

RotorSport UK Ltd

Service Bulletin

This form is the response from RotorSport UK Ltd either against a problem found in the product in service requiring a containment or rectification action, or as service information for aircraft modification incorporation. Upon completion of the action, the person responsible must enter details into the aircraft logbook/worksheet with the SB and/or CAA MPD (Mandatory Permit Directive) number and sign as normal (see instructions below). For help, contact RotorSport on 44(0)1588 650769, or email info@rotorsport.org.

SB No.: 050 Iss1	CCAR No.:	Classification:
Aircraft type & model (applicability) Calidus	Aircraft serial Nos. effected RSUK/CALS/any prior to 018	OPTIONAL RECOMMENDED or MANDATORY

Problem description & cause of problem if known

The present design of rotor is limited to 700 hours flight time (by MPD 2011-006-E which supercedes MPD 2010-008 R1). Approval of MC-175 by CAA authorises fitment of a new common rotor system to MT-03, MTOsport and Calidus aircraft. Rotorsystem II blades utilise a rotor-blade extrusion (BT666) first used on Calidus aircraft and this SB describes how to modify an original Calidus blade BG228 to RotorSystem II configuration. After modification to this bulletin each rotor blade will be equivalent to BG1794 and when a pair of blades are assembled to the hub-bar assembly BG1795 the whole assembly will be equivalent to BG1793 (Rotorsystem II 8.4m Cruise)

Effective date: 15.09.11

When built into Rotorsystem II, any blades modified in this way will have extended life. The life limit is dependent on the accumulated service life before modification but for <200hrs accumulated the life limit is 2,500hrs. For accumulated service life above 200hrs refer to RSUK for further assessment

Critical Safety Notes:

- 1) A rotor blade modified as described by this SB must only be used in a Rotorsystem II assembly, ie mated to a Rotorsystem II hub bar assembly. It must not be used in conjunction with an earlier hub bar.
- 2) This SB must only be implemented by RotorSport UK Ltd

Safety effect:

Increased service life, more benign handling

Weight and CG effect:

Can be assessed only in the context of a complete RotorSystem II installation – refer to SB-039 for Calidus installation.

Safety warning

The Hexion MGS Paste 20 is a two-pack resin system supplied in cartridge form for use with a static mixing nozzle. The mixed material is subject to an exothermic reaction and adequate skin protection must be used. In order to aid manual application the paste should be used at a temperature of 20-40degC and the first material extruded from the mixing nozzle should be discarded until the colour is homogenous (typ 5-15g waste). The resin develops its maximum mechanical strength only after post-curing at elevated temperature (3hrs at 50-60degC).

Action required to implement this bulletin:

A) Preparatory work:

1. Remove the rotor from the aircraft as described in the Pilots Handbook RSUK0060 Iss2 and Maintenance Manual RSUK0061 Iss3.
2. Dismantle the rotor noting the individual serial numbers of the blades and record the accumulated service time from the aircraft's log-book. Return the hub-bar assembly to RSUK
3. Visually inspect each blade – there must be no significant damage such as dents or deep scratches.
4. Weigh each blade and record its weight and condition
5. Position each blade in turn on a pair of plastic trestles
6. Using a 5mm drill carefully remove the countersunk head of the rivets retaining the end cap (6-plcs), drift the rivet shanks into the cavity of the blade and remove the orange end-cap. Discard the orange end-cap.
7. Carefully pull-out the inner cap from the blade. Retain for re-assembly.
8. Wearing suitable eye protection use a compressed air nozzle at the inner end to blow through each cavity

