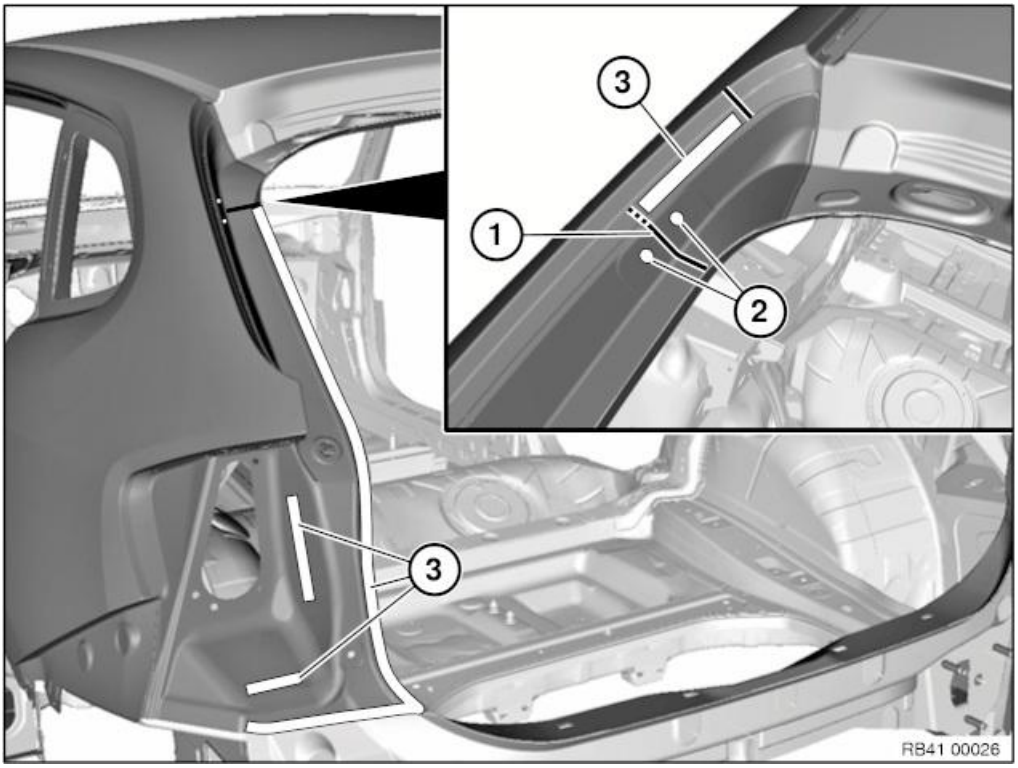
Open welded connections in areas (1).

Release side wall from cavity acoustic baffles (2).



Note:
In addition to the dimensions, the position of the separating cut can be determined with a template (1).

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Mark severance cut (1) as pictured and cut.

Attention!
Cut outer panel only.

The severance cut (1) runs down the middle between the attachment points (2) of the gas pressure spring.

Open welded connections in areas (3).

Release side wall from cavity sealing and remove.

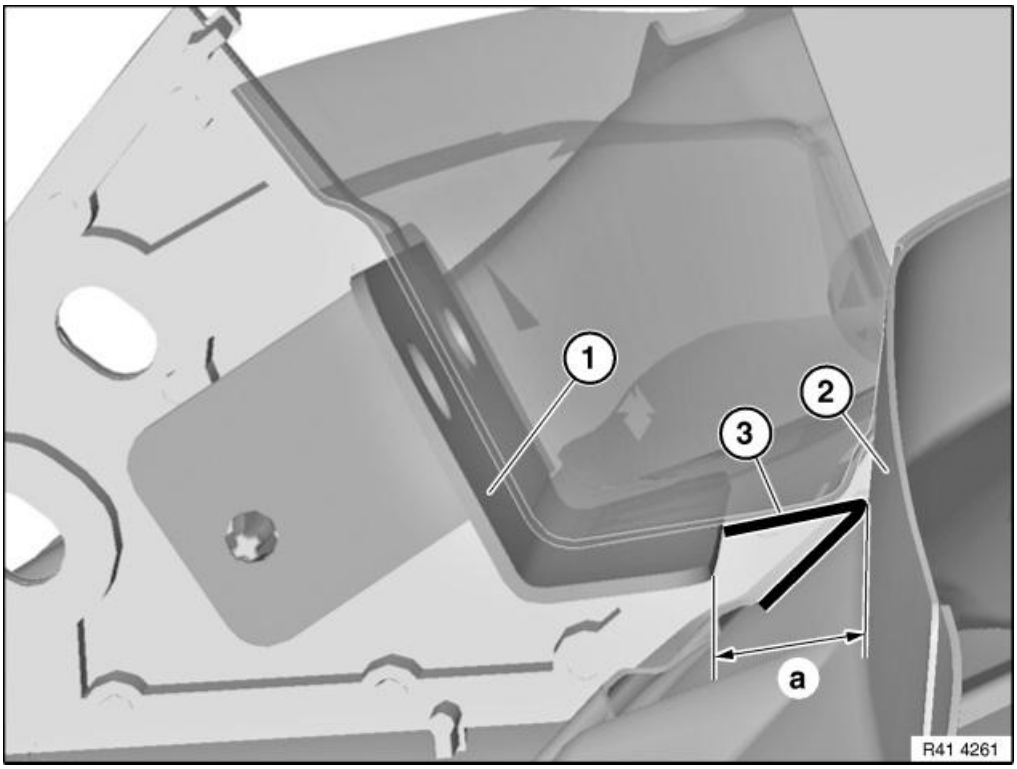
New part preparation

Remove mounting plate of gas pressure spring from new component.

Remove sill section from new part.

Mark severance cuts on the new part according to vehicle and cut.

Prepare reinforcement plates at all severance cuts.



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Detail view of D-pillar water channel with removed side wall:

(1) Mounting plate of the gas pressure spring

(2) Side frame, inside rear

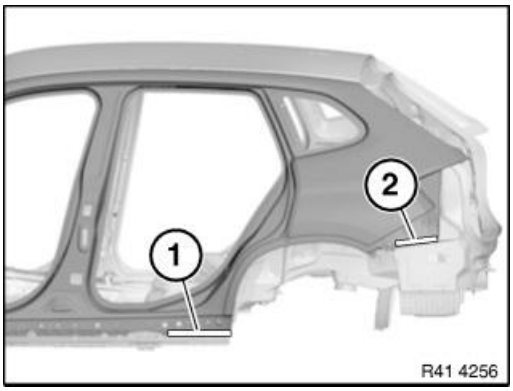
(3) Support bracket made of universal reinforcement plate

Make support bracket (3) from universal reinforcement plate for the water channel in area a between mounting plate of gas pressure spring (1) and inner side frame (2).

Adjust the support bracket as pictured.

Drill 2 ⌀ 4.2 mm diameter bore holes for the blind rivet through the inner side frame and support bracket.

Rivet the support bracket to the inner side frame.

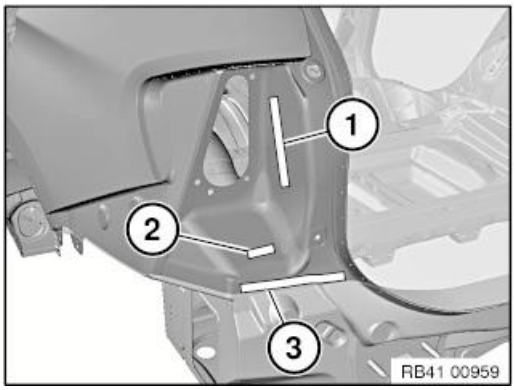


Adjust new part to fit and secure.

In areas (1) and (2), drill ⌀ 4.2 mm bore holes for blind rivet:

Area (1): 5 bore holes

Area (2): 3 bore holes



Set bore holes ⌀ 4.2 mm for blind rivet in areas (1) to (3):

Area	Number
1	3
2	1
3	3

Remove new part and deburr holes.



Attention!

Do not grind/sand new part in area of bonding surfaces.

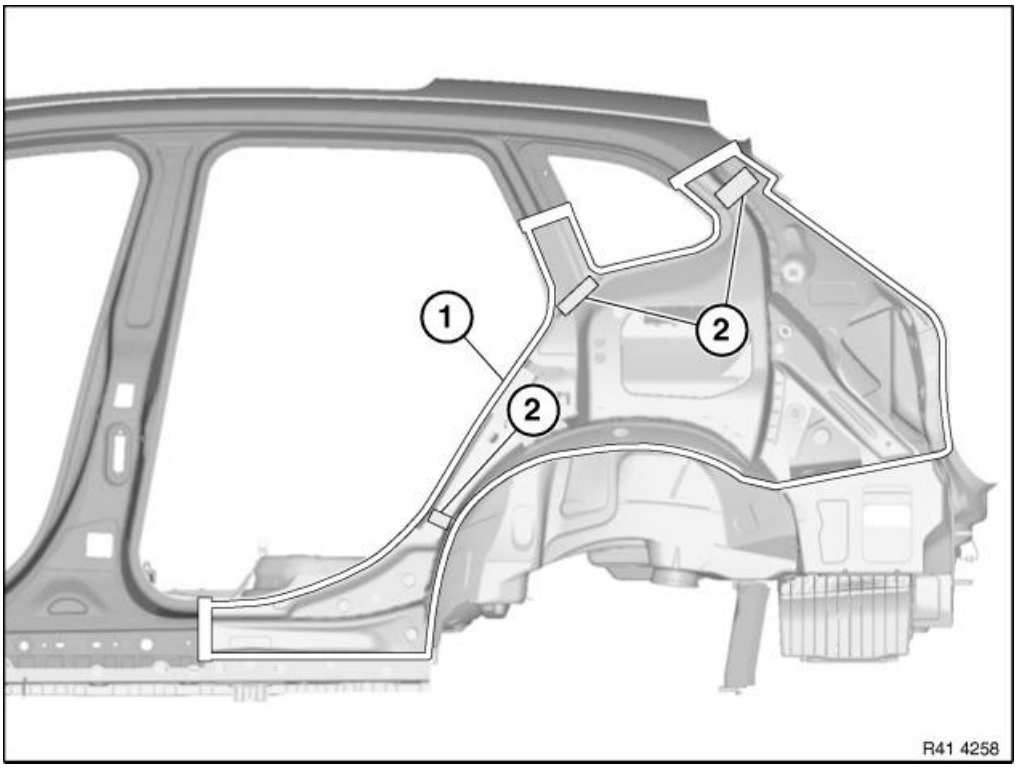


Installation

Clean all bonding surfaces on vehicle, on the new part and on the reinforcement plates with cleaning agent R1.

