COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF TRANSPORT

AIRWORTHINESS DIRECTIVE GLIDERS GFA AD/130 FFA 4

GLIDER TYPES AFFECTED: Diamant 16.5 and 18 Serial Nos. 11 to 80

BACKGROUND:

Inadequate bonding between spar cap and shear web cannot be ruled out.

REQUIRED ACTION:

Carry out inspection as per the attached Service Bulletin Diamant No. 07 (comprising of 11 pages) before further flying.

The Service Bulletin is an integral part of this AD.

COMPLIANCE:

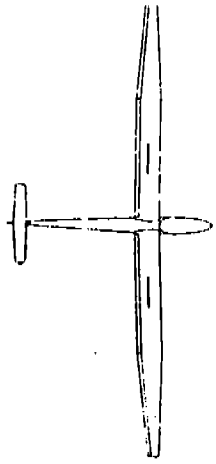
This directive is mandatory.

This directive is issued pursuant to Air Navigation Regulations under the delegated authority of the Secretary of the Department of Transport.

Douglas Lyon

(Douglas Lyon)
CHIEF TECHNICAL OFFICER AIRWORTHINESS
GLIDING FEDERATION OF AUSTRALIA

Date of Issue: 20th February, 1979.



DIAMANT

December 1978 No. 07

SERVICE BULLETIN

Mandatory

INSPECTION AND REPAIR OF BONDING IN WING

1. Planning information

1.1 Applies to the following gliders:

Type : DIAMANT 16.5 and 18

Serial Nos. : 11 - 80

1.2 Reason: Inadequate bonding between spar cap and shear web cannot be ruled out.

1.3 Purpose of the present bulletin:
- Inspection of the hat-section bonding (Appendix I)
- Repair of inadequate bonding (Appendix II)
- Improving the bonding between upper hat-section and shear web (Appendix III)

1.4 Compliance: Mandatory before lifting restrictions of Service Bulletin No. 06, but not later than 1500 flying-hours for S/N 26-80 and 1000 hours for S/N 11-25

1.5 Approval: Approved by the Swiss Federal Air Office for Airworthiness Directive.

1.6 Man power

1.6.1 Inspection: 4 hours
1.6.2 Repair : 6 hours per reinforcement (if required)
1.6.3 Appendix III: 10 hours

1.7 Materials: See appendices I, II, and III

1.8 Tools: See appendices I, II and III

1.9 Weight: Appendix II according to the extent of repair
Appendix III: 1,8 lb

1.10 Balance: Negligible effect: Arm 13,58 in (345 mm).

1.11 Reference to other publications: Repair Manual FV-816
Flight Manuals FV-818, FV-819 (D 16,5)
FV-820, FV-821 (D 18)

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FFA
Flug- und Fahrzeugwerke AG
Altenrhein
CH-9422 Staad SG

1.2 Execution: The inspection and the repair work shall be performed by an approved fiberglass glider repair shop, e. g.

Europe:	REPAIR AG CH-9423 Altenrhein Switzerland
Austria:	Flughafen Wien Betriebsgesellschaft Segelflugzeugwerkstätte A-1300 Wien
Great Britain:	John Hulme 10 Turnbridge Lane, Bottisham, Cambs., England.
USA:	- Fred Jiran Glider Repairs Mojave Airport, Bldg. 6 Mojave, Calif. 93501 Phone: 805-824-2800 USA
- Avtec Corp. 1433 Industrial Way P.O.Box 1328 Gardnerville, Nevada 89410 USA	- Sprague Aviation Glenside Circle Lafayette. Calif. 94549 USA
	- Smitty's Soaring Service Deansboro Road RT 12 B Clinton, New York 13323 USA
South Africa:	J.C. Dunbar & Sons Dunbar House 684 Main Pretoria Rd. Johannisburg South Africa 786-2720
* Australia:	

2. Inspection instructions: See appendix I

3. Repair instructions: See appendices II and III

After complying with the Service Bulletins Nos. 07 and 08 the restrictions of Service Bulletin No. 06 are no longer applicable and the glider is cleared to fly within the limitations of the Flight Manual. Service Bulletin No. 06 is cancelled.

This Service Bulletin shall be kept with the Technical Documents. Its compliance shall be entered in the log book and reported to the manufacturer.

