Enclosure No 1
to
Bulletin No BO-18/2011 MDM-1 „FOX"

WORKING INSTRUCTION FOR IMPLEMENTATION OF INSPECTION OPENING IN WING SKIN BOTTOM SURFACE (for console verification in aileron control circuit)

Elaborated by:

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1 Equipment necessary

For wing modification by implementation of inspection holes in the bottom skin, the following equipment is necessary:

No.	Item	Amount
1	Drill ø6	1 pc.
2	Diamond coated hole saw ø89 –or metal cutting hole saw.	1 pc.
3	Diamond coated hole saw ø60 - or metal cutting hole saw	1 pc.
4	Rule 500 mm	1 pc.
5	Diamond coated hole saw ø50 or metal cutting hole saw for initial hole -	1 pc.
6	Measuring tape 5m	1 pc.
7	Angle steel (min 250).	1 pc.
8	Inspection mirror ø55 (or rectangular with max height of 55 mm)	1 pc.
9	Brush for lamination process	1 pc.
10	Curved brush for lamination.	1 pc.
11	Scraper	1 pc.
12	Portable heater that allows curing of repair area at 60°C temperature.	1 pc.
13	Set of dishes for resin mixing	
14	Blind riveter	1 pc.

2 Material for repair

No.	Item	Amount
1	Glass fabrics Interglass 92125	2 m^2
2	Glass fabrics Interglass 92110	0,1 m^2
3	Resin MGS L285	0,36 kg
4	Hardener MGS H286	0,14 kg
5	Hard putty Novol	0,2kg
6	Aerosil	10 g
7	Inspection hole cover ø83, plexiglass, thickness 4 mm	2 pcs.
8	Anchor nuts M5	4 pcs.
9	M5X12 tappered screws	4 szt
10	Countersunk head blind rivets ø 3x9	8 pcs.
11	Sandpaper - 600	1 pc.
12	Painting materials - suitable for used painting cover in given copy of glider.	

3 Labour demand

1. Time required for the implementation of modification 5 days / 1 person

4 Terms of inspection hole implementation

The work covered by this Instruction must be done at Repair Workshop, approved for the repair of composite structures for aviation - in accordance with regulation in the country of glider registration.

5 Modification process:

The modification process must be completed both on the left and right wing panel – in analogous process.

5.1 Marking the inspection hole location on the wing bottom surface.

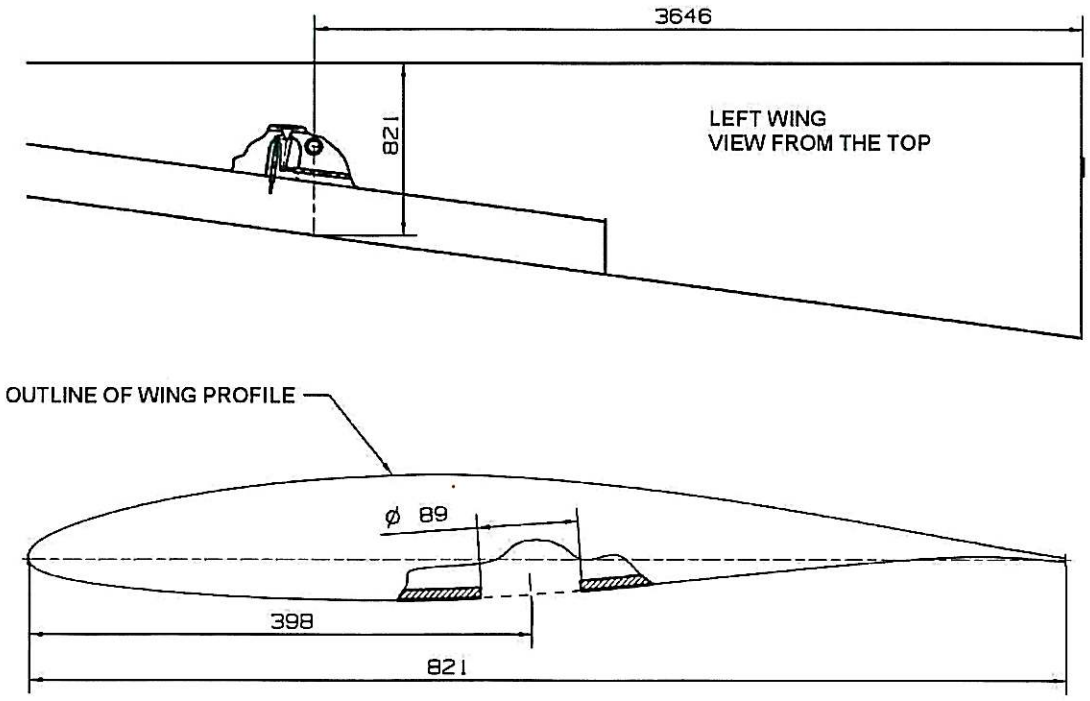


Figure 1 Location of the inspection hole on the left wing.

