


Aircraft Design Certification GmbH Reichensteinstr.48 69151 Neckargemünd		BRM Aero - replacement of oil cooler DC-045	Doc-Nr: ADxC-73-SB-015 Issue: A Date: 26.08.2022 ChangeNr.: ADxC-DC-73-045
Service Bulletin			

BRM Aero - replacement of oil cooler DC-045  
SERVICE BULLETIN

Office of Airworthiness release

Date:

Name:

Signature:

Verification Engineer

I hereby declare that the technical content of this document is correct and can be used to fulfil the obligations of the type design holder per 21.A.265(h)

Date:

Name:


Signature:

Author

Date:

Name: R. Harms G. / M. Basien

Signature:

Aircraft Design Certification GmbH Reichensteinstr.48 69151 Neckargemünd		BRM Aero - replacement of oil cooler DC-045	Doc-Nr: ADxC-73-SB-015 Issue: A Date: 26.08.2022 ChangeNr.: ADxC-DC-73-045
Service Bulletin			

## Amendments

Issue	Reason	Date
A	Initial issue	26.08.22

### BRM Aero - replacement of oil cooler DC-045

Replacement of original type design oil cooler by larger oil cooler to increase cooling capacity.  
Subsequent modification of cowling to fit to the larger oil cooler.

**STANDARD**

## 0 General


### 0.1 ATA Code

ATA 79 OIL – oil cooling system

### 0.2 Effectivity

All BRM Aero B23 with 912 series engines installed

TCDS: EASA.A.642

Aircraft Design Certification GmbH Reichensteinstr.48 69151 Neckargemünd		BRM Aero - replacement of oil cooler DC-045	Doc-Nr: ADxC-73-SB-015 Issue: A Date: 26.08.2022 ChangeNr.: ADxC-DC-73-045
Service Bulletin			

## 1 Planning information

### 1.1 Reason

Increase of cooling capacity of the oil cooler for hot and high operation for ROTAX Engine Type 912 (Series)

### 1.2 Safety Intent

The safety intent is N/A.

Under very hot and high conditions with prolonged engine run on ground, as well as prolonged climbs at low speeds, the oil cooler with greater surface ensures a more comfortable margin to the *oil temperature limit* reducing stress and wear of the engine.

### 1.3 Configuration Description

If criteria in Section 0 met, change the aircraft oil cooler to following PN:

Oil Radiator ROTAX 886107 (ADxC-73-DDP-7920)

Additional modify the lower cowling as described in chapter 3 according to dwg.-no.:  
54B220050N\_A

### 1.4 Compliance

If criteria in Section 0 is met


- Service bulletin must be accomplished
  - ☐ This SB could be made mandatory by an EASA AD.
  - ☐ This SB is mandatory as per EASA AD no.
- ☐ Service bulletin recommended to be accomplished to prevent significant operational disruptions
- ☐ Service bulletin to introduce improvements
- ☒ Service bulletin for convenience or option

### 1.5 Approval statement

The technical content of this document is approved under the authority of the DOA ref. EASA. 21J.411.

### 1.6 Concurrent publications

-

Aircraft Design Certification GmbH Reichensteinstr.48 69151 Neckargemünd		BRM Aero - replacement of oil cooler DC-045	Doc-Nr: ADxC-73-SB-015 Issue: A Date: 26.08.2022 ChangeNr.: ADxC-DC-73-045
Service Bulletin			

## 1.7 Manpower

Approx. 1 hour is required to accomplish the mechanical replacement of the oil cooler.  
Approx. 3 hours are required to accomplish the modification of the lower cowling (curing time not counted). In case the alternative to utilize a complete new cowling assy. is chosen no significant additional time is needed.

## 1.8 Weight and Balance N/A - neglectable


## 1.9 Electrical load data N/A

## 1.10 Software modification N/A

## 1.11 Referenced documentation

ROTAX Service Instruction SI-912 i-004R3 / SI-912-018R4

## 1.12 Other publications effected N/A

Aircraft Design Certification GmbH Reichensteinstr.48 69151 Neckargemünd		BRM Aero - replacement of oil cooler DC-045	Doc-Nr: ADxC-73-SB-015 Issue: A Date: 26.08.2022 ChangeNr.: ADxC-DC-73-045
Service Bulletin			

## 2 Material information

### 2.1 Material- cost – availability

Refer to BRM Aero for material cost and availability.

