

6.1.3 Fuel tank and fuel lines (including heater fuel tank and lines)

Validities

BMW PASSENGER CAR, BMW i, MINI PASSENGER CAR, ROLLS-ROYCE

Official method according to EG PTI:

Visual inspection while the vehicle is positioned over an inspection pit or on a vehicle lift, in case of CNG systems using a leak detector.

Fault determination according to EG PTI:

Visual inspection, while the vehicle stands over a test pit or on a vehicle lift, in case of compressed natural gas systems using leakage detector.

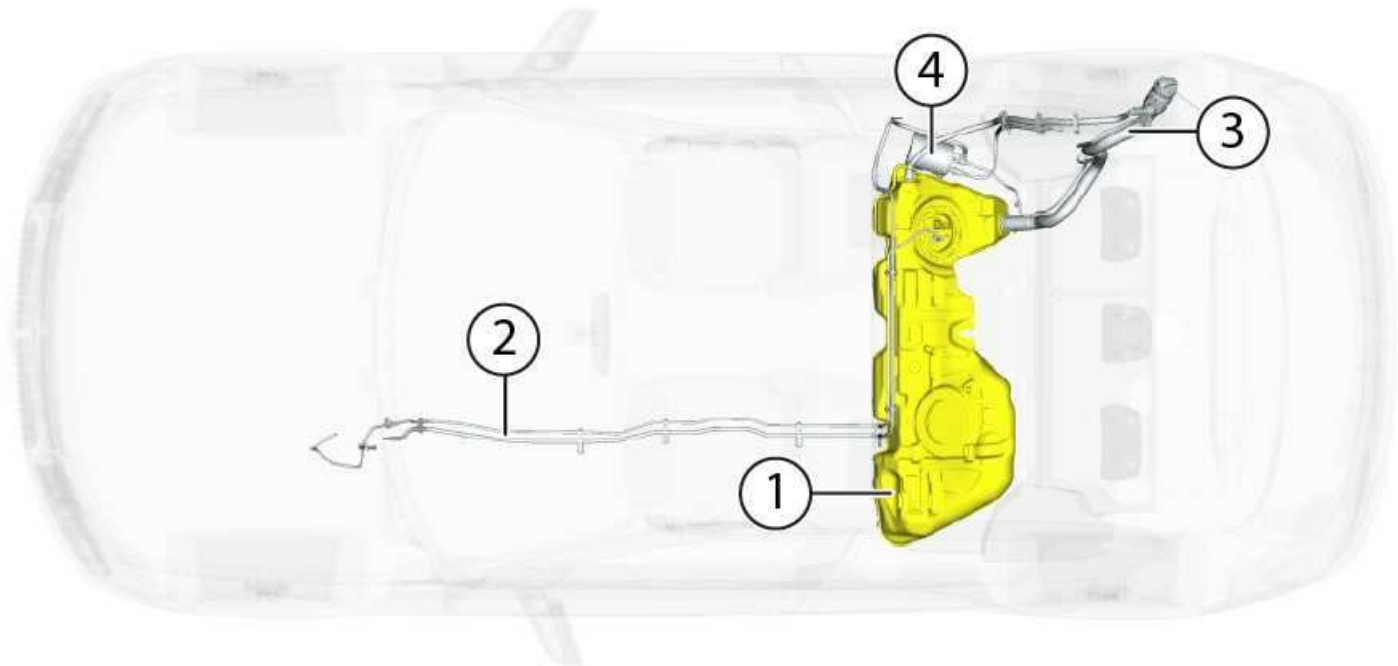
a)	Fuel tank or lines unsafe, consequently there is a particularly high risk of fire.
b)	Escaping fuel or missing or leaking fuel filler cap: risk of fire; excessive amount of escaping hazardous fluids.
c)	Lines chafing: Lines damaged.
d)	Fuel shut-off valve (if mandatory) not operating correctly.
e)	Risk of fire from:— escaping fuel/— poorly shielded fuel tank or exhaust system/— condition of the engine compartment.
f)	CNG or hydrogen system not according to regulations. Part of the system faulty.

Methods according to vehicle manufacturer:

Exemplary overview of fuel tank sizes of BMW passenger cars, BMWi, MINI and Rolls-Royce