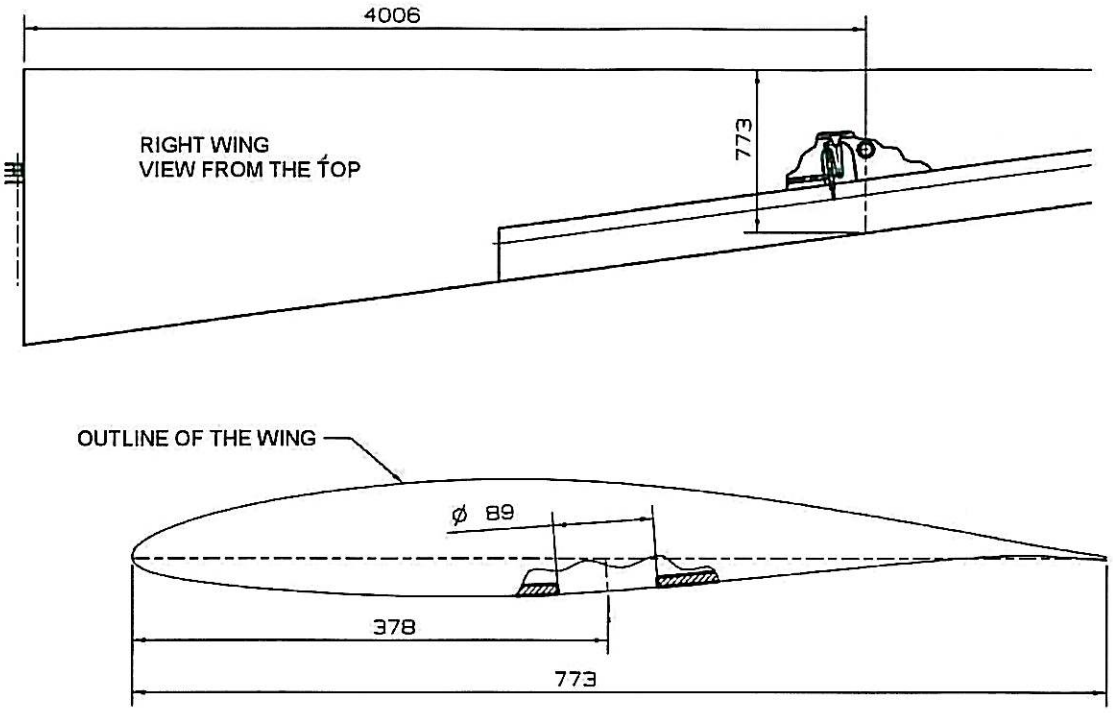


Figure 2 Location of the inspection hole on the right wing

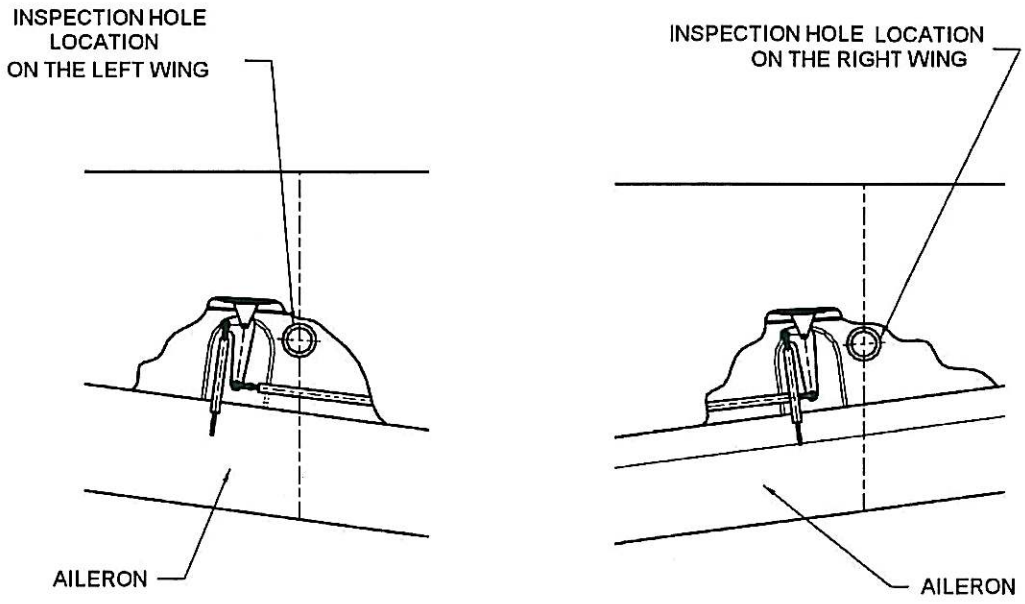


Figure 3 Inspection holes location on the Wings.

5.2 Wing surface protection against dirt and damage.

Figure. 4 Wing protection with foil

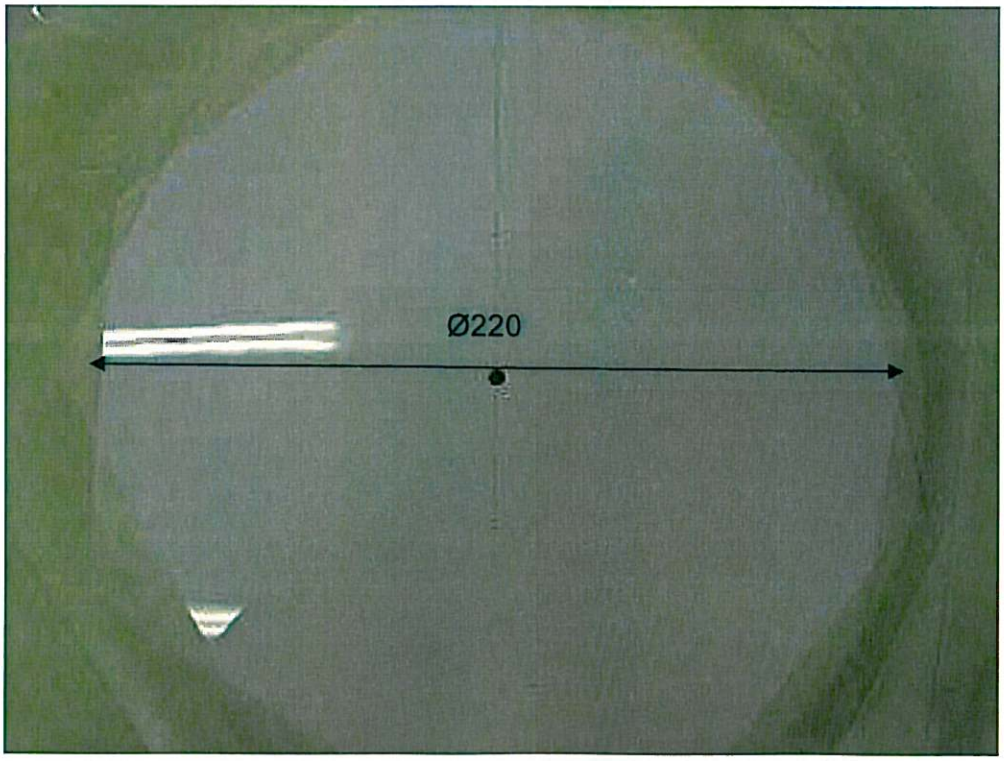


Figure 5. Lead hole drilling Ø6

5.3 Removing paint coating layer.

Figure 6. Removing paint and coating layers.

5.4 Cutting a hole in the skin.

It is recommended to cut the hole perpendicular to the skin in the area of modification. Use a diamond coated drill pipe Ø89. Alternatively metal cutting hole saw Ø89 mm can be used. Do not exert axial forces while cutting. Inside wing the sandwich core is covered by a layer of Interglass 92125 fabric – Take care not to cause delamination between the facing and PVC foam core.