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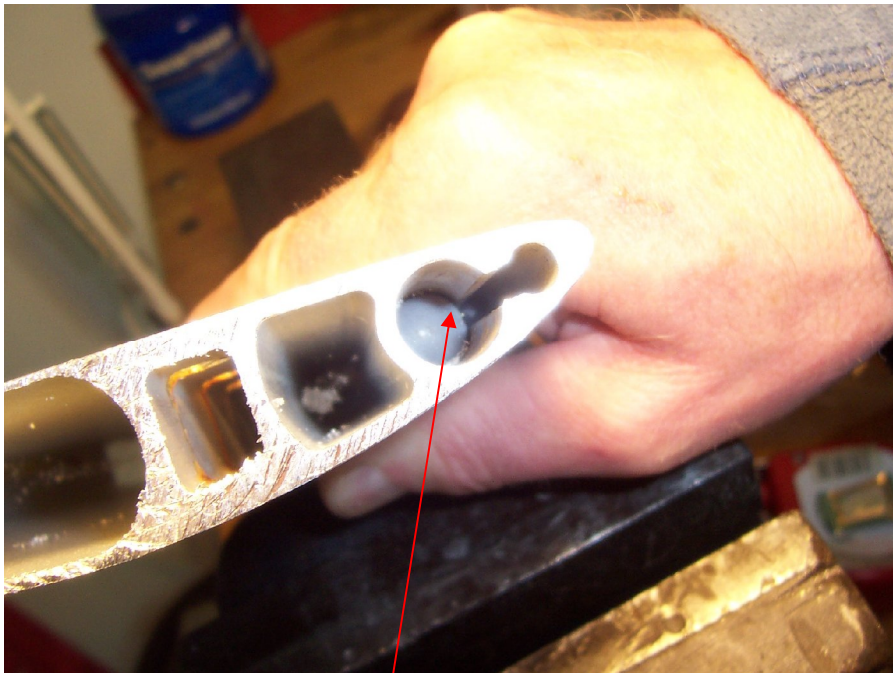
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- in the blade extrusion, in order to remove the rivet shanks and any balancing weights that may be present
- Using cylindrical magnet RSD4687 locate the inner end of each of the steel leading-edge balance weights (these are inside the nominal 6mm bore and the nominal 12mm bore approximately 1500mm from the blade outer end. Mark the end positions and measure each distance to the blade inner end (the distance should be approximately 2500mm).



Magnet RSD4687 on blade surface

- The next process stages confirm that there is no surplus adhesive inside the extrusion holes, so that the new weight extensions may be correctly positioned against the adhesive bead inboard of the existing balance weights. The photo below shows the clean adhesive bead expected.

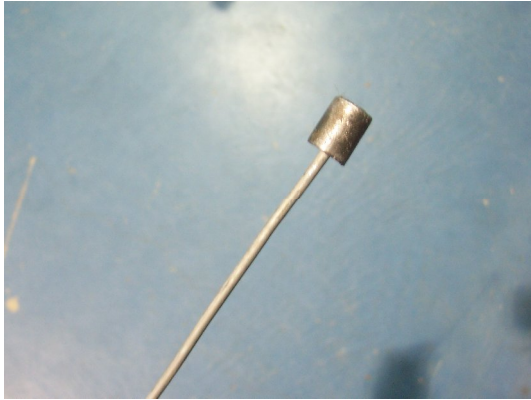


Cut section of blade showing the adhesive bead at the inboard end of the weights

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11. Using probe kit RSD4688 fitted with 12mm nose offer the end piece into the rotor's 12mm hole at the inner end. Push the tool forwards approximately 2000mm. Position the magnet on the blade surface so that it locates the end-piece through the aluminium extrusion. Slowly push forwards until the probe stops, the magnet will now show the position of the nose which must be within 5mm of the mark made previously. Remove the probe.
12. Repeat (11) with probe kit RSD4688 fitted with the 6mm nose and used inside the 6mm bore.
13. Weigh the steel weight extensions intended for the application. They must be matched in pairs with relative weight within 5g.
14. Weigh the aluminium tube inserts intended for the application. They must be matched with relative weight within 2g



