Remedial measures in the event of water penetration, model 452

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Remedial measures in the event of water penetration, model 452

0. Preconditions

0.1 Definition of a leak:

Leaks are points at which water penetrates into the interior of the vehicle and is not fed out via one or more design features without leaving damage to the interior.

Example 1: slight drips running down the window which through the dainage openings which are directed out via the drainage holes in the interior door duct seal in the door's wet area do not accord with the definition of a leak, but rather with the state of the art.

Example 2: heavy drips of water which run over the door liner conform to the definition of a leak.

0.2 Rain test on the retailer's premises:

> **Before starting any sealing measure** a rain test is carried out **to verify the customer complaint.** The test is carried out either with a
- hosepipe (min. 1/2") with rain attachment or a
- watering can (max. 10 ltr.) with rain attachment.

> **After any repair is completed the rain test is repeated** to check the effectiveness of the sealing measure.

> One person sits inside the vehicle during the rain test to check for any water penetration.

> The 'rain' is applied to the vehicle from a height of approx. 25-30 cm.

> Rain is applied to each of the 4 corners of the soft top for min. 1 min.

> To test the bulkhead/floor area for watertightness the right and left A-pillar liners are removed while rain is applied to the whole of the windscreen for at least 2 min.

Defect figure 1. Water penetrating through door's inner liner/speaker and mirror mounting

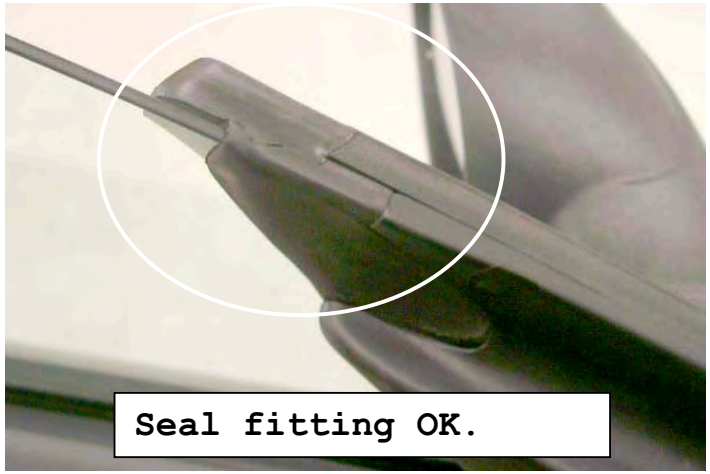
Note: Drips which reach the inside of the vehicle via the inner liner must be reduced in volume to ensure that they are able to exit via the duct seal.

Remedial measures in the event of water penetration, model 452

Measure 1.1.

Check the mirror mounting seal fitting and optimise if necessary:

•Slacken the inside of the mirror mounting and reposition the seal.



Measure 1.2.

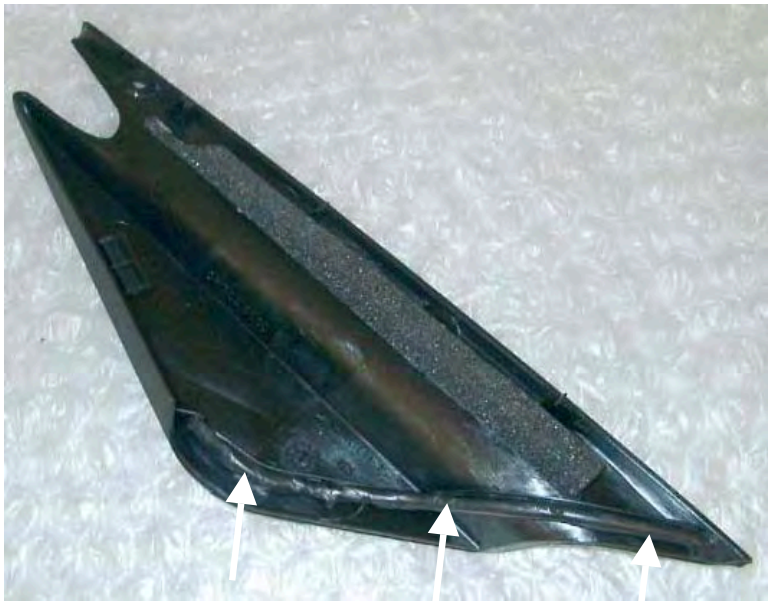
Optimise mirror mounting fitting:

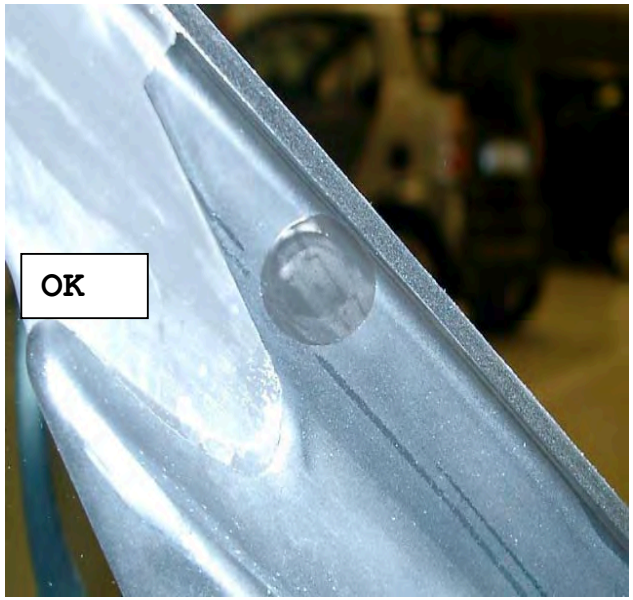
•Slacken the mirror mounting screw fastener and tilt the mirror back slightly so that the door does not compress the roof peak seal when closed. This ensures optimum tightness at the transition from the mirror to the roof peak seal.

Measure 1.3.

Check inside of mirror mounting cover:

- The butyl seal seam must be replaced when dismantling the inner mirror liner.
- Seal the screws (2x) additionally with thread of butyl and an adhesive (spare part no. 001777V001000000).

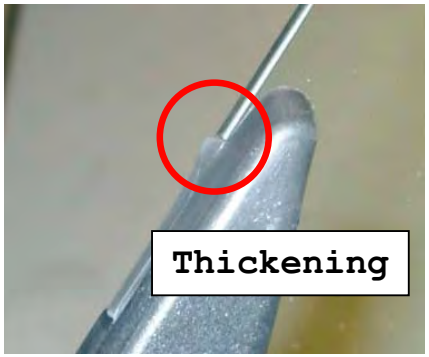




Measure 1.4.

Adjust mirror mounting seal:

IMPORTANT: if the mirror mounting seal is raised by the repositioning of the side mirror it is necessary to address this problem. (See figures)

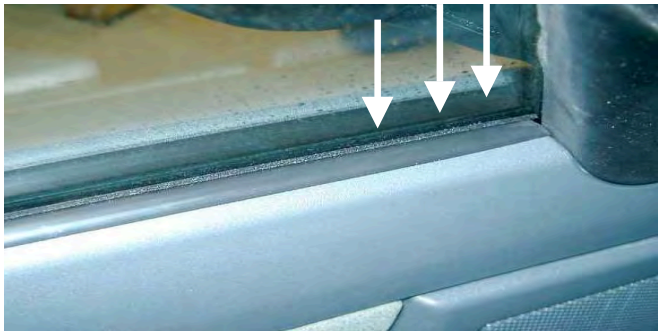


Measure 1.5.

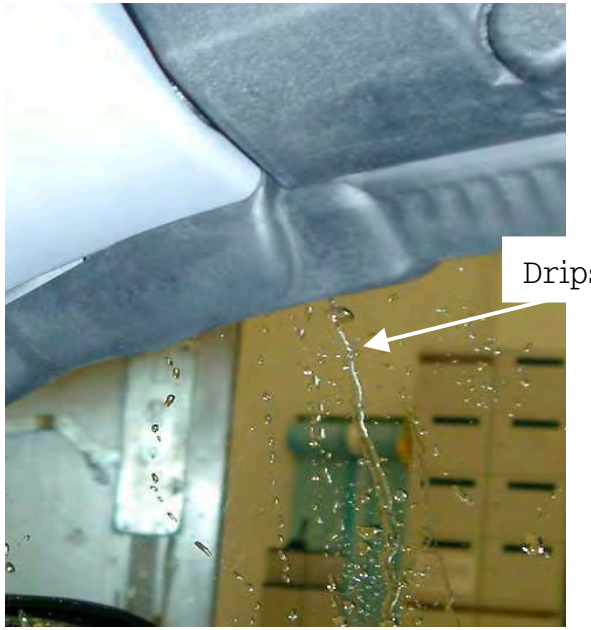
Check the drainage holes in the duct seal:

the water can no longer run through the inner duct seal of the side window.

- Check the drainage holes in the front and rear duct seals.
- The lip must not close the duct seal channel.



<u>Defect figure 2.</u> Water penetrates through centre of door liner - drips coming down the window from the joint between the roof peak/side spar



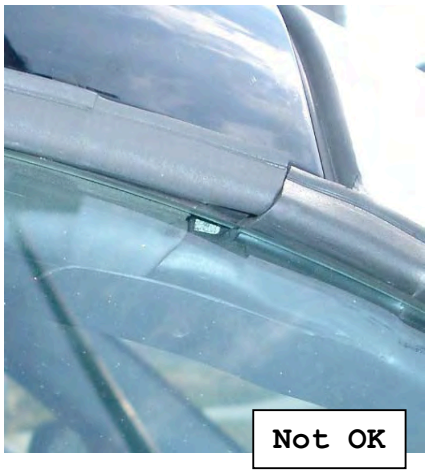
<u>Note:</u> Drips running down the window and into the vehicle interior via the inner liner must be reduced in volume to ensure that they are able to drain out through the duct seal.

Remedial measures in the event of water penetration, model 452

Measure 2.1. Optimise the fitting of the seal:

- Slacken the roof peak seal, push the weatherstrips together by hand and fit according to the figures.

- Once the roof peak seal is removed from the body, check the sealer application in the seal and fill up if necessary. If there is sufficient sealer, it will adhere to the body flange. (See page 36)

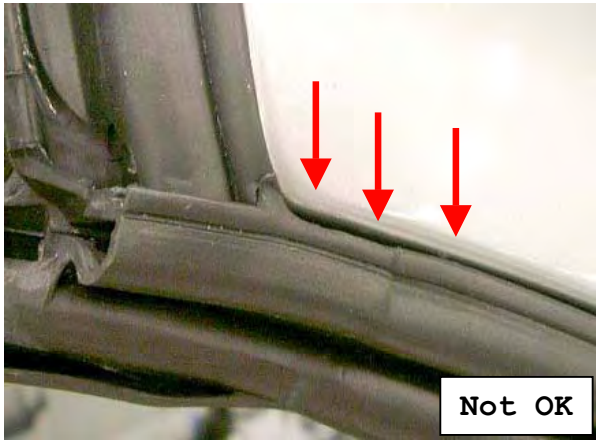


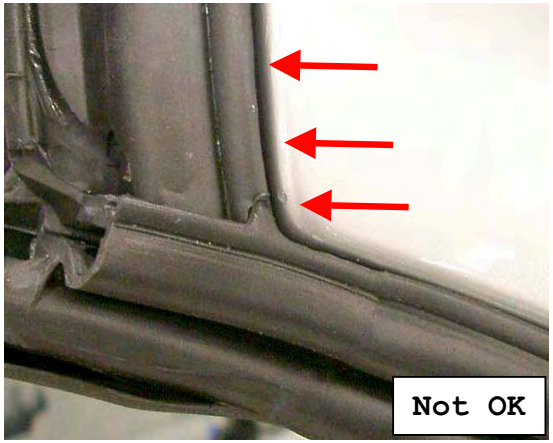
Seals in contact with one another and compressing

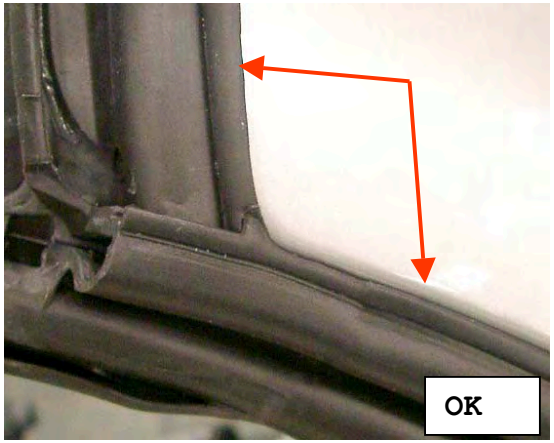
The seals sit flush side by side,
Width of join approx. 1 – 1.5mm

Measure 2.1.

- Slacken the roof peak seal, push the weatherstrips together by hand and fit according to the figures.