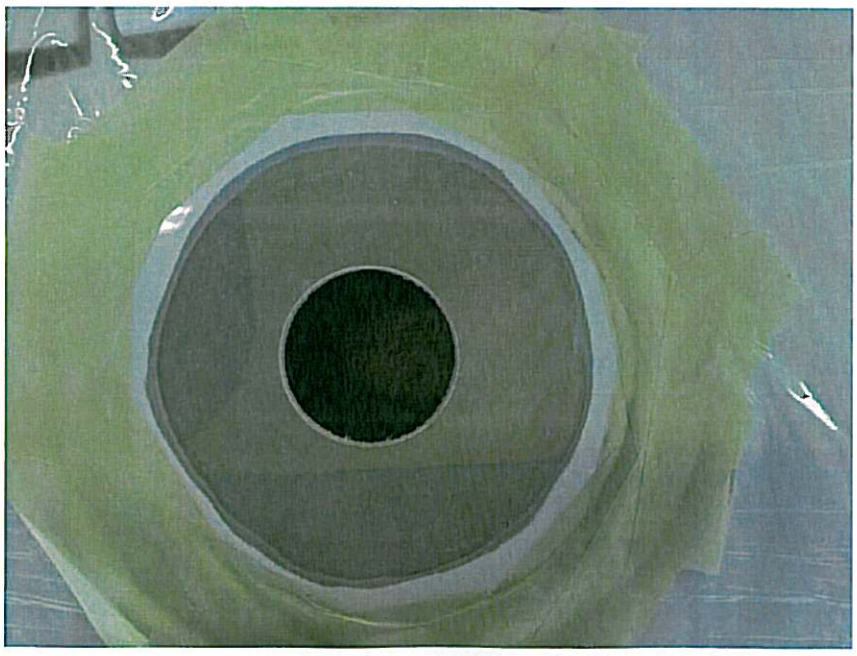


Figure 7 Cutted hole.

Gently grind the upper and lower edge of the cutted hole, pay attention to avoid delamination between facings and core. Slightly round edges to facilitate fabrics lay-up.

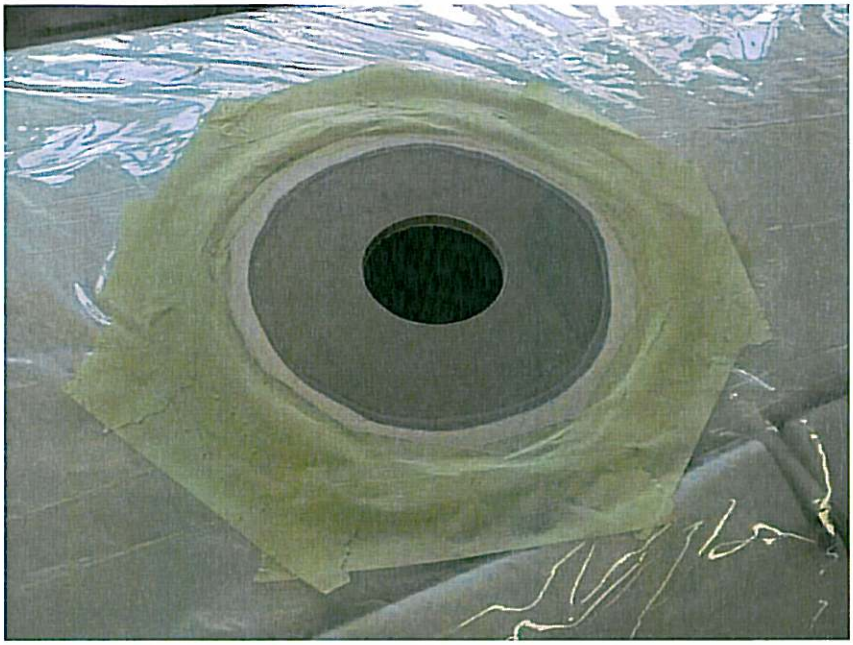


Figure 8. Edge grinding.