* Australia
Glider Repair and Overhaul Services, Tocumwal Aerodrome, Tocumwal, N.S.W. 2714
Bacchus Marsh Aviation Services, Aerodrome, Bacchus Marsh, Vic., 3340
Edmund Schneider Pty. Ltd., Two Wells Road, Gawler, S.A. 5118.

Instruction for visual inspection of the bonding between spar cap and web

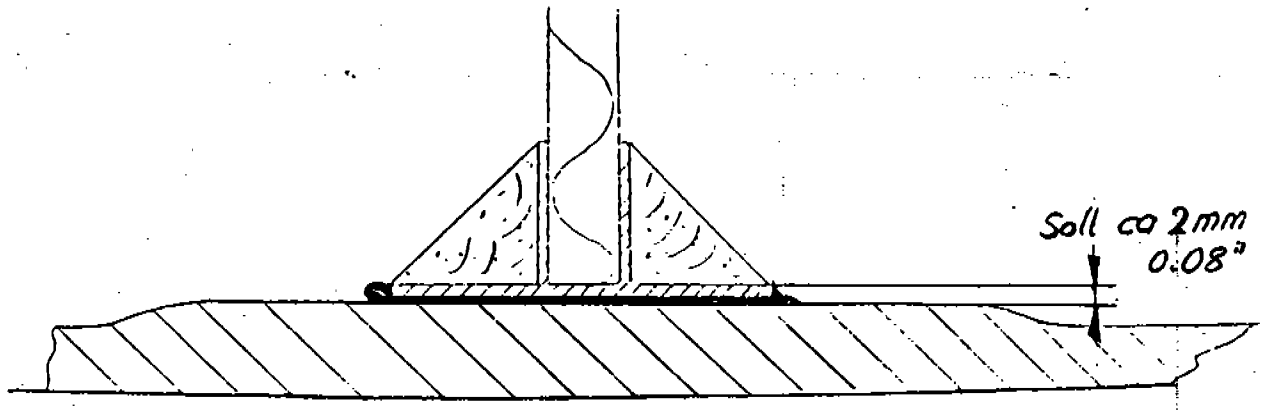
Tools:
- Hand drill with drill bit 1/8" Ø x 8 in long
- Tube 3/16" x 1/8" I.D.
- Strip lamp or narrow beam lamp
- Angled mirror or fiber optics intrascope, if available
- "Long" hook probe (AWG 20 wire bent 90 degrees, 2" long, fixed to a rod 10 ft long)
- "Short" hook probe (AWG 20 wire, 0,08 in hook bent at 90 degrees)

Materials: None

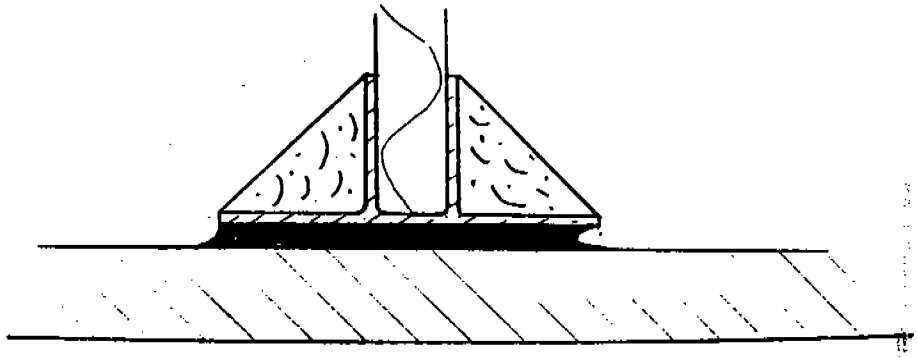
Procedure:

1. Lay wings on trestles the right way-up.
2. Remove covers in bottom wing panel
3. Insert strip lamp through holes in root rib.
   Inspect forward facing bonding seams up to tank rib, rearward seams up to 9 ft from root rib.
   Inspect bonding seams directly or by means of the angled mirror through the access holes in the root rib using the following criteria:

   3.1 The bonding may be considered to be satisfactory, if the resin has oozed, often in drops, out of the bonded joint. The height of the hat section flange should be less than 0,08" above the skin panel surface to ensure a thin bonded joint.



