

Carbon fiber repair on fender flares

Topic number	LI98.00-P-067242
Version	1
Function group	98.00 General
Date	10-30-2017
Validity	G-Class 4x4 ^2
Reason for change	
Reason for block	

Complaint:

Various complaints for:

- clearcoat wavy
- clearcoat deposits or contaminants
- cracked carbon fiber (possibly due to outside force)

Cause:

Various

Remedy:

All repairs should be investigated with an authorized Mercedes-Benz Collision Center, prior to making a decision to replace any components.

Certified Collision Centers have paint vendors who each have specific repair instructions for carbon fiber substrate (instructions attached for each paint vendor).

Attachments	
File	Description
Glasurit.pdf	Glasurit carbon fiber repair instructions
PPG.pdf	PPG carbon fiber repair instructions
Sikkens Akzo-Nobel.pdf	Sikkens Akzo-Nobel carbon fiber repair instructions
Spies Hecker.pdf	Spies Hecker carbon fiber repair instructions
Standox.pdf	Standox carbon fiber repair instructions

Symptoms
Overall vehicle / Paint/corrosion / Paint damage / Micro scratches
Overall vehicle / Paint/corrosion / Paint damage / Brush scratches
Overall vehicle / Paint/corrosion / Paint damage / Etching
Overall vehicle / Paint/corrosion / Paint damage / Deposits

XENTRY TIPS

Overall vehicle / Paint/corrosion / Paint damage / Foreign influence
Overall vehicle / Paint/corrosion / Paintwork Fault / Clouding
Overall vehicle / Paint/corrosion / Paintwork Fault / Has uneven flow/structure
Overall vehicle / Paint/corrosion / Paintwork Fault / Color deviations
Overall vehicle / Paint/corrosion / Paint damage / Cracks
Body / Body/Cab / Fender / Bad fitting
Body / Body/Cab / Body / Surface warp

Validity		
Vehicle	Engine	Transmission
G (463) - 463.255	*	*



TECHNICAL INFORMATION

4. Mercedes-Benz-specific refinishing processes

4.4 Carbon fibre reinforced plastic (CRP)

Carbon fibre reinforced plastics consist of carbon fibre filaments embedded in epoxy resin. A characteristic feature of these materials is their very high stability at a low density. If these carbon fibre filaments are used for producing vehicle bodies or bodywork components, they are embedded in either colourless or tinted epoxy resin, depending on the application. Since the UV resistance of the epoxy resin is inadequate, the carbon fibre filaments are generally protected with two layers of clearcoat. The first clearcoat layer is intended to provide a visually smooth surface, and the second clearcoat layer is for UV protection. The latter is particularly important in the case of “visible carbon fibre”. Visible carbon fibre differs from topcoated carbon fibre in that the filaments are visible. A repair of visible carbon fibre only makes sense in the event of superficial damage which can be remedied by applying a clearcoat layer. In other words, the filament must not be damaged because otherwise the damage will remain visible. Repairing a topcoated carbon fibre component, on the other hand, does not call for any particular requirements. The standard refinish methods for metal surfaces or thermoset materials (SMC, GRP) incl. body filler can be used.

Topcoated carbon fibre

Pre-treatment	 541-30 1x	 Wipe dry	 Red sanding pad, soaked with 541-30	 700-10 1x	 Wipe dry				
Clean with Glasurit Degreasing and Cleansing Agent 700-10 before applying 285-270.									
Primer filler	Glasurit® Primer Filler Pro 285-270	Glasurit® Hardener 929-58	Glasurit® Reducer 352-91, -216	 5:1:1	 HVLP 1.7-1.9 mm 2.0-3.0 bar	 ½ +2 80-120 µm	 60 min. at 60°C	 P400- P600	 P800- P1000

Alternative: Glasurit® Primer Filler Pro 285-230, -290

Note:
After the first coat of primer filler, visible surface defects (e.g. pinholes) can be filled manually with a brush. After interim sanding with a random orbital sander (P400 - P600) or manual sanding (P800 - P1000) this step can be repeated until the desired result is achieved.