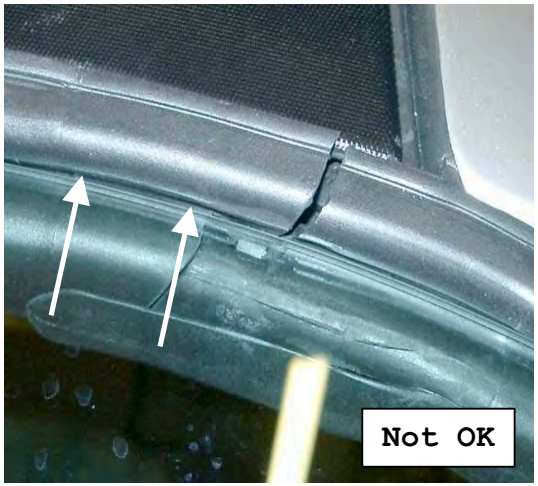


Roof peak seal is not in contact with the body shell

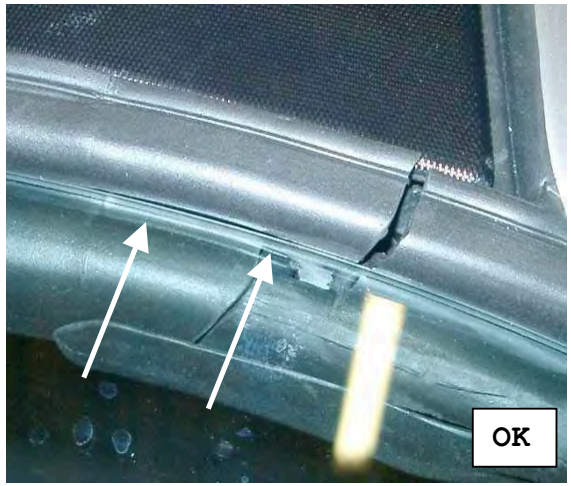
Note:
There must be no gaps between the seal and the the body shell at the radius.
Figure OK

Measure 2.2. Optimise side window position:

•Optimise side window position in Z and X axes until contact is ensured as shown in figure. Pull the lowering window max. 1.5 mm in the "Z" axis out of the retaining clip. If the adjustment is not sufficient, adjust the door on the hinge in the "Z" axis. The striker should also be adjusted to the door position.



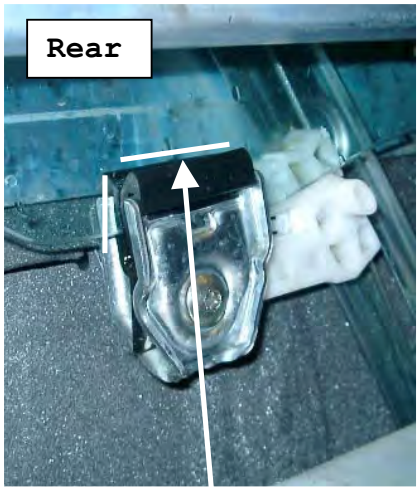
Window is not in contact "in Z" axis



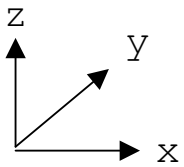
Window in contact in "Z" axis

Figures Window adjustment screws

Readjust window stop



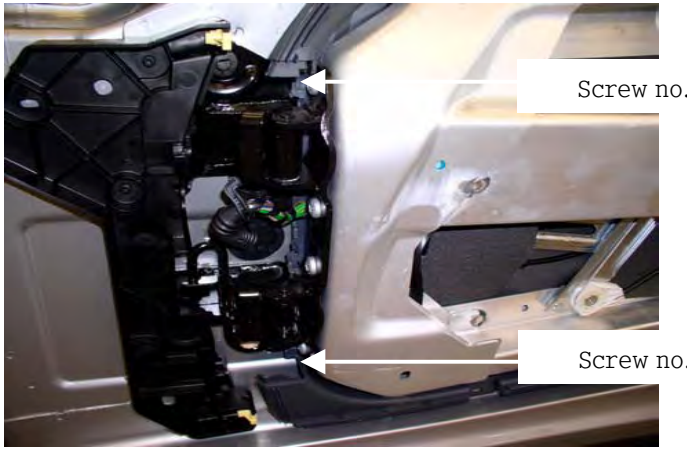
Mark position



Standard: The side window must not compress the seals when the door is closed.

Measure 2.2. Inward adjustment of side door:

•Optimise side window position in the "Y" axis until the side window is in contact with the side spar.



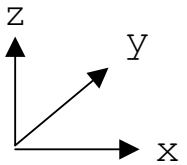
Note:

The following measures must be carried out to adjust the position of the side door:

•Remove headlamp cover
•Slacken fastening screws on the CBS
•Remove aerial
•Remove door panel
•Mark position of side door (x,y,z)
•Slacken door screws nos. 1,2 and 4, then carefully slacken screw no. 3.
•Rotate side door inwards by approx. 1-1.5mm in the y axis using screw no. 3.
•Tighten screws once more to tightening torque M =34Nm+/- 4.

Standard:

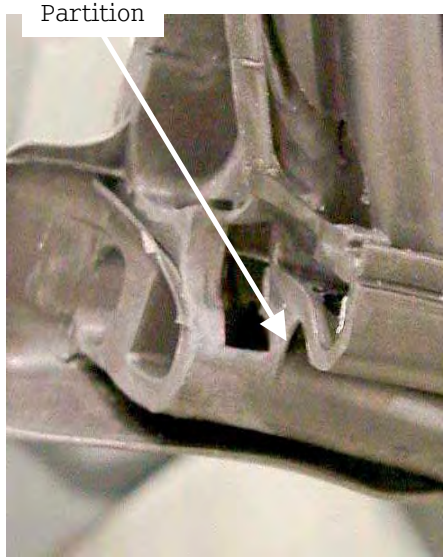
The side window must not compress the seals when the door is closed.



Measure 2.3. Enlarge the roof peak seal drainage hole:

- Enlargement of the drainage hole

Before



After

Enlarge the hole in the seal by approx. 5mm using a scalpel.
Attention : do not damage the partition.

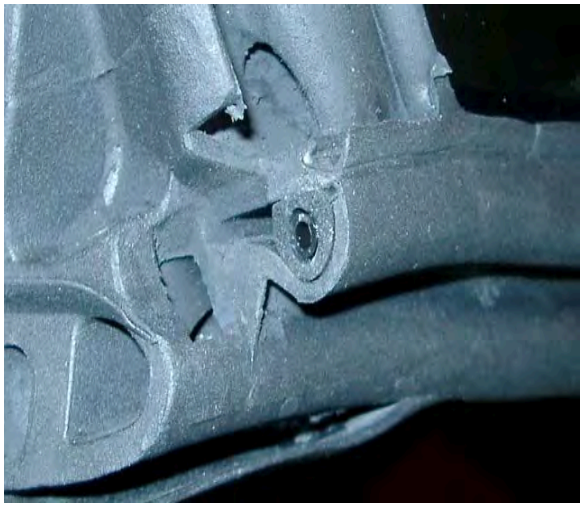
<u>Measure 2.4.</u> Rework roof peak seal:

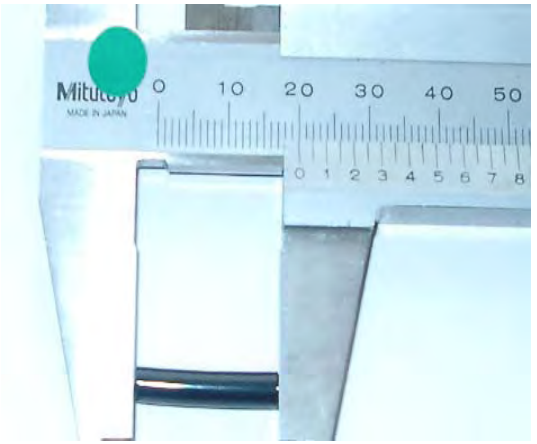
Abrade the roof peak seal on the sealing surfaces with emery paper (80K).
(Length, see figure below)

Attention: do not damage the partition!

Measure 2.4. Rework roof peak seal:

- The cellular rubber hose is already fitted during series production and a Festo air line is inserted for stabilisation.





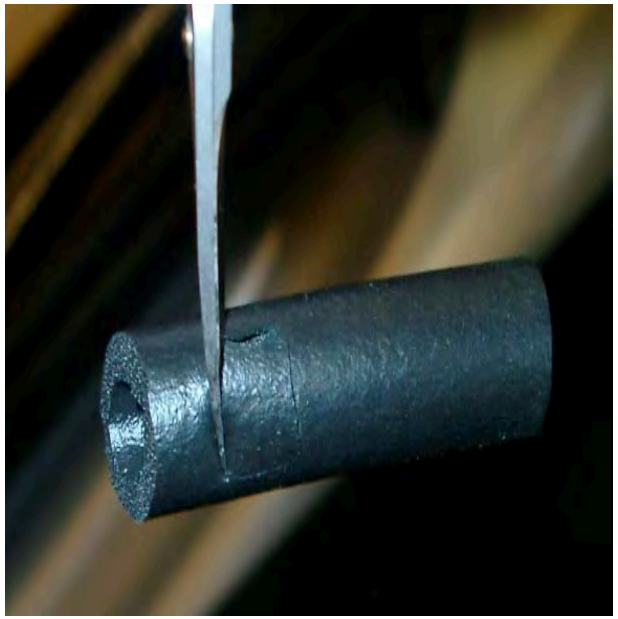
- Pull Festo hose into roof peak seal hose insert and fix with Cyberbond 2241
- Festo hose length approx. 20mm.

<u>Measure 2.5.</u> Reinforcement of left and right roof peak seal:

- A cellular rubber hose (l=40mm) is inserted to reinforce the roof peak seal
- The water drainage channel must be made in the cellular rubber. (See figures)

Insert hose (l=40mm)...

...mark the exact position of the drainage hole...



...and cut out.

Measure 2.5. **Reinforcement of left and right roof peak seal:**

- To ensure that the cellular rubber stays in place, spot-glue it in place with Cyberbond 2241.

Reposition hose again

...and spot-glue in place.

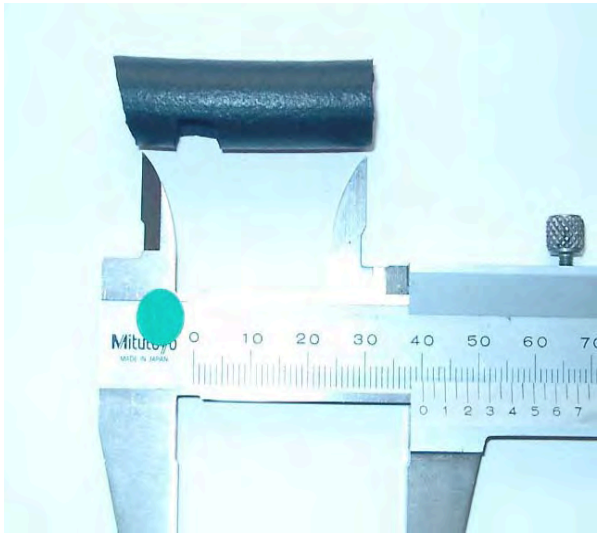
TIP: Inserting cellular rubber hoses is easier with silicon spray

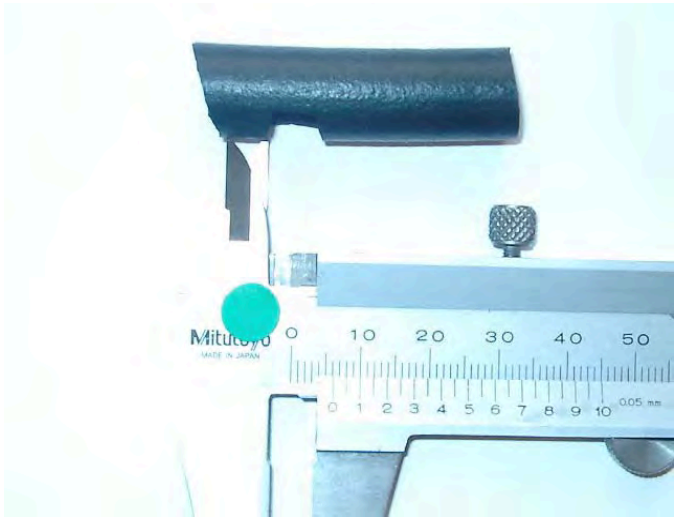
Remedial measures in the event of water penetration, model 452

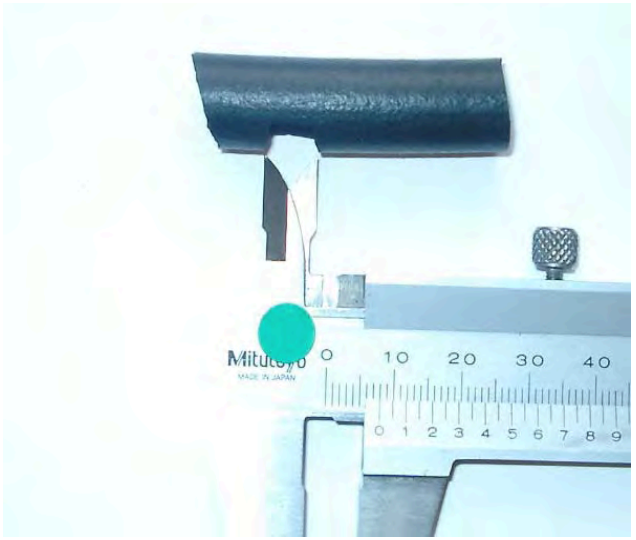
Measure 2.5. **Reinforcement of left and right roof peak seal:**

Measurements of cellular rubber hose

- Length = approx.40 mm
- Diameter = 13 mm x 3 mm wall thickness
- Notch from edge = approx.6 mm
- Notch width = approx.8 mm







Measure 2.6. **Reinforcement of side spar seal:**

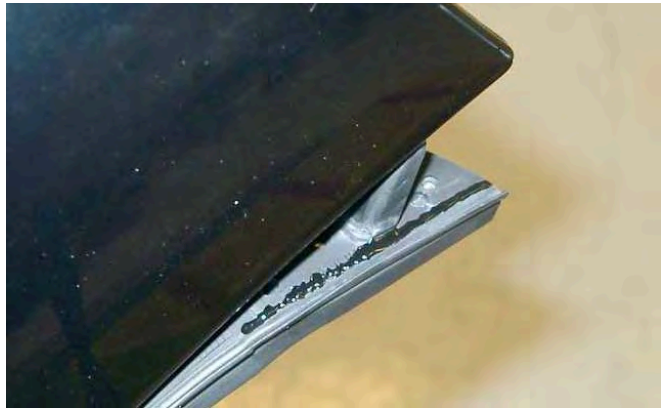
- Insert Festo air line (l= 20mm) into hose insert.
- Fix with Cyberbond 2241

Before

After

Measure 2.7. Fix the side spar seal:

- The roof spar seal is glued firmly to the end of the roof spar for a length of 50mm.