Note: Remove dust and vacuum the interior at the place of drilling.
In the left hand wing panel, protect the aileron pushrod with foil against dirt

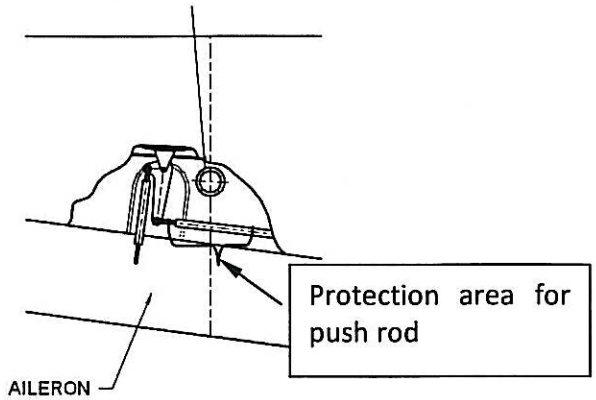


Figure 9. Location of push rod protection in the left wing.

5.5 Degreasing and grinding of surfaces inside the wing.

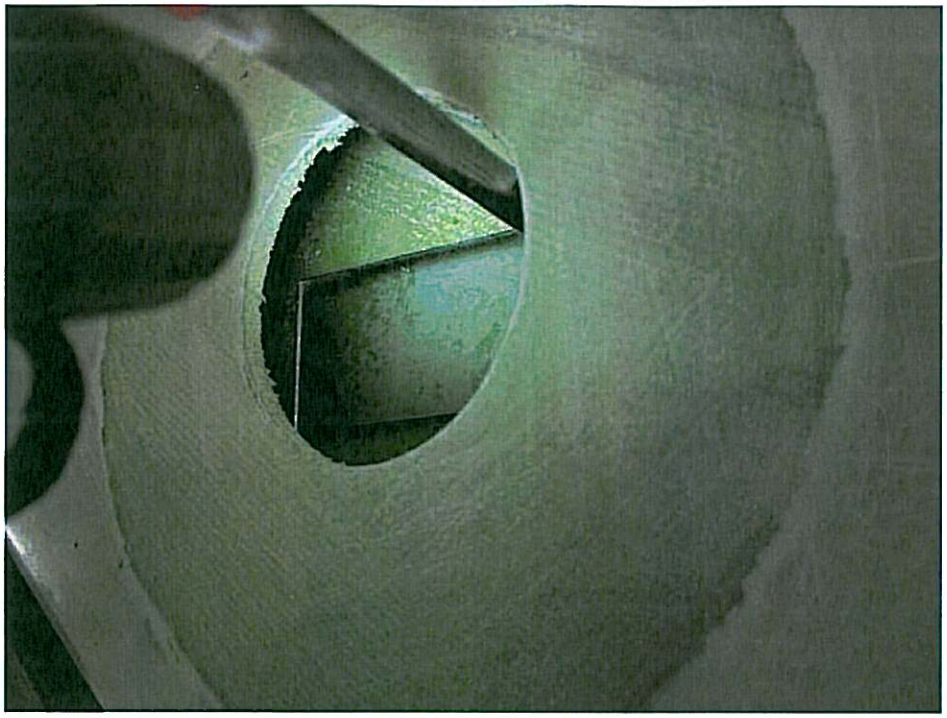


Figure 10. Degreasing and grinding of surfaces inside of the wing.

Note: Round hole edges.

