

SUBJECT : Retrofit of wingtips with winglets

EFFECTIVITY : DG-300 all models (optional)

ACCOMPLISHMENT : Not applicable

REASON : The wings may be equipped with removable wingtips with winglets to improve performance.

INSTRUCTIONS : 1. Installation of the wingtips with winglets according to working instructions for TN 359/17 and drawings 3F 52 and 3F 53.
2. Exchange page 0.1 of the flight manual and insert pages 2a, 7.1, 7.2 and 7.3, issued October 1995.
3. Inspection at major modification.
This inspection consists of the following items:
a) Inspect instructions 1 and 2
b) Write an inspection report with the following note:
Inspection after retrofit of wingtips with winglets according to GLASER-DIRKS Technical Note No. 359/17.

MATERIAL : Flight manual pages 0.1, 2a, 7.1, 7.2, 7.3 issued October 1995
Working instructions for TN 359/17
Drawing 3F 52 and 3F 53
1 Retrofit kit wingtips with winglets see material list in working instructions for TN 359/17

WEIGHT AND BALANCE : Influence negligible

REMARKS : Instructions No. 1 and 3 are to be executed by the manufacturer or by a licensed workshop and be inspected and entered in the aircraft logs by a licensed inspector.

Bruchsal 4, date
Oct. 16, 1995

Author: W. Dirks

Type certification inspector: A. Lange

LBA - approved:

The German original of this TN has been approved by the LBA under the date of 29. Nov. 1995 and is signed by Mr. Fendt. The translation into English has been done by best knowledge and judgement.

Note: Instructions are for one wingpanel. The work should be executed on both wings simultaneously.

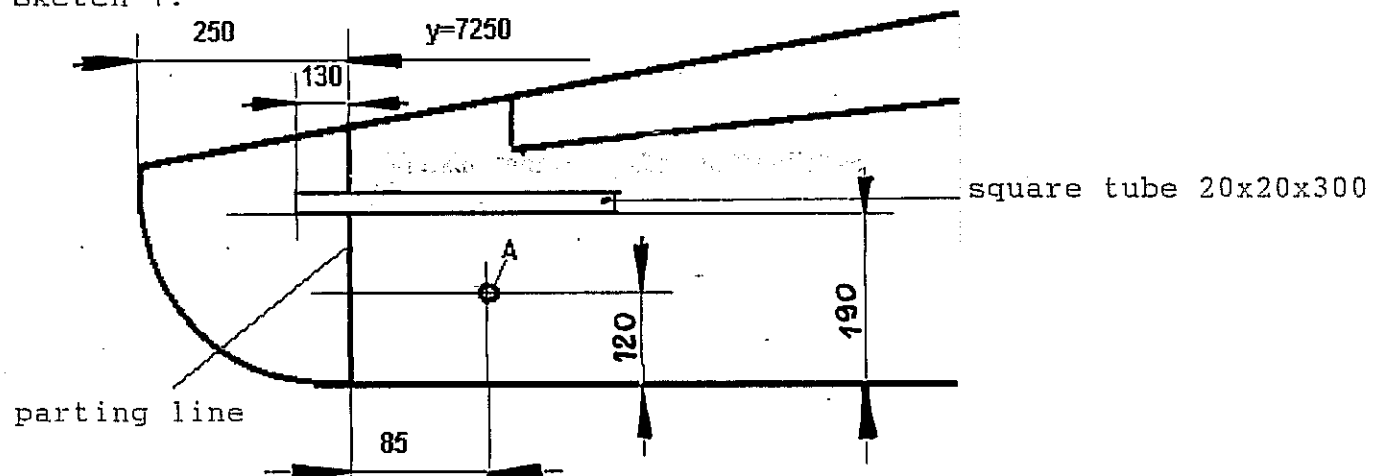
1.1 Mark the parting line on both wingtips on upper and lower surface at station $y=7250$. This station is 250mm from the most outboard end of the wingtip in inboard direction. Measure parallel to the wing leading edge. Mark this section over the whole wing chord 90° to the wing leading edge.