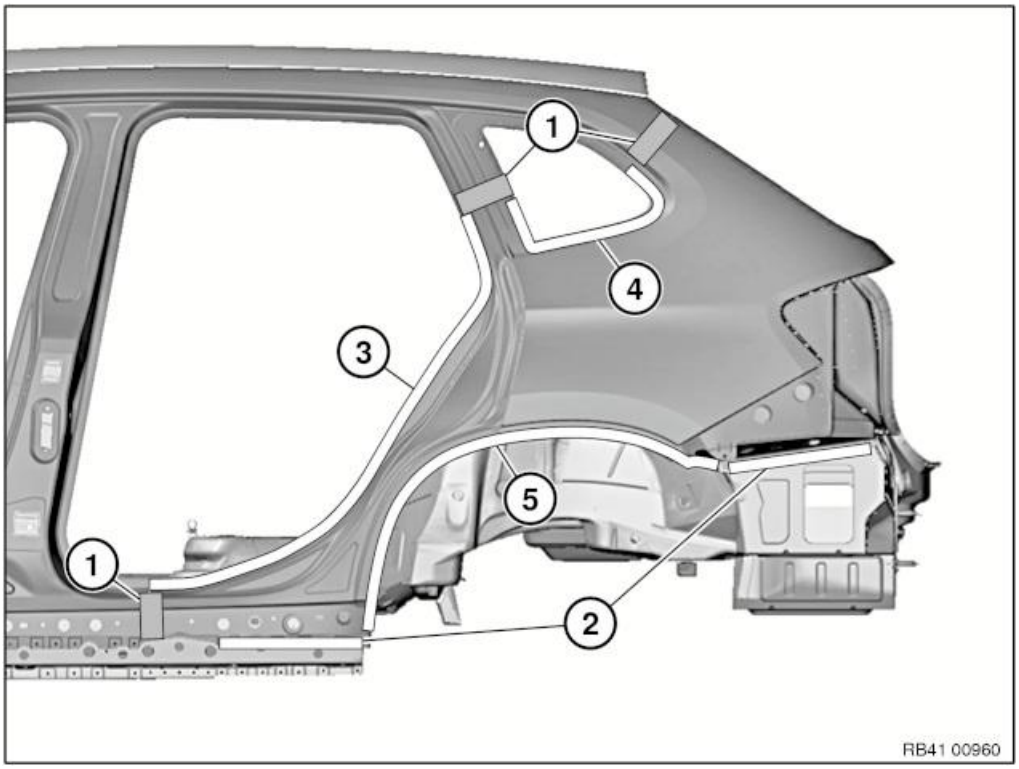
Apply adhesive to reinforcement plates. Install reinforcement plates.

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Apply adhesive in areas (1).

Apply sealant to D1cavity sealing in areas (2).



Install side panel with a second person helping.

Note:
When installing side panel, make sure there is sufficient adhesive on bonding surfaces.

After adjusting side panel to fit, tighten nuts of reinforcement plates (1).

Secure side wall next to the reinforcement plates with gripping pliers.

Rivet side panel with blind rivets in areas (2).

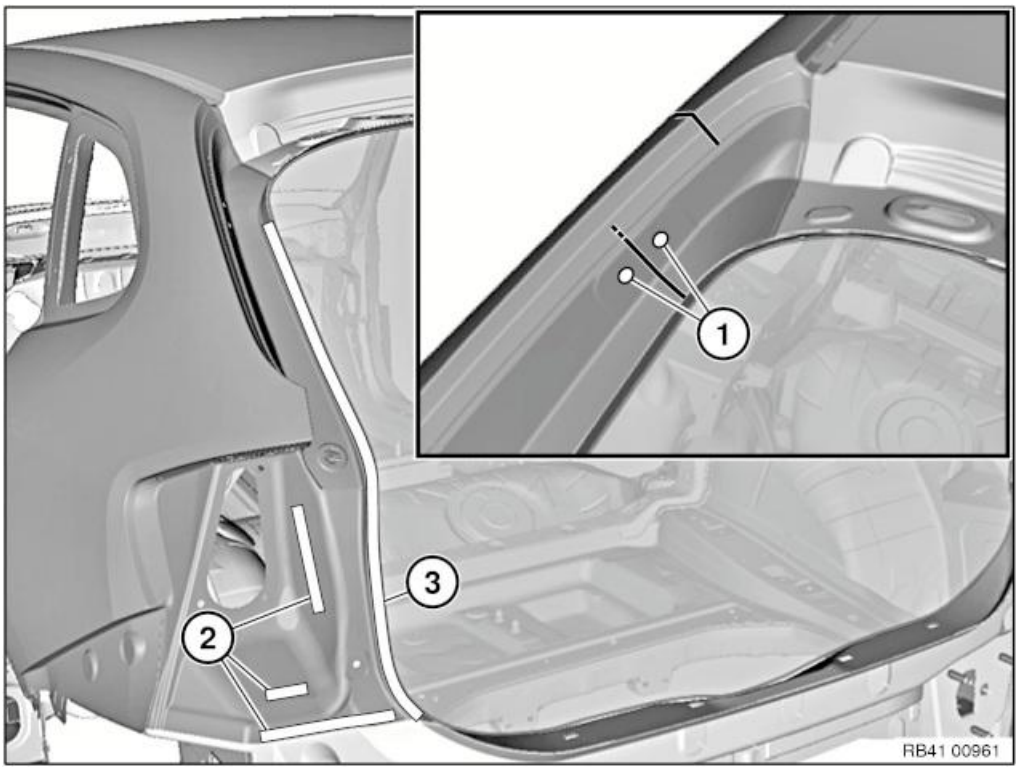
In areas (3) to (5), use punch rivet N4.

Area	Number
3	10

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4	5
5	8

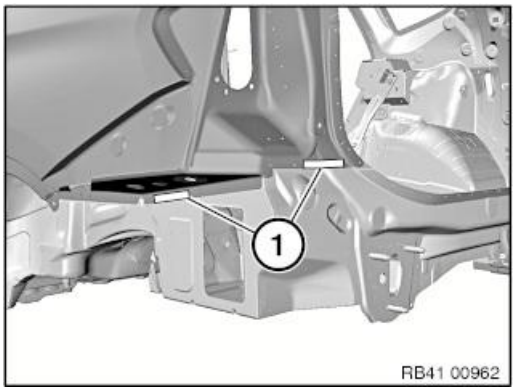
Weld the separation point on the D-pillar.



To secure side wall, insert screws (1) in mounting plate.

Rivet side panel with blind rivets in areas (2).

Use 9 punch rivets N4 in area (3).



After adhesive has hardened, install one EMC screw in each case in areas (1).

Additionally, install EMC screw in sill area.

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41 5. ... Adjust door

Important:

Do not damage adjoining body parts.

Minor corrections (realignment work) are permitted if the existing adjustment options are not sufficient.

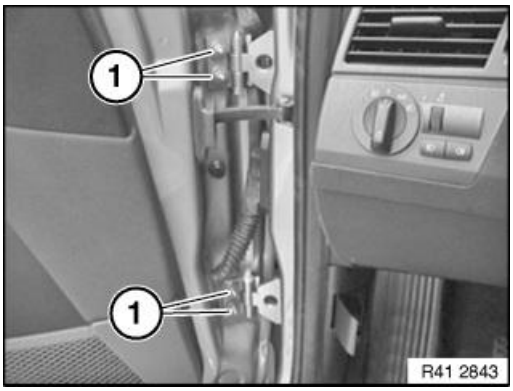
Note:

Observe gap dimensions .

The door must be provided with all attachment parts for correct adjustment.

Adjust screwed body parts from rear to front.

The following illustrations are schematic representations and are to be applied to the relevant vehicle type.