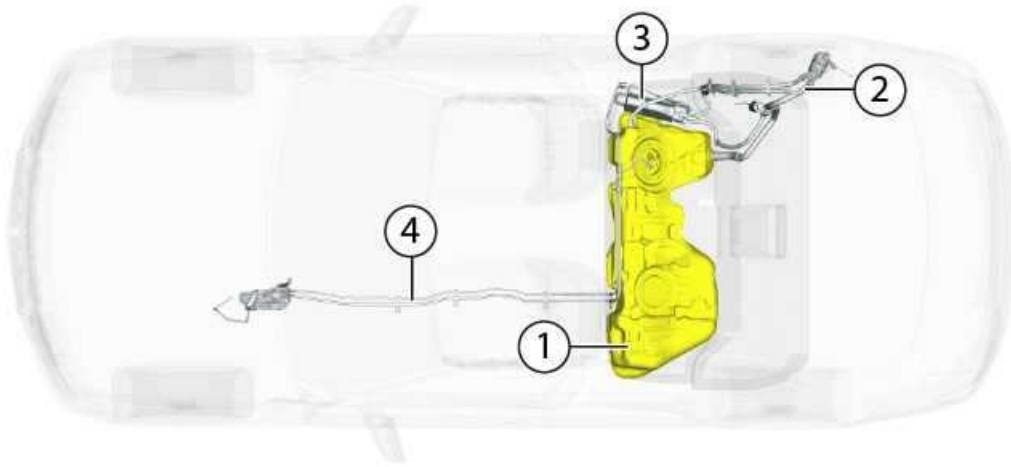
1-Series, 2-Series

- 1) Fuel tank
- 2) Fuel line
- 3) Fuel filler pipe
- 4) Carbon canister



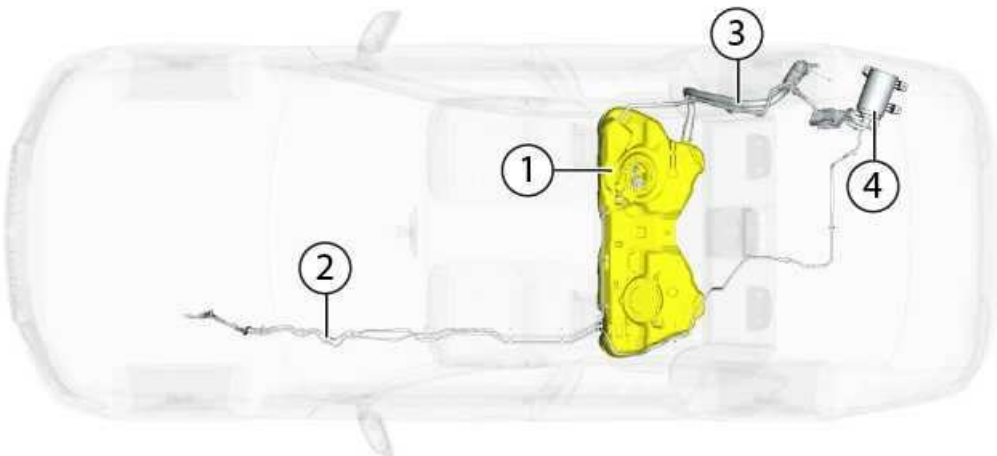
3-Series, 4-Series

- 1) Fuel tank
- 2) Fuel filler pipe
- 3) Carbon canister
- 4) Fuel line



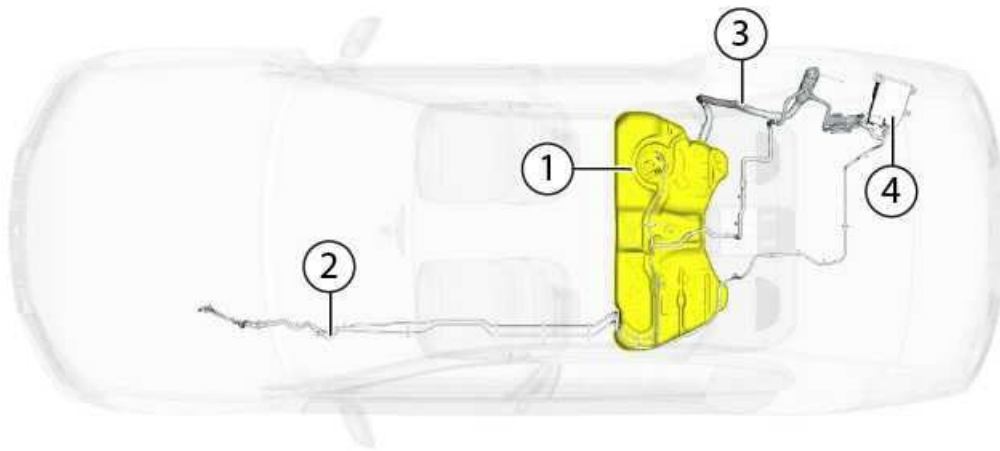
5-Series, 6-Series

- 1) Fuel tank
- 2) Fuel line
- 3) Fuel filler pipe
- 4) Carbon canister



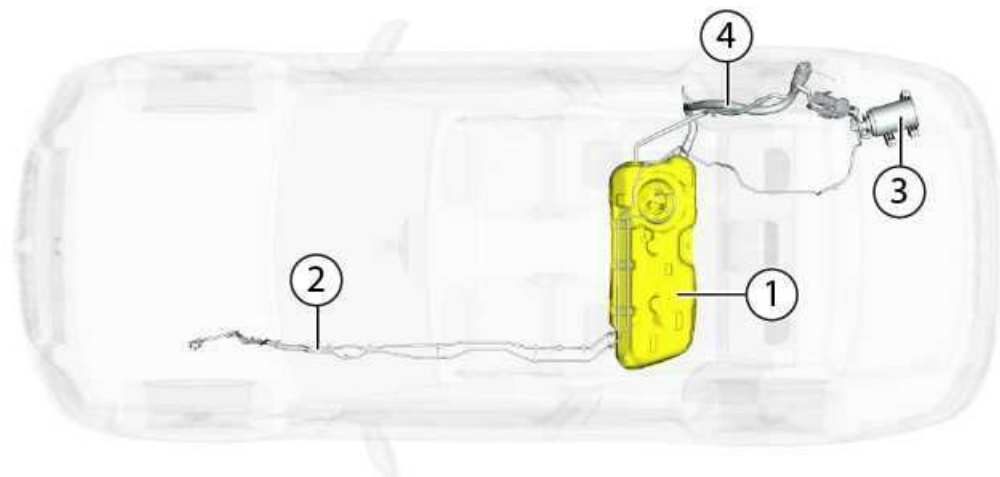
7-Series, 8-Series

- 1) Fuel tank
- 2) Fuel line
- 3) Fuel filler pipe
- 4) Carbon canister



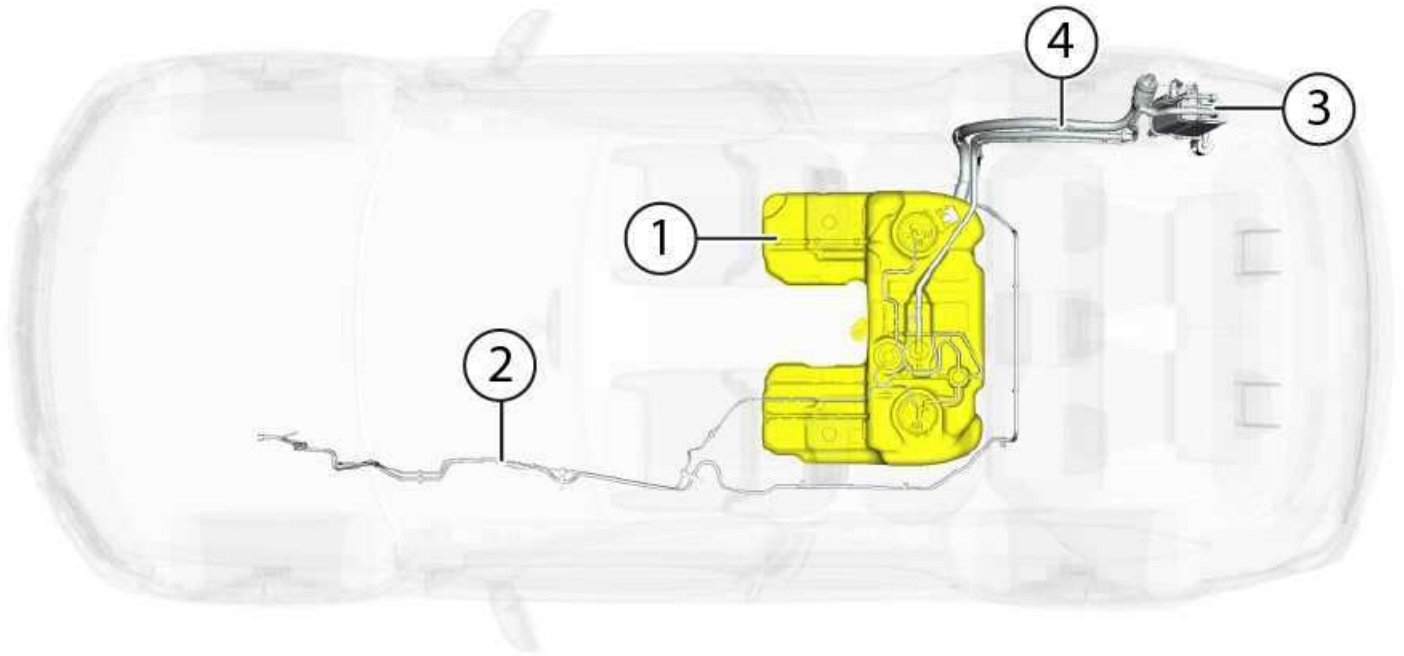
X3/X4

- 1) Fuel tank
- 2) Fuel line
- 3) Carbon canister
- 4) Fuel filler pipe