Cut the wingshell at the inboard side of the marked line manually with a hack-saw. Cut upper and lower surfaces separately and make sure that both cuts are in one plane vertical to the wing lower surface.

1.2 Draw another line on the wing upper surface parallel to the leading edge 190mm behind the leading edge, 300mm long according to sketch 1. Prepare two square tubes 20mmx20mmx300mm. Fix a tube with double sided selfadhesive tape at the line.

Mark hole A according to sketch 1 and drill it with a dia. 10mm drill through the upper wing surface.

Sketch 1:



Also please refer to drawing 3F53.

1.3 Hold wingtip with winglet in position at the wing and lift it so far, that the upper surface of the wingtip touches the square tube over its whole length. Only the leading edge of the square tube will touch the wingtip surface (at 190mm behind leading edge). Check if the gap at the parting is of constant width. Check with a 4mm Allen key wrench if the locking pin 3F45 can be screwed through the centre of hole A. If necessary adjust the gap by sanding away excess material.

1.4 Remove the outboard end of the blowing air duct (not applicable to DG-300 Club) according to drawing 3F53 up to $y=7230$ mm and completely inside the wingtip. Don't damage the inside glassfibre layer of wing and wingtip.

Grind away the wingspar caps up to $y=7230$ mm if they exceed this station.

1.5 Roughen all glue areas for reinforcement layers, ribs, foam strips and suspensions with 60 grit sandpaper. Also make sure that the edges of the spar caps are roughened.

1.6 Remove the foamcore of wing and wingtip at the parting line 5mm deep.

1.7 Now laminate the reinforcement layers B (2x92130, 90x45mm) in the area of the suspension 3F48/1 on lower and upper wing inside surface according to drawing 3F52. Therefore impregnate the layers on a plastic foil and fill the edges and any holes at the sparcaps with BW-resin (resin mixed with cotton flocks). Apply peel-ply on top of the reinforcement layers.

Close the open end of the blowing air duct with a piece of foam H60, 6mm thick and with BW-resin according to drawing 3F53. Make sure, that there are no holes in the resin.

1.8 Replace the removed foam core at the parting line see item 1.6 by a mixture of microballoons and resin at wing and wingtip.

1.9 The next step is to glue the suspension 3F48/3 (for the wingtip) onto the tube 3F41 with BW-resin. Check first that gluing areas are roughened and degreased. To get the correct position assemble the suspension 3F48/1 to the tube and screw in the locking pin 3F45 with an Allen key wrench. Both suspensions must be parallel. Place the assembly on a flat board for curing.

1.10 Let all parts cure properly.

2.1 Peel off the peel-ply from the reinforcement B inside the wing. If there are spots which are not roughened, abrade with sand paper. Rub down excess microballoon filler from wing and wingtip at the parting line.

2.2 Place rib 3FE30 (right) or 3FE31 (left) on the root rib of the wingtip with winglet. Make shure, that the bolts 3F43 fit into the bushes 3F44 with zero freeplay. Remove suspension 3F48/1 from the tube of the wingtip and assemble it to the tube of the wingtip with winglet. Now try to fit the assembly to the wing.

If this is not possible grind away from the suspension 3F48/1 as far as necessary. The upper surface of the wingtip must touch the square tube, see item 1.3.

Remove the assembly again and remove the suspension 3F48/1 from the tube and remove the rib 3F30 respectively 3F31. Mark the suspensions for right and left wing assembly.

Apply release agent to the rootrib and to the tube of the wingtip with winglet, let dry.

2.3 Assemble rib and suspension again, see item 2.2. Seal the holes of the suspension on upper and lower side with plasticine. Make sure that no plasticine is applied to the glue surfaces.

Remove excess plasticine with acetone if necessary.