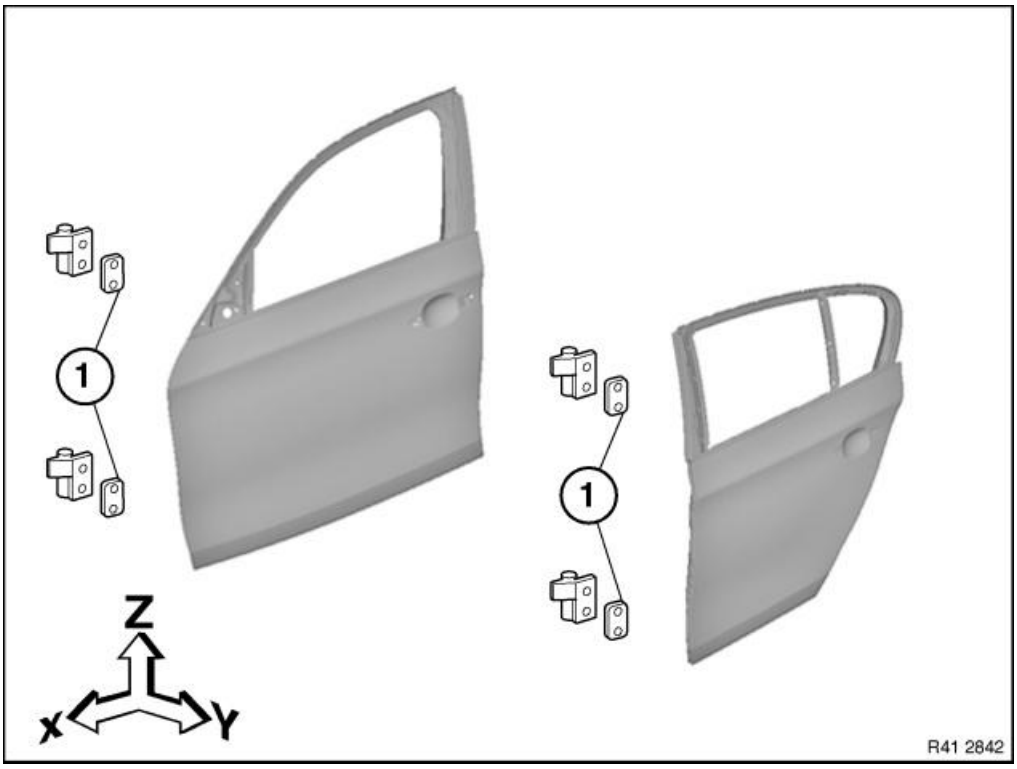


Slacken lock striker, remove if necessary.

Slacken nuts (1) until door can still just be moved.

Tightening torque 41 51 2AZ .

Tightening torque 41 52 2AZ .



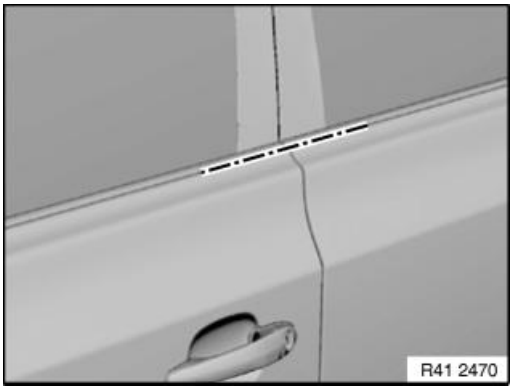
Adjust rear door in transition to front door (Y) by fitting shims.

Installation:

To preset new part, carry over number of shims from damaged door.

Adjust door longitudinally (X) and vertically (Z).

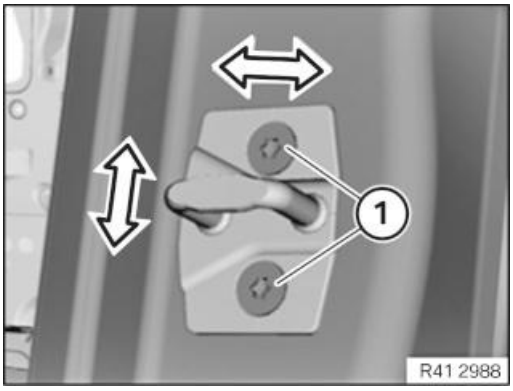
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Check that adjoining body parts are flush in terms of height and correct if necessary.**Note**

Vertical adjustment of door must not be influenced by lock striker.

When the door is closed, the lock striker must not touch or scrape against the door lock. Look out for scratches.



Slacken screws (1) until lock striker can still just be moved.

Move lock striker sideways in order to adjust transition between door and rear side panel.

Tightening torque 51 21 2AZ .

Note

When the door is closed, the lock striker must not touch or scrape against the door lock. Look out for scratches.

After installation:

- Tighten all screws and nuts to specified torque.
- Touch up unpainted surfaces in the appropriate colour.
- If necessary, adjust front door.

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41 51 ... Notes on replacing the door



Important!

For production reasons the side impact beam is only screwed loosely.

Tighten screws of side impact beam.



Remount all components on the new door.

If necessary, replace damaged components.

The procedure is described in the repair instructions of the components.

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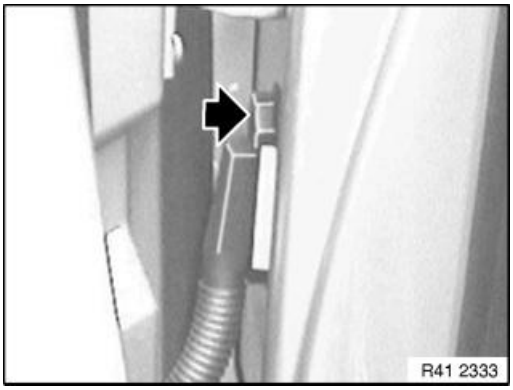
41 5. ... Removing and installing door



Important!
Do not damage adjoining body parts.

The illustrations are schematic representations and are to be applied to the relevant vehicle type.

Open door.



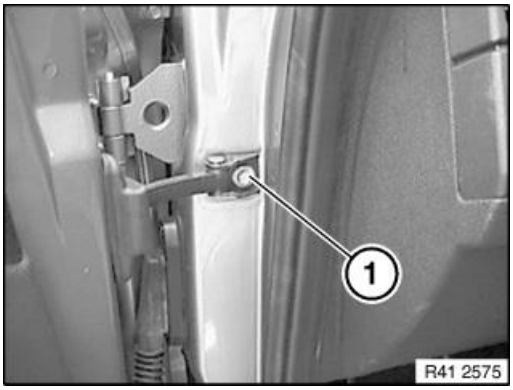
Release screw on connector frame.

Front door:

Tightening torque 41 51 4AZ.

Rear door:

Tightening torque 41 52 4AZ.



Note:
Secure door against closing.

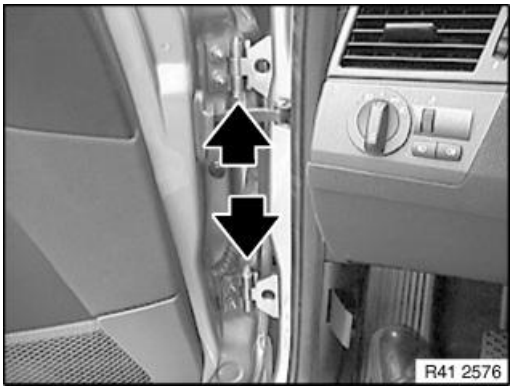
Release screw (1) on door retainer.

Front door:

Tightening torque 51 21 3AZ.

Rear door:

Tightening torque 51 22 3AZ.



Important!
Secure door against falling out.

Release screws between both hinge elements at top and bottom.

Pull both screws out of hinges.

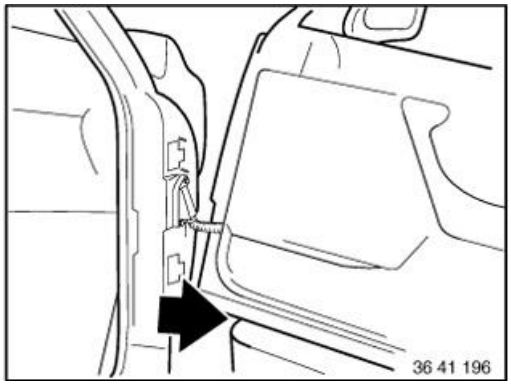
Front door:

Tightening torque 41 51 1AZ.

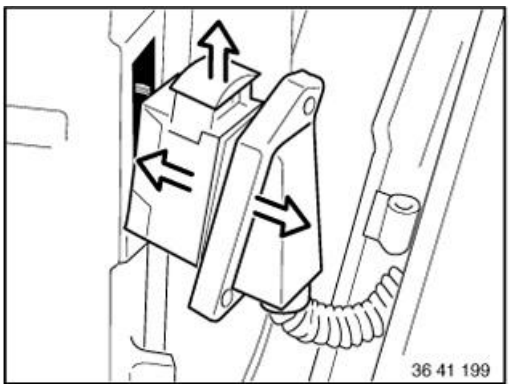
Rear door:

Tightening torque 41 52 1AZ.

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Pull out door sideways and place it on a suitable surface.



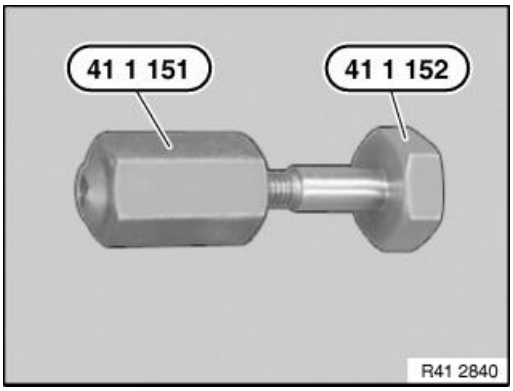
Pull plug connection from door pillar, unlock by pulling out bar and detach.*Installation:*
If necessary, adjust door.