   3.2 Overthick bonded joints may well include entrapped air bubbles, if the resin had not been properly squeezed out. Receding glue line must be viewed with suspicion. In both these cases a repair according to Appendix II must be carried out. The extent of the fault will be determined by means of probe drillings. Probe drillings shall be carried out within the suspected area, starting from inboard, in accordance with para. 4.



3.3 If receding glue line is detected, estimate depth of same with probe hook and mark spanwise position on opposite wing surface. Repair according to Appendix II of this Service Bulletin.

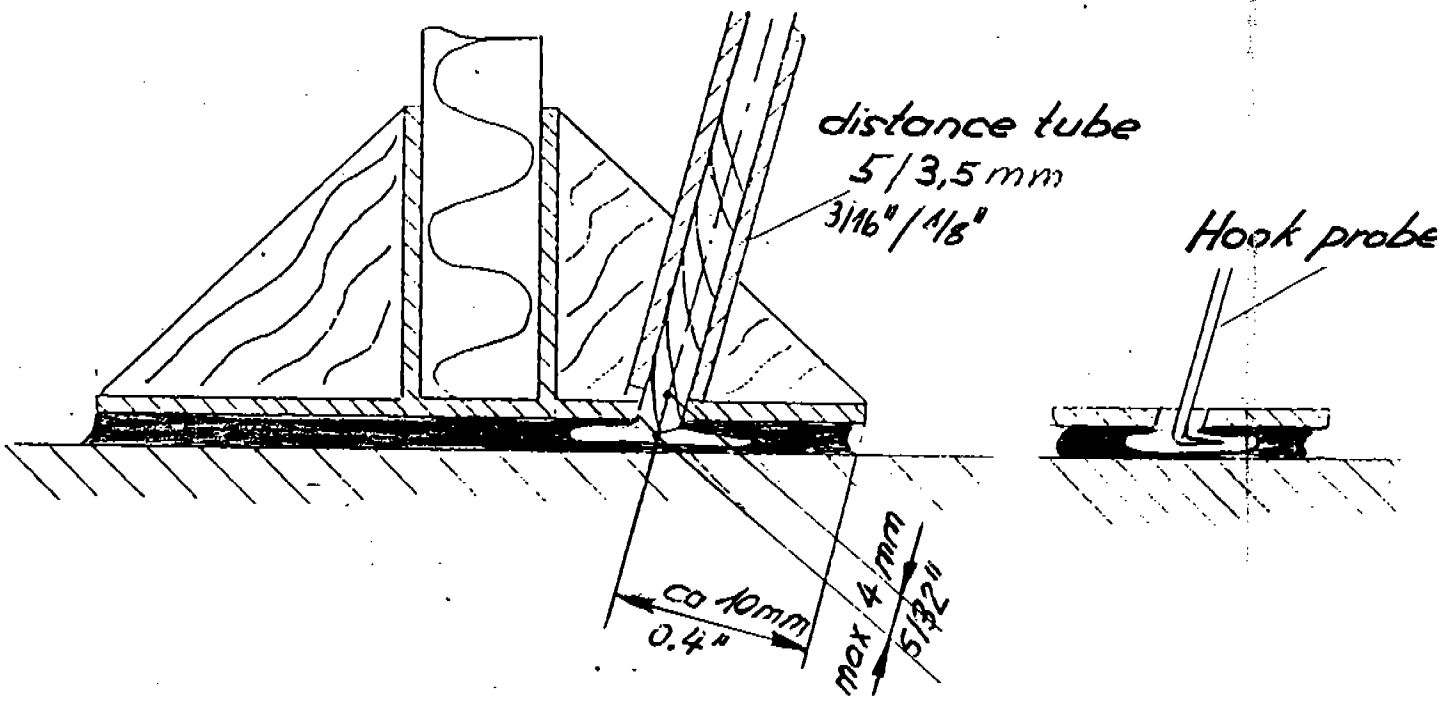
4. Probe drillings shall be executed as follows:
If the defect is in the lower spar cap, leave the wing in normal position (for attention to the top spar cap all sitings are reversed).