Apply pressure to the seal for approx. 2 min

Thin and careful application of glue is required

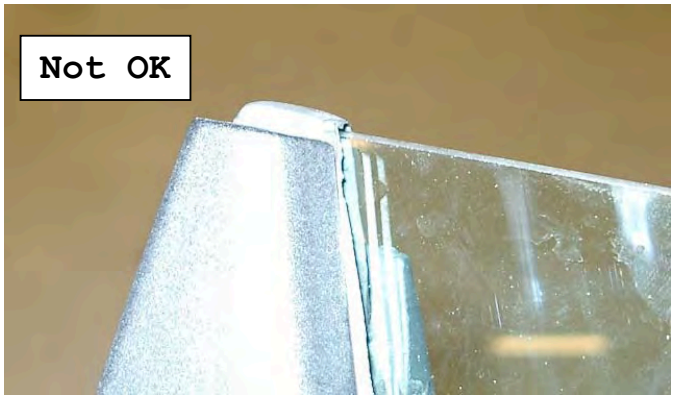
Defect figure 3. Water penetration via rear inner door liner / drips on window at rear

Note: Drips running down the window and into the vehicle interior via the inner liner must be reduced in volume to ensure that they are able to drain out through the duct seal.

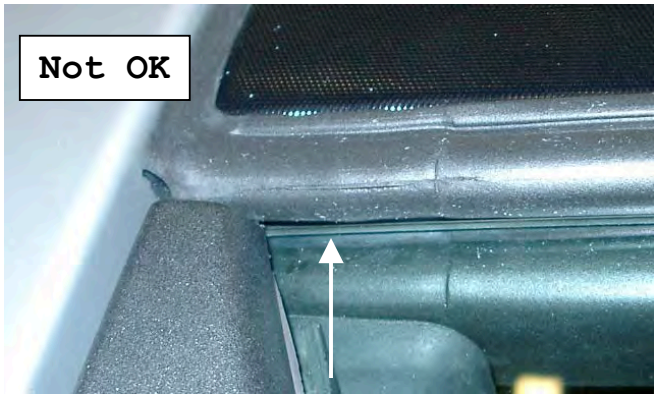
Measure 3.1. Check the **position of the side window and adjust if necessary:**

Pull the lowering window max. 1.5 mm out of the retaining clip in the "Z" axis. If the gap is too large the entire door must be raised in the "Z" axis. Use the door-side hinge screws to raise the door in the "Z" axis.

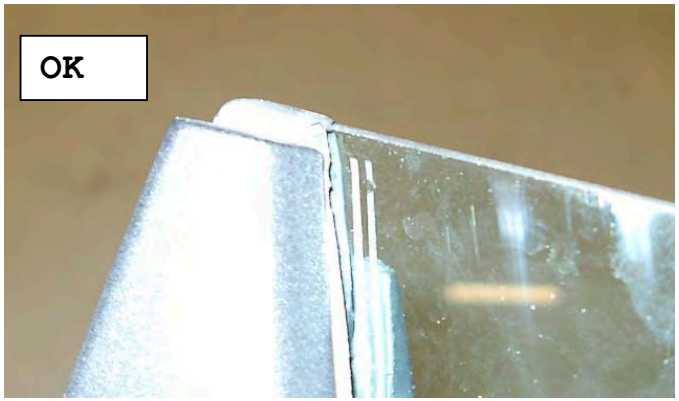
Before

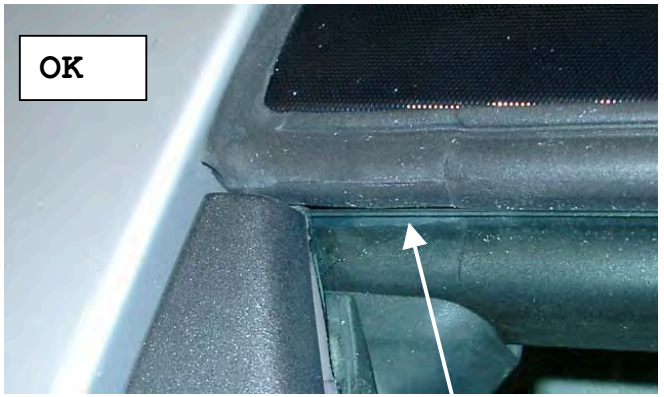


Before



Gap from window to seal too large





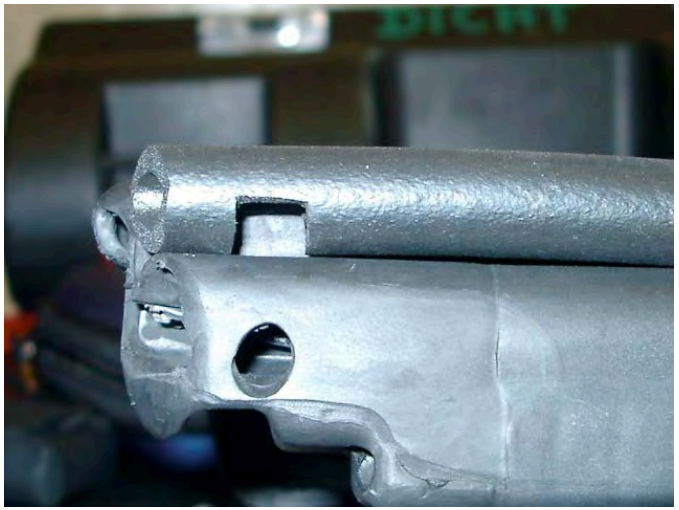
Gap minimised by window adjustment:
< 1mm

After

After

Measure 3.2. Reinforcement of side spar seal, rear:

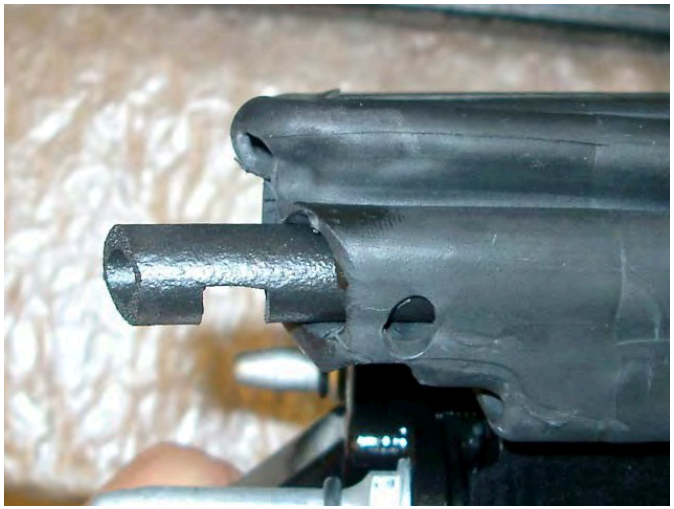
- A cellular rubber hose (L=70mm, 13x3mm) is inserted into the rear side spar to stabilise the sealing profile.
- Make a drainage channel. (See figures)
- Position the cellular rubber hose by spot-gluing with Cyberbond 2241.



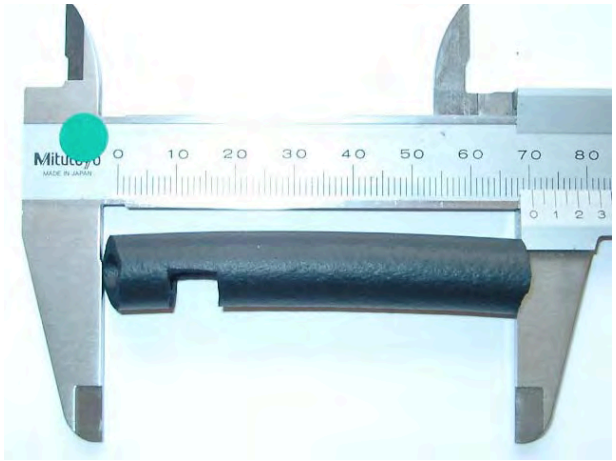
Take care: the chnnel and the drainage hole in the side spar must line up.

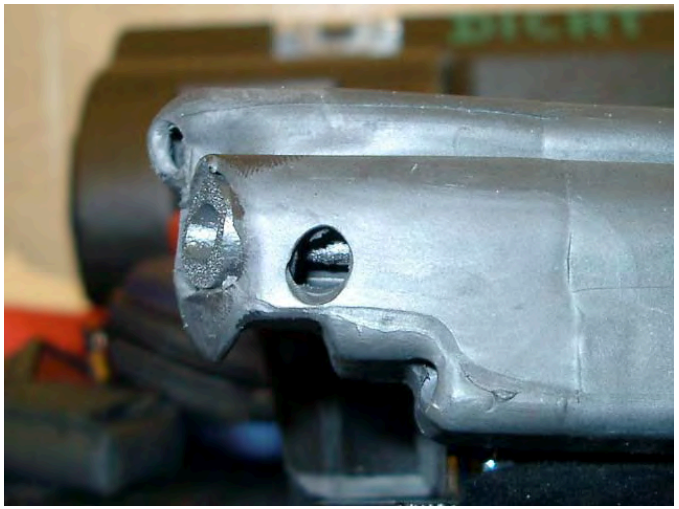
TIP: Inserting cellular rubber hoses is easier with silicon spray

Remedial measures in the event of water penetration, model 452

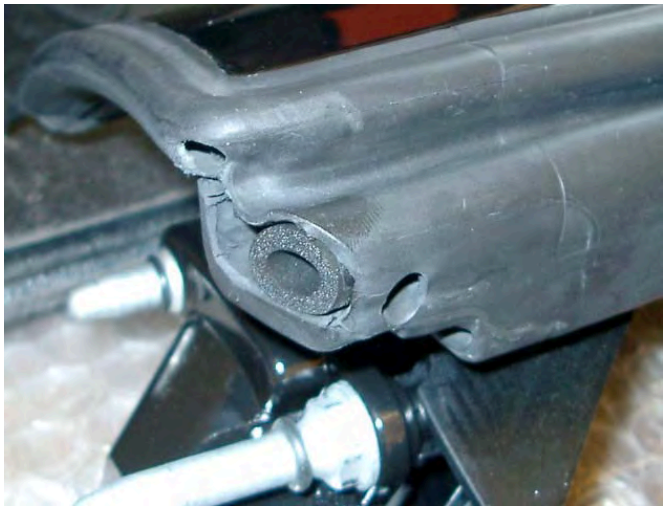


Length = 70 mm





Drainage channel web width = 7 mm



Channel notch = 8 mm

<u>Measure 3.3.</u> Check the drainage holes in the duct seal:

The water cannot drain through the inner duct seal of the side window:

Check the drainage holes in the front and rear duct seals. Reposition the seal if necessary.

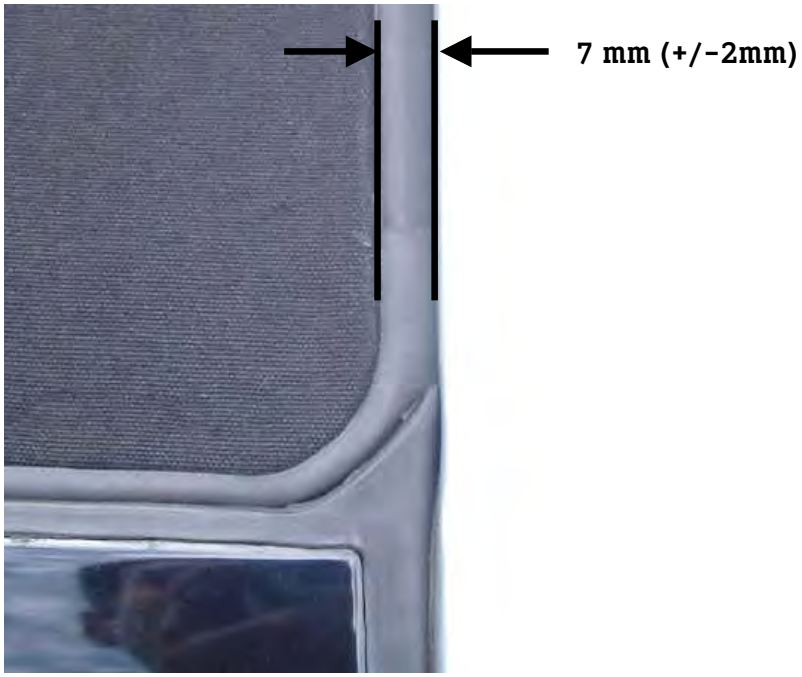
- The lip must not close the duct seal channel.