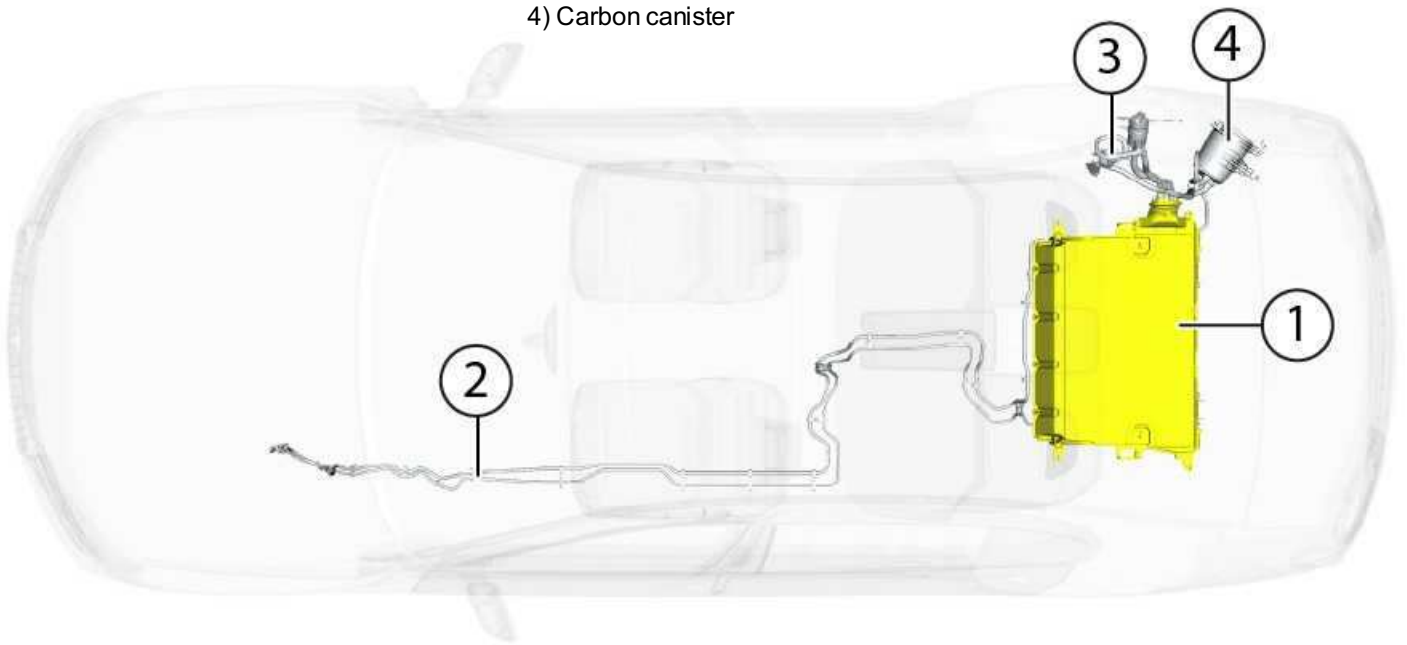
X5 / X6 /X7

- 1) Fuel tank
- 2) Fuel line
- 3) Carbon canister
- 4) Fuel filler pipe



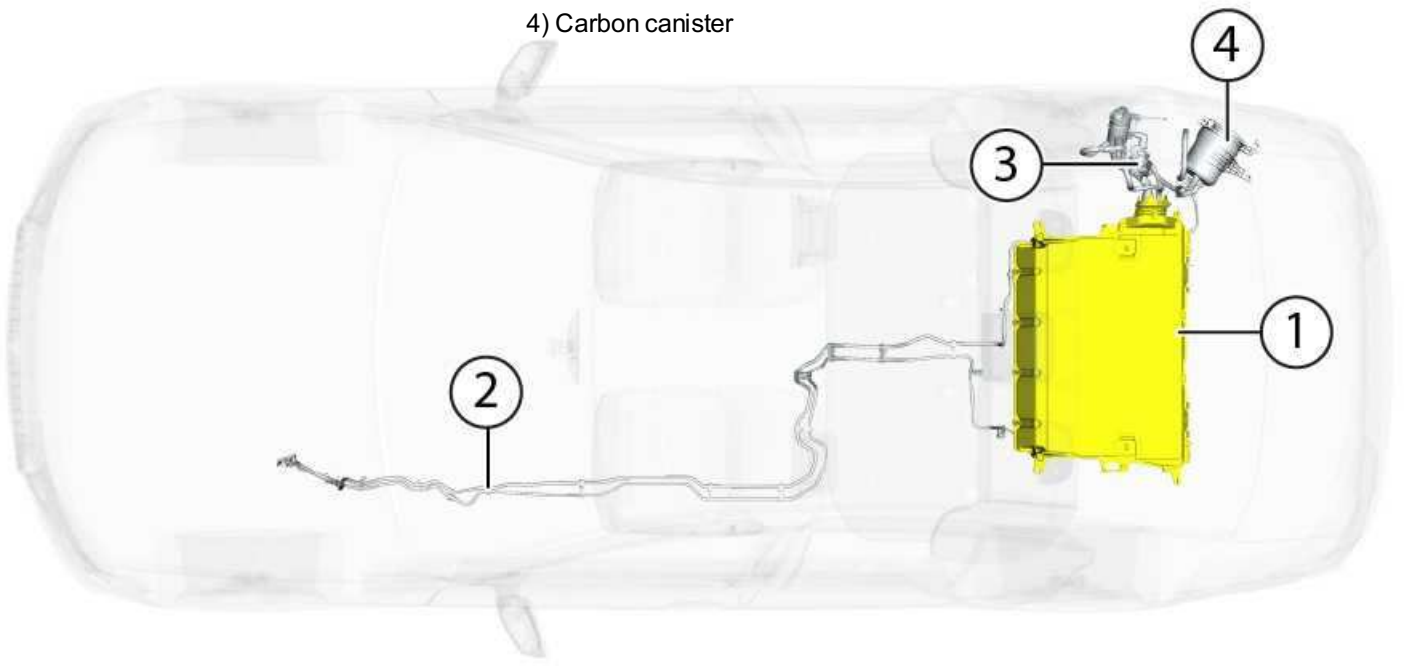
7 Series PHEV

- 1) Fuel tank
- 2) Fuel line
- 3) Fuel filler pipe
- 4) Carbon canister



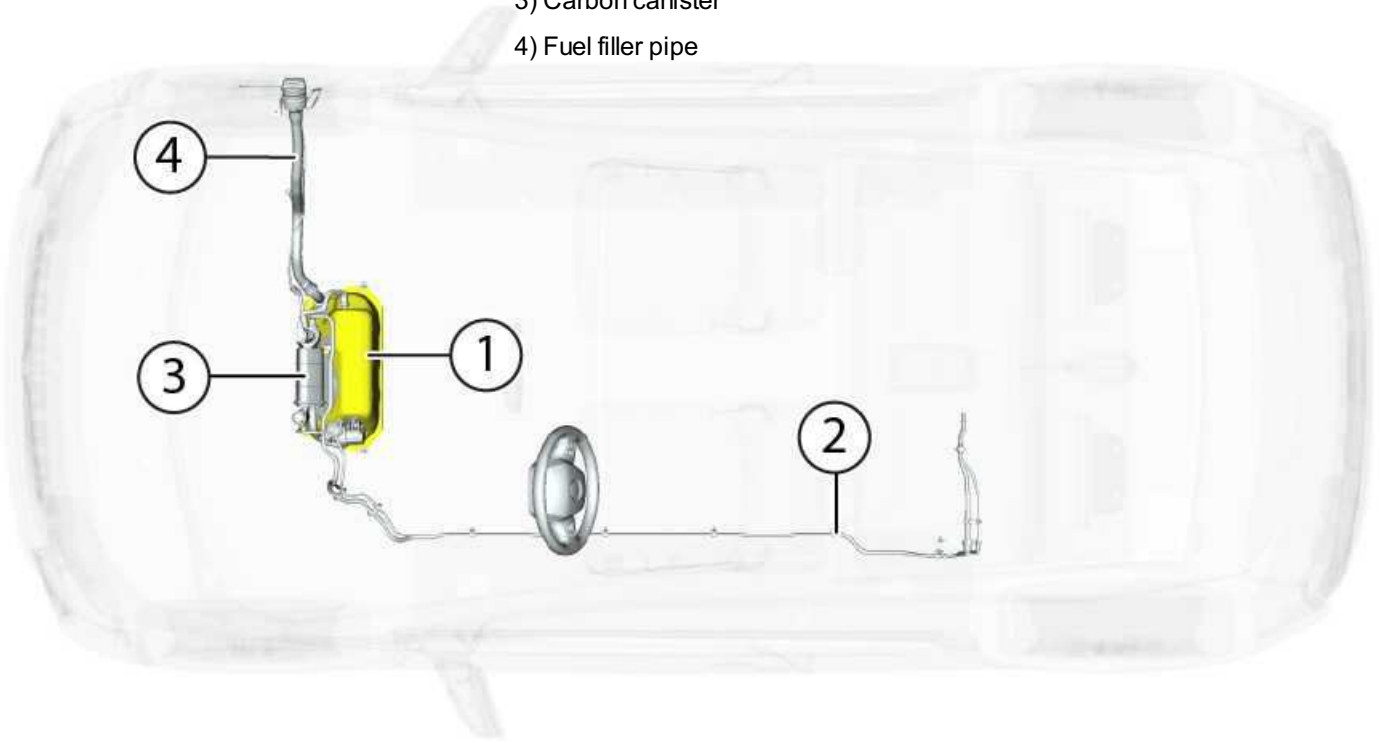
5 Series PHEV

- 1) Fuel tank
- 2) Fuel line
- 3) Fuel filler pipe
- 4) Carbon canister



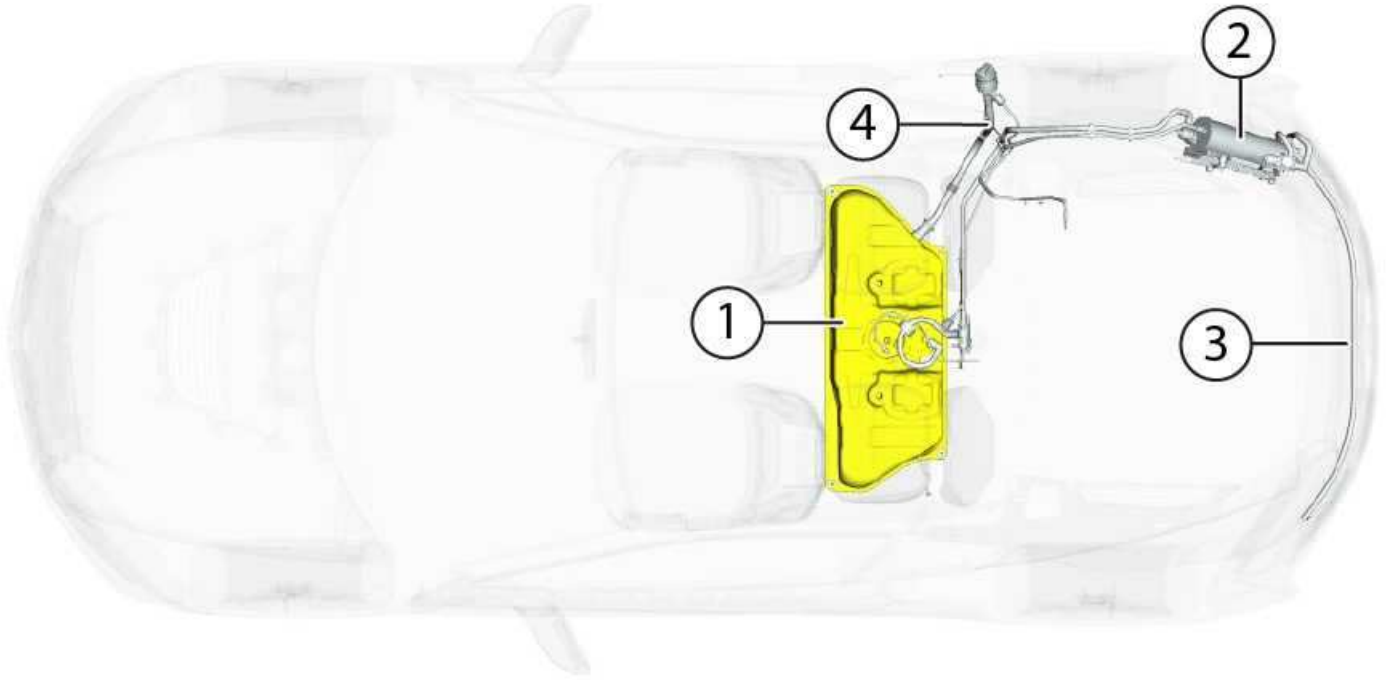
I01

- 1) Fuel tank
- 2) Fuel line
- 3) Carbon canister
- 4) Fuel filler pipe



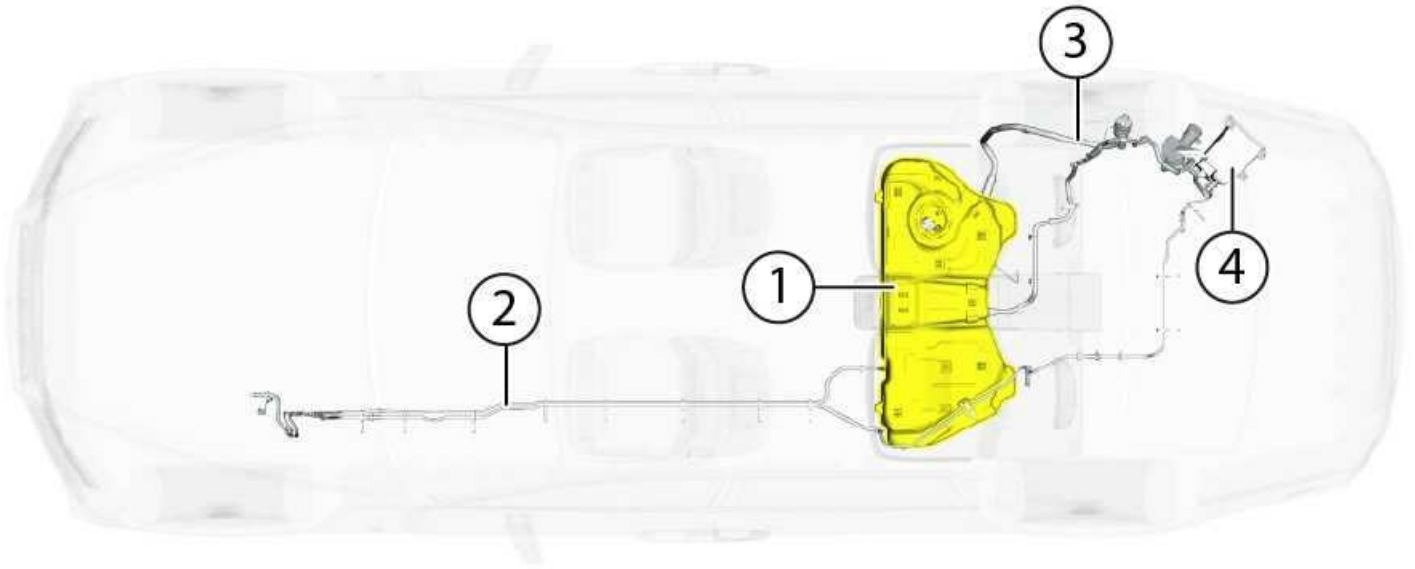
i8

- 1) Fuel tank
- 2) Carbon canister
- 3) Tank ventilation line
- 4) Fuel filler pipe