4.1 Find chordwise spar cap edge position by tapping upper surface with pencil, observe the change of note and mark.

4.2 Drill 0,2" dia. hole (avoiding spar cap) in wing surface opposite to the suspected area.

4.3 Using long 1/8" dia. drill, slip over a 3/16" distance-tube, so that the drill point protudes 5/32".

4.4 Drill 1/8"dia. hole into foam corner fillet of hat section, through hat section flange and into thick joint according to figure below. Cavity will be felt when drilling. If not, introduce "short" probe hook and see if cavity can be felt.



4.5 Repeat probe drillings cca. 1 in inboard and outboard of the first hole using the same hole in the upper wing skin.

4.6 Repeat steps 4.2 through 4.6 using a new hole drilled 3" outboard of the first hole in the top surface, to be repeatd until the range of the suspected joint defect has been covered.

5. Where no cavities have been found, the holes may be filled in after completion of operations of Appendix III.

6. If cavities have been found, repairs according to Appendix II of this Service Bulletin must be carried out.

Instruction for repair of inadequate bonding

Tools:
- Hand drill
- File
- Syringe with tube Ø 3/16 x 1/8" I.D., 7" long
- Bonding equipment

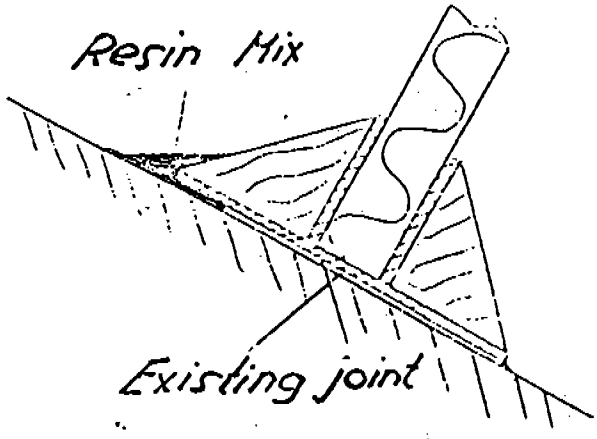
Materials:
- Resin XB 2878 A 100 parts by weight
- Hardener XB 2878 B 36 parts by weight
- Glass fabric No. 140
- Foam core

Procedure:

Having established the extent of inadequate bonding by visual inspection or by probe drilling according to Appendix I, the following procedure must be applied:

1. Single small recesses of glue line up to 2 in in length may be repaired by filling in with resin mixture as follows:

   1.1 Tilt and support the wing 15 degrees from horizontal:



   1.2 If accessible roughen surface in and around recess.

   1.3 Use probe drilling hole for syringe needle and apply resin mixture into the cavity.

   1.4 Cure for 4 hours.

2. Larger recesses and cavities in the glued joint must be mended as follows:

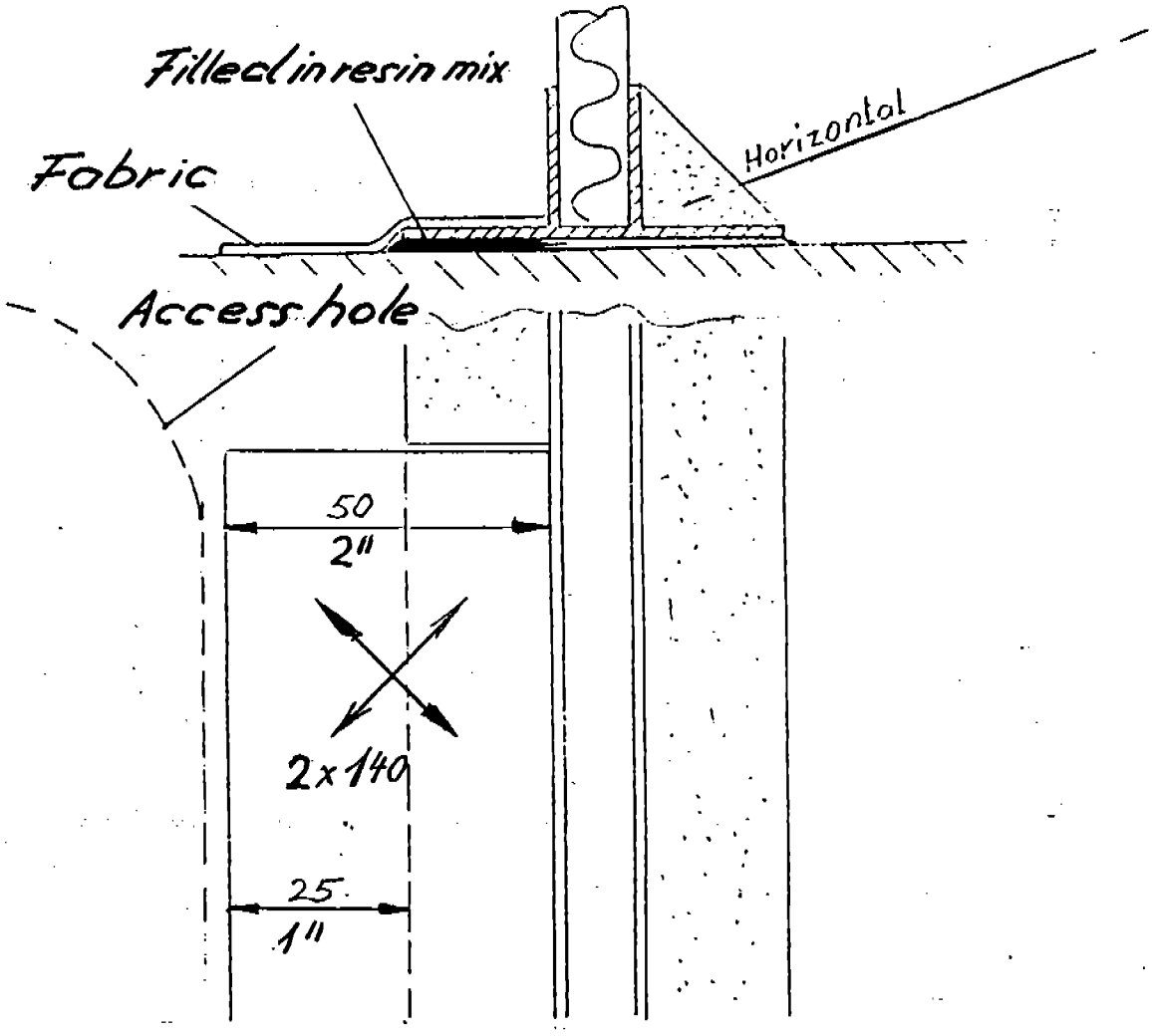
   2.1 At the location of the fault, cut a 7 x 3,2 in, oval access hole in the skin panel outside of spar cap, preferable in lower wing surface.

   2.2 Remove foam corner fillet from hat section 4 in beyond defective area and sand hat section flange adjacent inner sandwich skin 1 in wide.

2.3 Open cavities shall be filled with resin mixture according to para. 1.

2.4 Closed cavities: Inject resin mixture by means of syringe using all probe drillings.

2.5 Laminate 2 glass fabric strips No. 140 (cut diagonaly) over hat section flange and skin.



2.6 This type of repair is only required in the parallel part of the wing, if necessary on both sides of the spar.

NOTE: If repair of the aft spar is necessary within the span of the air brake housing, para. 2.3 and 2.4 apply only.

If more than one access hole is required, these should be arranged at about 32 inches distance from the next access hole.

Instruction for improving the bonding between upper hat section and shear web

Tools:
- Narrow beam light
- 20 ml (1,2 cu.in.) syringe with tubes Ø 3/16" x 1/8" I.D.
- Bonding equipment
- Screwdriver
- Mirror

Materials:
- Resin XB 2878 A
- Hardener XB 2878 B
- Microballoon
- Glass fabric Nos. 140, 130, 119
- Plastic tape
- Polyethylene foil

Procedure:

1. Trestle up wing upside down.

2. Drill 0,2 in dia. holes at 30 degrees to lower surface according to figure on page 2. Remove covers (except cover near root rib).

   Exception: Regions accessible through probe drillings and/or access holes of 2.1, Appendix II.

3. Wax lower wing surface with car wax (without silicone content)

4. Tilt wing to 75 degrees and secure by clamping stub spar to trestle using suitable wedge (leading edge down).

   NOTE: Wing leading edge must be exactly horizontal.