5.6 Laminate two insert pads for cover attachment (for left and right wing)

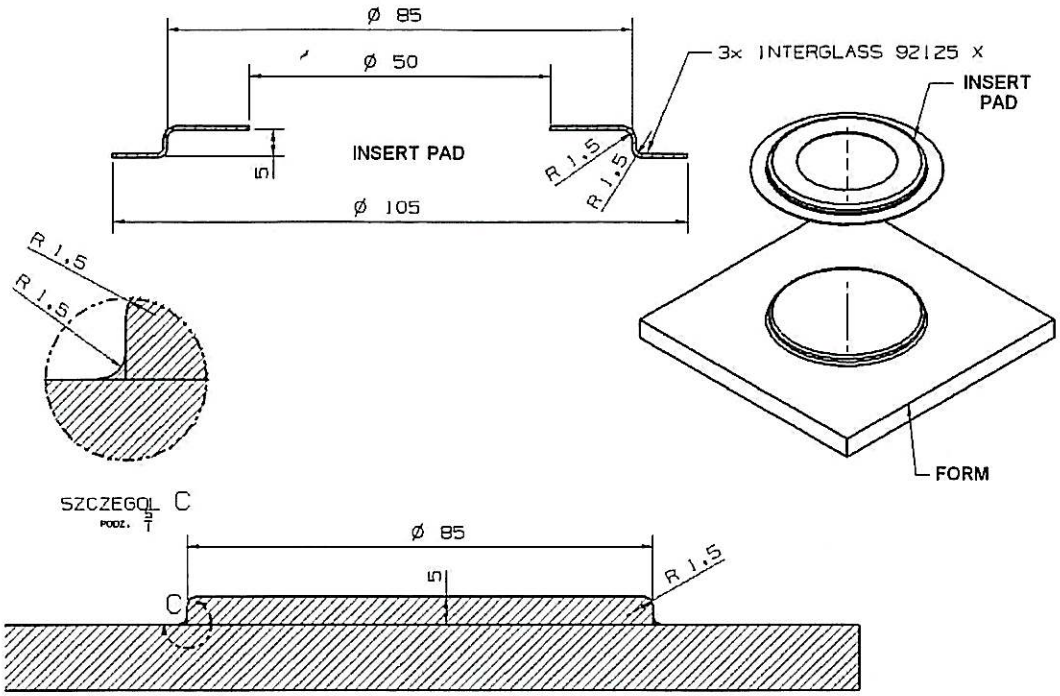


Figure 11. Dimensions of insert pad and form sample.

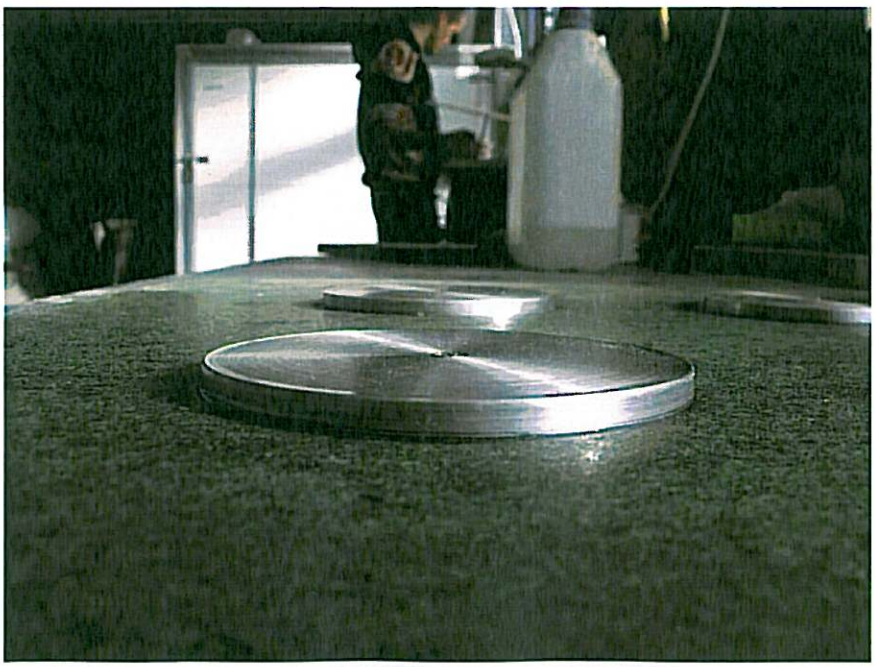


Figure 12. Sample of insert form.

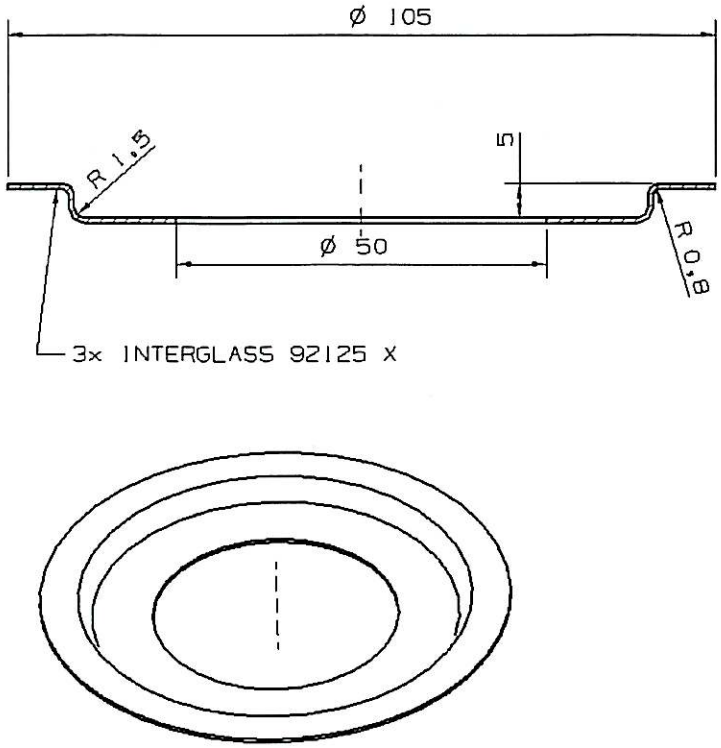


Figure 13. Insert pad for cover attachment.