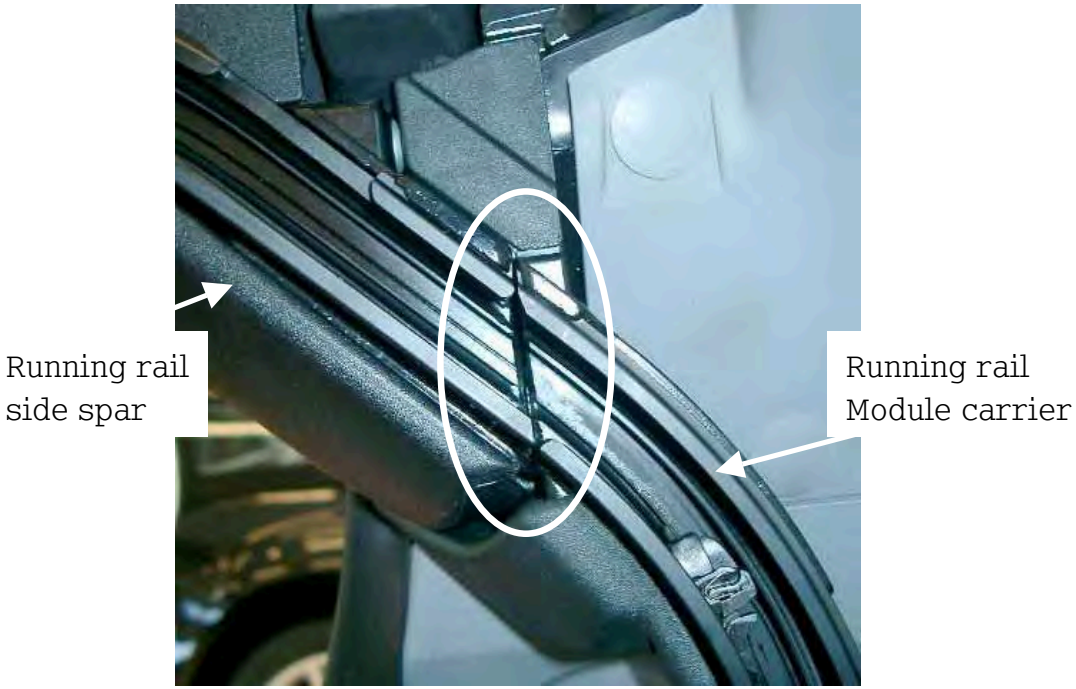
Defect figure 4. Water penetration at B-pillar

Preliminary measure: check roof position and adjust if necessary.

The joint between the canopy/hard top shell to the roll bar must be 7 mm in the X-axis (tolerance +/- 2mm). If this value lies outsuide the tolerance or if left and right differ significantly, the soft top must be adjusted at the supports (B-pillar).

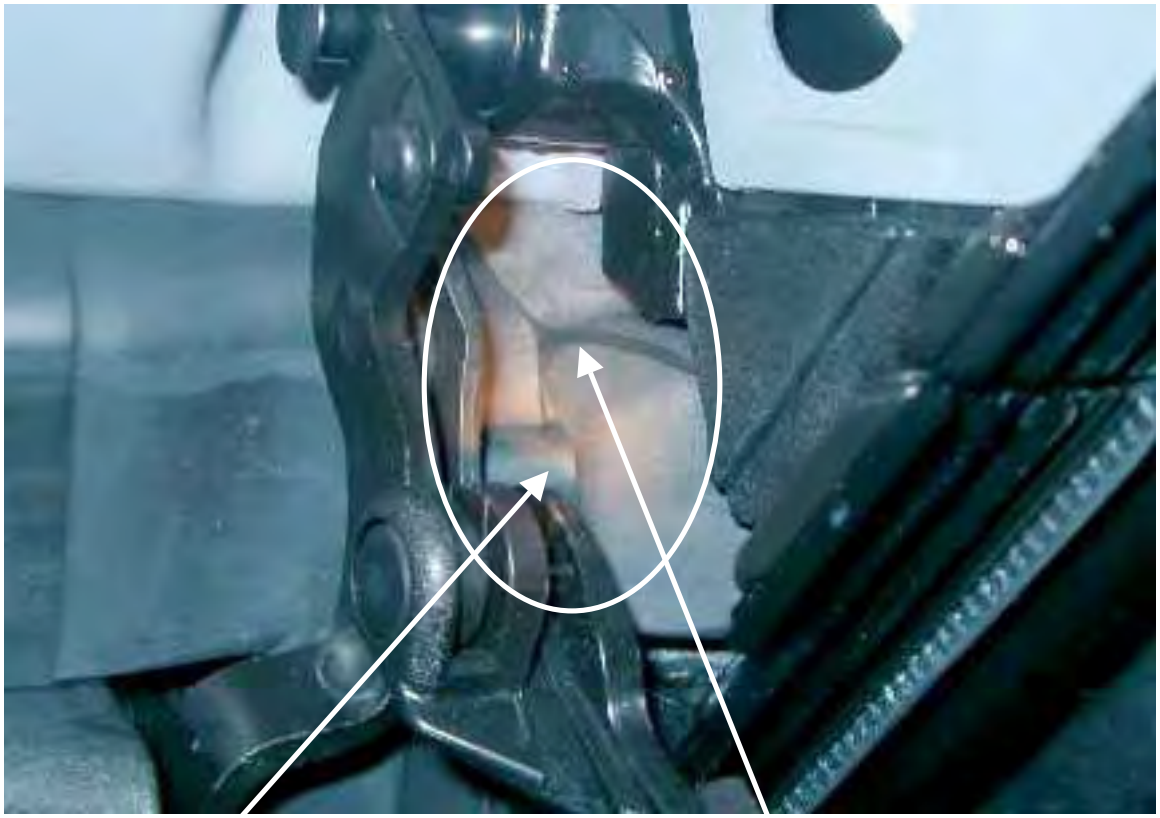
Attention: note the gap/transition between the soft-top and the running rails (parallel, not distorted)!



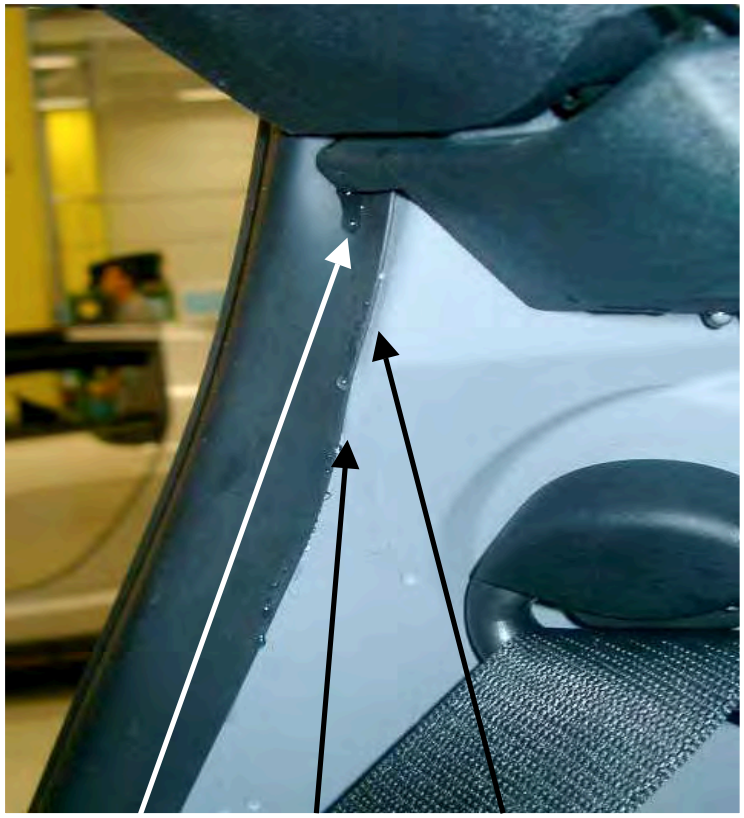


Defect figure 4. Water penetration at B-pillar

4.1. Water penetration via trough/ canopy seal blow pipe



Canopy seal blow pipe, wasser exiting from canopy trough



Water via inner liner

Defect figure 4. Water penetration at B-pillar

4.1. Water penetration via trough/ canopy seal blow pipe

Measure 4.1.1. Positioning the blow pipe in the door seal trough:

- The blow pipe must be positioned above the trough of the door seal.

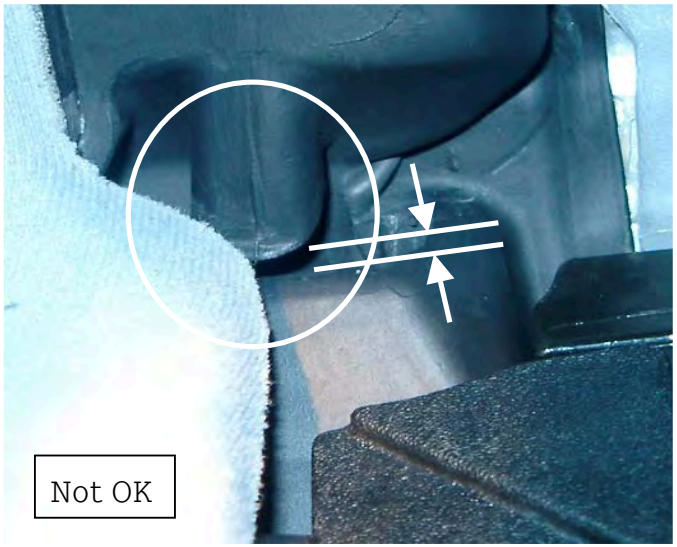
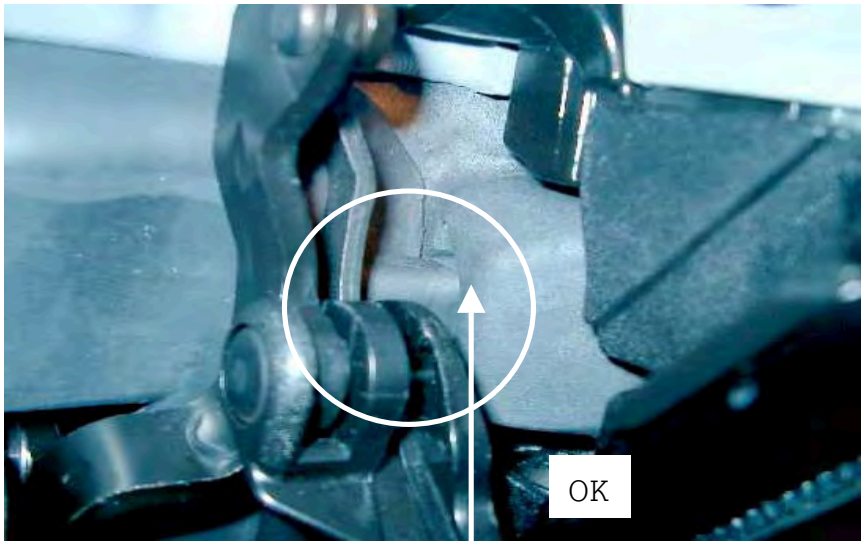


Photo from beneath
(Example -hard top seal)



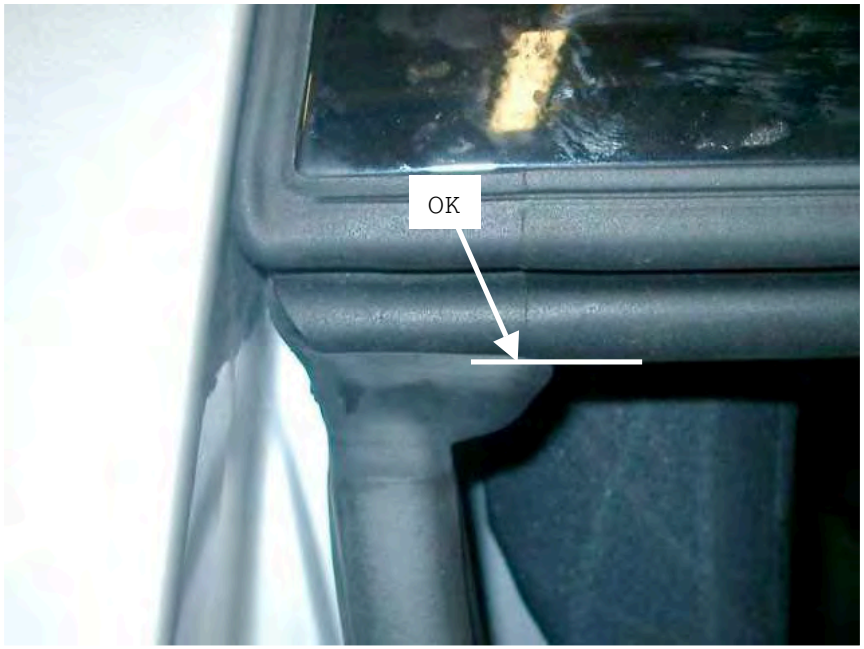
Blow pipe in door seal trough

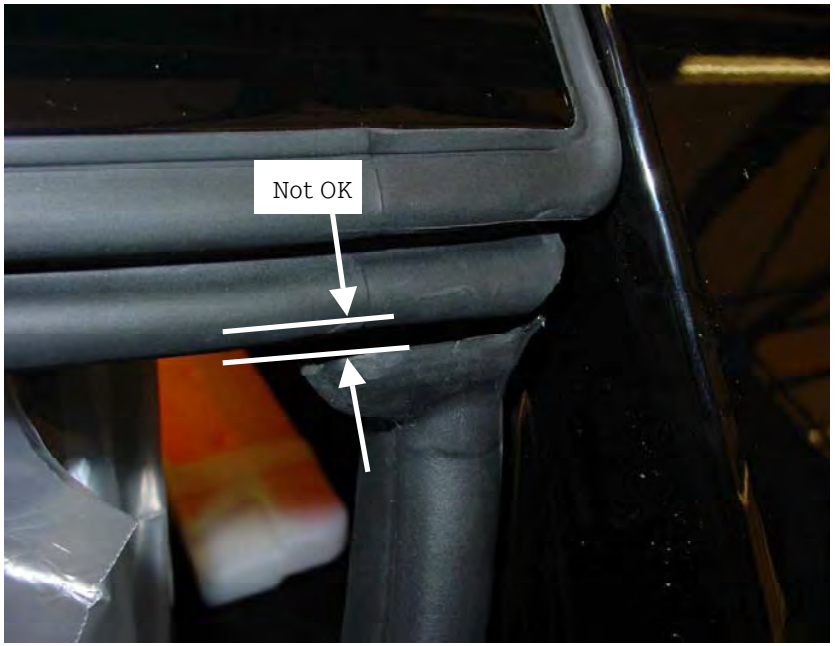
<u>Defect figure 4.</u> Water penetration at B-pillar

4.1. Water penetration via trough/ canopy seal blow pipe

<u>Measure 4.1.2.</u> Position the door seal/trough:

- The door seal trough must be in contact with the side spar.