5. Use narrow beam lamp to illuminate bonding seam between hat section and shear web through hole in root rib.

6. Prepare a mixture of 100 gr resin XB 2878 A and 36 gr hardener XB 2878 B according to the Repair Manual.

   Caution: Minimum temperature 20°C

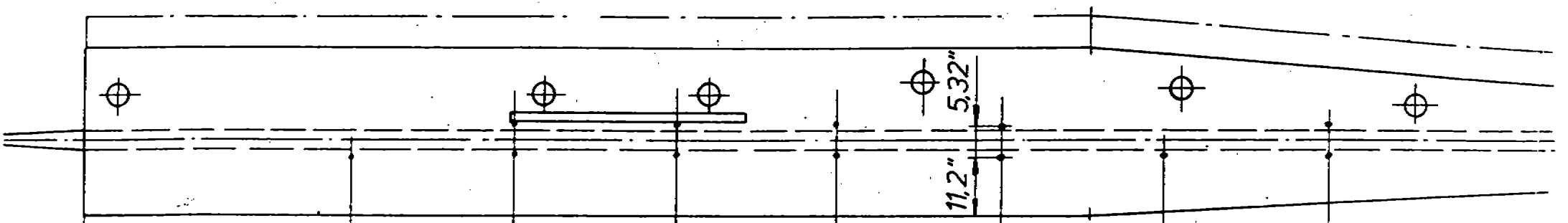
7. Insert the short syringe tube through the outermost upper hole to reach the web and the foam corner fillet. Then withdraw tube 0,4 in. Squeeze out 45 gr of resin mixture onto the shear web in about one minute. Continue with the next two holes.

8. Using the beam lamp, check if any resin leaked out. If so, mark the position on the wing.

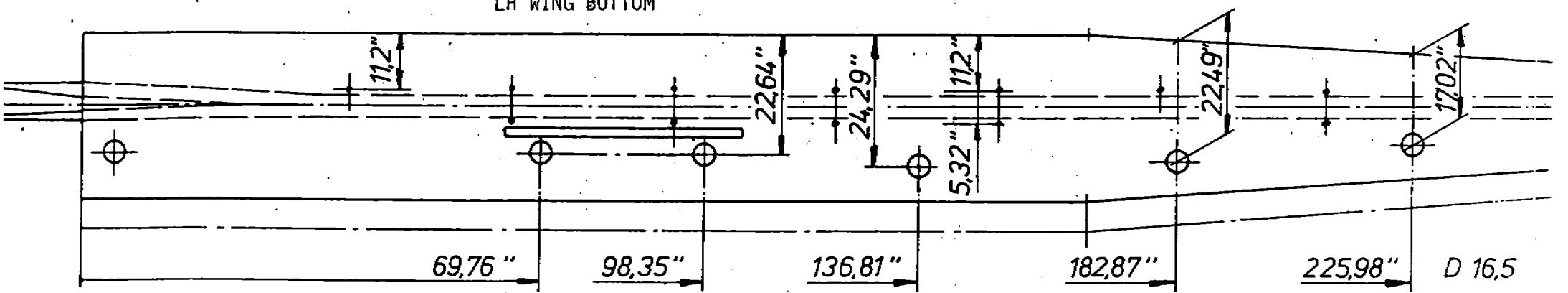
9. Apply resin mixture using the next holes and check for leakage, if any, mark position. Use long tube for inboard end.