### 2.2 Company support information

#### BRM AERO, s.r.o.

Address: Letecká 255 686 04 Kunovice Czech Republic

Phone: + 420 773 984 338

E-mail 1: info@brmaero.com

E-mail 2: aero.brm@gmail.com

Web: <http://www.brmaero.com>

### 2.3 Material requirements per aircraft

- |    |  |                                    |
|----|--|------------------------------------|
| 1. | 1x Oil cooler                                  | 886107                             |
| 2. | 1x Left bracket                                | 71B230051N                         |
| 3. | 1x Right bracket                               | 71B230052N                         |
| 4. | 2x Copper washer                               | CSN 02 9310 / DIN 7906-A 20x14x1,5 |
| 5. | Termination protective tape PYROSIL            | ADxC-73-DDP-7905                   |
| 6. | One BRM lamination kit 54B220055N containing   |                                    |
| a. | 1 pc Replacement insert part                   | 54B220056N                         |
| b. | app. 200 g Laminating resin 285 + Hardener 286 | ADxC-73-DDP-9901                   |
| c. | 50x2500 mm Carbon fabric 200 g/m2              | ADxC-73-DDP-9908                   |
| d. | 100x2500 mm Peel ply fabric                    | according BRM-AEROCOMP PR-1        |
| e. | 10 g thixotropic agent for adhesive bond       | Cotton flakes / Aerosil mixture    |
| f. | app. 150 g Two-component polyester filler      | BRM_544_Surface protection         |
| g. | Paint system*                                  | Glasurit according BRM-ON-541      |

Alternative to Pos 6:

- |    |   |            |
|----|---|------------|
| 7. | Bottom Cowling assy. (Bigger oil radiator)* | 54B220050N |
|----|---|------------|