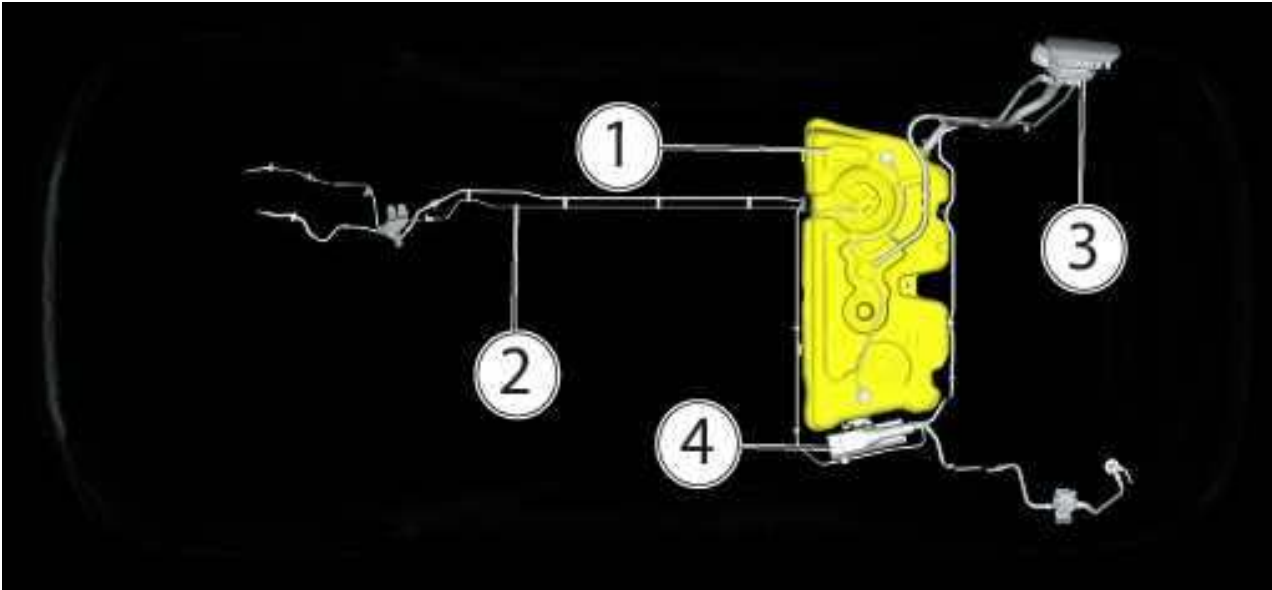
Rolls-Royce

- 1) Fuel tank
- 2) Fuel line
- 3) Fuel filler pipe
- 4) Carbon canister



MINI , X1, X2

- 1) Fuel tank
- 2) Fuel line
- 3) Fuel filler pipe
- 4) Carbon canister



Cosmetic repairs on wheel rims

Cost-effectiveness of the repairs has been checked.

Arrangement of wheel rims

Type	Repair options
Cast aluminium wheel	see Point 2
Cast aluminium wheel (machine-polished)	see Point 3
Carbon-fibre wheel rim	see Point 4

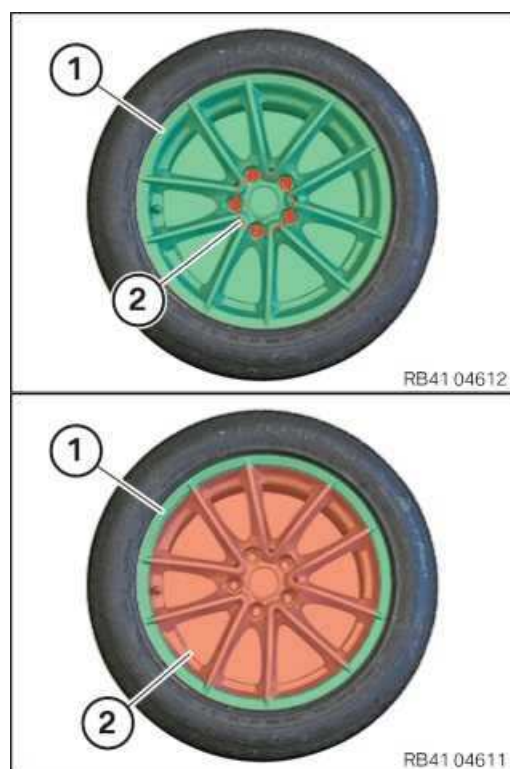
Cast aluminium rim

The rim must be replaced if damaged:

- All types of deformations
- All types of cracks
- All damage deeper than 1 mm of aluminium
- All damages on the inner surface of the wheel rim and in the rim base
- The radial runout and lateral runout prior to preparation exceed the production tolerance of 0.3 mm

It is possible to repair the following damage:

- Maximum depth of damage to aluminium 1 mm
- The distance of the damage from the outer rim edge must not exceed 30 mm



Paintwork damage in area (1) can be repaired with paintwork.

Paintwork is not permitted in area (2).

In area (1) a repair to the aluminium up to a depth of 1 mm is allowed.

The wheel rim must be replaced if there is damage to the aluminium in area (2).

Repair procedure for cast aluminium wheel rim

1 – Preparing the wheel rim

- Dismount tyres.
- Clean the aluminium rim with a steam-jet cleaner.
- Dry the aluminium rim.
- Pre-grind the aluminium rim (break sharp edges with a grain P180 grinding wheel).
- Blow off the aluminium rim.
- Clean damaged areas extensively with silicone remover.

General information:



CAUTION

Materials harmful to health.

Health risks in the event of contact with substances that are harmful to health!

- Observe and comply with the Safety Information on the containers and the notes on the manufacturer's safety data sheet.
- Conduct all work in appropriate personal protective equipment only.

Putty S1

Processing time 20 °C	90 min
Processing time 30 °C	60 min
Age-hardening duration 60 °C	60 min
Storage	15 °C ... 25 °C
Durability (note the expiration date on the cartridge)	12 Monate

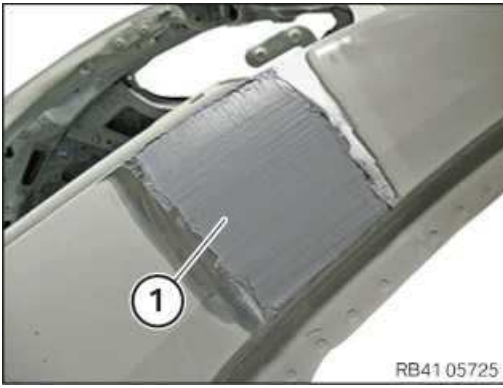
The barrel can be squeezed out with a commercially available cartridge press. Only use cartridge presses with a piston rod.

2 – Repairing the wheel rim

2 – Prepare surface for application of body filler

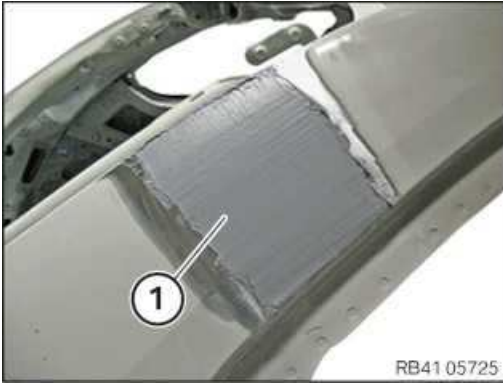
- Grind surface to a metallic bright-finish.
For steel sheet, use grain 80.
With aluminium sheet use grain 180.
The surface must be clean, dry and free from grease.
- Clean surface with solvent cleaner R2 and leave to dry for 5 minutes.
- Clean surface with solvent cleaner R1 and leave to dry for 2-3 minutes.

2 – Apply body filler



- Fill area (1) with body filler S1.
Apply excess body filler S1.
- If possible, apply body filler S1 in one go to avoid air bubbles.

2 – Cure body filler



- Cure body filler S1.



TECHNICAL INFORMATION

Optionally, various devices can be used.

- Cure body filler S1 with "FlexiTherm" heater pad system.
- Please comply with instructions in Owner's Handbook.

Select program in the control unit (5).

The control unit autonomously controls and regulates the temperature of each individual heating mat (1).

These are separately activated. The temperature sensor is located on the inside (red side).

The heating mats may only be used in connection with the anti-adhesive paper (8).

For trouble-free temperature measurements, the sensor must always be on the body filler (separated by anti-adhesive paper).

- Cure body filler S1 with infra-red heater.



RISK OF DAMAGE

Damage due to overheating

When using temperature-controlled infrared radiators, damage to adhesive bonds, paint and vehicle components can occur when drying spatula and filler. The thermometers integrated in the infrared radiator only function 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, although 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.

- Check the surface temperatures on small component surfaces during the drying process with an external thermometer. The general rule is: The surface temperatures must not exceed 85°C.

- When the infrared heater is used for the first time, the correct distances for the desired temperatures must be determined.





Switch the infra-red heater on and change the distance until the surface temperature of the body filler no longer changes for a period of 2 min.

Measure temperature using an optical thermometer.

If optical thermometers are used (Epsilon value 0.92-0.95), the heater must be switched off briefly during the measurement.

Record the measurement

- Standard optical thermometers can be used to measure surface temperatures.

2 – Work body filler



CAUTION

Grinding dust when grinding components.

Hazardous to health!

- Directly draw off the grinding dust.
- Ensure adequate ventilation.
- Conduct all work in appropriate personal protective equipment only.

- Wear a fine dust mask with protection class P2-P3.
- Sand body filler S1 using a machine after cooling to 25 °C.
Maximum permissible layer thickness after sanding is 5 mm.
For steel sheet, use grain 80.
With aluminium sheet use grain 180.
- Pores and faulty spots that become visible after grinding the surface must be closed with polyester filler (BMW Colour system).
Use a drill bit with Ø40.2 mm. Turn the drill by hand to expand the pores in v shape. by tFill cavities with polyester filler.
- Clean surface with solvent cleaner R2 and leave to dry for 5 minutes.
- Clean surface with solvent cleaner R1 and leave to dry for 2-3 minutes.

3 – Painting the wheel rim

- Pre-grind to apply filler (grain P220 grinding wheel or superfine soft pad).
- Blow off the aluminium rim.
- Clean the aluminium rim with silicone remover.
- Mask the aluminium rim, rim base and contact surface of the hub.
- Mask the rear side of the rim flange.
- Apply the filler.
- Dry the filler.
- Grind the filler (grain P400 grinding wheel).
- Blow off the aluminium rim.
- Clean the aluminium rim with hydro cleaner.
- Mask the screw holes.
- Clean the aluminium rim before applying the base coat.
- Apply the base coat.
- Dry the base coat.
- Apply the clear coat.
- Dry the clear coat.