Topcoat	Glasurit® 90 Line and Glasurit® HS VOC Clears
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TECHNICAL INFORMATION

Visible carbon fibre

Pre-treatment	 541-30 1x	 Wipe dry	 Red sanding pad, soaked with 541-30	 700-10 1x	 Wipe dry				
Clear	Glasurit VOC HS Racing Clear 923-135					Glasurit® Hardeners 929-31/-33		Glasurit Racing Additive 523-15	
						 2: 1 + 10%	 HVLP mm -320 bar	 2 40-60 µm	 60 min. 60°C

Note:

After the first coat of clear, visible surface defects (e.g. pinholes) can be filled manually with a brush. After interim sanding with a random orbital sander (P400 - P600) or manual sanding (P800 - P1000) this step can be repeated until the desired result is achieved.

Premium-Finish (if necessary)

Pre-treatment	 541-30 1x	 P1200	 541-30 1x	 Wipe dry					
Clear	Glasurit® HS Multi Clear VOC 923-335					Glasurit® Hardeners 929-31/-33		Glasurit® Reducer 352-91, -216	
						 2: 1 + 10 %	 HVLP 1.3 mm 2.0-3.0 bar	 2 40-60 µm	 30 min. at 60 °C

Special Paint Repair System S-06-GBL



SLR McLaren: Warranty repair system with flattable Surfacer, for carbon fiber substrates, for spare parts and smaller damages

There are originally equipped carbon fibre reinforced composites used on the Mercedes-Benz SLR McLaren (type 199). In the case of sanding through the OEM finish and subsequent recoating this can cause problems (bullseyes, featheredge or sandscratches around repaired area). The following process will avoid any such problems when repairing this paint system.

	Substrates		
	Carbon fibre (Spare Part)	Spare Part with minor Defects ¹⁾	OE Finish with rub-through Areas ¹⁾
Cleaning / Sanding	Deltron D846 Deltron D8434	Deltron D846 Deltron D8434	Deltron D846 Deltron D8434
Stopper / Filler		MB Plastic Repair Kit ²⁾ or IviPlast 66	MB Plastic Repair Kit ²⁾ or IviPlast 66 (if required)
Surfacer	Deltron D821 tinted	Deltron D821 tinted	Deltron D821 tinted
Intermediate sanding	P400 (dry) or P800 (wet)		
Surfacer	Deltron D821 tinted	Deltron D821 tinted	Deltron D821 tinted
Basecoat(s)	Deltron GRS BC	Deltron GRS BC	Deltron GRS BC
Waterborne Basecoat(s)	Envirobase High Performance	Envirobase High Performance	Envirobase High Performance
Clearcoat(s)	Deltron D894 Deltron D8120	Deltron D894 Deltron D8120	Deltron D894 Deltron D8120

¹⁾ Please note that only scratches and abrasions in the substrates are allowed to be repaired, but no cracks or holes that show damages of the carbonfibres.

²⁾ Please refer to the chapter "Repair of Plastic Parts" to find more details about the repairing of plastic parts with the approved MB Plastic Repair Kit.

Cleaning:

The key to successful painting of plastic substrates is thorough preparation. Inadequate cleaning is especially likely to cause adhesion failure when a plastic substrate is involved.

- Wash all surfaces with soap and water
- If the surface of the plastic substrate appears inconsistent, it is recommended that the part be 'flamed' or pre-stoved for 30 minutes at 60°C. This will drive any residual release agents to the surface for easier removal during the cleaning process.
- Clean the plastic surface carefully and thoroughly with **D846 DX103 Degreasing Agent for Plastics**. Clean each section individually wiping on **D846** with a clean cloth and removing it another clean dry cloth. For textured or other uneven surfaces, the use of a fine nylon brush (such as a nailbrush) is recommended.

Deltron D846 – DX103 Cleaner / Antistatic Agent for Plastics

See " Sanding and Cleaning "	Ready for use	Apply with clean lint free cloth	Wipe off with clean lint free cloth	Antistatic agent: apply to part	Antistatic agent: leave to evaporate	RLD241V

Deltron D8434 – Plastic Substrate Cleaner

See " Sanding and Cleaning "	1:1 or 1:2 with water	Scuff with Scotch-Brite™ Grey Ultrafine	Rinse with clean water, allow to dry	RLD241V

- Sand out the defects and featheredge the clear very carefully using P400 to P600 dry grade sanding paper.
- Clean with **D8434 Plastic Substrate Cleaner**, and dry. DO NOT use a solventborne degreaser, as this can cause swelling of the OE waterborne basecoat featheredge.
- Infrared the repair area for 3 minutes, and cool.
- Reclean using **D8434**.
- If the damage is through down to the substrate use the MB Plastic Repair Kit or Iviplast 66.