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41 51 ... Replacing door hinge bushing (door removed)

Special tools required:

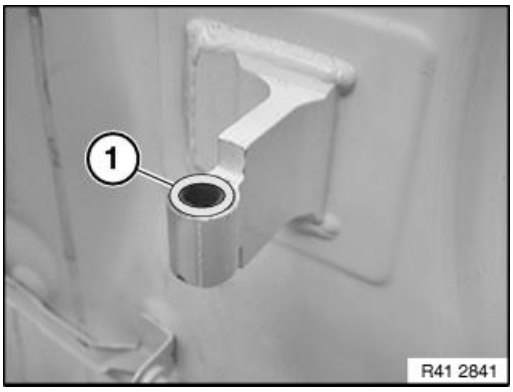
- 41 1 150
- 41 1 151
- 41 1 152



Set of special tools 41 1 150 comprises:

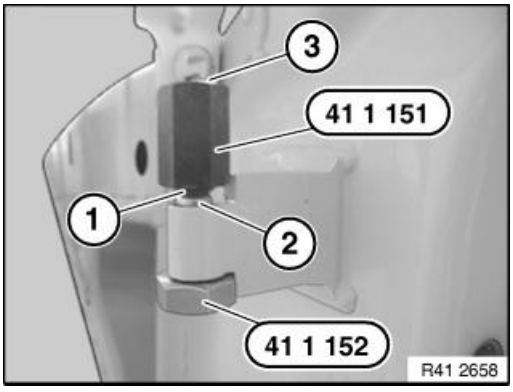
Bush41 1 151

Screw41 1 152



Cut off hinge bushing in area (1) with chisel.

Drive out remainder of hinge bushing with punch.



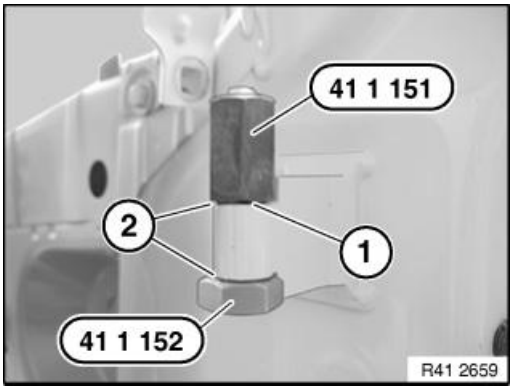
Insert screw 41 1 152 with new hinge bushing (2) into hinge.

Screw bushing 41 1 151 with flat end (3) pointing upwards onto screw41 1 152 .

Turn bushing 41 1 151 until taper (1) borders hinge bushing.

Unscrew bushing 41 1 151 again.

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Twist bushing 41 1 151 with flat end (1) onto screw41 1 152 .
Turn bushing 41 1 151 until gap dimensions (2) are identical.

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41 5. ... Adjust door

Important:

Do not damage adjoining body parts.

Minor corrections (realignment work) are permitted if the existing adjustment options are not sufficient.

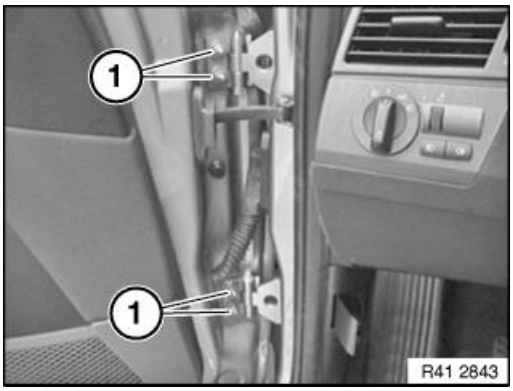
Note:

Observe gap dimensions .

The door must be provided with all attachment parts for correct adjustment.

Adjust screwed body parts from rear to front.

The following illustrations are schematic representations and are to be applied to the relevant vehicle type.

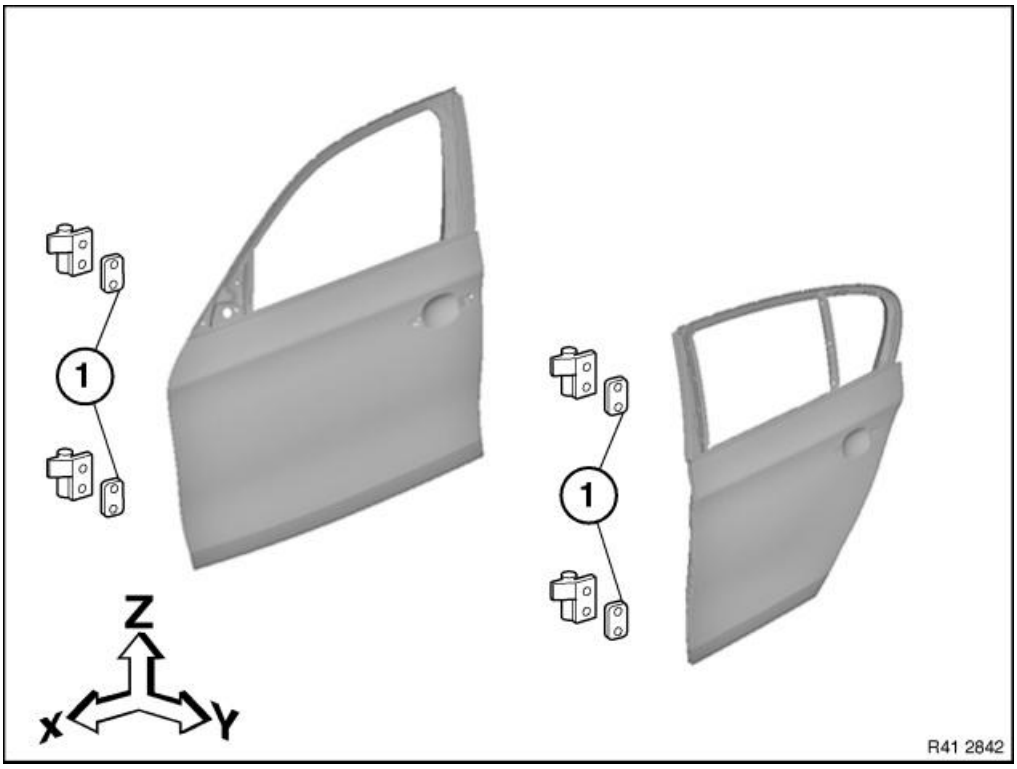


Slacken lock striker, remove if necessary.

Slacken nuts (1) until door can still just be moved.

Tightening torque 41 51 2AZ .

Tightening torque 41 52 2AZ .



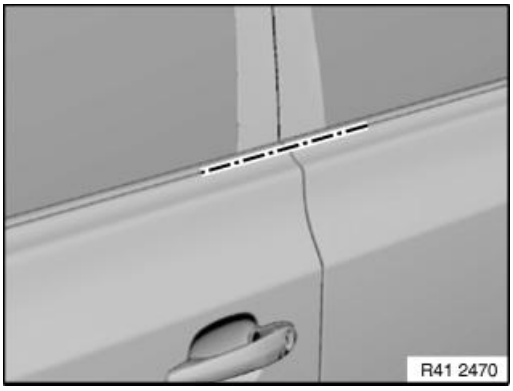
Adjust rear door in transition to front door (Y) by fitting shims.

Installation:

To preset new part, carry over number of shims from damaged door.

Adjust door longitudinally (X) and vertically (Z).

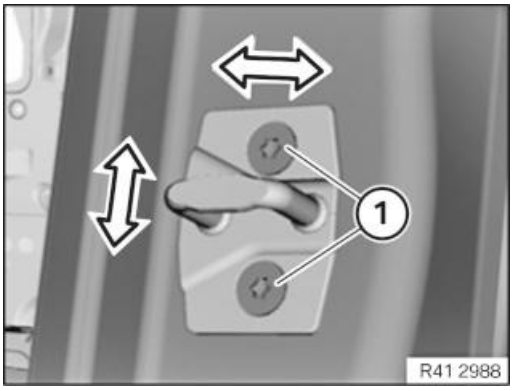
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Check that adjoining body parts are flush in terms of height and correct if necessary.**Note**

Vertical adjustment of door must not be influenced by lock striker.

When the door is closed, the lock striker must not touch or scrape against the door lock. Look out for scratches.



Slacken screws (1) until lock striker can still just be moved.

Move lock striker sideways in order to adjust transition between door and rear side panel.

Tightening torque 51 21 2AZ .

Note

When the door is closed, the lock striker must not touch or scrape against the door lock. Look out for scratches.

After installation:

- Tighten all screws and nuts to specified torque.
- Touch up unpainted surfaces in the appropriate colour.
- If necessary, adjust front door.

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41 51 ... Notes on replacing the door



Important!

For production reasons the side impact beam is only screwed loosely.

Tighten screws of side impact beam.



Remount all components on the new door.

If necessary, replace damaged components.

The procedure is described in the repair instructions of the components.

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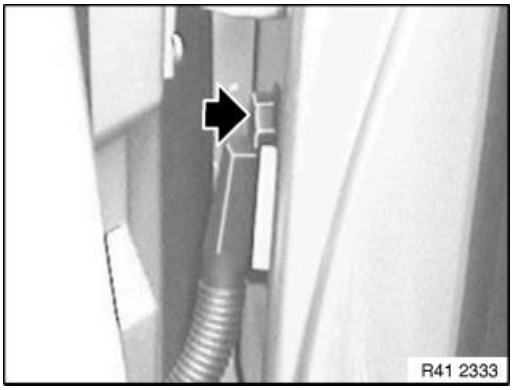
41 5. ... Removing and installing door



Important!
Do not damage adjoining body parts.

The illustrations are schematic representations and are to be applied to the relevant vehicle type.

Open door.



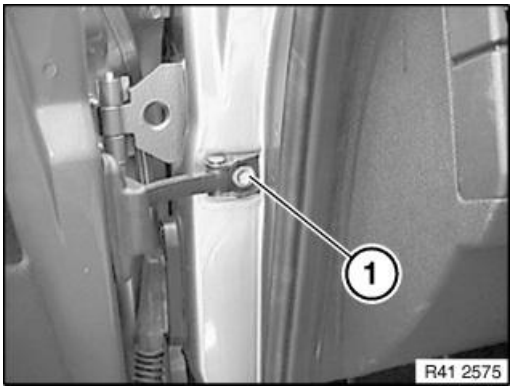
Release screw on connector frame.