\* specific color(s) needed for the specific airplane

### 2.4 Rework parts

Lower cowling 54B220056N / Alternative: New lower cowling 54B220050N

### 2.5 Special tooling

Safety wire 0.32" and appropriate pliers

Cutting pliers

Flat screw driver

Wrench size 7mm, 16mm, 17mm, 19mm, 22mm, 30mm

Cutter

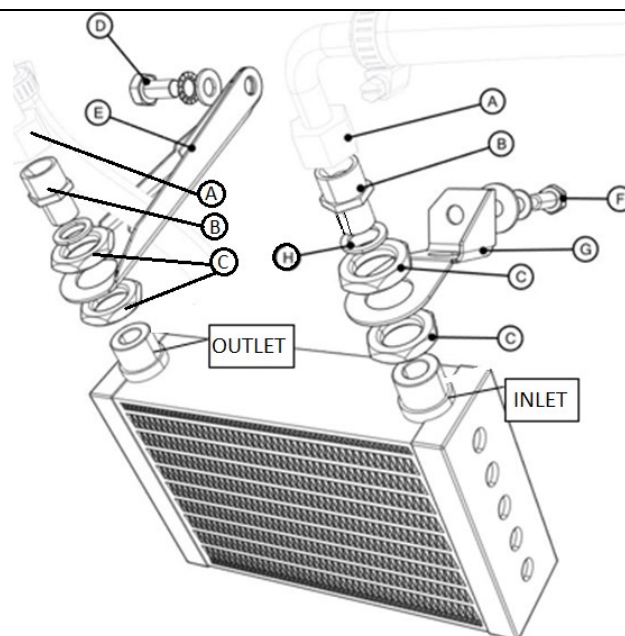
Loctite 243

Sealing Loctite 577

Hose cutter

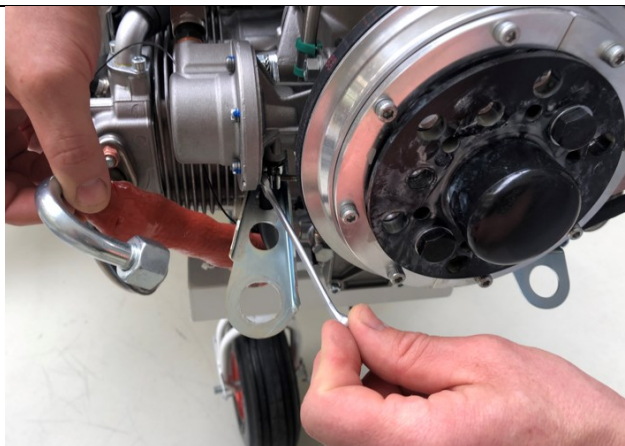
Service Bulletin

### 3 Accomplishment/Instructions

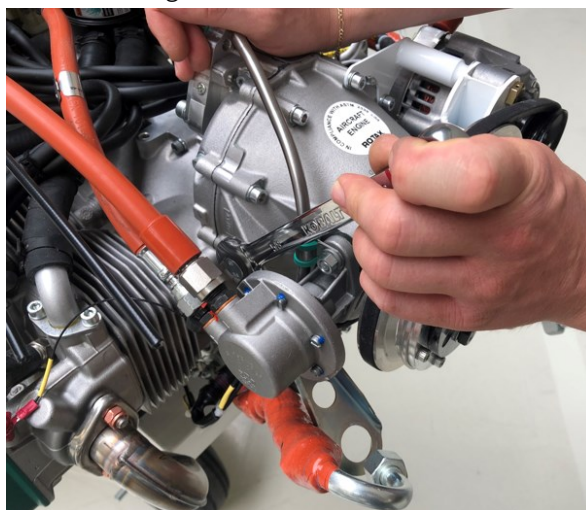


- 1) Remove the upper and the lower engine cowlings (acc. to ADxC-73-001-AMM)
- 2) If necessary, let the engine (and oil temperature) cool to ambient temperature.
- 3) Unscrew the inlet and outlet hoses (**A** ; wrench size 19mm and 22mm)  
*Note: A small amount of oil may leak from the hoses, use a container to capture.*
- 4) Remove both the inlet and outlet adapters (ADAPTER M18x1.5/M14x1.5 **B** ; PN 000780, wrench Size 19mm). Clean and check for reinstallation.
- 5) Remove all 4 nuts fixing the radiator in the brackets (**C** ; a very flat wrench size 30mm is needed for the bottom nuts). Remove the radiator (watch out for oil in the radiator).  
*Note: A protective hose falls out of the space behind the radiator (between radiator and oil pump). Keep it for the re-installation.*
- 6) Unscrew the bolt holding the left (inlet) bracket (**F** ; wrench size 13mm).  
*Note: Cut the safety lock wire on the bolt before this step.*
- 7) Remove the left (**G** ; inlet) bracket.
- 8) Install the new left bracket 71B230051N and gently screw the bolt in (**G** ; without tightening).
- 9) Release the hose clamp of the fuel pump drain hose routed through the right bracket (on the fuel pump side; wrench size 7).

Service Bulletin



- 10) Unscrew the bolt of the right bracket M10x20 (D ; wrench size 16mm or 17mm).




- 11) Disconnect the fuel pump drain hose on the fuel pump side and remove the right (outlet) bracket (E)  
*Note: this is a good moment to check the drain hose being unobstructed, by simply blowing into it.*
- 12) Position the new right bracket 71B230052N (E), route the fuel pump drain hose through the second largest opening (see below) and re-connect the drain hose to the fuel pump again and secure with the hose clamp.



- 13) Bolt the right bracket using the bolt and washer removed in step 10)



Aircraft Design Certification GmbH Reichensteinstr.48 69151 Neckargemünd		BRM Aero - replacement of oil cooler DC-045	Doc-Nr: ADxC-73-SB-015 Issue: A Date: 26.08.2022 ChangeNr.: ADxC-DC-73-045
Service Bulletin			

- 14) Use the replacement oil radiator P/N 886107, apply Loctite 243 to the inlet/outlet thread and screw the lower nut on both the radiator inlet and outlet threads.