- Be careful only to cover the substrate; any covering of the featheredge should be sanded carefully using P400 to P600 dry grade sanding paper before the application of D821.

Iviplast 66

See " Sanding and Cleaning "	SHA305 2,0 – 2,5 % (20°C)	7 – 10 min. (20°C)	Suitable knife or spreader	30 – 40 (20°C) Do not use IR!	P80 – P120- P240 Only dry sanding!	60 min. (20°C) with PPG 2K Plastic Primers	RLD185

Deltron D821 – HS Antichip Primer

Untinted: 3:1:1 Tinted (DG): 3:1:1,5:1	with D841 and D807	3 – 4 hours 18 – 25" DIN 4mm (20°C)	1,4 – 1,6 mm	2 – 3 coats (60 – 100 µm)	10-15 min. between coats, 15 min. before baking	20 – 30 min. (60°C)	P400	RLD104

Notes:

- Apply 2 light coats, reducing the pressure of the spraygun if required, using D821 as a primer-surfacer.
- Ensure that the D821 covers the complete repair area.
- After flash-off, dry using Infrared.

Intermediate Sanding

After drying the complete surface is flatted	See " Sanding and Cleaning "	P400	P800	Apply with clean lint free cloth	Wipe off with clean lint free cloth	RLD63

Deltron D821 – HS Antichip Primer

Untinted: 3:1:1 Tinted (DG): 3:1:1,5:1	with D841 and D807	3 – 4 hours 18 – 25" DIN 4mm (20°C)	1,4 – 1,6 mm	2 – 3 coats (60 – 100 µm)	10-15 min. between coats, 15 min. before baking	20 – 30 min. (60°C)	P400	RLD104

Deltron GRS BC

 							
Use tack rag. Check color to adjacent parts	10 % D841 for optimum performance	1:1 with D807	15" DIN 4mm (20°C)	1,4 – 1,6 mm	2 coats + control coat (if necessary)	10 min. be- tween coats, 15 min. be- fore clearcoat	RLD02 RLD153

or

Envirobase High Performance

Use tack rag. Check color to adjacent parts	Addition of thinner acc. TDS	22 – 26" DIN 4mm (20°C)	1,2 – 1,4 mm	2 – 3 coats + control coat (if necessary)	Dry till evenly matt / use ExpressDry	RLD213 RLD229V

Deltron D894 – HS Clear

Use tack rag	4:1:0,5 with D897 and D807	3 – 4 hours 16 – 19" DIN 4mm (20°C)	1,3 – 1,6 mm	1 mist coat, 1 full coat (50 – 60 µm)	No flash-off between coats or before baking	30 min. (70°C), 10 min. (IR med.)	SPP1001 (T001) (1-24 hrs. after drying)	RLD100

or

Deltron D8120 – HS Premium Clear

Use tack rag	3:1:0,8 with D841 and D807	2 hrs. 16 – 17" DIN 4mm (20°C)	1,4 – 1,6 mm	1 medium coat, 1 full coat (50 – 60 µm)	5 min. bet- ween coats, 10 min. before baking	30 – 40 min. (60°C), 15 min. (IR med.)	SPP1001 (T001) (1-24 hrs. after drying)	RLD181

e) CFK (not visible)

Cleaning		The surface must be cleaned with warm water and pH neutral cleaner
Degreasing		M200
Degreasing		M700
Sanding		Small scratches can be sanded with P240 – P320 by machine (3mm)
Degreasing		M700
Tack rag		The surface has to be cleaned thoroughly
Filler		Colorbuild Plus
Basecoat		Autowave
Clearcoat		Autoclear LV Superior

e) CFK (not visible)