Front door:

Tightening torque 41 51 4AZ.

Rear door:

Tightening torque 41 52 4AZ.



Note:
Secure door against closing.

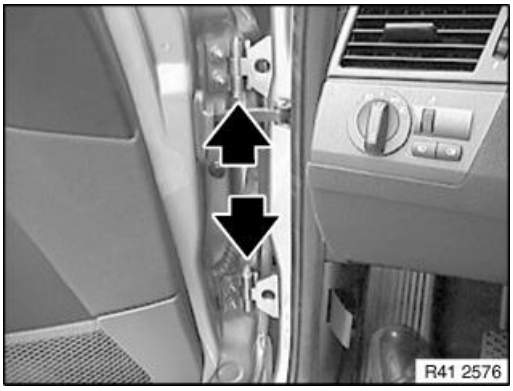
Release screw (1) on door retainer.

Front door:

Tightening torque 51 21 3AZ.

Rear door:

Tightening torque 51 22 3AZ.



Important!
Secure door against falling out.

Release screws between both hinge elements at top and bottom.

Pull both screws out of hinges.

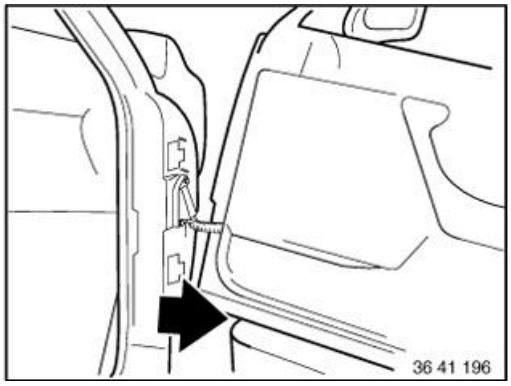
Front door:

Tightening torque 41 51 1AZ.

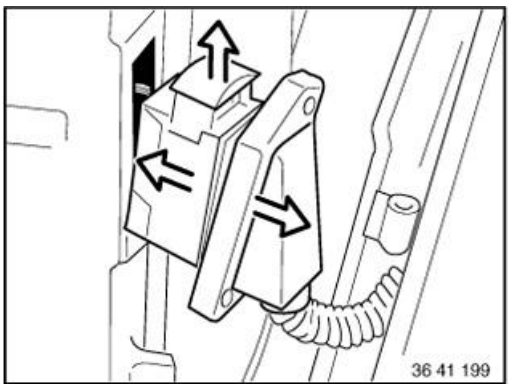
Rear door:

Tightening torque 41 52 1AZ.

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Pull out door sideways and place it on a suitable surface.



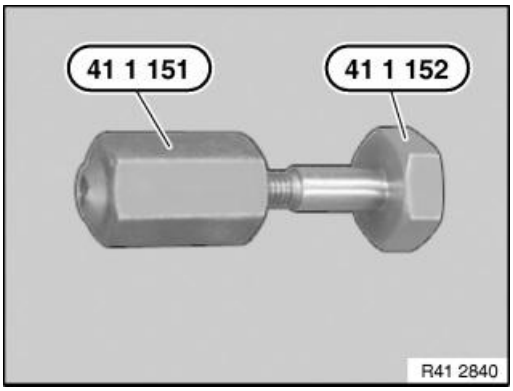
Pull plug connection from door pillar, unlock by pulling out bar and detach.*Installation:*
If necessary, adjust door.

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41 51 ... Replacing door hinge bushing (door removed)

Special tools required:

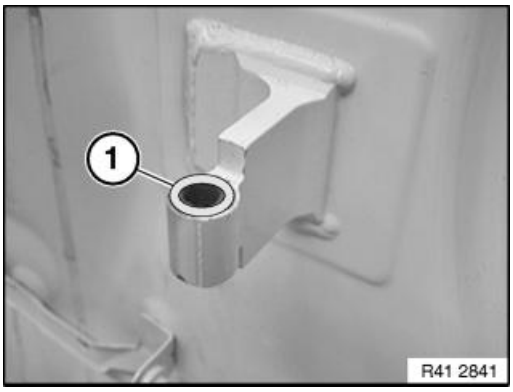
- 41 1 150
- 41 1 151
- 41 1 152



Set of special tools 41 1 150 comprises:

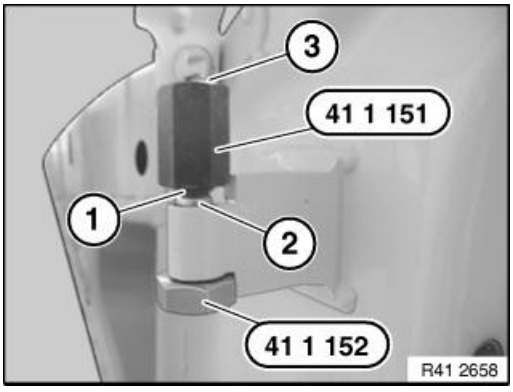
Bush41 1 151

Screw41 1 152



Cut off hinge bushing in area (1) with chisel.

Drive out remainder of hinge bushing with punch.



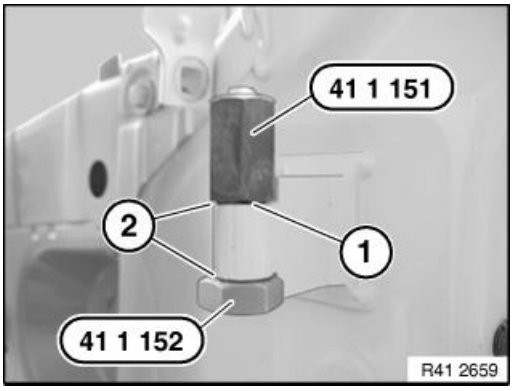
Insert screw 41 1 152 with new hinge bushing (2) into hinge.

Screw bushing 41 1 151 with flat end (3) pointing upwards onto screw41 1 152 .

Turn bushing 41 1 151 until taper (1) borders hinge bushing.

Unscrew bushing 41 1 151 again.

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Twist bushing 41 1 151 with flat end (1) onto screw41 1 152 .
Turn bushing 41 1 151 until gap dimensions (2) are identical.

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41 61 014 Adjusting engine compartment lid

Important!

E92, E93, E82, E88 only:

These instructions only apply to vehicles **without** active pedestrian protection!

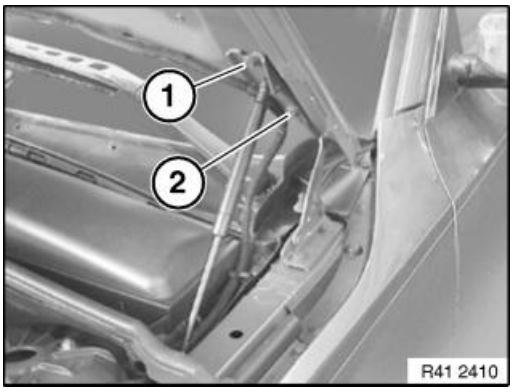
Observe separate procedure for vehicles **with** active pedestrian protection.

Read contents of Body, General.

The gap dimensions specified serve as the basis for the adjusting procedure.

Make unpainted surfaces visible by also moving the hinges. Touch these up in the appropriate colour.

Note:
Carry over schematic diagram to the relevant vehicle type.

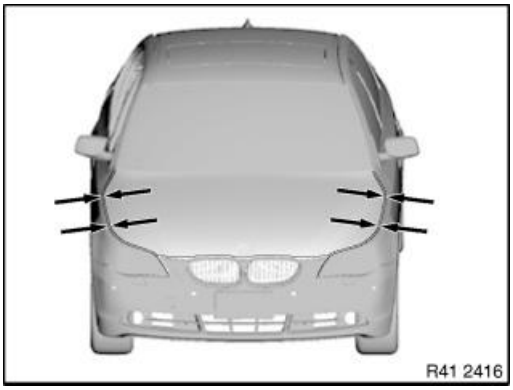


Loosen screws (1) and (2) on left and right hinges.

Engine compartment lid lid must be able to be moved.

Note:

If the adjustment range is not sufficient, release retaining screws of engine compartment lid hinge on body and move hinge.

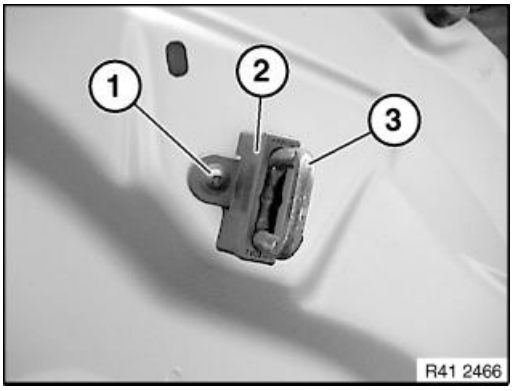


Locks and retaining hook must engage correctly.

Adjust engine compartment lid.

Note:
Height adjustment of engine compartment lid to side wall by means of stop pads.

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Note:
Height adjustment of engine compartment lid to front wall:

Release screw (1) and remove cover (2).

Height adjustment by turning at closing hooks (3).

Tighten all screw connections again.

Tightening torque 41 61 1AZ.

Important!

Check function of retaining hook.