*Note: before any action with the oil cooler is performed inspect the cooler for transport damage and check presence of caps preventing contamination of the cooler. If no caps are present, or in case of doubt, flush the oil cooler thoroughly. After removing the caps extreme care must be exercised to avoid entry of any objects.*

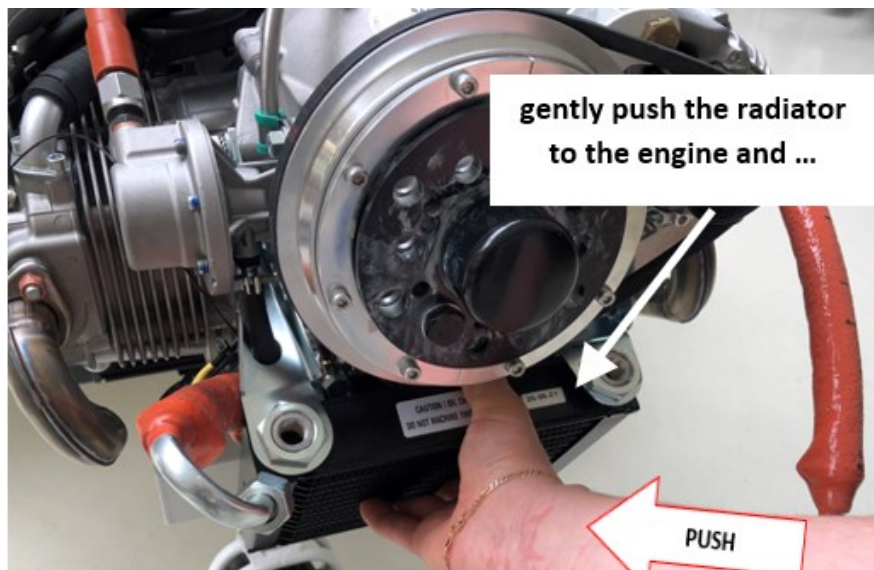
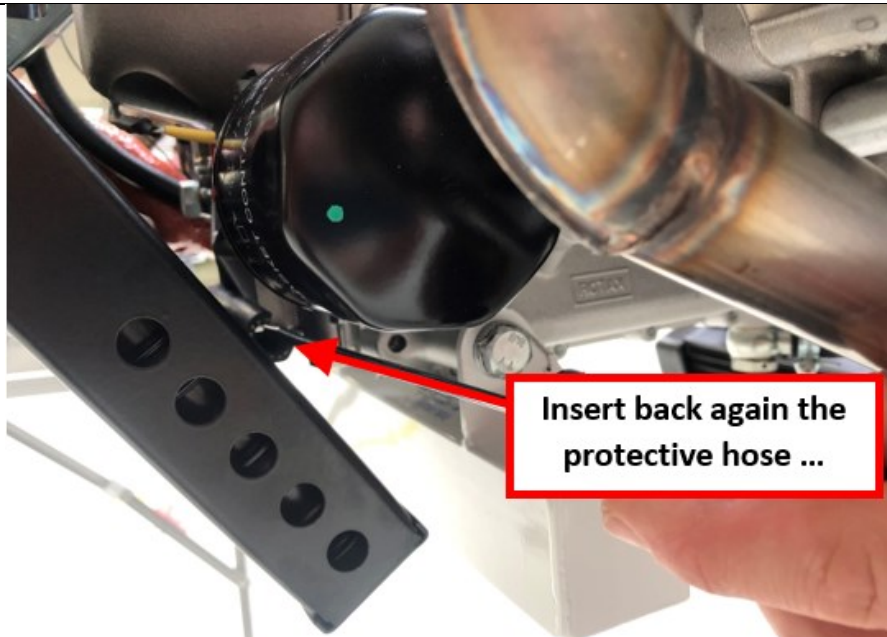
- 15) Apply Loctite 243 to the thread again and mount the oil radiator on the brackets so that the upper nut is approximately flush with the inlet/outlet tube ends.