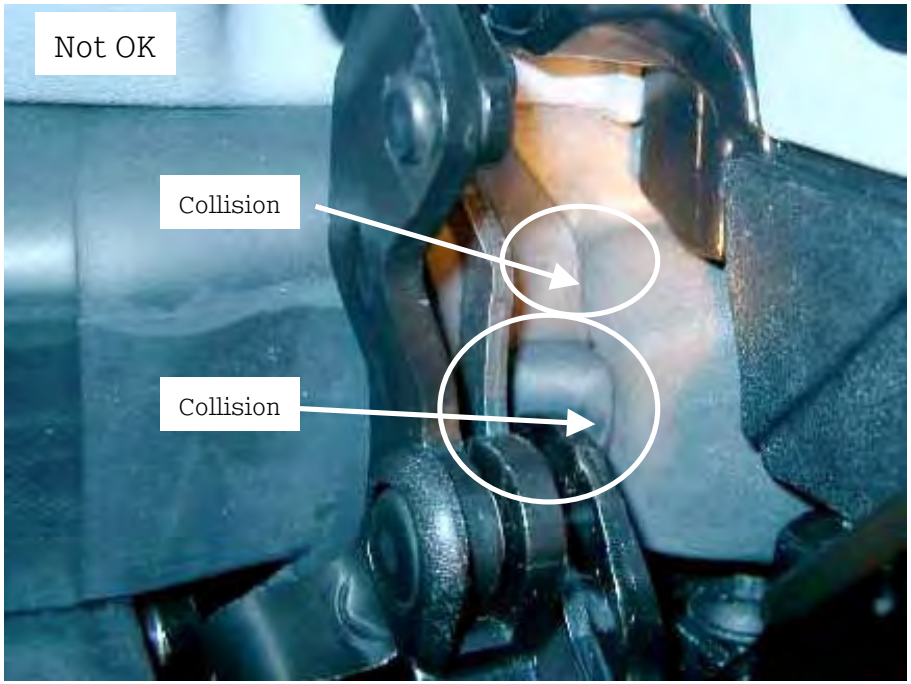


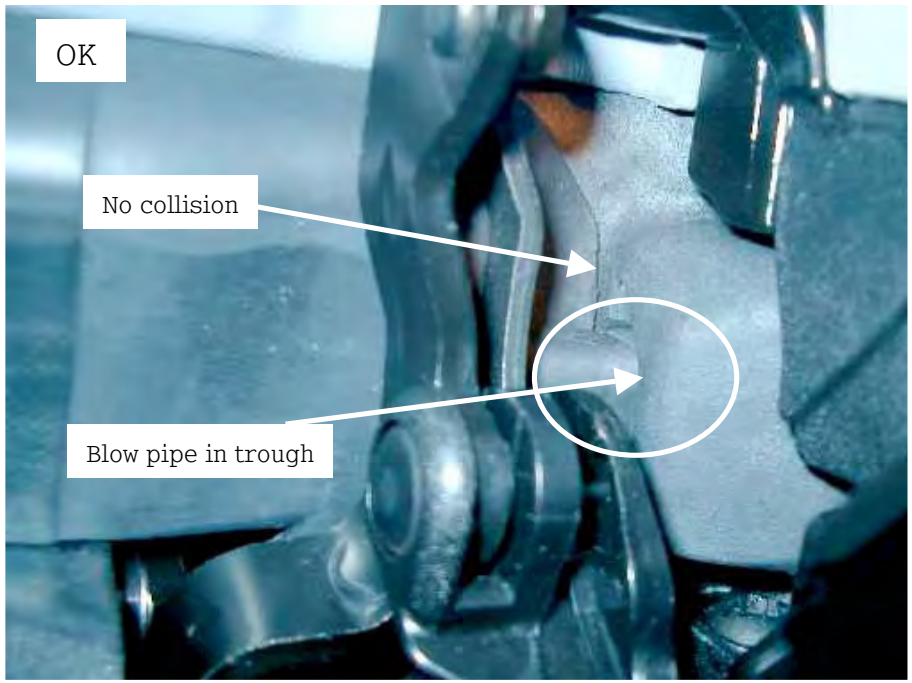


Defect figure 4. Water penetration at B-pillar

Measure 4.1.3. Rework the canopy seal:

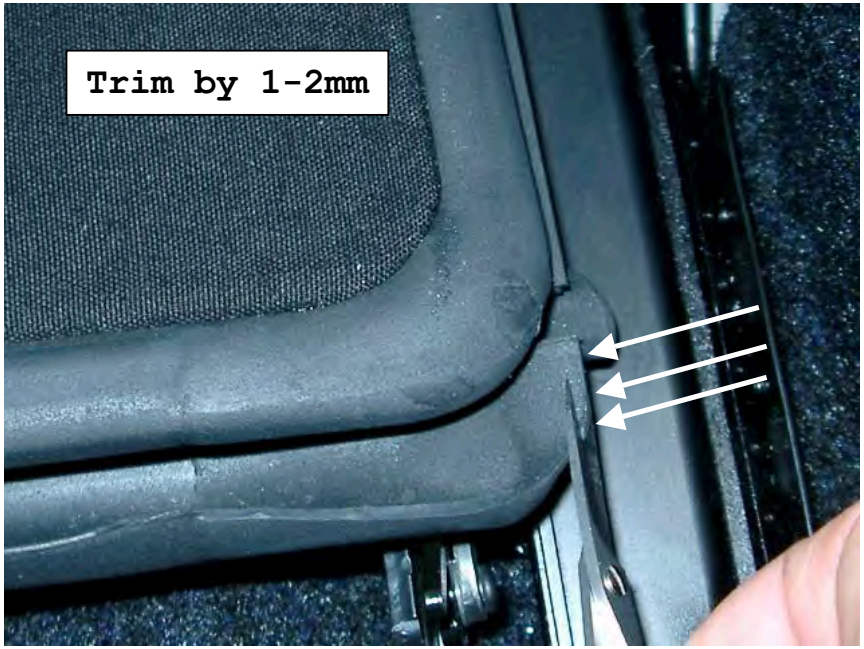
•If the blow pipe (canopy) collides with the door seal trough when the top is down,
the position of the door seal must be changed. (See figure)
•If the canopy seal collides with the door seal at the side, the canopy seal must be trimmed. (Overleaf).





Defect figure 4. Water penetration, B-pillar

Measure 4.1.3. Rework canopy seal



Trim canopy seal trough
(only if collision with door seal and contact not OK)

Emery door seal in this area.
(emery paper grade 80)

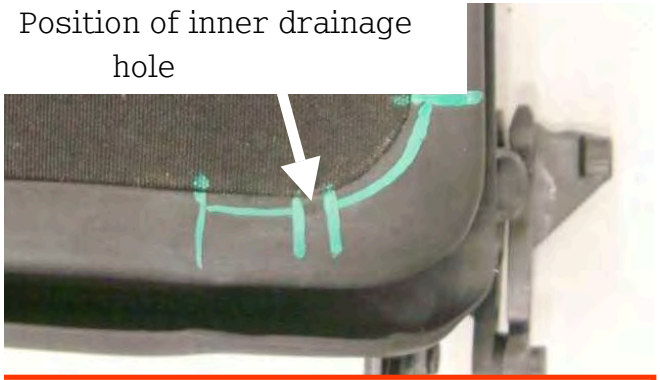
Remedial measures in the event of water penetration, model 452

Defect figure 4. Water penetration, B-pillar

Measure 4.1.3. Rework canopy seal

- The canopy seal is fastened to the soft top with Cyberbond 2241 and sealed.
- Apply glue to the radius (until the radius run-off) and approx. 10mm before the inner drainage hole.

Position of inner drainage hole



Area of glue application (mark)

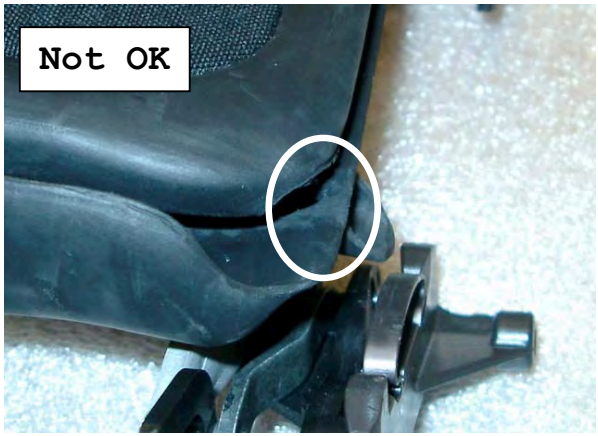
Apply glue with care.

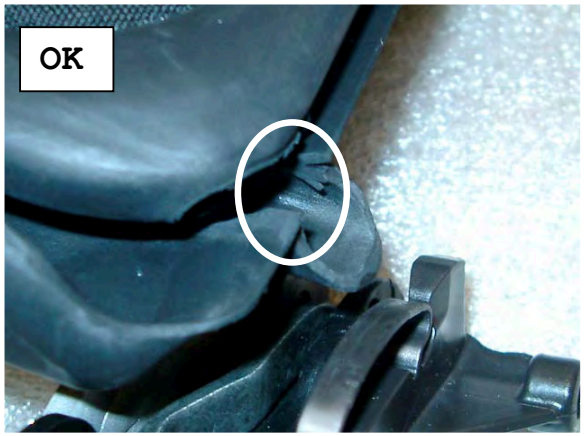
Apply pressure to the seal for approx. 20 sec

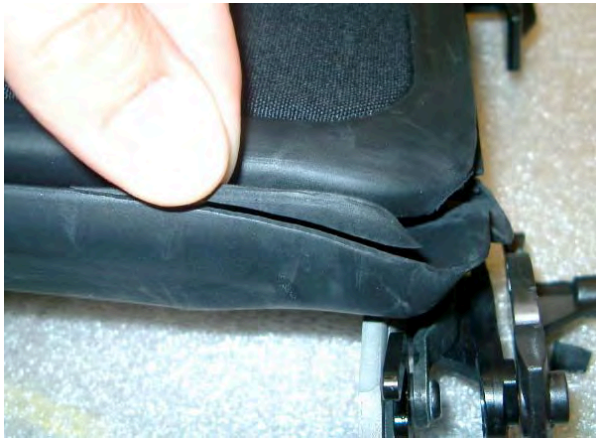
Remove any glue which seeps out

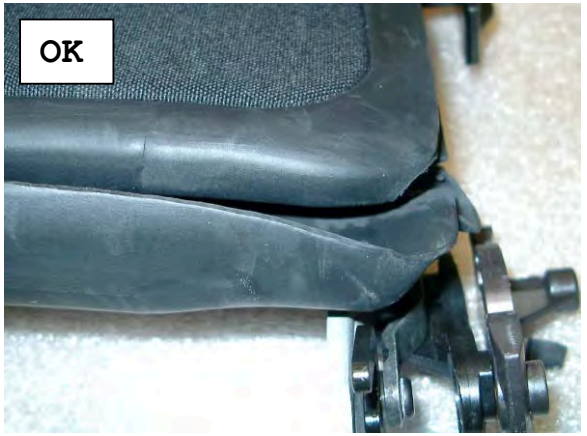
Measure 4.1.3.