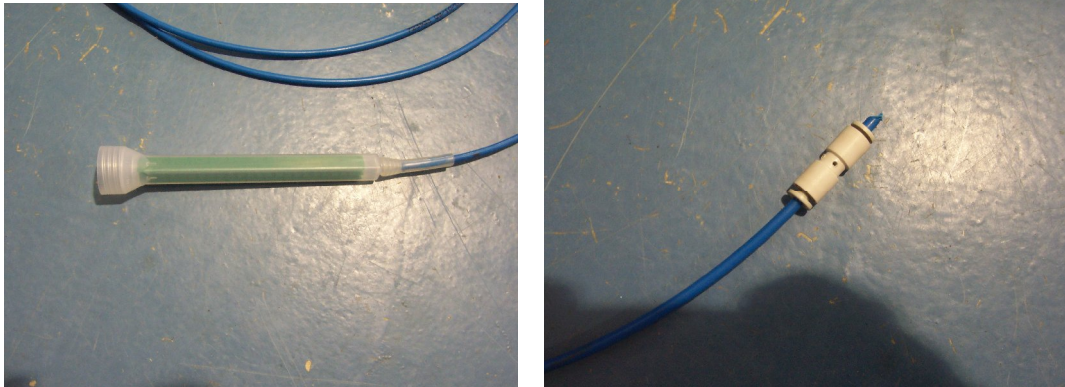
The 12mm nose of probe RSD4688

B) Fitting the weight extensions from the blade inner end. NB: Once started there must be no interruptions causing delay (and potential contamination):

1. Position each blade in turn on edge (leading edge downwards) in the wooden fixture RSD5175 with the inner end of the blade accessible.
2. Using probe kit RSD4688 fitted with the cleaning pad moistened with Amberklene LO30 clean the area immediately in front of the adhesive bead in the 12mm and 6mm holes. Remove the probe.
3. Using the special extended nozzles (6mm RSD5180, 12mm RSD5181) in turn fitted to the hand-gun RSD4677 inject MGS Paste20 into the 12mm hole and 6mm hole immediately adjacent to the 1500mm weight in the hole. Withdraw the nozzle 500mm whilst expelling adhesive (five strokes for the 12mm, 3~4 for the 6mm), unload the gun pressure then withdraw the nozzle fully.
4. Prepare the two 500mm balance weight extensions (6mm RSD5172, 12mm RSD5173) by rubbing with abrasive paper and degreasing with Amberklene LO30 on a clean rag. Then smear the surface with a thin priming coat of MGS Paste20.
5. Fit the two weight extensions simultaneously by pushing down the respective bore with metal rods. As the weight extensions enter the adhesive paste this will be extruded around them and between them (through the connecting slot). Keep pushing until it is evident that the weight extensions have butted against the standard installed weights. Remove the metal rods and using Amberklene LO30 clean-off any adhesive residue from the end of the blade.
6. Using the magnet RSD4687 identify and mark the inboard end of the fitted weight extensions

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The integral static mixer (left photo) and special 12mm nozzle (right photo) of RSD5181
The nozzle ejects adhesive radially to ensure placement of adhesive around the bore of the extrusion

C) Fitting the tube insert at the blade inner end NB: Once started there must be no interruptions causing delay (and potential contamination):

1. With a small piece of rag dampened with Amberklene LO30 clean-up the 14mm hole
2. Prepare the 300mm tube insert (RSD2081) by rubbing with abrasive paper and degreasing with Amberklene LO30 on a clean rag. (One end is pre-fitted with rubber bung RSD4676).
3. Extrude 5 gun-strokes of MGS Paste20 into the entry of the 14mm hole
4. Offer the bunged end of the tube insert into the 14mm hole. Simultaneously coat with MGS Paste20 from the handgun, rotate and push forwards until the end is exactly in line with the inner end of the rotor blade.
5. Push the 6-off 9dia PTFE rods RSD5174 (or lubricated bolts) through the rotor blade and tube insert. Clean-off ejected surplus adhesive.
6. Clean-off surplus adhesive from the tube end and carefully place the rotor blades into the heated chamber RSD4689. Allow to cure at 50-60degC for 3 hours before further work
7. Using gloves remove the rotor blades from the heated chamber and allow to cool to room temperature
8. Tap free the PTFE rods (or bolts), clean-up any flakes of adhesive and trial-fit 6-off rotor bolts. If any are excessively tight remove and pass a 9.00mm H7 reamer through the hole.

D) Replacement of end caps and check-weighing

1. Firmly push a RED end cap BT3818 into the outer end of the blade. Drill through the existing holes 3.0dia and fit 3x8 countersunk aluminium pop-rivet (RSD6062) to the 6-places.
2. Push the original inner cap into the inner end of the blade.
3. Weigh each blade. Each must be heavier than its pre-recorded weight by nominally 650g (made-up of 0.55kg weights, 77g tube insert, typ. 23g adhesive).

E) Static balance of rotor.