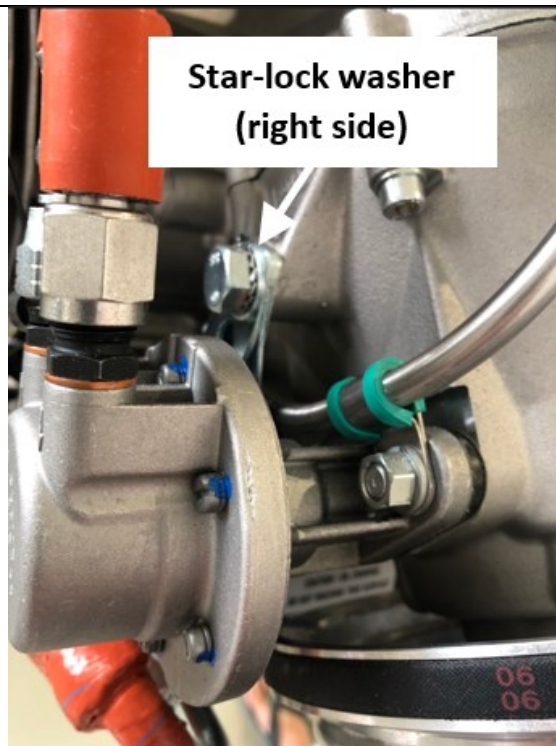
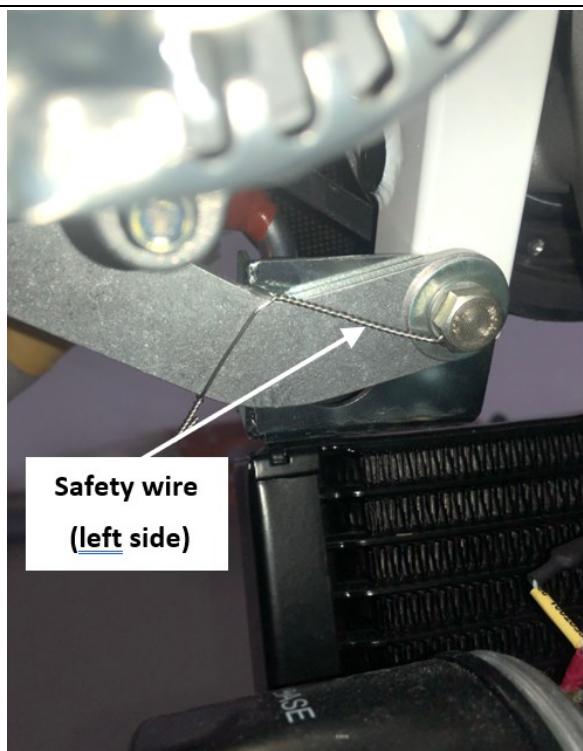
- 16) Tighten the lower nuts against the bracket (torque moment: M8 20-22Nm M10 40-42Nm)
- 17) Insert back again the protective hose (see the Note in step 5) between the radiator and the oil pump, gently push the radiator to the engine and tighten the bolts fixing the brackets to the engine (left/right). Secure with safety wire on the LHS and with new installed star-lock washer on the RHS (see pictures below)



Service Bulletin



Aircraft Design Certification GmbH Reichensteinstr.48 69151 Neckargemünd	 BRM Aero - replacement of oil cooler DC-045	Doc-Nr: ADxC-73-SB-015 Issue: A Date: 26.08.2022 ChangeNr.: ADxC-DC-73-045
Service Bulletin		



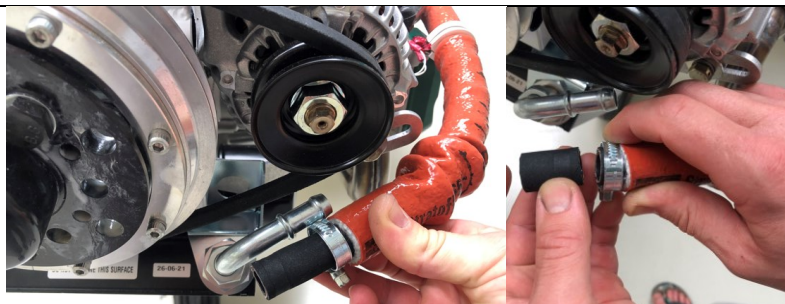
- 18) Install a new washer (H ; copper washer 20x14x1,5) on the reduction (B)
- 19) Apply sealing Loctite 577 to both reduction nuts (they must be cleaned oil free), screw the reductions in the radiator and tighten with a wrench size 19.



- 20) Remove the tape on the end of the protective sleeve on both inlet and outlet hose, slide the fire protection sleeve back to get to the hose clamp and cut and remove safety lock wire.
- 21) Release the hose clamp (wrench size 7) and pull the bend steel fittings (left 180°, right 90°) out of the hose.
- 22) To define the correct hose length, mount the steel fitting on the radiator inlet/outlet, route the hose parallel to it and cut to an appropriate length. Usually about 20 mm of hose need to be cut. Repeat for the fire sleeve.