Rework canopy seal (if not yet carried out)



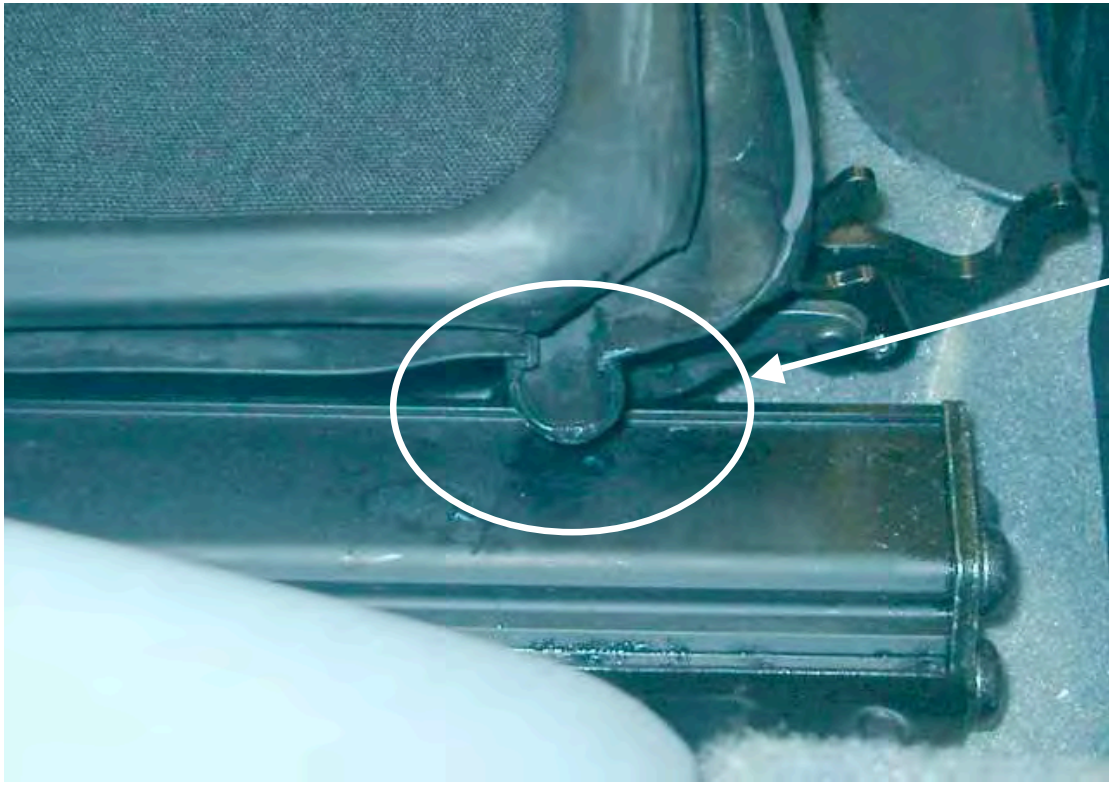






Defect figure 4. Water penetration, B-pillar

Measure 4.1.3. Rework canopy seal



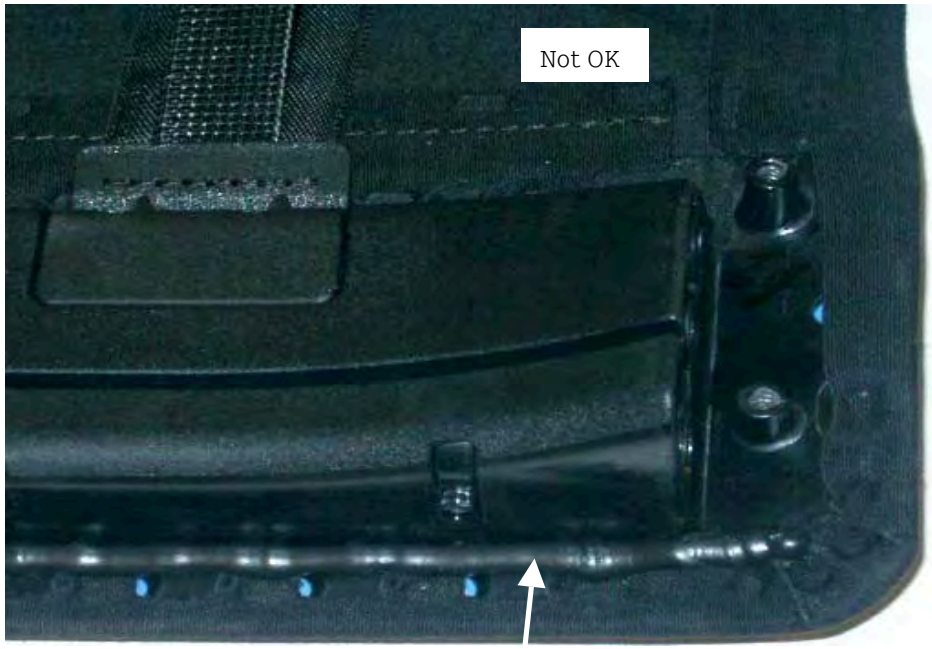
To prevent drips forming below the blow pipe, treat inside and underside of the blow pipes with grease, item no. 0017777V001000000.

Note:
Water drops or moisture on the inside of the roof module carrier do not indicate a roof leak. When the soft top is opened after rain, water collected there can drip over the edge of the **canopy seal.**

Defect figure 4. Water penetration, B-pillar

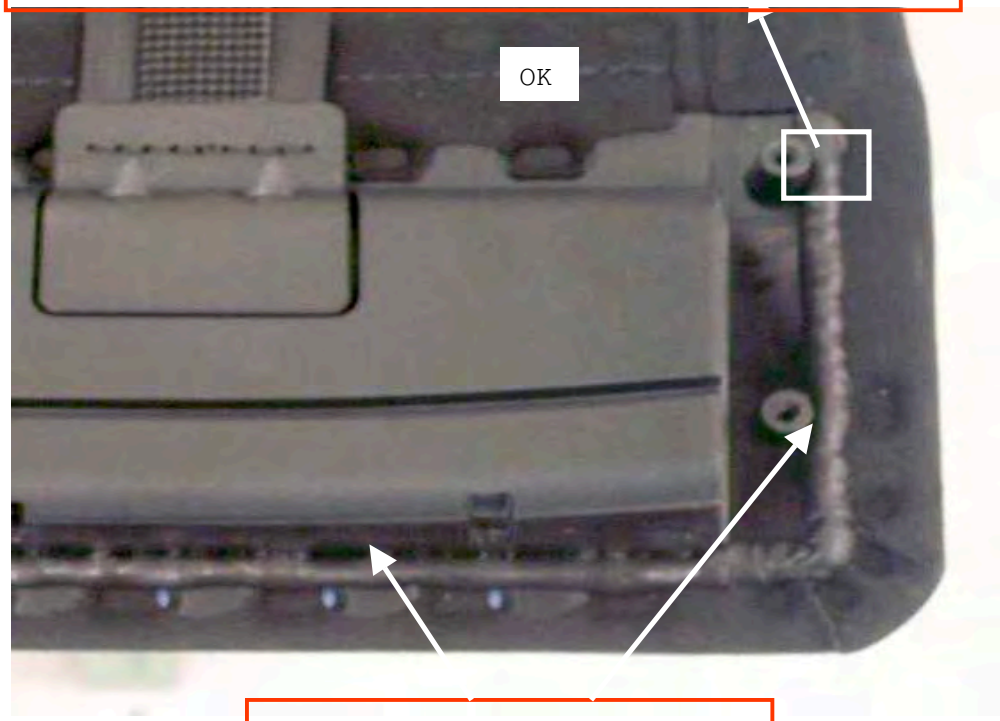
Measure 4.1.3. Rework canopy seal

•Remove canopy seal and replace sealant application (flexible window sealant) according to the figure.



Sealant application, old

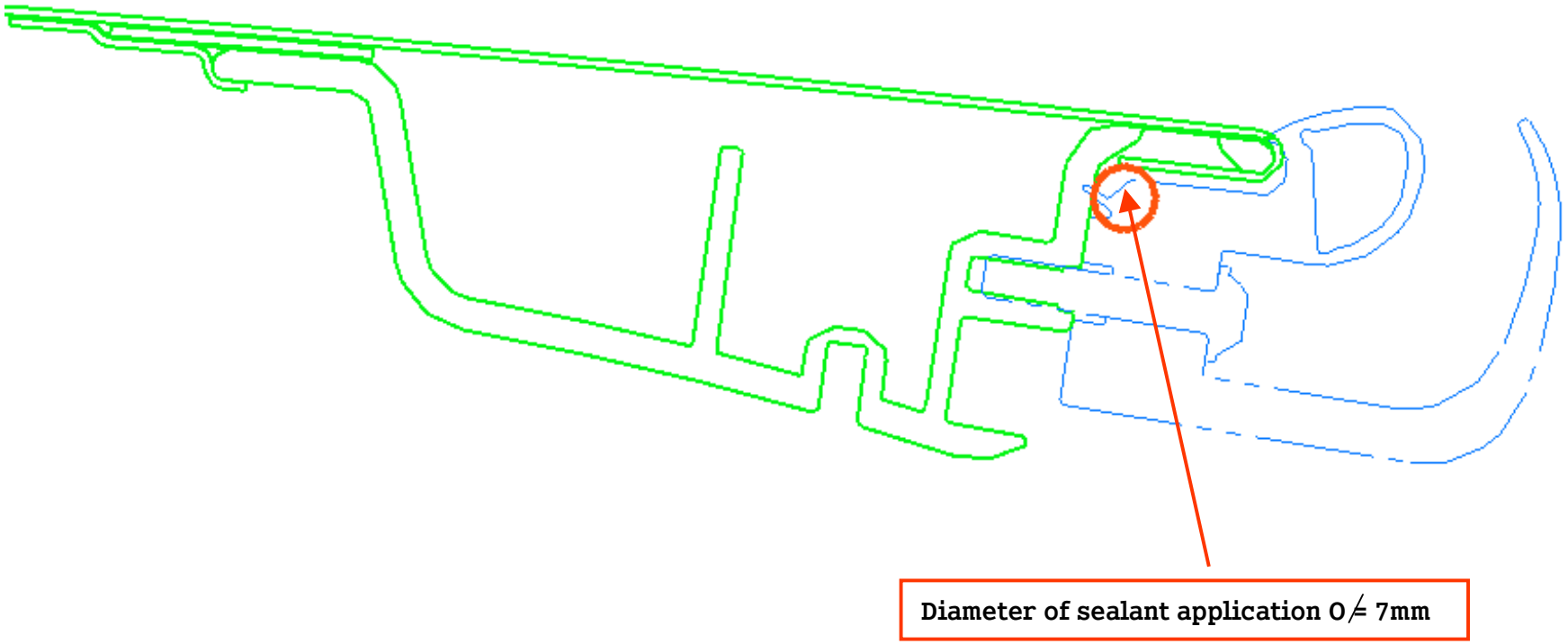
Permitted area below the moulding for sealant exit



Sealant application, current

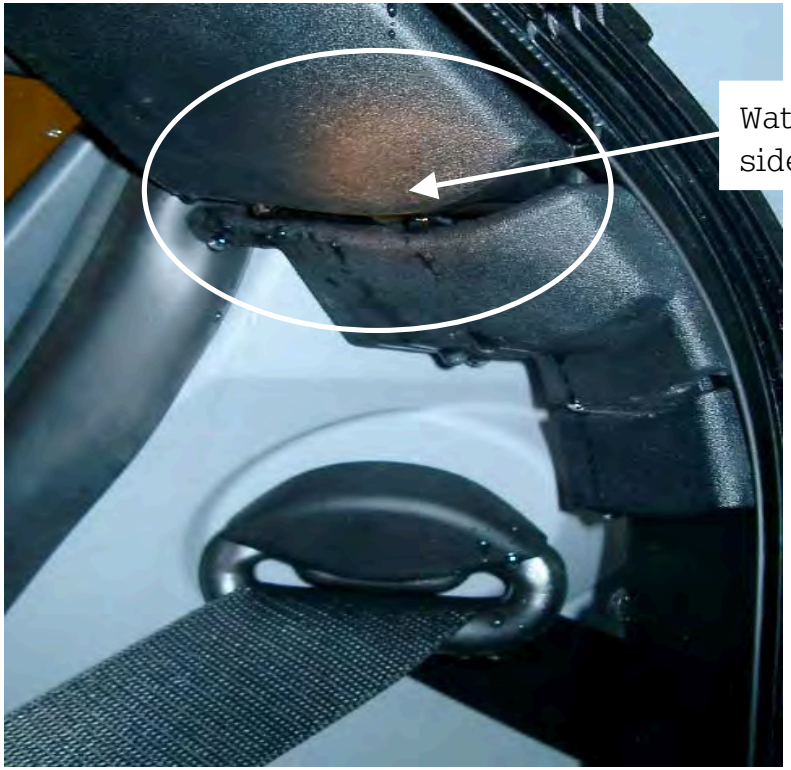
Defect figure 4. Water penetration, B-pillar

Measure 4.1.3. Rework sealant application on canopy seal:



Defect figure 4. Water penetration, B-pillar

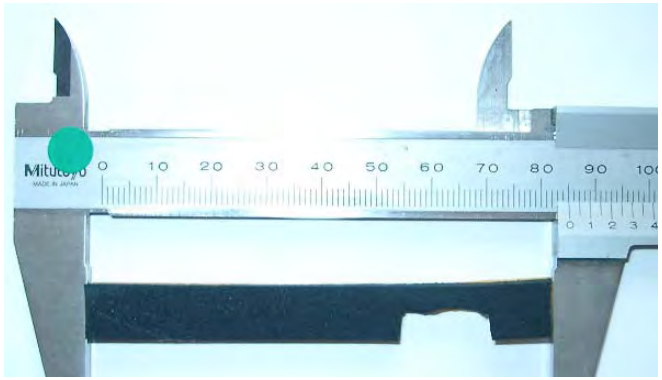
4.2. Water penetration via rear side spar / head pad