10. If a leakage is found, tilt wing to 45 degrees position and leave 4 hours.

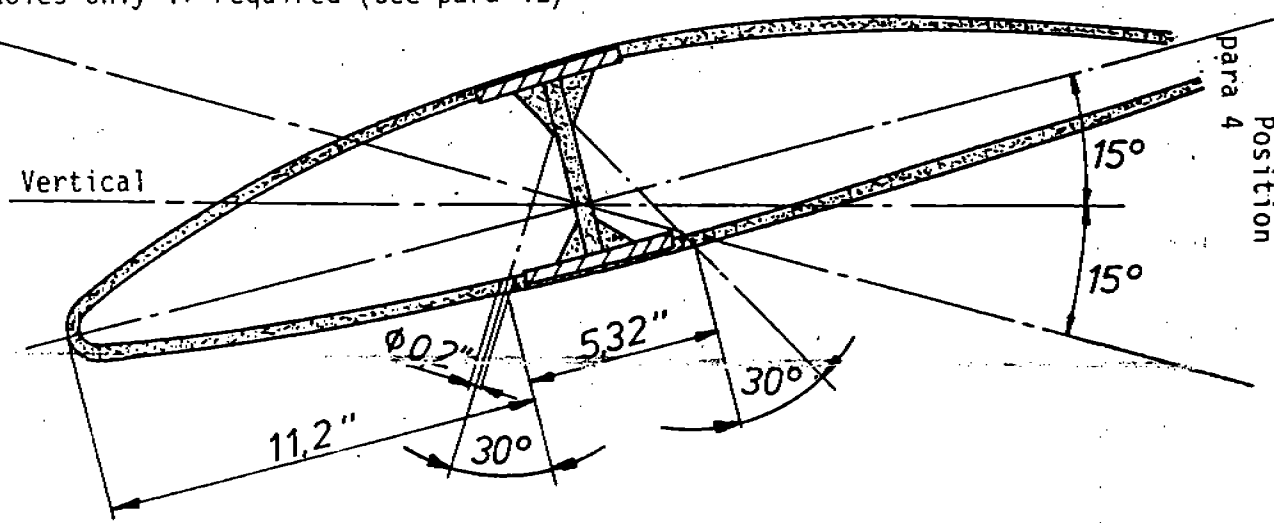
RH WING BOTTOM

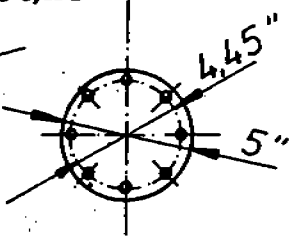


LH WING BOTTOM



No holes in upper wing surface.
Front holes only if required (see para 12)





Position para 4

Cover

Dimensions in inches

11. After curing tilt wing back to 75 degrees and apply resin mixture to the leak point using nearest hole. Leave for 4 hours.

12. If gap between web and hat section is existing on forward face of spar (visible through hole in root rib), drill holes in front of spar, turn wing to 75 degrees nose up position and repeat procedure of para. 6 to 11 using the forward holes. There should be no more leakage of resin. Keep wing in this position for 4 hours at 20°C minimum.

13. Fill the 3/16" holes with microballoon/resin mixture after leveling the wing the right way up. Cover over holes with plastic tape.

14. Patch up the 7 x 3.2 in access holes, if required in Appendix II, according to Repair Manual section 3, page 5 :

    14.1 Increase size of cut-out in outer sandwich skin and foam core to 8.3 x 4.7 in.

    14.2 Roughen inner skin carefully and chamfer edge of outer skin.

    14.3 Prepare a patch for inner skin by laminating glass fabric no. 130 using outer skin covered with polyethylene foil as a profile mold.

    14.4 Cut to size foam core and inner patch and bond both into cut-out.

    14.5 Trim core to contour.

    14.6 Bond outer patch to skin and core using one layer of glass-fabric no. 140 diagonally and one layer of no. 119 (outside).

    14.7 Trim outer contour.

15. After curing 4 hours at 20°C (min.) sand repaired holes to smooth finish.

16. Repaint surface as necessary according to Repair Manual.

17. After 12 hours curing sand painted areas using 600 grade wet sanding paper and polish.

18. Enter inspection and repair into log book.

INFORMATION SHEET

relating to FFA Service Bulletin no. 7

a. The accompanying Service Bulletin and appendices are intended for the information of aircraft owners and of workshops officially approved for the repair of glassfibre sailplanes.

   Such repair workshops shall carry out the instructions contained in the Bulletin under their own responsibility and at their own risk.

b. The Service Bulletin and its appendices do not imply any transfer of responsibility as to the manner in which any such work is carried out, nor do they provide any extension or renewal of any manufacturer's guarantee whose period of validity has expired, nor supplement any guarantee which may still be current.

c. The Service Bulletin and its appendices are approved by the Swiss Federal Air Office.

d. The Service Bulletin and its appendices, as well as this information sheet which forms an integral part of the Bulletin, are subject to Swiss law.