M200										
			The surface has to be cleaned with the selected surface cleaner and a clean cloth. Immediately thereafter, the surface has to be wiped dry thoroughly with high quality absorbent degreasing cloths. Two cloths have to be used, as one cloth will merely shift rather than remove dirt and grease. The surface cleaner should not evaporate as the contamination on the surface will remain. The surface has to be wiped dry thoroughly before the degreaser evaporates.						Technical datasheet \$4.03.01	
M700 Antistatic Silicone Remover										
			The surface has to be cleaned with the selected surface cleaner and a clean cloth. Immediately thereafter, the surface has to be wiped dry thoroughly with high quality absorbent degreasing cloths. Two cloths have to be used, as one cloth will merely shift rather than remove dirt and grease. The surface cleaner should not evaporate as the contamination on the surface will remain. The surface has to be wiped dry thoroughly before the degreaser evaporates.						Technical datasheet \$4.02.02	
Colorbuild Plus										
	3	1	+ 10%	Sikkens # 35	1.5 – 2.0	2 –3 x 1	30 min. at 60°C	P500		Technical datasheet \$2.02.02
	Colorbuild Plus	Hardener Sanding	Activator Sanding							
Autowave Solid colour										
	100	10 – 20	Sikkens # 14	1.2 – 1.4	2 x 1	Until completely matt and dry				Technical datasheet \$1.09.03
	Autowave	Activator WB								
Autowave Metallic & Pearl										
	100	10 – 20	Sikkens # 14	1.2 – 1.4	full coat	Intermediate coat	Effect coat	Until completely matt and dry		Technical datasheet \$1.09.03
	Autowave	Activator WB								
Autoclear LV Superior										
	100	60	20	Sikkens # 31	1.2 – 1.4	2 x 1	30 min. at 60°C			Technical datasheet \$1.05.01
	Autoclear LV Superior	Superior Hardener	Superior Reducer							

f) CFK (visible)

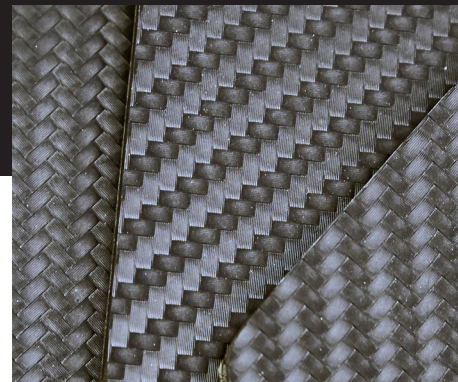
Cleaning		The surface must be cleaned with warm water and pH neutral cleaner
Degreasing		M200
Degreasing		M700
Sanding		Scratches to be sanded with P800 and P1200 – P1500 afterwards
Primer		Akzo Nobel 55K23019 Fondo do Trasparente X Carbonlook
Clearcoat		Autoclear LV Superior
Sanding		P800 – P1000
Clearcoat		Autoclear LV Superior

M200					
			The surface has to be cleaned with the selected surface cleaner and a clean cloth. Immediately thereafter, the surface has to be wiped dry thoroughly with high quality absorbent degreasing cloths. Two cloths have to be used, as one cloth will merely shift rather than remove dirt and grease. The surface cleaner should not evaporate as the contamination on the surface will remain. The surface has to be wiped dry thoroughly before the degreaser evaporates.		

M700 Antistatic Silicone Remover					
			The surface has to be cleaned with the selected surface cleaner and a clean cloth. Immediately thereafter, the surface has to be wiped dry thoroughly with high quality absorbent degreasing cloths. Two cloths have to be used, as one cloth will merely shift rather than remove dirt and grease. The surface cleaner should not evaporate as the contamination on the surface will remain. The surface has to be wiped dry thoroughly before the degreaser evaporates.		

Carbon Primer 55K23019 Fondo do Trasparente X Carbonlook									
	5 Primer	1 Primer Hardener	1 Plus Reducer	Sikkens # 23	1.2 – 1.4	1 x 1	30 min. at 20°C		

Autoclear LV Superior									
	100 Autoclear LV Superior	60 Superior Hardener	20 Superior Reducer	Sikkens # 31	1.2 – 1.4	2 x 1	30 min. at 60°C		



4.5.1 Carbon fiber composite plastics

CFRP is made of filament yarn embedded in resin. The material is characterized by extremely high stability at comparably low density and thus weight. This is also the main reason why it is used for automotive engineering.