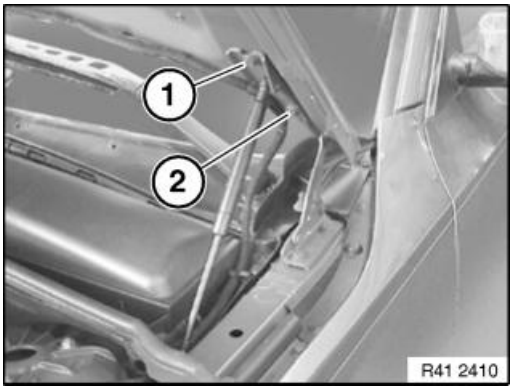
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41 61 000 Removing and installing engine hood

Refer to the description texts of the KSD CD (FRU 41 61 000) for details of stripping-down and rigging work.

Warning!

Support engine hood in fully opened position with suitable apparatus. Risk of injury.



Note:
Carry over schematic representation to the relevant vehicle type.

Loosen screws (1).

Unfasten screws (2).

Remove hood lid.

Installation:
Install engine hood at screw locations to on hinge. This dispenses with the need for adjustment after installation.

If this is not possible, adjust engine hood.

Tightening torque 41 61 1AZ.

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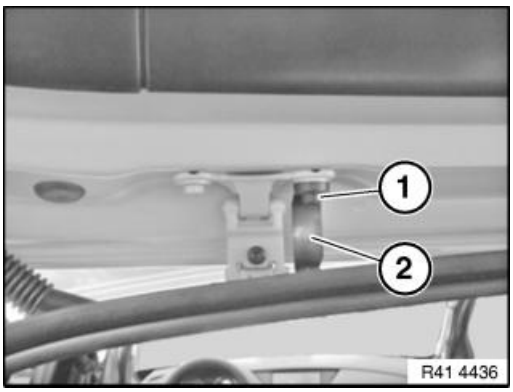
41 62 014 Adjusting rear lid

Read contents of Body, General .

For stripping and rigging operations, refer to texts on KSD CD (FR number 41 62 014).

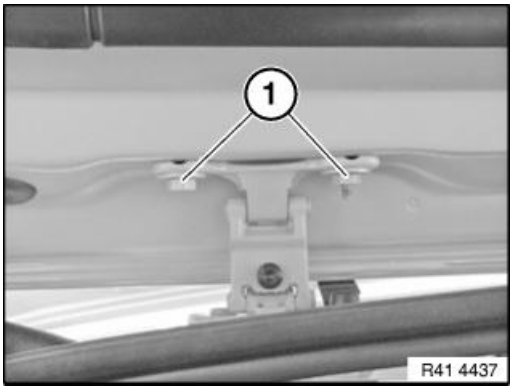
The gap dimensions serve as the basis for adjustment work.

Make unpainted surfaces visible by also moving the hinges. Touch these up in the appropriate colour.



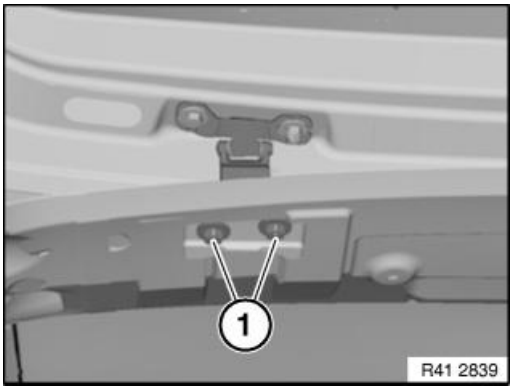
Release nut (1) and remove grounding strap.

Tightening torque 41 62 5AZ .



Slacken screws (1) on rear lid hinge to rear lid until such stage that rear lid can still be moved.

Tightening torque 41 62 1AZ .



If adjustment range is not enough, also slacken nuts (1).

Note:
There is sealing compound between rear lid hinge and body.

Adjust rear lid/tailgate.

Retighten all screws.

Tightening torque 41 62 3AZ .

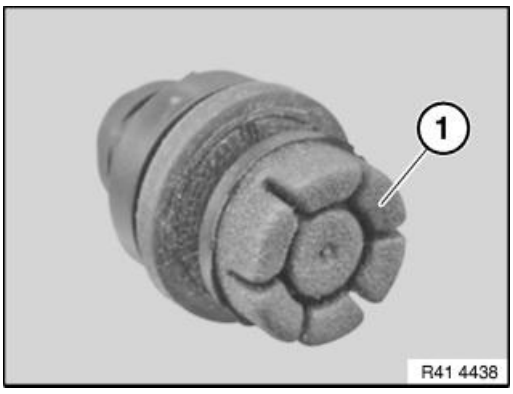
Adjust rear lid lock .

Adjust bump stops if necessary.

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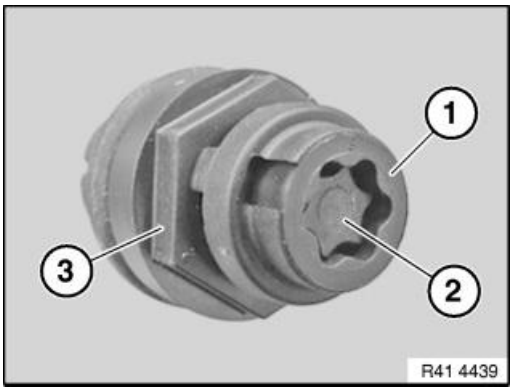
51 23 ... Adjusting/replacing bump stops

Necessary preliminary tasks:
Remove luggage compartment wheel arch panel.



Following parts must not be damaged:

- (1) Bump stop
- (2) Lock nut (following illustration)



General view of rear side:

- Adjust stop pads
  Remove cap (1).
  Adjust stop pad to correct height by turning screw (2) to left or right.

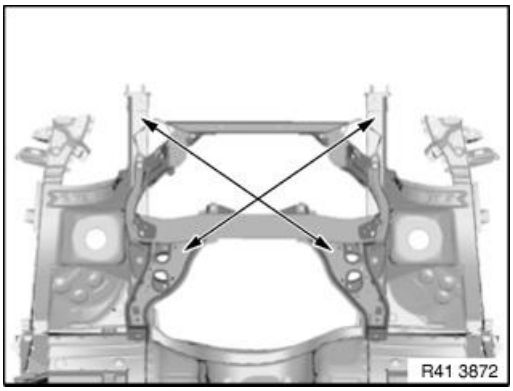
- Remove stop pads
  Release nut (3) and remove stop pads.

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41 00 505 Checking front body structure

Necessary preliminary tasks:

- Remove front underbody protection

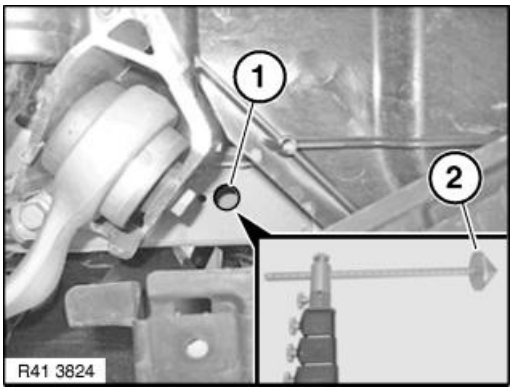


Structural damage can be identified by measuring with a beam trammel.

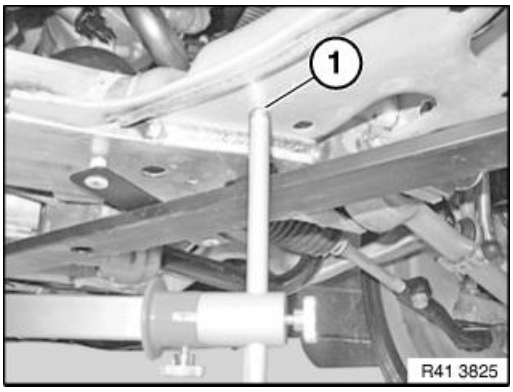
Here, symmetrically arranged points on the vehicle are measured in diagonal sequence.

If the two measured values are identical, there is no damage to the vehicle.

Note:
Illustration only an example. Detail deviations, depending on engine version, are possible.



In front area use conical adapter (2) at bore holeÂ (1).



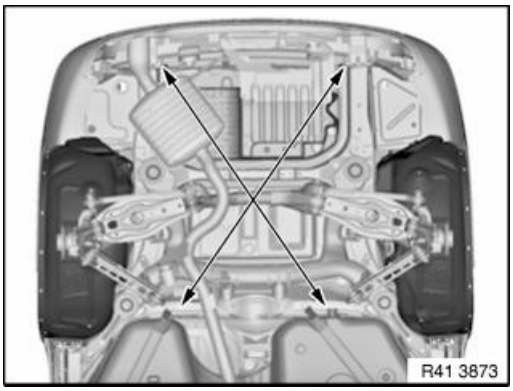
Use 8 mm dia. bore hole (1) on front axle support.

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41 00 510 Checking rear body structure

Necessary preliminary tasks:

- Remove underbody panelling

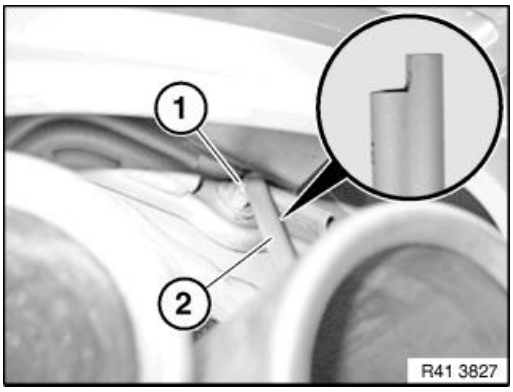


Structural damage can be identified by measuring with a beam trammel.