2.4 Glue the foamstrips C (Divinycell H60 6mm thick. 90mmx15mm) with a little polyester resin into wing and wingtip according to drawings 3F52 and 3F53. Make sure that no polyester resin is applied to the glue surfaces for rib and suspension. If this can't be avoided, roughen or grind away the polyester after curing.

2.5 Now the rib and suspension which are assembled to the wingtip with winglet is to be glued into the wing. Apply epoxy resin to all glue areas and to all surfaces of the wooden suspension. Then apply BW-resin to the glue surfaces of the rib and inside the wing for the suspension. Insert the assembly into the wing Make sure that the positioning is correct according to item 1.3. Fix the assembly in this position with tape and wooden sticks. Allow to cure.

3.1 After curing unscrew the locking pin 3F45 via hole A. If necessary remove excess resin with a 10mm drill first, be very carefully! Now remove the wingtip with winglet.

3.2 Check if rib and suspension are properly glued or if there are resin voids, roughen faulty areas and apply BW-resin accordingly. Sand away excess resin.

3.3 Now apply release agent to the wing at the parting lines and to the root rib, allow to dry.

Assemble the rib for the wingtip 3F32 (right) or 3F33 (left) to the wing. Make sure that bolts and bushes match with zero freeplay. Assemble the tube 3F48/3 to the wing, screw in the locking pin.

3.4 Assemble the wingtip and check if its upper surface is touching the square tube. If necessary grind away from suspension 3F48/3 accordingly. Remove the wingtip and the rib again and apply resin to all glue surfaces. Make sure, that the hole for the tube in the rib and the glue areas of the tube are roughened and degreased.

3.5 Apply BW-resin into to the hole of the rib and to the tube and place the rib in position. Then apply BW-resin to the rib and inside the wingtip at the location of the suspension. Position the wingtip and check that the gap at the parting line is of constant width and that the upper surface of the wingtip touches the square tube.

3.6 Fix the wingtip in this position with tape. Allow to cure.

3.7 Prepare a thinner mix of resin with cottonflocks to glue tube D (10x1x20mm) into hole A. It is advisable to close the tube at the lower end with plasticine. Before the resin starts to cure push the 4mm Allen key wrench through the plastiline into the locking pin to make shure, that the pin can be screwed out. Leave the Allen key wrench in position until the resin is cured.

4.1 Screw the locking pin upwards and remove the wingtip. Check if the rib is glued properly or if resin is missing at certain places. Roughen unproper spots and apply BW-resin accordingly. Sand away excess resin.

Remove all plasticine from tube D and grind off the tube until it is flat with the wing surface.

4.2 Post cure wingtip and outboard part of the wing assembled at 54°C for a min. of 16 hours.

5.1 Paint work.

List of materials included in the retrofit kit

pcs.

- 1 wingtip with winglet right complete, but without paint work
- 1 dto. left
- 1 rib wingside right 3FE30
- 1 dto. left 3FE31
- 1 rib for wingtip right 3FE32
- 1 dto. left 3FE33
- 2 suspensions wingside 3F48/1 (wood with bush 3F42)
- 2 suspensions for wingtip 3F48/2 (wood, no bush)
- 2 tube 3F41 (locking device installed)
- 1 aluminium tube 10x1 40mm long
- 2 wingtip skids 17F22
- 4 screws M6x30 DIN 964-4.8zn
- 1 glasfibretape 92130 45mm wide 400mm long
- 1 Divinycell foam H60 6mm thick 120x200mm
- 1 Allenkey wrench 4mm with T-handle

Further materials not included in the kit

- appr. 0.8 kg epoxyresin MGS L285 with hardener MGS H286
- appr. 1 kg Lesonal Schwabbellack with hardener and thinner
- appr. 0.1 kg Microballoons
- appr. 0.1 kg cottonflocks
- appr. 0.1 m² peel-ply
- plastlice
- release agent
- 2 square tubes 20x20x300mm aluminium or steel
- double sided tape
- tape

Bruchsal Nov. 5. 1995

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Type certification inspector: W.Dirks