Service Bulletin




- 23) Slide the hose onto the steel fitting, tighten with the hose clamp and secure with a safety lock wire.



- 24) Pull the protective sleeve over the clamp and wrap with termination protective tape.  
25) Tighten the fitting on the radiator with a wrench size 19 and 22 (Torque moment)  
26) Final installation:



- 27) Check and tighten all connections  
28) Remove the bayonet cap of the oil reservoir  
29) Purge the oil according to ROTAX Service Instruction SI-912 i-004R3 / SI-912-018R4  
30) Fill in oil according to AMM turn the propeller slowly by hand in direction of engine rotation several times to pump oil from the engine into the oil tank. Follow the AMM.  
31) Check oil level and add oil if needed. (new cooler has ~50ml greater volume, total volume now approx. 3.65 liter).  
32) Install bayonet cap.  
33) Make pre-flight check acc. to AMM/AFM.

Aircraft Design Certification GmbH Reichensteinstr.48 69151 Neckargemünd		BRM Aero - replacement of oil cooler DC-045	Doc-Nr: ADxC-73-SB-015 Issue: A Date: 26.08.2022 ChangeNr.: ADxC-DC-73-045
Service Bulletin			

- 34) Start the engine and perform the engine run test according to the AFM and Rotax engine operator´s manual.

*Note: for engine run after oil system work safety precautions are recommended (observer with firefighting equipment)*

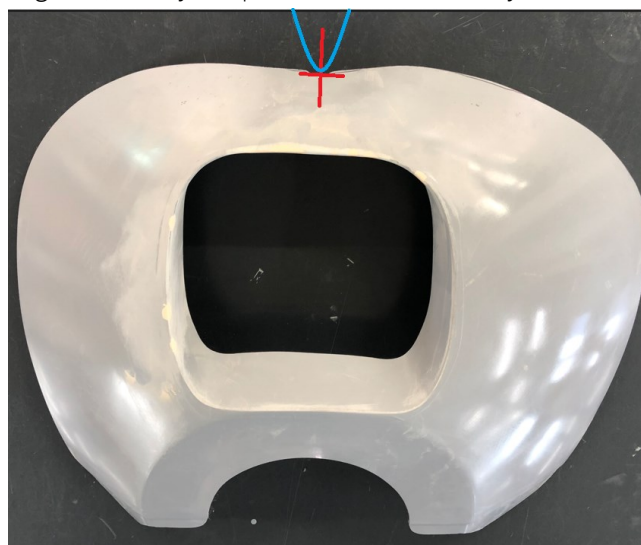
- 35) Check for leaks of the oil system
- 36) Install the modified cowling (acc. to the AMM), for modification see instructions below.
- 37) Check oil level and add if necessary.

#### Modification of the lower engine cowling


- 1) Cut-out the inlet opening in the engine cowling so that the replacement inlet part fits into the cowling. This is preliminary cut and does not require specific tolerances.



- 2) Position the replacement inlet part to the cowling so that the NACA inlets (shown blue) are aligned (modify the pre-cut-out if necessary)



- 3) Install the cowling on the airplane and check again that the NACA inlets are aligned, and the inlet position corresponds to the oil radiator correctly. If needed, make according adjustments.

Aircraft Design Certification GmbH Reichensteinstr.48 69151 Neckargemünd		BRM Aero - replacement of oil cooler DC-045	Doc-Nr: ADxC-73-SB-015 Issue: A Date: 26.08.2022 ChangeNr.: ADxC-DC-73-045
Service Bulletin			

*Note: any cutting and trimming shall never be done in close proximity of the aircraft.  
The carbon dust is easily damaging joints and bearings as well as potentially  
shortcutting electric equipment.  
Never perform lamination or adhesive work in workshop areas where lubrication of any  
type, oil, grease or fuel is handled!*

- 4) Position the replacement inlet part to the cowling and accurately outline the shape on the engine cowling.
- 5) Mark the outline of the replacement part on the cowling:



- 6) Cut the lower section of the replacement part (side of the NACA-incision, shown upside down in the pictures) about two inches from the edge and mark again on the cowling:



*Note: the NACA inlet incision on the replacement inlet part serves only for correct alignment of the replacement inlet part with the engine cowling. In this step the NACA incision on the replacement inlet part needs to be removed! Do not cut the NACA inlet on the cowling!*