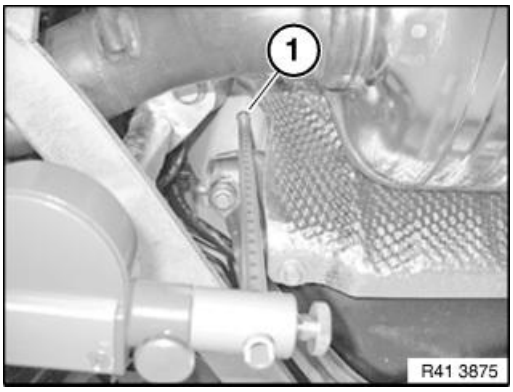
Here, symmetrically arranged points on the vehicle are measured in diagonal sequence.

If the two measured values are identical, there is no damage to the vehicle.

Note:
Illustration only an example. Detail deviations, depending on engine version, are possible.



In rear area use adapter (2) on threaded bolt of impact plate (1).*Note:*
If necessary, make recess in adapter yourselves.



Remove plug in areaÂ (1).

Use bore hole for measurement.

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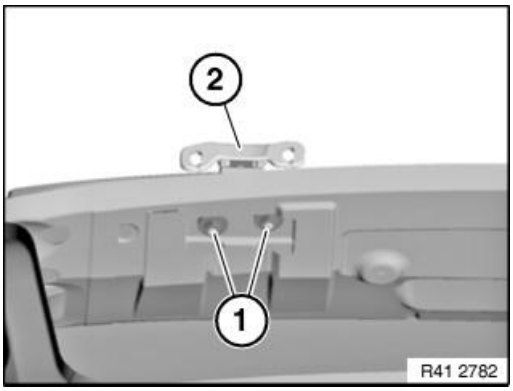
41 62 520 Removing and installing / replacing left or right hinge for rear lid

Read contents of Body, General.

Necessary preliminary tasks:

- Remove rear lid

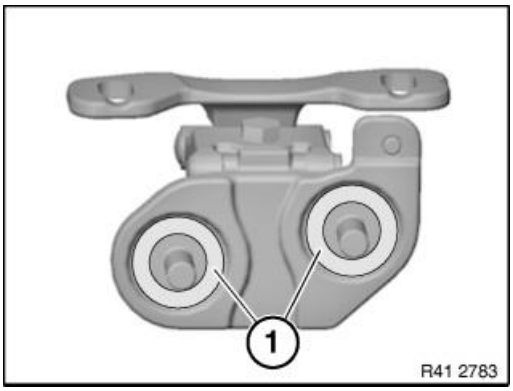
For stripping and rigging operations, refer to texts on KSD CD (FR number 41 62 520).



Slacken nuts (1) on vehicle.

Tightening torque 41 62 3AZ.

Remove hinge (2).



Installation:

Before final assembly, apply sealing compound in areas (1).

Adjust rear lid on the basis of the body gap dimensions.

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41 62 000 Removing and installing rear lid

Read contents of Body, General .

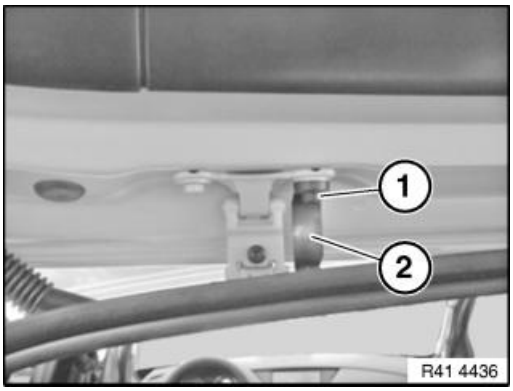
For stripping and rigging operations, refer to texts on KSD CD (FR number 41 62 000).

Necessary preliminary tasks:

- Remove panels for rear lid .
- Detach gas pressure spring .
- Disconnect all plug and socket cable connections on rear lid.

Warning!

Support rear lid in fully opened position with suitable apparatus. Risk of injury.



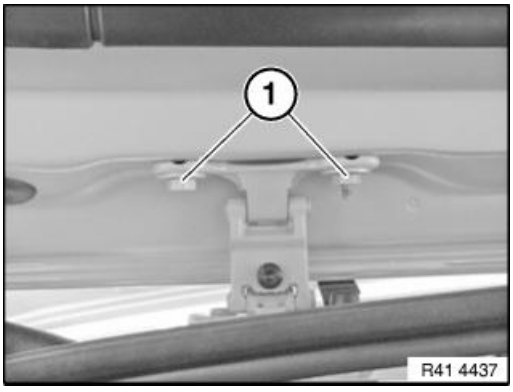
Carry over the work step shown symmetrically to the other side of the vehicle.

Remove cover (1) and release nuts underneath.

Tightening torque 41 62 5AZ .

Remove grounding straps (2).

Note:
Replace damaged grounding straps.



Carry over the work step shown symmetrically to the other side of the vehicle.

Unfasten screws (2).

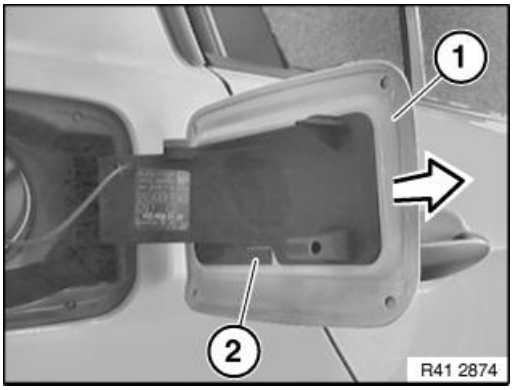
Tightening torque 41 62 1AZ .

Remove rear lid.

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41 63 000 Removing and installing flap for fuel filler neck

Note: The illustration is a schematic representation and is to be applied to the relevant vehicle type.



Open fuel filler flap.

Lever out lockÂ (2) and detach fuel filler flap (1) in direction of arrow.

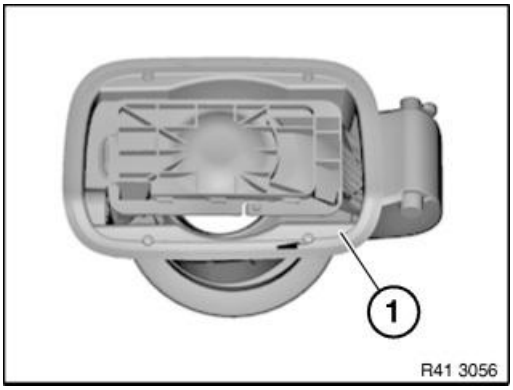
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41 63 003 Replace cover bowl

Necessary preliminary work:

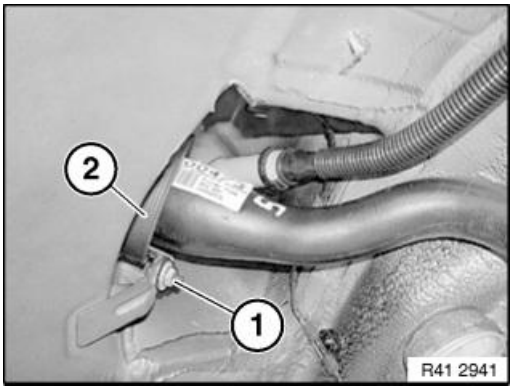
- Remove flap for fuel filler neck
- Remove front wheel arch cover (rear section)

Important!
Deformation of the sheet metal flanges in the side panel and the wheel arch results in permanent vehicle leakage. Carry out removal/installation with great care.



Following new body parts are required (refer to Electronic Parts Catalogue):

- (1) Filler bowl



Slacken nut (1).

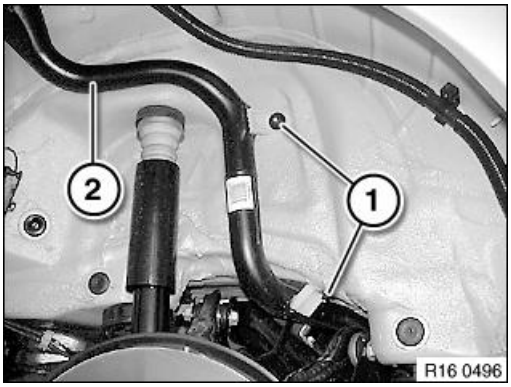
Press out gasket (2).

Installation note:
Make sure gasket (2) is correctly seated.

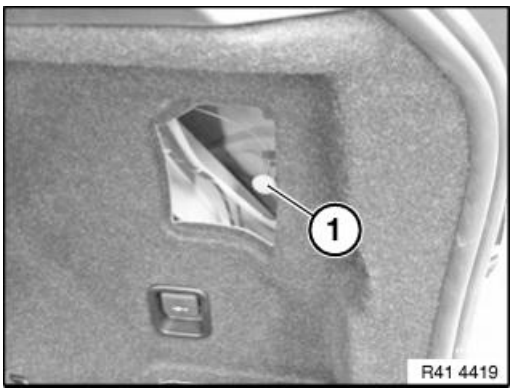
Installation note:
Clean **contact surface** on body and earth cable on fuel filler pipe.

Ground connection must be guaranteed.

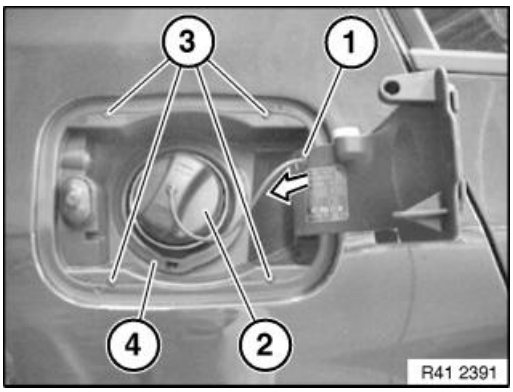
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Unscrew nuts (1).