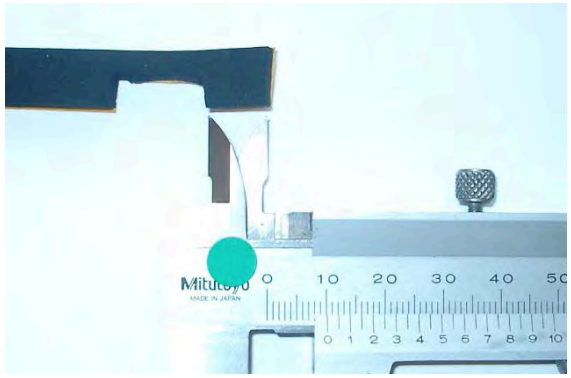


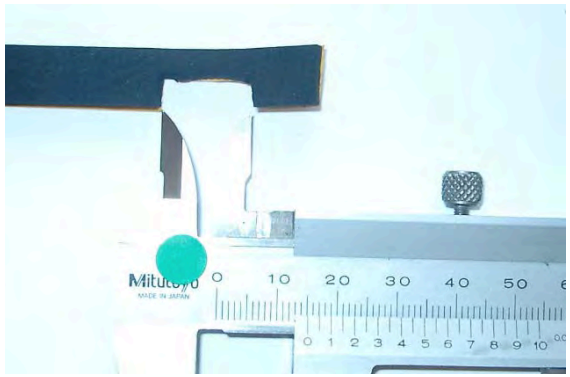
Measure 4.2.1 Fitting a partition

Glue a partition into rear side spar (self-adhesive foam tape in pack 0017777V001000000)

Length	= 85mm
Height	= 9mm
Depth	= 4mm
Length of groove	= 15mm
Distance of groove	= 10mm







Notch for screw arbor in rear side spar

Defect figure 5. Water penetration in the floor area

5.1. Leak in the roof peak seal

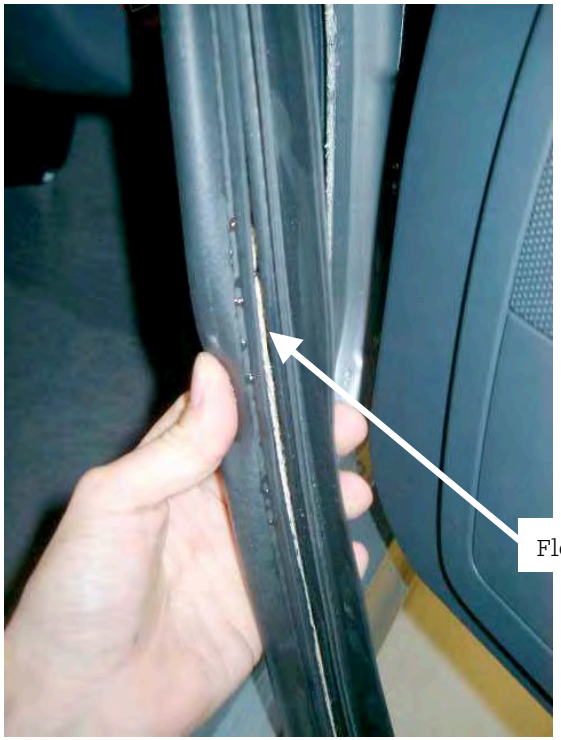
Water running over the sill into the floor area because the water changes sides in the seal's weather strip.

Defect figure 5. Water in the floor area

5.1. Leak in roof peak seal

Measure 5.1.1. Water penetration into lower sill area

•Unfasten A-pillar seal up to the sill and reseal the weather-strip groove (flexible window sealant) (Push weather-strip together again before fitting). **Sealant bead approx. 3mm diameter**

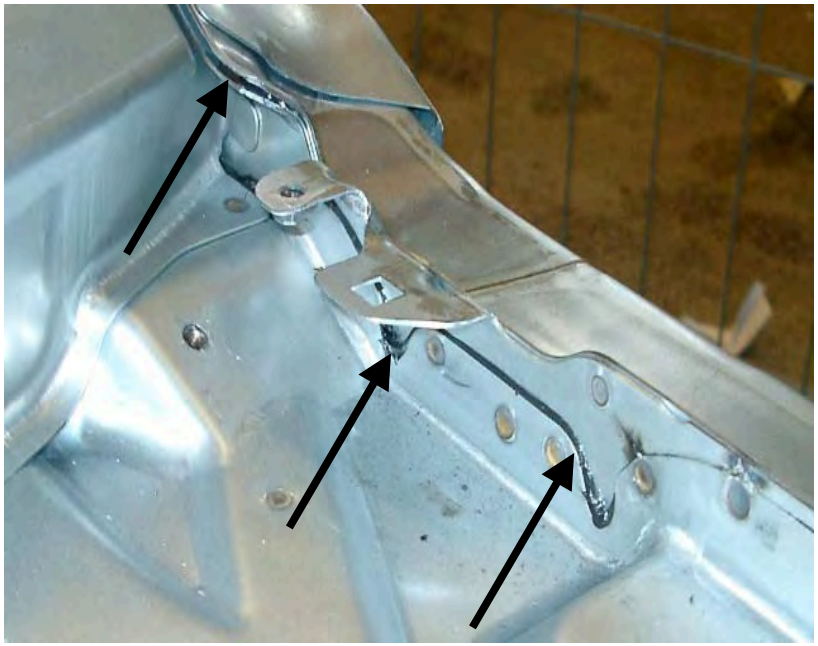


<u>Defect figure 5</u> Water penetration in the floor area

5.2. Leak in the body shell

<u>Measure 5.2.1.</u> Rework the seal seams in the front area

- Check seams and rework if necessary (use standard body sealant).



Side wall area below FLA right/left

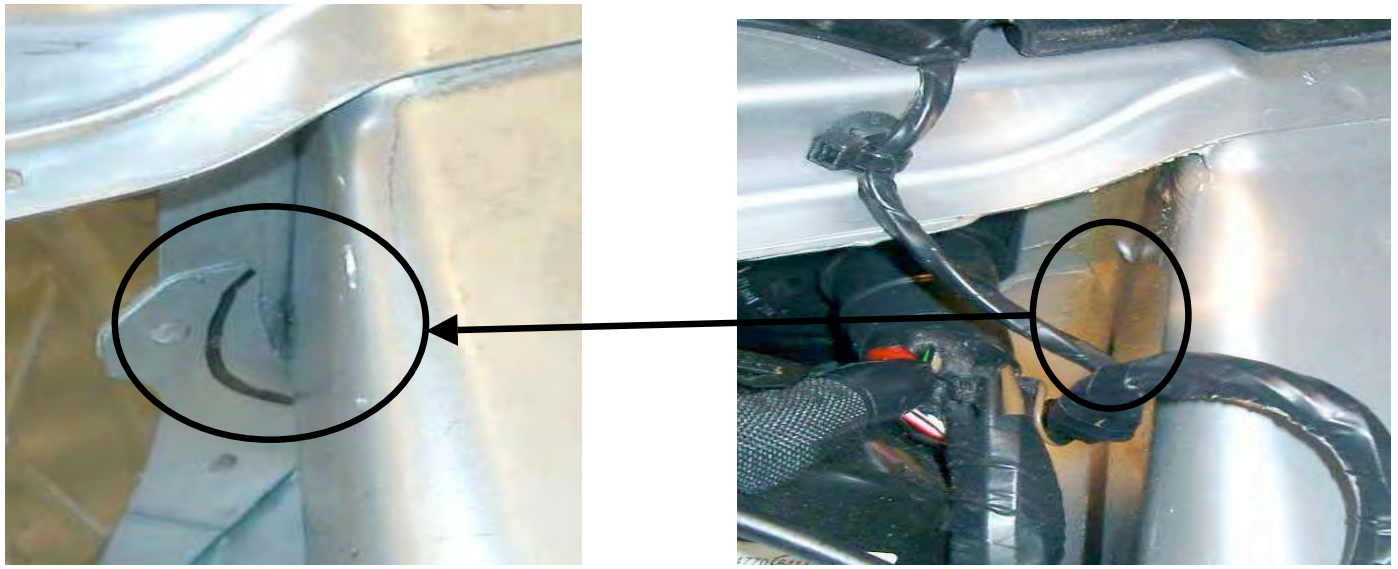
Fastening screws – seal

Defect figure 5 Water penetration in the floor area

5.2. Leak in the body shell

Measure 5.2.1.

- Check seams and rework if necessary (standard body sealant).



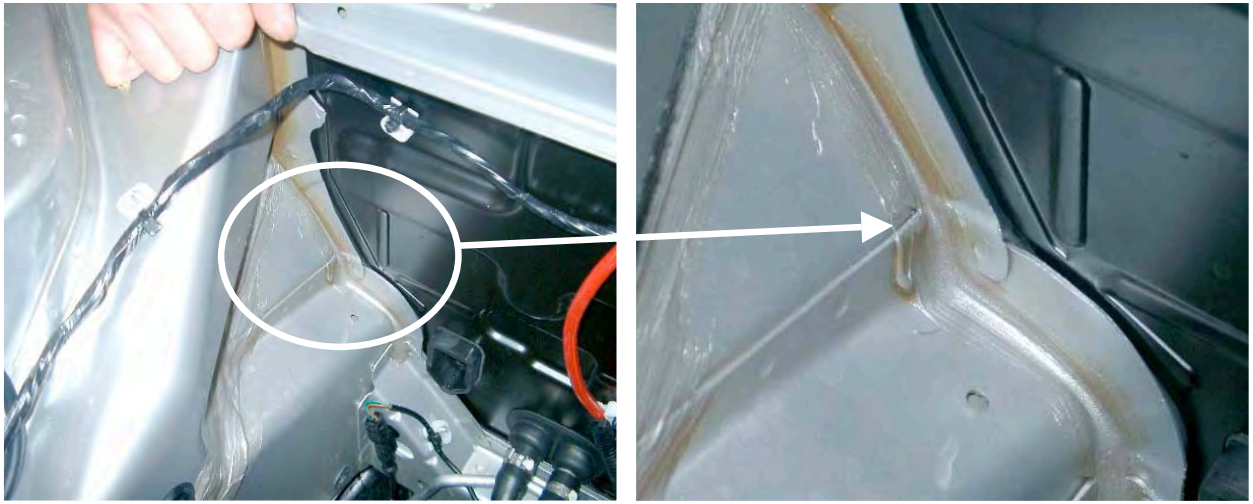
Rear power brake area

Defect figure 5. Water penetration in the floor area

5.2. Leak in the body shell

Measure 5.2.1.

- Check seams and rework if necessary (standard body sealant).
- The seal seams can be subjected to rain test with a watering can when vehicle is dismantled.



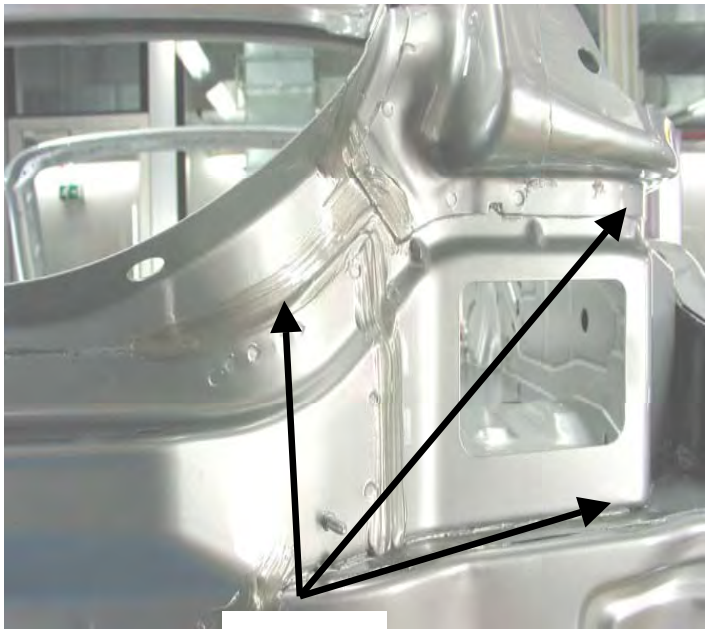
Area in front of right bulkhead

Defect figure 5. Water penetration in the floor area/trunk

5.2. Leak in the body shell

Measure 5.2.2. Rework seal seams in the rear area:

- Check seams and rework if necessary (standard body sealant).
- The seal seams can be subjected to rain test with a watering can when vehicle is dismantled.



Seal seams

Unused screw holes must be covered with the adhesive.