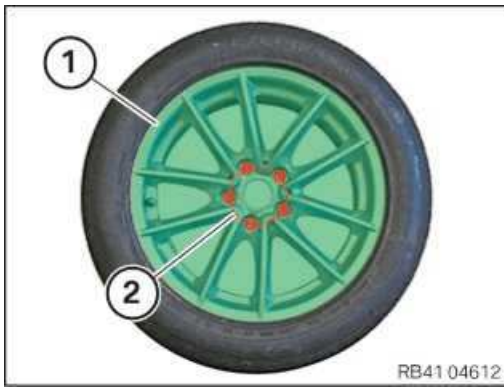
Cast aluminium wheel rim (machine-polished)

The rim must be replaced if damaged:

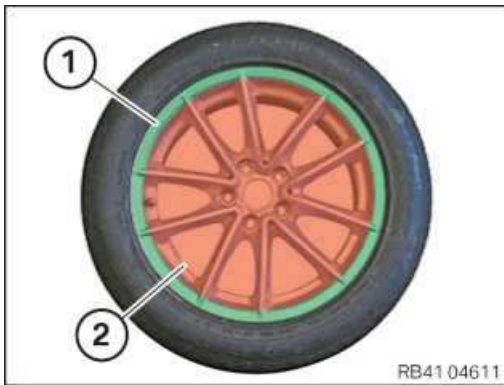
- All types of deformations
- All types of cracks
- All damage deeper than 1 mm of aluminium
- All damages on the inner surface of the wheel rim and in the rim base
- The radial runout and lateral runout prior to preparation exceed the production tolerance of 0.3 mm

No cosmetic repairs to aluminium are allowed.

Only the clear coating may be repaired on the entire front side of the wheel rim of diamond polished cast aluminium wheels.



Paintwork damage in area (1) can be repaired with paintwork.
Paintwork is not permitted in area (2).



In area (1) damage to aluminium up to a depth of 1 mm is permissible.
For technical reasons, the rim must not be replaced.
The wheel rim must be replaced if there is damage to the aluminium in area (2).

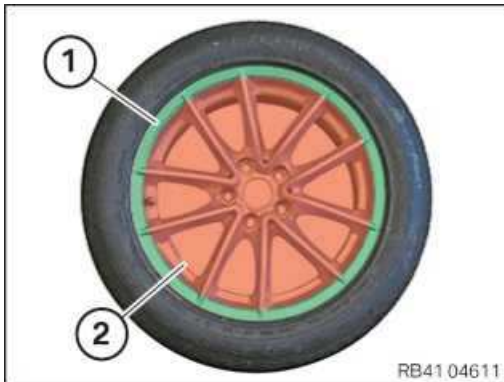
Carbon fibre wheel rims

No cosmetic repairs on carbon fibre wheel rims are permitted.

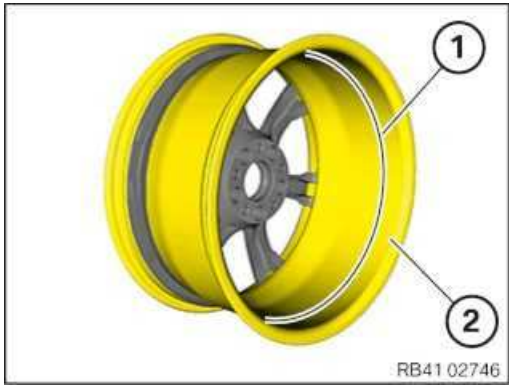
Assessment of damage to carbon fibre wheel rim

The wheel rim must be replaced in the event of the following damage:

- All types of deformations
- All types of cracks
- All damages greater than 1 mm depth
- The radial run-out and lateral run-out exceed the production tolerance of 0.3 mm



In area (1) damage up to a depth of 1 mm is permissible.
The wheel rim must not be replaced for technical reasons.
The rim will need to be replaced if there is damage in area (2).



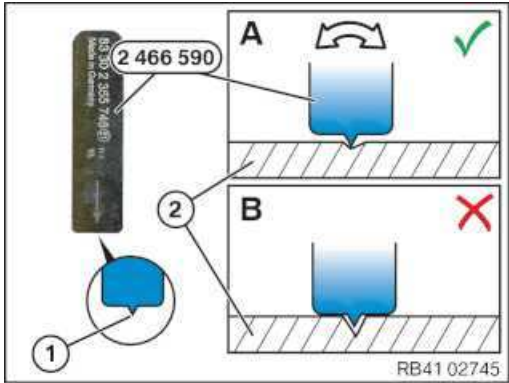
Radial scratches (1) on the interior (2) of the rim are permissible up to a depth of 0.4 mm.

The wheel rim must not be replaced for technical reasons.

The interior of the rim (2) can be coated with temperature-resistant matt paint.

The rim will need replacing if the depth of the scratches exceeds 0.4 mm.

4 – Determining depth of scratch



- Gauge has a test probe (1) with a height of 0.4 mm.
- If the test probe sits up at the deepest point of the scratch (figure A), it can be moved to the left and right. The scratch is less than 0.4 mm deep.
- If the test probe dips so deeply into the scratch that the gauge sits flat (figure B), the scratch is deeper than 0.4 mm and the part is damaged.

Additional Information

Overview of Special Tools

Overview Technical Data

Putty S1

Processing time 20 °C	90 min
Processing time 30 °C	60 min
Age-hardening duration 60 °C	60 min
Storage	15 °C ... 25 °C
Durability (note the expiration date on the cartridge)	12 Monate

Gap dimensions, body

General notes

The dimensions stated in this document apply at an object temperature of 20 Å°C.

The aim of adjustment is to achieve a uniform gap.

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

In terms of door gaps the maximum deviation between the front and rear door gap must be 1.0 mm.

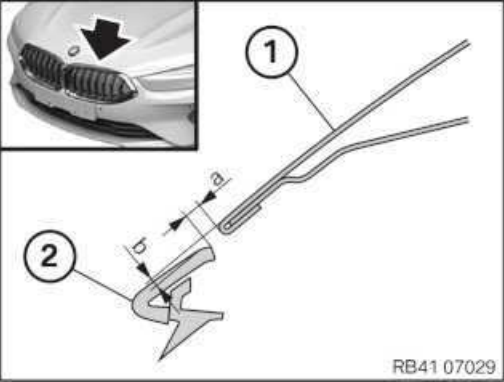
No gap dimension are specified for components which cannot be adjusted.

Gap dimensions

Gap dimensions

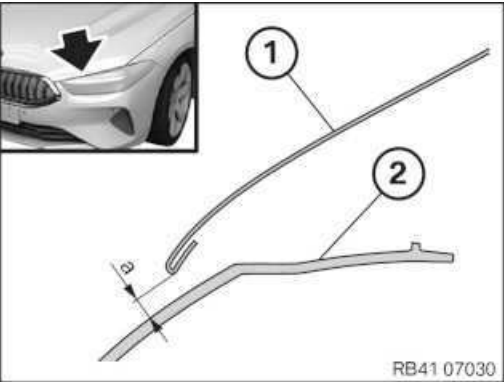
Gap dimension bonnet to ornamental grille surround

<i>1 bonnet; 2 ornamental grille surround</i>	
a	4,2 (3,2 - 5,2) mm
b	1,3 (-0,2 - 2,8) mm



Gap dimension bonnet to headlight

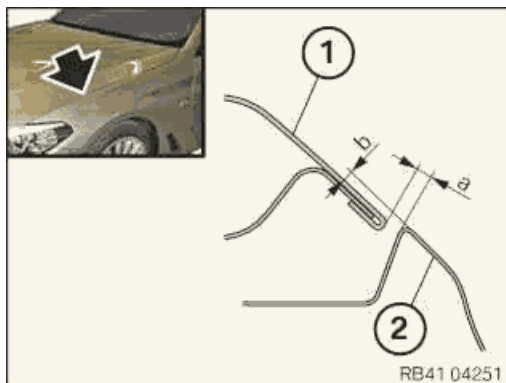
<i>1 bonnet; 2 headlight</i>	
a	6,4 (4,6 - 8,2) mm



Gap dimension bonnet to front side panel

1 bonnet; 2 front side panel

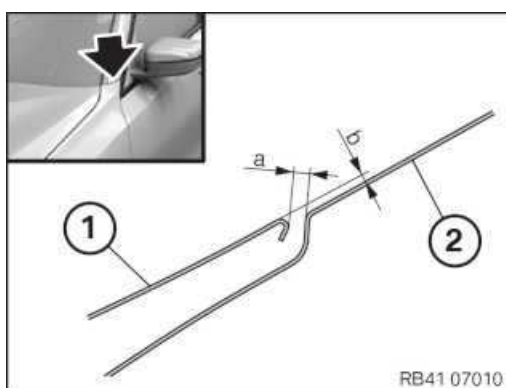
a	3,3 (2,3 - 4,3) mm
b	0,1 (-1,5 - 1,7) mm



Gap dimension front side panel to A-pillar

1 front side panel; 2 A-pillar

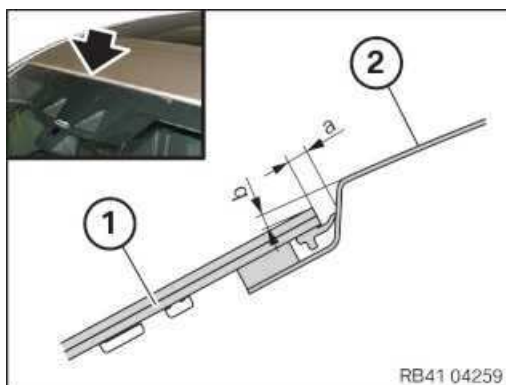
a	2,7 (1,6 - 3,8) mm
b	0 (-1,1 - 1,1) mm