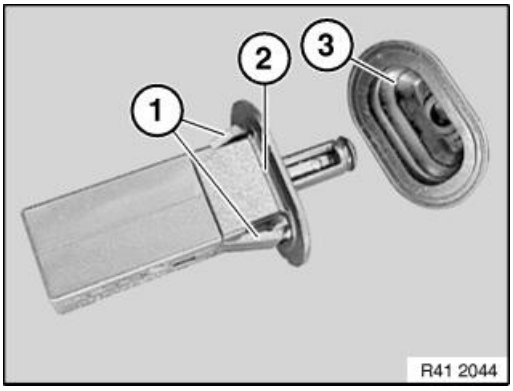
Release emergency release (1) from bracket.



Press retaining strap (1) inwards and remove.

Remove cover (2).

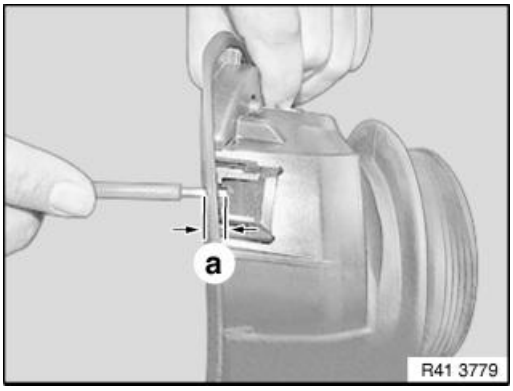
Remove rubber pad (3).



Release latch mechanisms (1) and remove ejector (2).*Installation note:*
Catches (1) on ejector (2) must not be damaged.

Check protective cap (3) for correct seating.

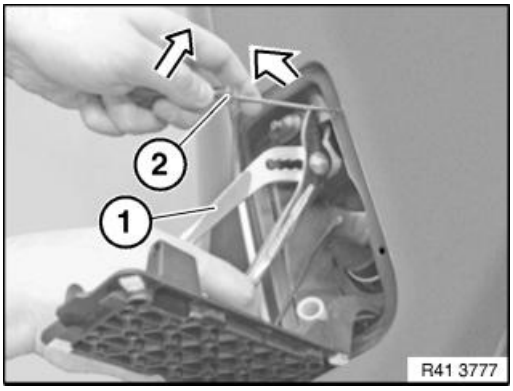
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Note:
For purposes of clarity, picture shows cover bowl removed.

Insert screwdriver in bore hole to specified dimension a and unlock cover bowl latch mechanism.

Dimension a=8 mm



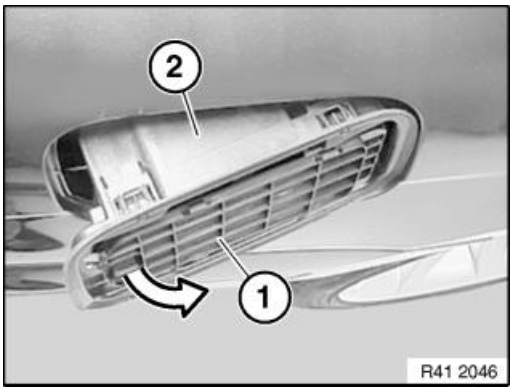
Hold cover bowl under tension.

Unlock catches individually with screwdriver (2).

Unlock catches in following order:

1. Top left
2. Bottom left
3. Top right
4. Bottom right

Move screwdriver in opposite direction at both lower catches.



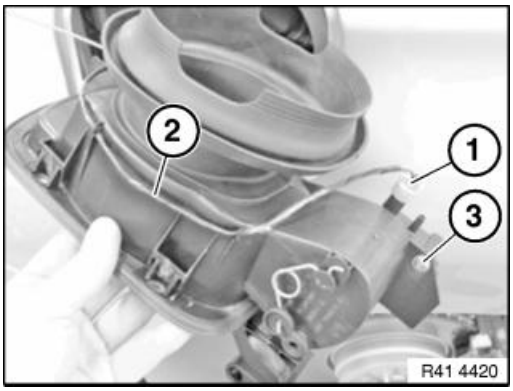
Close hinge arm (1).

Important!

Do not damage sheet metal flange of side wall.

Carefully twist out cover bowl (2) at first at rear in direction of arrow from side panel and remove.

Remove sealing sleeve from fuel filler pipe.

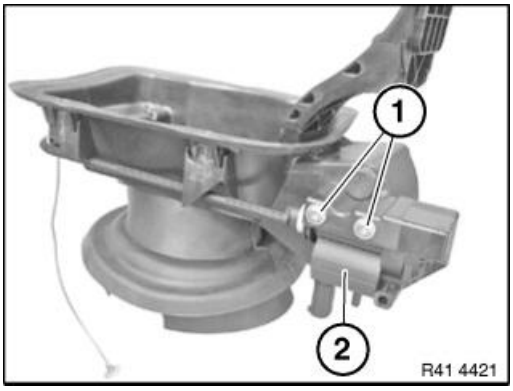


Unlock connector (1) and remove.

Unclip cable (2).

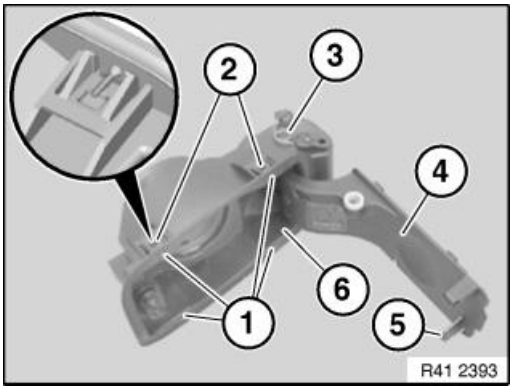
Release screw (3).

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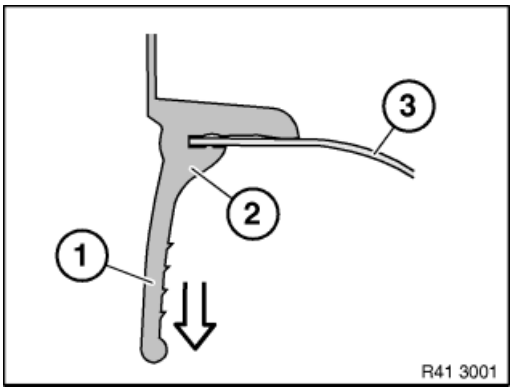
Release screws (1) and remove actuator drive (2) for fuel filler cap.*Installation note:*
Make sure actuator drive (2) for fuel filler flap is installed correctly.

Check central locking system before installation of cover bowl.

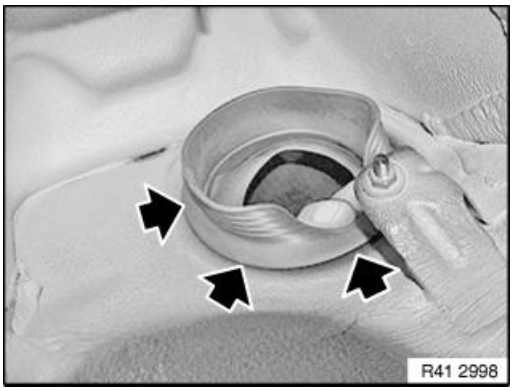


Installation note:
Following parts on cover bowl (6) must not be damaged or missing:

1 Rubber pad
2 Latch mechanisms, top/bottom
3 Spring
4 Catch
5 Guide



Installation note:
Using fitting aid (1), pull sealing lip (2) over sheet metal flange of wheel arch (3).



Installation note:
Illustrations shows fuel filler pipe removed.

Check that sealing lip is correctly seated. (watertightness).

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41 ... 0 Notes on the repair technique used in the main group 41

Two different repair techniques are used in body repair.

These are welding and bonding/riveting.

If the repair instructions do not specify a repair technique, then welding must **always** be used.

The bonding/riveting repair technique is **always** described in detail in the repair instructions.

Quality standards must be met.

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64 00 ... Information on using cleaning agent/paints (personal protection equipment)



Warning!

Use of cleaning agents/paints not compliant with instructions can cause serious injuries or burns!

Handling cleaning agents/paints can trigger allergic skin and respiratory reactions!



Important!

Observe following instructions:

- Store cleaning agents/paints only in a secure cabinet.
- Keep cleaning agents/paints away from naked flames and other sources of ignition.
- Protect cleaning agents/paints from high temperatures and direct sunlight.
- Always keep an eye douche on hand, change the water regularly (once a month).



Important!

Observe following instructions before use:

- Manufacturer's instructions (on container/packaging)
- Hazard warnings (on container/packaging)
- Manufacturer's instructions on package insert
- Material safety data sheet of manufacturer
- Product information in EPC
- National market regulations



Important!

Observe following instructions during use:

- Do not eat, drink or smoke while working with these products.
- Avoid direct contact with skin and eyes.
- Wear personal protective clothing/equipment.
- Ensure that all enclosed areas are well ventilated or extract fumes directly.
- Immediately change working clothes soiled with cleaning agent/paint.
- After finishing work, wash your hands and apply protective skin cream.



Important!

Follow hazard warnings and wear personal protection equipment!

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First Aid:

- If product comes in contact with eyes, immediately flush with running water for about 10 - 15 minutes. Seek the advice of eye specialist.
- In the event of skin contact and where applicable an allergic skin reaction, clean the affected areas immediately with soap and water and then apply silicone-free skin cream. Seek advice of physician.
- If an adhesive product is swallowed, rinse mouth/parts of mouth thoroughly with running water. Drink 1-2 glasses of water. Do not induce vomiting. Consult a doctor.
- After inhaling vapours ensure ample supply of fresh air. Keep calm, keep respiratory tracks clear and call doctor.



Recycling:

Dispose of cleaning agents/paints in a professional manner!

Observe national/country-specific disposal regulations.

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