Today, production processes are so advanced that they help to avoid the formerly dreaded voids in the surface. Only these perfect parts are used today in the Aftersales component range of Mercedes-Benz.

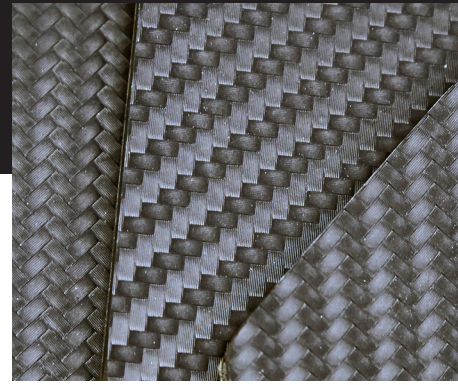
The main challenge when coating CFRP is to avoid that the texture noticeably shines through the clear coat.

The use of the following products and careful method of working guarantees a perfect surface finish for color-coated CFRP, and also for visible carbon.

Cleaning Basically all vehicles must be cleaned thoroughly before being moved into the painting facility	Heat carbon components for 60 minutes at max. 80°C	 Permahyd Silicone Remover 7080 and wipe with clean cleaning tissue	 P240-P320; avoid sanding through	 Blow surface dry; Permahyd Silicone Remover 7080 and wipe with clean cleaning tissue						
Surfacer	Permasolid HS Performance Surfacer 5320	 5:1 with Permasolid VHS Performance Hardener 3425	 5% Permacron Reducer 3380	 HVLP 1.4 - 1.8 mm 0.7 bar atomizing pressure 3 = 200 - 250 µm	 5-10 min intermediate and final flash-off	 2 min 50% plus 8 min 100% power	 or 60°C 30 min	 P240-P320; avoid sanding through	 Blow surface dry; Permahyd Silicone Remover 7080 and wipe with clean cleaning tissue	
Surfacer	Permasolid HS Performance Surfacer 5320	 5:1 with Permasolid VHS Performance Hardener 3425	 5% Permacron Reducer 3380	 HVLP 1.4 - 1.8 mm 0.7 bar atomizing pressure 3 = 200 - 250 µm	 5-10 min intermediate and final flash-off	 or 60°C 30 min	 P400-P500; avoid sanding through	 Blow surface dry; Permahyd Silicone Remover 7080 and wipe with clean cleaning tissue		
Waterborne base coat	Permahyd Hi-TEC Base Coat 480	 Permahyd WT Additive 6050 10% for solid colors, 20% for effect colors	 HVLP 1.2 - 1.3 mm 0.7 bar atomizing pressure	 Application in one spray operation 10 - 25µm	 Final flash-off until matt					
Clear coat	Permasolid HS Clear Coat 8055	 3:1 with Permasolid VHS Hardener	 5% Permasolid HS Clear Coat Additive 9034	 HVLP 1.3 - 1.4 mm 0.7 bar atomizing pressure	 Application in one spray operation 45 - 55µm	 5-10 min intermediate and final flash-off	 60°C 40 min			

Carbon fiber composite plastics.

Carbon fiber reinforced plastic (CFRP), coated.



4.5.2 Visible carbon matt

Cleaning Basically all vehicles must be cleaned thoroughly before being moved into the painting facility	Heat carbon components for 60 minutes at max. 80°C	 Permahyd Silicone Remover 7080 and wipe with clean cleaning tissue	 P240-P320; sanding through destroys the substrate	 Blow surface dry; Permahyd Silicone Remover 7080 and wipe with clean cleaning tissue			
Matt clear coat	Permasolid HS Clear Coat 8030	 Permasolid Matting Component MA 110 Mixing ratio 70:30 % by weight. It is necessary to spray a sample	 4:1 with Permasolid VHS Hardener 3240	 10% Permacron Reducer 3385	 HVLP 1.5 mm 0.7 bar atomizing pressure	 2 coats in cross direction approx. 100 µm	 5-10 min intermediate and final flash-off
	 60°C 50 min	 P800					
Matt clear coat	Permasolid HS Clear Coat 8030 finish coat	 Permasolid Matting Component MA 110 Mixing ratio 70:30 % by weight. It is necessary to spray a sample	 4:1 with Permasolid VHS Hardener 3240	 10% Permacron Reducer 3385	 HVLP 1.5 mm 0.7 bar atomizing pressure	 2 coats in cross direction approx. 70µm	 5-10 min intermediate and final flash-off
	 60°C 50 min						

Carbon fiber reinforced plastic visible carbon-matt.