- 7) Following the outlined shape make an accurate cut-out in the engine cowling. (in red marked the pre-cut-out area that is already removed)

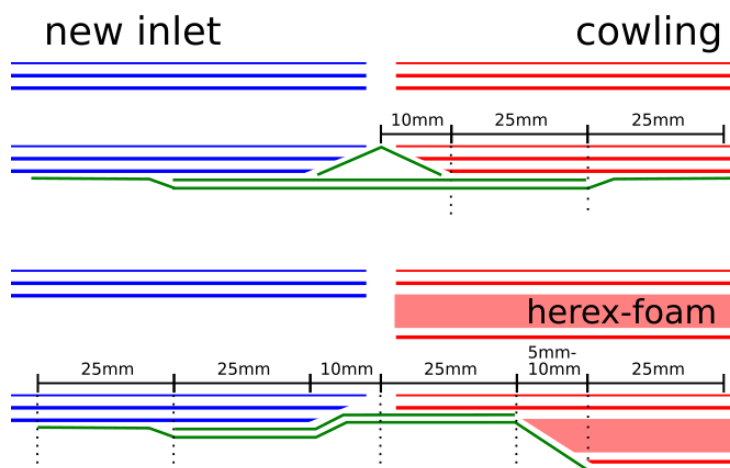
Service Bulletin



- 8) Remove the peel ply fabric from inside of the replacement inlet part.
- 9) From the outside of the cowling, apply the position the inlet part into the cowling cut-out and fasten it thoroughly from the outside with tape. Inside the cowling, grind the composite parts around the cut-out as shown in the schematics below (depending if herex-foam is part of the lay-up or not)


*Note: in contradiction to common assumptions, the surfaces of removed peel ply are NOT a good basis for adhesive bonding. All surface onto which new laminate is placed must be sanded (grade 80) and cleaned for preparation.*

- 10) Laminate the joint with two layers of carbon fabric (CARBON GG 200 P PLAIN (45°) 200g/m<sup>2</sup>; shown green) with following layup positioned +45° locally to the cut line:




*Procedure:*

- Mixing ratio of epoxy and hardener is 100:40 ± 2% of weight ratio. Mix for minimum 1minute
- Use paraffin free mixing pots
- Prepare a scratch test sample after mixing (little quantity in a plastic container – alternatively use excess resin in mixing pot).
- The pot life of the LG285+LH286 mixture is 90min at room temperature.
- Use scales with at least 0.5g resolution to enable adherence to the +/-2% tolerance
- Cure at room temperature for minimum 24h prior handling
- Check scratch sample before proceeding. If sample does not show polymerization resulting in brittle debris when scratched with a nail or sharp knife contact BRM/ADC

Aircraft Design Certification GmbH Reichensteinstr.48 69151 Neckargemünd		BRM Aero - replacement of oil cooler DC-045	Doc-Nr: ADxC-73-SB-015 Issue: A Date: 26.08.2022 ChangeNr.: ADxC-DC-73-045
Service Bulletin			

- 
- *Regular post cure cycle is 8h at 60°C – for the low loaded element a post cure at elevated temperature of min 50°C is sufficient. Heat up and cool down rates shall not exceed 1°/minute.*
  - *Do not expose the new joint to significant force prior post cure.*
- 11) Apply peel ply fabric on the laminated parts
  - 12) After resin hardening pull off the peel ply fabric from the inside and grind sharp edges if necessary.
  - 13) On the outside filler the connection gap until a smooth surface is reached
  - 14) Re-paint the cowling accordingly.
  - 15) Perform the engine run test according to the AFM and Rotax engine operator´s manual.
  - 16) Complete the aircraft records (logbook) to reflect compliance with this Service Bulletin.
  - 17) Make a logbook entry and add note to aircraft CAW documentation that this Service bulletin has been incorporated.
-



Aircraft Design Certification GmbH Reichensteinstr.48 69151 Neckargemünd		BRM Aero - replacement of oil cooler DC-045	Doc-Nr: ADxC-73-SB-015 Issue: A Date: 26.08.2022 ChangeNr.: ADxC-DC-73-045
---	---	---	---

## 4 Service Bulletin

## 4 Appendix

- *NIL*