1. Assemble the rotor blades to the new Rotorsystem II hub-bar assembly (BG1795) in accordance with the AMM RSUK0061 Iss3.
2. Engrave the relevant rotor numbers into the hub-bar ends.
3. Remove but retain the inner caps
4. Set-up the rotor on the RSUK static balance fixture RSD5176. Set-up a slight oscillation to determine whether the rotors are in balance. If adjustment is required position selected weight-slugs (6mm RSD5170, 12mm RSD5171) on the weight extension marks (from B6 above). When satisfactory balance is achieved place a small sphere of MGS Paste20 on the end of the each slug and push into intimate contact with the end of the weight extension.
5. Replace the inner caps
6. Release the rotor assembly for re-installation on the aircraft under SB-039.

Parts required to implement this service bulletin:

2-off Calidus rotor blades with orange end-caps (BG228)

2-off 6mm x 500 balance weight extension RSD5172 (made from BT3789)

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2-off 12mm x 500 balance weight extension RSD5173 (made from BT3788)
 2-off Tube insert RSD2081 (BT3893)
 2-off Tube plug RSD4676
 6mm weight slug RSD5170 – as required
 12mm weight slug RSD5171 – as required
 Hexion adhesive MGS Paste20 (Two-pack) RSD4675 (with handgun RSD4677) – as required
 Amberklene LO30 aerosol solvent RSD4655
 12-off 3x8 csk pop rivet RSD6062
 Hub-bar assembly BG1795
 4-off rotor blade bolts BT661
 2-off rotor blade bolts BT3700
 2-off rotor blade bolts BT3699
 2-off rotor blade bolts BT3698
 2-off rotor blade bolts BT3697
 12-off washer BT3706
 12-off washer BT393
 12-off M8 nyloc nut BT121

Effect on Pilots Handbook or Maintenance Manual?
 Both significantly affected – refer to
 RSUK0060 Iss2 Calidus Pilots Handbook
 RSUK0061 Iss3 Calidus Maintenance Manual



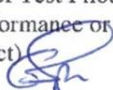
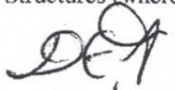
Service Bulletin Completion action

Issue Permit Maintenance Release Certificate

CAA BCAR A3-7 Authorised Person (NB: this SB must only be implemented by RotorSport UK Ltd) to certify that the work is completed by writing 'SB-050 Rotor blade upgrade incorporated as part of SB-039 in the aircraft logbook white pages, and record the action in the pink pages entitled 'Aircraft Modifications'. Both entries must be signed by the CAA Authorised Person together with their CAA Authorisation number.

*The technical content of this document is approved under the authority of the UK CAA
 Design Organisation Approval Ref: DAI/9917/06*

SB authorised by: (name, signature, and date of signature)

Quality Conformance Manager  20/9/11	Engineering Manager  20/9/11	Chief Test Pilot (if flight performance or safety effect)  20/9/11	Structures (where required)  20/09/2011
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Document completion date:	Issued to:	When	Issuer name	Signature
	Internal			
	CAA			
	Owners			
	LAA/BMAA Inspectorate			

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Appendix 1 to SB-050

Aircraft serial no. Registration G-	Service Bulletin implementation Worksheet	Date raised: Raised by:	
Purpose – record service bulletin implementation actions.		Document reference: SB-050	
Aircraft Maintenance Manual (AMM) referred to and issue level/date:			
Note; attach SB sheets to this document			
Task	Notes	Eng'r check/date	Inspector check/date
Record serial number of rotor blades subject to this SB action, together with flight hours to-date.	Blade serial no: Blade serial no: Rotor accumulated flight hours: Safe Life (in hours) remaining:		
Inspect rotor blades for damage.	Stop implementation of this SB if unacceptable (see AMM for damage assessment criteria)		
Record weight of each blade as received	Blade serial no.....weight: Blade serial no.....weight:		
Record batch number and “use-by” date of adhesive			
Record weight of each blade after modification	Blade serial no.....weight: Blade serial no.....weight:		
Confirm red end caps fitted and rivets secure (6-plcs each cap)			
Confirm static balance satisfactory			
Confirm inner caps fitted and secure			
Customer acceptance: Name:		Aircraft hobbs meter reading	
Signature/date:		Confirm logbooks annotated:	
Permit Maintenance Release – see PMR statement under related document SB-039			
Engineer/Inspector signature Name: CAA Authorisation code :		Date of work Location where work completed	