6. Material and tool list

Material:

Repair kit, soft top seals

Spare parts package number 0017777V001000000

Tool:

- Nail shears
- Standard emery paper K.80

7. Agreed standards

smart roadster:

- ERM service package 11010107

smart roadster-coupé:

- ERM service package 11010108

8. Allocation of the Service Packages and Work positions:

Rain test before the remedial measure:

Service Package in smart DMS 8.0:	01030153E49
Work Position in DaimlerChrysler ASRA:	02 4007 0

Rain test after the remedial measure:

Service Package in smart DMS 8.0:	01030159E49
Work Position in DaimlerChrysler ASRA:	02 4019 0

Defect figure 1. with measures 1.1. to 1.5.:

Service Package in smart DMS 8.0:	01030154M15
Work Position in DaimlerChrysler ASRA:	02 4008 0

Defect figures 2. and 3. with measures 2.1. to 3.3.:

Service Package in smart DMS 8.0:	01030155M15
Work Position in DaimlerChrysler ASRA:	02 4015 0

Defect figure 4. with measures 4.1. and 4.2.:

Service Package in smart DMS 8.0:	01030156M15
Work Position in DaimlerChrysler ASRA:	02 4016 0

Defect figure 5. with measures 5.1.1.:

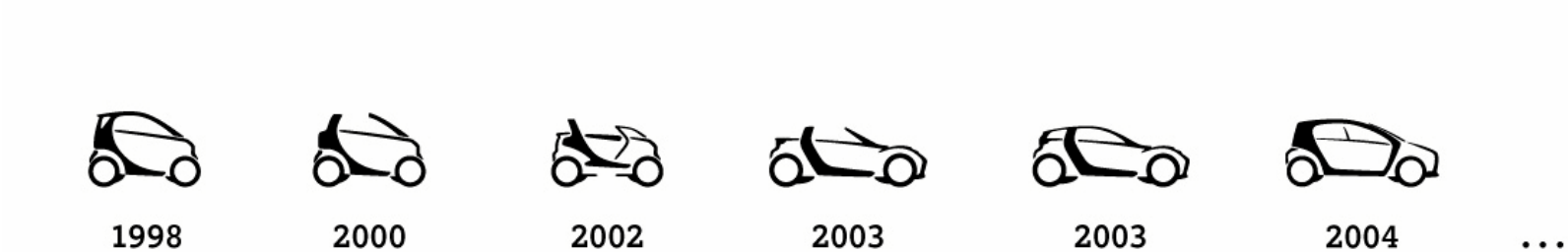
Service Package in smart DMS 8.0:	01030158M15
Work Position in DaimlerChrysler ASRA:	02 4018 0

Defect figure 5. with measures 5.2.1. and 5.2.2.:

Service Package in smart DMS 8.0:	01030157M15
Work Position in DaimlerChrysler ASRA:	02 4017 0

Remedial measures, seals, model R/C 452

Supplementary information



Contents

- General information
- Assigning parts to year of manufacture
- Ideal sequence of remedial steps
- Tips and tricks for rapid achievement of objectives

1. General information

1. Deciding which part to use for different model years

For model year 2003 vehicles, use parts from group "A"
For model year 2004 vehicles, use parts from group "A"
For model year 2005 vehicles, use parts from group "B"

Never mix parts from different groups.

These criteria were agreed by smart gmbh based on a wide range of measured variables and form the basis for the warranty appraisal.

Important notes:

Fitting sealing systems in contravention of these criteria will invalidate any warranty/goodwill claim for the requisite work.

Due to parts shortages for model year 2003 and 2004 vehicles, smart gmbh has converted a certain number of vehicles to the model year 2005 sealing system. Converted vehicles (2005 status) can be recognized by the features described on page 7 !

2. Definition of leaks / drips

Leaks are defined as water entering the vehicle interior which is not directed out again by design measures without causing residual damage to the interior.

Example 1:
Slight drips on the window which are directed back outwards via drainage holes in the inner door well seal into the wet area of the doors are not considered as leaks according to the definition, but rather as the state of the art. They are described as such in the owner's manual.

Example 2:
Heavy drips on the window which run over the door cladding are considered as leaks within the terms of the definition.

2. Assigning parts to years of manufacture

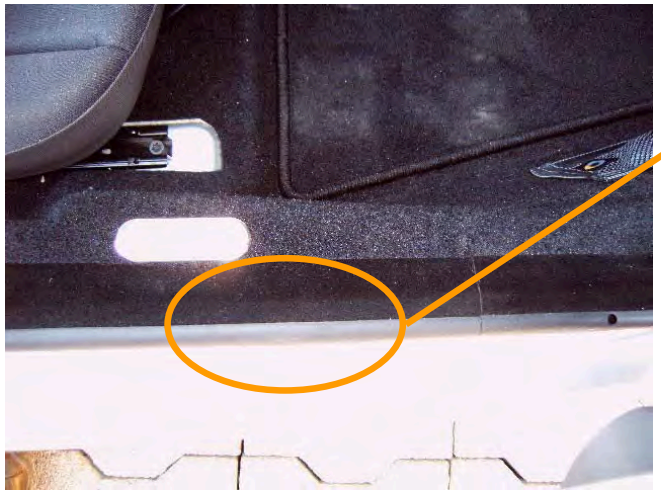
Assigning the sealing package "A" to model year 2003 and 2004 vehicles

- Roof peak seal **0017060V002000000**
- Side strut seal, right **0009358V006000000** / Hardtop seal, right **0009360V006000000**
- Side strut seal, left **0009357V006000000** / Hardtop seal, left **0009359V006000000**
- Door seal, right **0009309V008000000**
- Door seal, left **09308V008000000**
- Window guide seal, front right **0011234V008000000**
- Window guide seal, front left **0009789V008000000**
- Exterior mirror, manual, right **0009725V007C22A00** LHD / **0011326V007C22A00** RHD
- Exterior mirror, manual, left **0009724V007C22A00** LHD / **0011315V007C22A00** RHD
- Exterior mirror, electric, right **0009819V006C22A00** LHD / **0012958V005C22A00** RHD
- Exterior mirror, electric, left **0009818V006C22A00** LHD / **0012932V005C22A00** RHD

Assigning sealing package "B" to model year 2005 vehicles

- Roof hard top seal **0017060V004000000**
- Side strut seal, right **0009358V007000000** / Hard top seal, right **0009360V007000000**
- Side strut seal, left **0009357V007000000** / Hard top seal, left **0009359V007000000**
- Door seal, right **0009309V009000000**
- Door seal, left **0009308V009000000**
- Window channel seal, front right **0011234V010000000**
- Window channel seal, front left **0009789V010000000**
- Exterior mirror, manual, right **0009725V008C22A00** LHD / **0011326V008C22A00** RHD
- Exterior mirror, manual, left **0009724V008C22A00** LHD / **0011315V008C22A00** RHD
- Exterior mirror, electric, right **0009819V007C22A00** LHD / **0012958V006C22A00** RHD
- Exterior mirror, electric, left **0009818V007C22A00** LHD / **0012932V006C22A00** RHD

Ways of differentiating between the two sealing systems



Seals for model year 2005 can be recognized by the flocking on the roof peak seal and door seal.

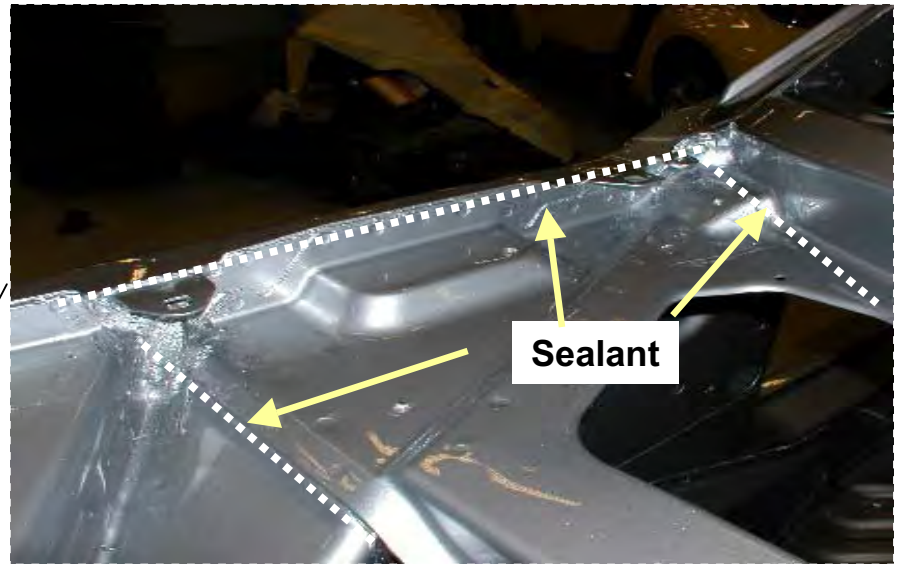
The model year 2005 exterior mirror can be recognized by its triangular mirror cover (no screw fastening, presence of rubber lip).

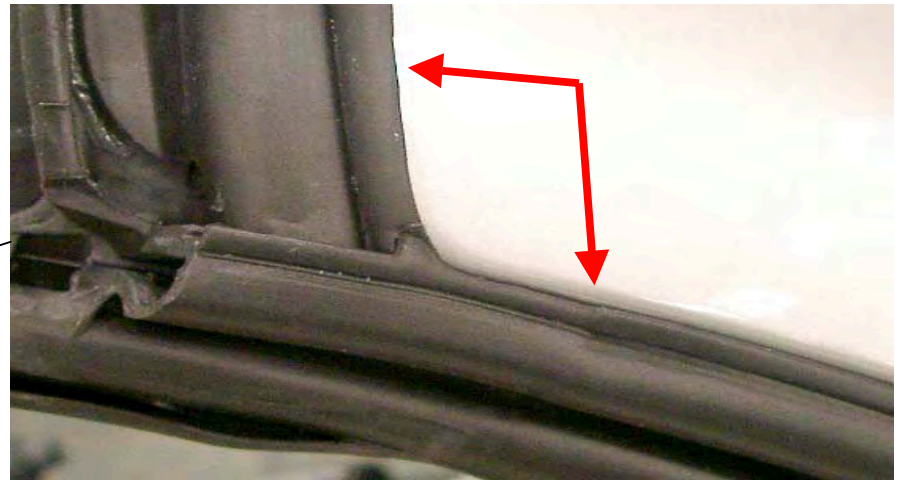
3. Ideal sequence of remedial steps

1. Disassembly of CBS parts
- CBS front
- CBS rear
- Door panel right/left
- Interior/carpet

2. Sealing of body seams
- Description, see Info Letter 02.04.2004

3. Assembly of seals
- Description, see Info Letter 25.08.2003





4. Assembly and positioning of side struts
- Description, see Info Letter 25.08.2003

5. Positioning of side window with respect to door frame
- Description, see Info Letter 25.08.2003

6. Assembly/positioning of the exterior mirror
- Description, see Info Letter 02.04.2004

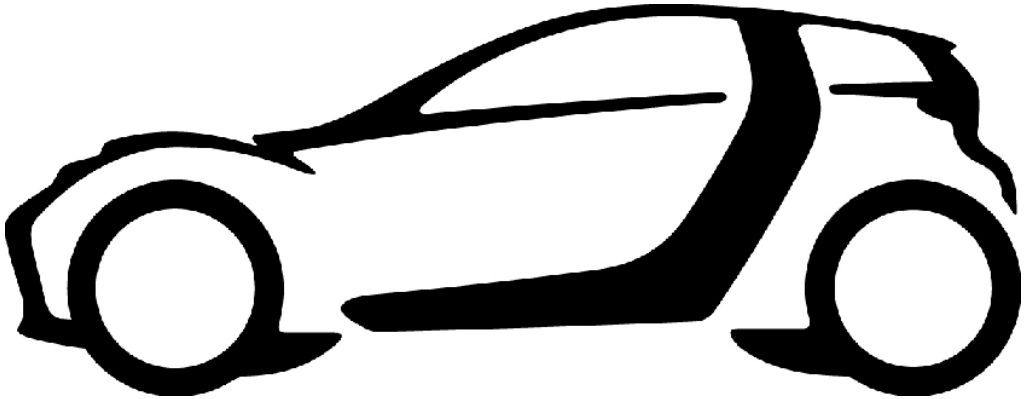
7. Fitting CBS parts

8. Carry out rain test
- Description, see Info Letter 02.04.2004

9. Carry out reworking as required

10. Interior fittings / checking vehicle functions

11. Warranty / goodwill claim + documentation



4. Tips and tricks for rapid achievement of objectives

1. Basic adjustments on the door frame

- Adjust the roof peak seal (DSP) to fit the body
- Adjust the side struts to fit the roof frame and the DSP

Note

Use the special tool "soft top template" (part number **Q001 9576 V001000000**/ window adapter **W452 589032300**) to adjust the soft top (base carrier) and the A/B pillars to a defined position with respect to one another.
This soft top template is used to fasten the individual parts to the body and is also used to fit the side window / side door to the door frame.
Fitting instructions are given in WIS work package **AR 77.30-P-1010 RR**.
The special tool "Soft top template Q0019576V001000000" is subject to guaranteed availability. You can order the template via the standard ordering procedure.

2. Checking the position of the side window with respect to the side strut

For this purpose, the side strut is inserted into the body and the soft top closed.
The side door is examined with respect to the fit of the side window and the seal.
In this case the side window must be in contact with the entire surface of the sealing profile.
(see 2. Ideal sequence of remedial steps, no. 5)
If the side window needs re-adjusting, use the soft top template (or additional side window adapter) to adjust the side window.
Fitting instructions are given in WIS work package **AR 77.30-P-1010 RR**.

3. Optimizing the side window position (contact with window opening mechanism)

The side window needs to be fixed to the window opening mechanism to prevent it from dropping after a certain amount of time in use. For this purpose, O-rings, part number 0021709V001000000, are attached to the window opening mechanism sliders.
Fitting the O-rings and/or replacing the sliders is described in the WIS work package **AR 72.10-P-1805 RR**.

- **Transition; side window to exterior mirror**

There must be a seamless transition to the side window when fitting the exterior mirror.
The exterior mirror is therefore adjusted to the correct position when the side window is closed (see 2. Ideal sequence of remedial steps, no. 6).
Take particular care that the window channel seal is fitted correctly at the front.
Particularly with YOM 2005 it must fit snugly to the mirror.

5. Basic adjustment of soft top and positioning of seals

After using the soft top template the roof cap (rear soft top seal) should be adjusted to the correct position with respect to the anti-roll bar. The contact pressure can be checked using, e.g. a check card. The check card should be able to move between the body and the roof cap but with a slight resistance.
This will minimize the amount of water penetrating and ensure that it is more easily drained away by the water management design measures.
To ensure the correct positioning of the drainage pipe on the roof cap, the inside and outside surfaces are greased with a rubber-based grease (Krytox grease).
The upper section of the door seal is also treated with the same grease.