Gap dimension windscreen to roof outer skin

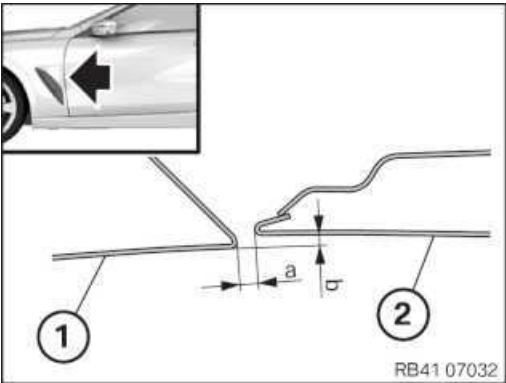
1 windscreen; 2 roof outer skin

a	4,3 (3,1 - 5,5) mm
b	0,9 (-0,6 - 1,9) mm



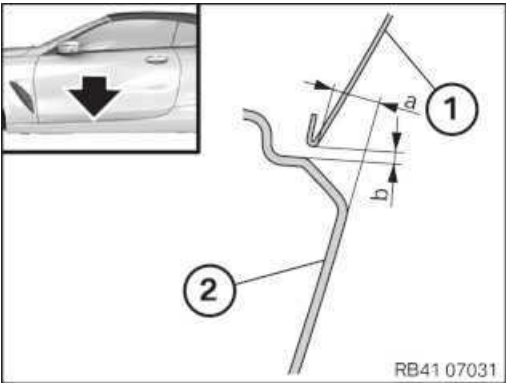
Gap dimension front side panel to front door

<i>1 Front side panel; 2 front door</i>	
a	3,8 (2,8 - 4,8) mm
b	0,8 (0 - 1,6) mm



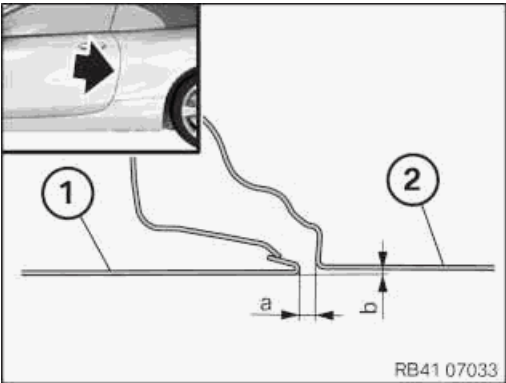
Gap dimension front door to side sill trim panel

<i>1 front door; 2 side sill trim panel</i>	
a	3,5 (2,3 - 4,7) mm
b	13.3 (12,0 - 13.6) mm



Gap dimension from front door to rear side panel

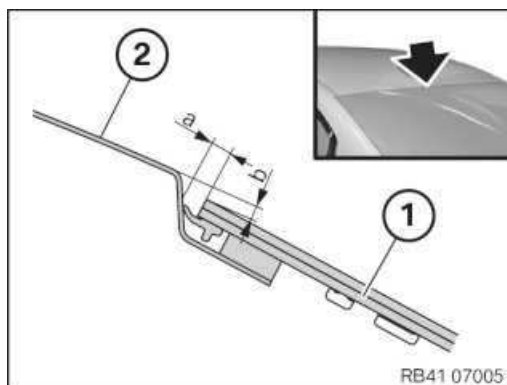
<i>1 Front door; 2 Rear side panel</i>	
a	3,8 (2,8 - 4,8) mm
b	0 (-0,3 - 1,3) mm



Gap dimension rear window to roof outer skin

1 rear window; 2 roof outer skin

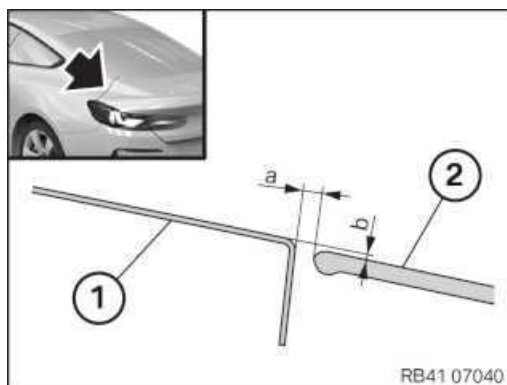
a	3,3 (2,0 - 4,6) mm
b	0,9 (-0,6 - 1,9) mm



Gap dimension rear side panel to tailgate

1 rear side panel; 2 tailgate

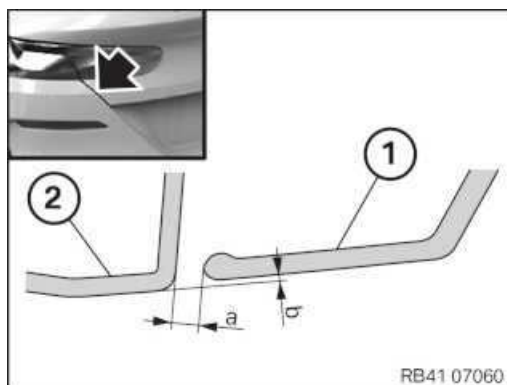
a	3,8 (2,6 - 5,0) mm
b	0,8 (-0,6 - 2,2) mm



Gap dimension tailgate to rear bumper panel

1 tailgate; 2 rear bumper panel

a	4,3 (2,8 - 5,8) mm
b	0,4 (-1,3 - 2,1) mm



Gap dimensions

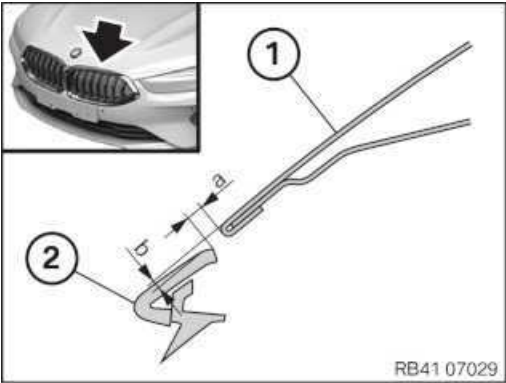
Additional Information

Overview Technical Data

Gap dimension bonnet to ornamental grille surround

1 bonnet; 2 ornamental grille surround

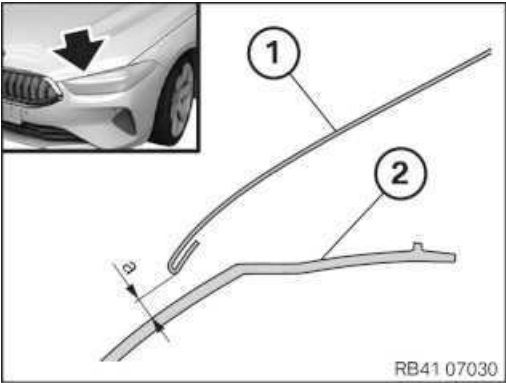
a	4,2 (3,2 - 5,2) mm
b	1,3 (-0,2 - 2,8) mm



Gap dimension bonnet to headlight

1 bonnet; 2 headlight

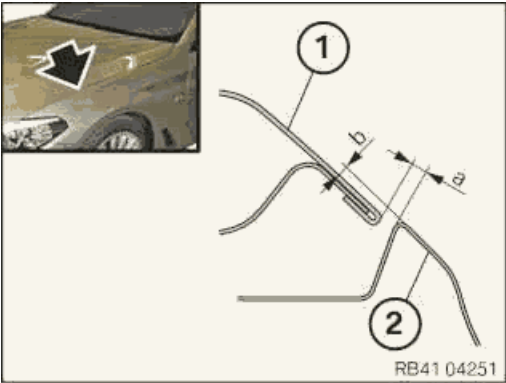
a	6,4 (4,6 - 8,2) mm
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Gap dimension bonnet to front side panel

1 bonnet; 2 front side panel

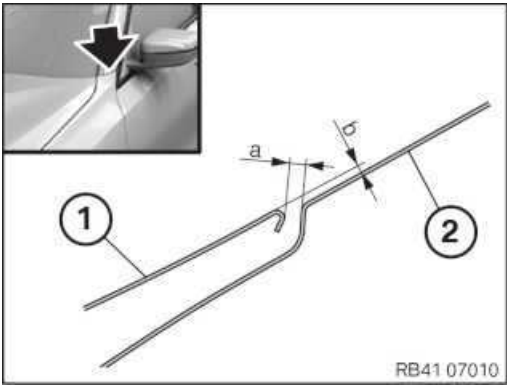
a	3,3 (2,3 - 4,3) mm
b	0,1 (-1,5 - 1,7) mm



Gap dimension front side panel to A-pillar

1 front side panel; 2 A-pillar

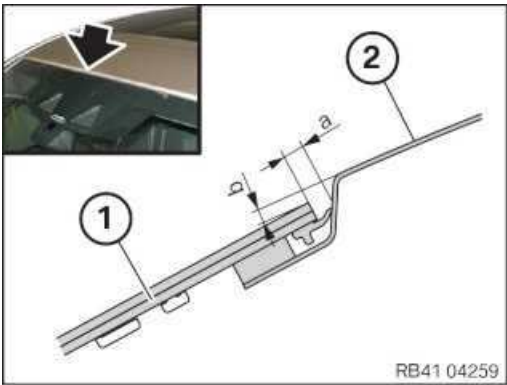
a	2,7 (1,6 - 3,8) mm
b	0 (-1,1 - 1,1) mm



Gap dimension windscreen to roof outer skin

1 windscreen; 2 roof outer skin

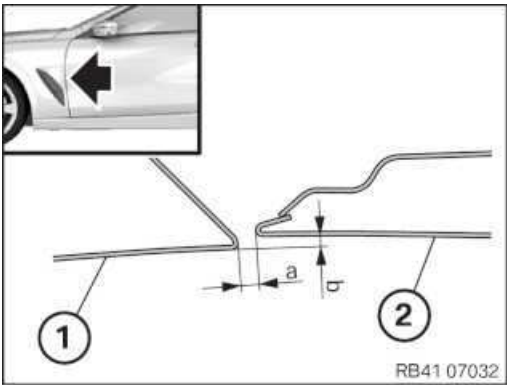
a	4,3 (3,1 - 5,5) mm
b	0,9 (-0,6 - 1,9) mm