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4.5. Carbon fiber composite plastics

4.5.1. Carbon fiber reinforced plastics, coated

CFRP is made of filament yarn embedded in resin. The material is characterized by extremely high stability at comparably low density and thus weight. This is also the main reason why it is used for automotive engineering.

Today, production processes are so advanced that they help to avoid the formerly dreaded voids in the surface. Only these perfect parts are used today in the Aftersales component range of Mercedes-Benz.

The main challenge when coating CFRP is to avoid that the texture noticeably shines through the clear coat.

The use of the following products and careful method of working guarantees a perfect surface finish for color-coated CFRP, and also for visible carbon.

4.5.1. Carbon-Fiber reinforced plastics; coated									
Cleaning Basically all vehicles must be cleaned thoroughly before being moved into the painting facility	Heat carbon components for 60 minutes at 60°C. The object temperature may never exceed 80°C!	Standox Cleaner (waterborne) and dry with clean wipes	Sand with P 240-P320. Avoid sand through area	Clean surface dust-free. Standox Cleaner (waterborne) and dry with clean wipes					
Surfacer	Standox VOC Xtra-Filler U7560	5:1 with Standox VOC-X-Hardener	5% Standox VOC-Thinner	HVLP 1,4 - 1,8 mm 0,7 bar atomizing pressure 3 = 200-250 µm	5 - 10 min intermediate and final flash off	2 min 50% plus 8 min 100% power	or 60°C 30 min	P 240-P320	Clean surface dustfree. Standox Cleaner (waterborne) and dry with clean wipes
Surfacer	Standox VOC Xtra-Filler U7560	5:1 with Standox VOC-X-Hardener	5% Standox VOC-Thinner	HVLP 1,4 - 1,8 mm 0,7 bar atomizing pressure 2-3 = 100-200 µm	5 - 10 min intermediate and final flash off	or 60°C 30 min	P 400-P600	Clean surface dustfree. Standox Cleaner (waterborne) and dry with clean wipes	
Waterborne Basecoat	Standoblu Basecoat	Standoblu Viscosity Adjuster 10% for Solid-, 20% for Effect Colors	HVLP 1,2 - 1,3 mm 0,7 bar atomizing pressure	1 + 0,5 1 Visit application 10 - 25µm	Final flash off until matt				
Clearcoat	Standocryl VOC Xtra Clear K9560	3:1 with Standox VOC-Hardener	5% Standocryl VOC-2K-Additiv	HVLP 1,3 - 1,4 mm 0,7 bar atomizing pressure	1 + 0,5 1 Visit application 50-70µm	5-10 min Final flash off	short wave 10-15 min	or 60°C 30 min	

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4.5.2. Carbon-Fiber reinforced plastics; visible carbon matt

Cleaning Basically all vehicles must be cleaned thoroughly before being moved into the painting facility	Heat carbon components for 60 minutes at 60°C							
		Standex Cleaner (waterborne) and dry with clean wipes	Sand with P 240-P320. Avoid sand through area	Clean surface dust-free. Standox Cleaner (waterborne) and dry with clean wipes				
Clear coat	Standex VOC Xtra Clear K9560	 3:1 with Standox VOC-Hardener	 5% Standox VOC-2K-Additiv	 HVLP 1,3 - 1,4 mm 0,7 bar atomizing pressure	 2 spray coats in cross direction approx. 100µm	 5-10 min intermediate and final flash off	 60°C 30 min	 P 800
Clear coat matt	Standex VOC-HS-Clear K9520	 Standox Special matt mixing ratio 70:30 Gew%. It is mandatory to spray test panels	 4:1 with Standox VOC-Härter 30-40	 10% Standox VOC-Thinner 30-40	 HVLP 1,3 - 1,4 mm 0,7 bar atomizing pressure	 2 coats in cross direction	 5-10 min intermediate and final flash off	 60°C 50 min Air drying not possible