Gap dimension front side panel to front door

1 Front side panel; 2 front door

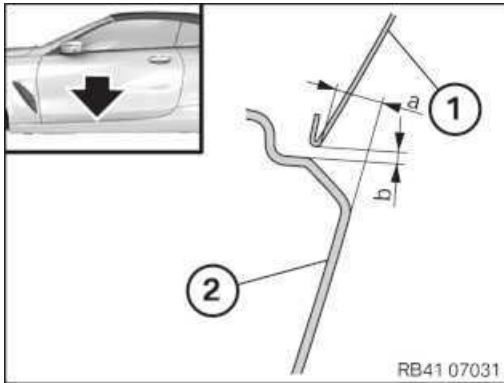
a	3,8 (2,8 - 4,8) mm
b	0,8 (0 - 1,6) mm



Gap dimension front door to side sill trim panel

1 front door; 2 side sill trim panel

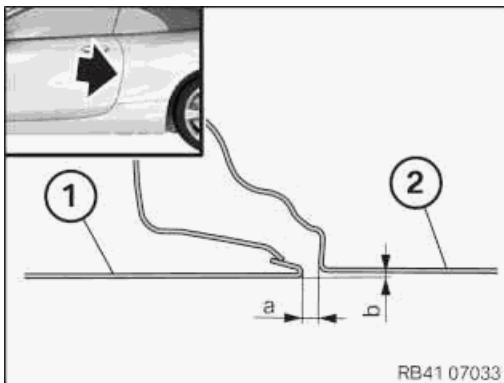
a	3,5 (2,3 - 4,7) mm
b	13.3 (12,0 - 13.6) mm



Gap dimension from front door to rear side panel

1 Front door; 2 Rear side panel

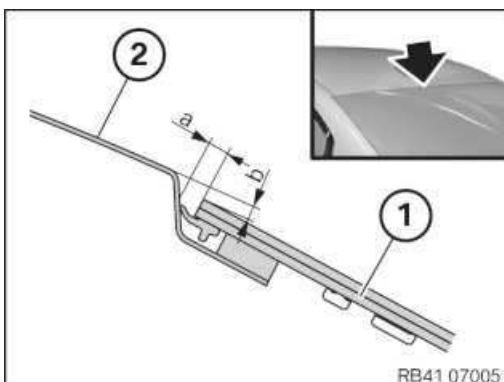
a	3,8 (2,8 - 4,8) mm
b	0 (-0,3 - 1,3) mm



Gap dimension rear window to roof outer skin

1 rear window; 2 roof outer skin

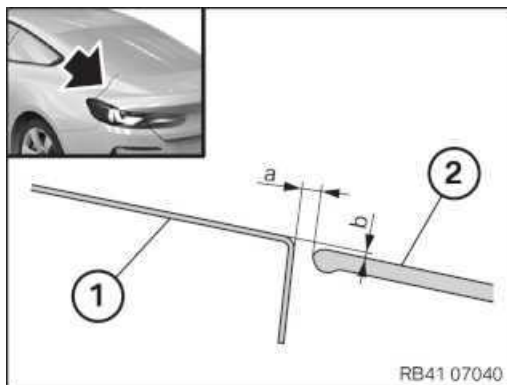
a	3,3 (2,0 - 4,6) mm
b	0,9 (-0,6 - 1,9) mm



Gap dimension rear side panel to tailgate

1 rear side panel; 2 tailgate

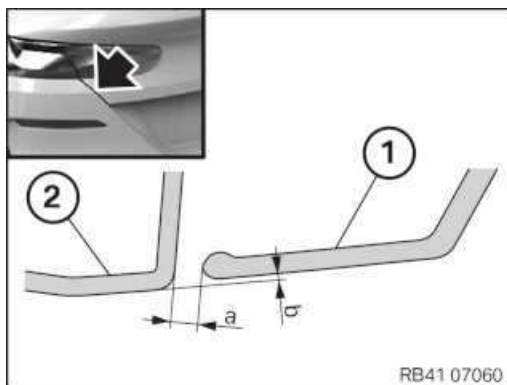
a	3,8 (2,6 - 5,0) mm
b	0,8 (-0,6 - 2,2) mm



Gap dimension tailgate to rear bumper panel

1 tailgate; 2 rear bumper panel

a	4,3 (2,8 - 5,8) mm
b	0,4 (-1,3 - 2,1) mm



Transferring hole pattern

Transferring hole pattern

When renewing a body component, the existing hole pattern must be transferred from the body to the new part.

1 – Transferring hole pattern

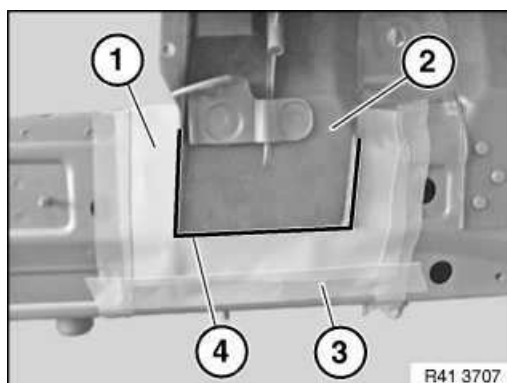
Prerequisite

New part is adjusted.

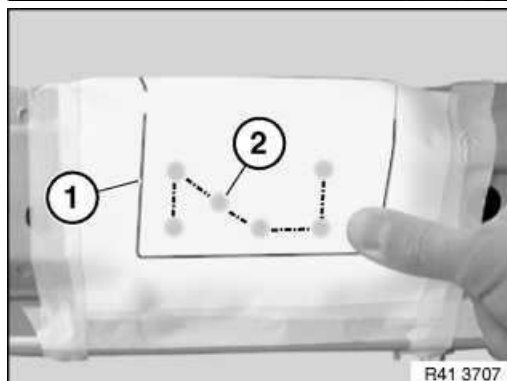


NOTICE

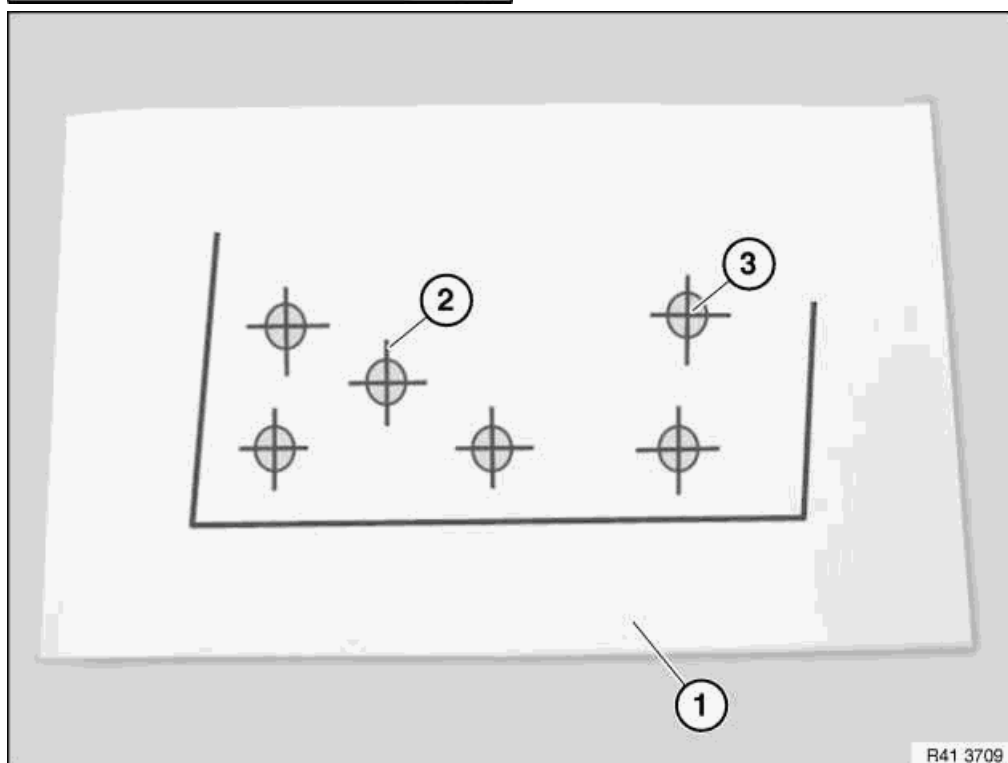
Schematic diagram is for example purposes. Some parts may differ in certain details.



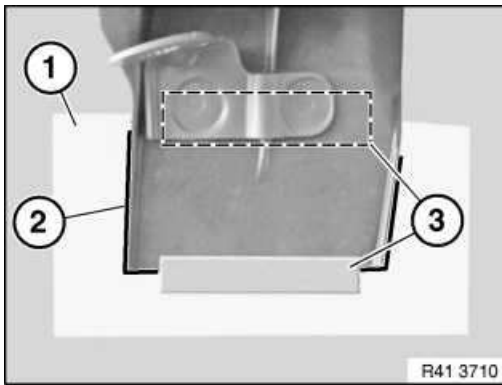
- Insert a template (paper template) (1) between the new part (2) and the body and secure it with adhesive tape (3).
- Transfer the outline (4) of the new part to the template.
- Remove the new part (2).



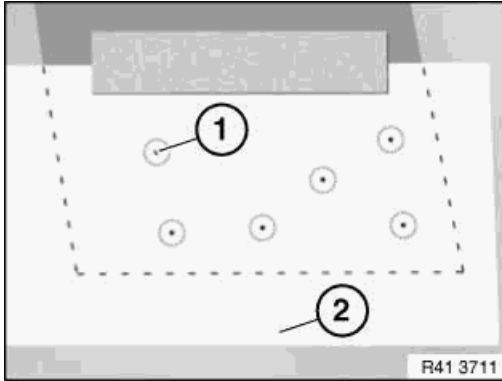
- Use your thumbs to press down on the positions of the bore holes (2) to transfer them to the template.
The outline of the new part (1) provides better orientation.
- Remove the template.



- Place the template (1) onto a flat surface.
- Mark the centre points of the bore holes with X (2).
- Use a sharp object to punch through the paper to transfer the centre points (3) of the bore holes.



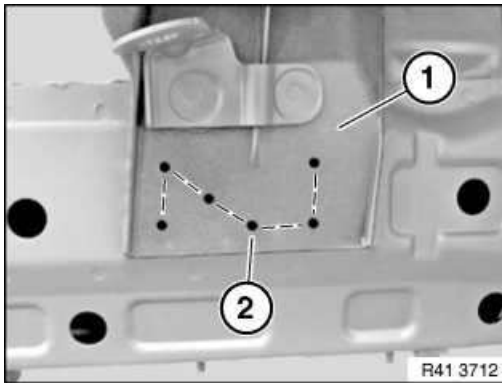
- Align the template (1) according to the outlines (2) on the inside of the new part.
- Secure the template (1) with adhesive tapes (3).



- Turn the new part around.

Note: The X marks must not be visible from this view.

- Set punch marks at the pressed through centre points (1). Provide counter support directly below the punch marks for punching.
- Remove the template (2).
- At the punch marks (1), drill out holes with an approximate diameter of 3 mm.



- Position the new part (1) on the vehicle.
- Drill out holes (2) to 6.8 mm diameter.

Vehicle identification number, general

General information for vehicle identification numbers

Observe national/country-specific regulations.

In the factory, the vehicle identification number is engraved in the designated area and in accordance with the series is equipped with a foil to protect it from corrosion.

In the case of a repair, the vehicle identification number is generally incorporated in the substitute area. The substitute area is usually situated below the Vehicle identification number. The factory used BMW emblem is replaced with a + at the beginning and end to clearly differentiate the vehicle identification number.

The IGEF number is dropped when replacing the component.

General information for embossed vehicle identification numbers

This procedure is used for all vehicles on which the vehicle identification number can not be punched.

If replacing the carrier support or the body, new parts can normally be ordered via BMW Group Parts with an embossed vehicle identification number. If this is not possible, observe country-specific regulations.

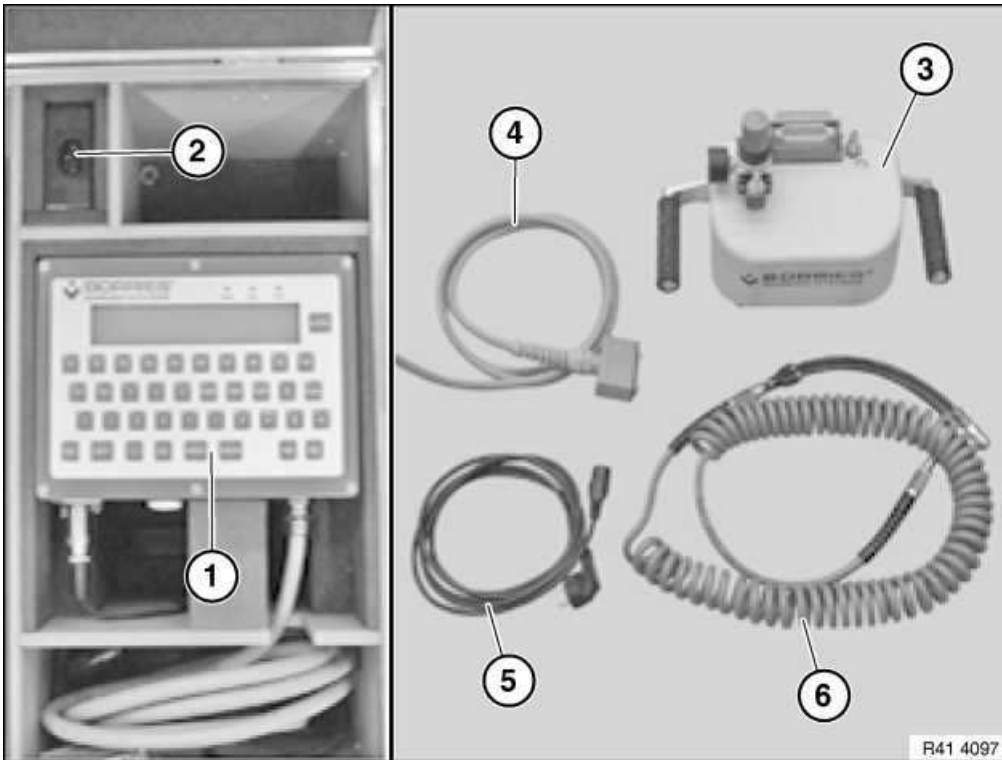
If an additional second vehicle identification number is embossed into the substitute area, the existing vehicle identification number must be crossed out. Only use the designated product range from the needle embossing machine. Tape off the invalid vehicle identification number with a foil.

Paint the area around the vehicle identification number according to the BMW painting handbook. Ensure that layer thicknesses are small.

After painting, a new foil must be bonded on the vehicle identification number, if a foil was installed for the series as standard.

1 – Emboss the VIN

Overview of needle embossing device



1 Display

2 Mains connection

3 Needle embossing device

4 Connecting cable

5 Mains lead

6 **Compressed air hose** A compressed air connection is required (approximately 6 bar, use only dry oil-free compressed air)

Sourcing reference: Request detailed information about the order process under specialtools@bmwgroup.com.

General information for punched vehicle identification numbers

In the case of a repair, the vehicle identification number is engraved with a special tool before painting the new part.

Refer to the special tool number and the vehicle-specific repair instructions for the correct procedure.

If an additional second vehicle identification number is punched into the substitute area, the existing vehicle identification number must be crossed out. To do so, punch the letter I from the punch numbers lengthways through the existing vehicle identification number. Tape off the invalid vehicle identification number with a foil.

Paint the area around the vehicle identification number according to the BMW painting handbook. Ensure that layer thicknesses are small.

After painting, bond a new foil on the vehicle identification number, if a foil was installed for the series as standard.

Bonding the foil for the vehicle identification number

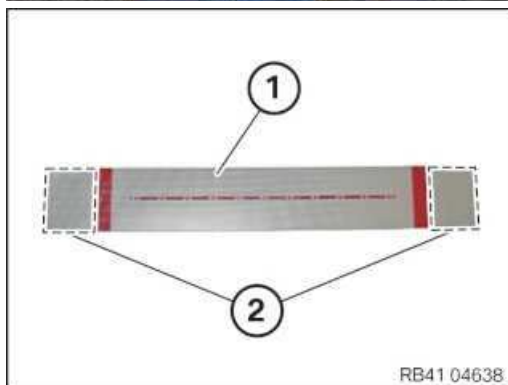
2 – Apply the foil (straight) for the VIN



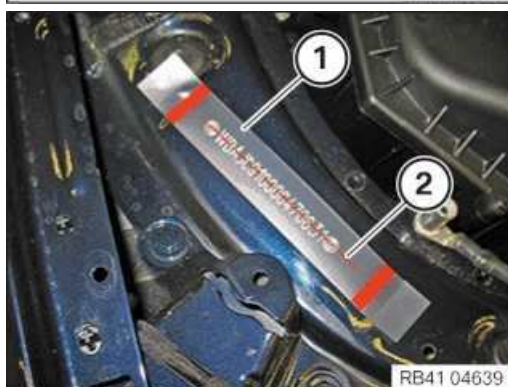
- Clean the surface in area (1) with cleaning agent R2 and allow to dry.

Expendable materials

Cleaning agent R2	500 ml	83190417324
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- Pull off the protective film beginning at an edge.
Touch the foil (1) only in the areas (2).



- Position the foil (1) with the line (2) in the centre above the VIN and press it on.



- Pull off the backing film (1) beginning on one side.
If applicable, rub air bubbles out toward the edge.

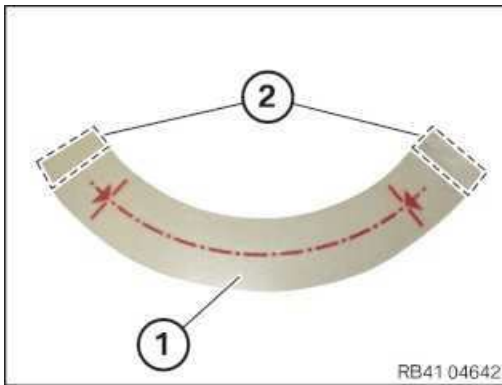
3 – Apply the foil (bent) for the VIN



- Clean the surface in area (1) with cleaning agent R2 and allow to dry.

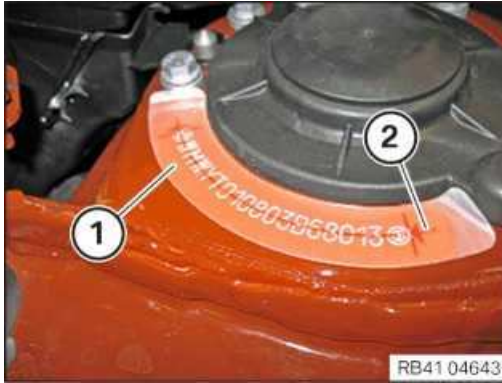
Expendable materials

Cleaning agent R2	500 ml	83190417324
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RB41 04642

- Pull off the protective film beginning at an edge.
Touch the foil (1) only in the areas (2).



RB41 04643

- Position the foil (1) with the line (2) in the centre above the VIN and press it on.



RB41 04644

- Pull off the backing film (1) beginning on one side.
If applicable, rub air bubbles out toward the edge.

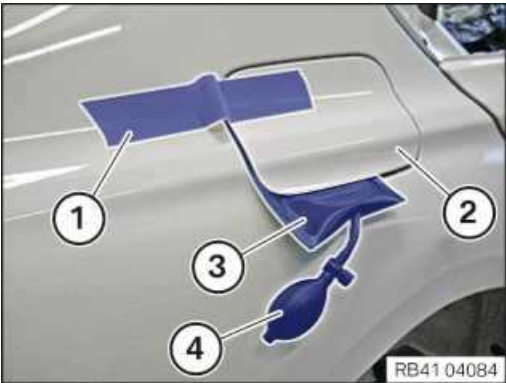
Fuel filler flap emergency release

If the servomotor is faulty, the fuel filler flap must be emergency-released if there is no cable.

1 “ Fuel filler flap emergency release



- Slide the special tool into the gap between the fuel filler flap (1) and the side panel.



- Bond the adhesive tape (1) to the side panel and the fuel filler cap (2) with a loop.

Expendable materials

Yellow plastic adhesive tape	83199410979
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- Inflate the air cushion (3) with the hand pump (4), until the fuel filler cap (2) pops open.
- Pull off the adhesive tape (1).
- Repair the vehicle.

Additional Information

Overview of Special Tools