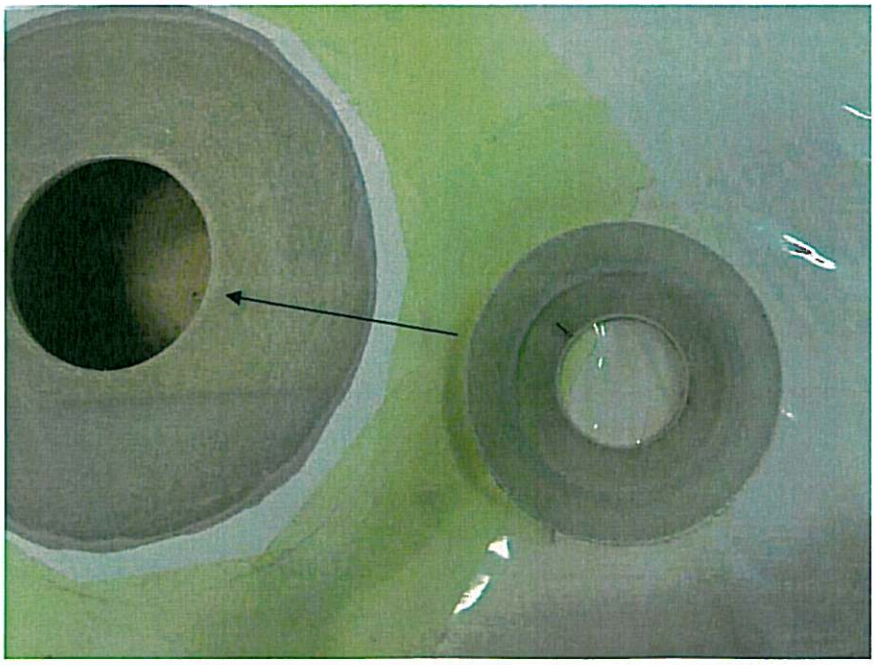


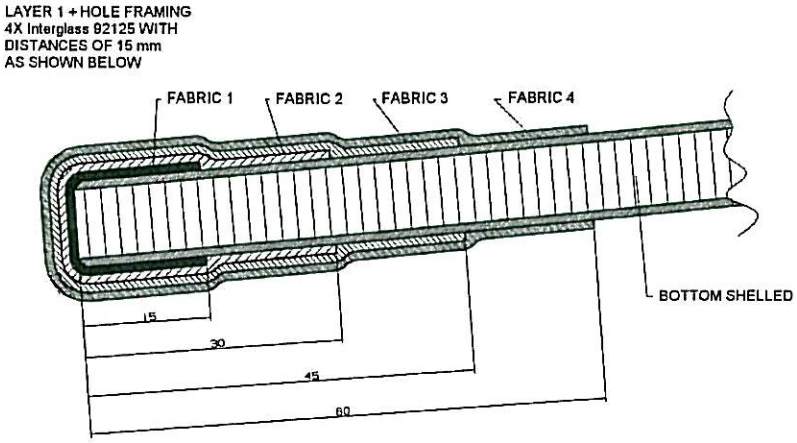
Figure 14. Cutted hole and previously prepared insert pad.

Note: Adjust insert pad to the hole (provide clearance in the hole for the fabric – approx. 1mm)

5.7 Saturation of layers forming inspection hole rand.

Dimension of layers – fabric INTERGLASS 92125:

- Layer 1: 30mm x 430mm
- Layer 2: 70mm x 430mm
- Layer 3: 100mm x 440mm
- Layer 4: 130mm x 500 mm



Saturate the layers on foil with composition L285/H286 in accordance with resin data sheet. Lay-upt sequential (from the narrowest), moving the beginning of each layer (by approx ¼ of the circumference) to avoid lumps.

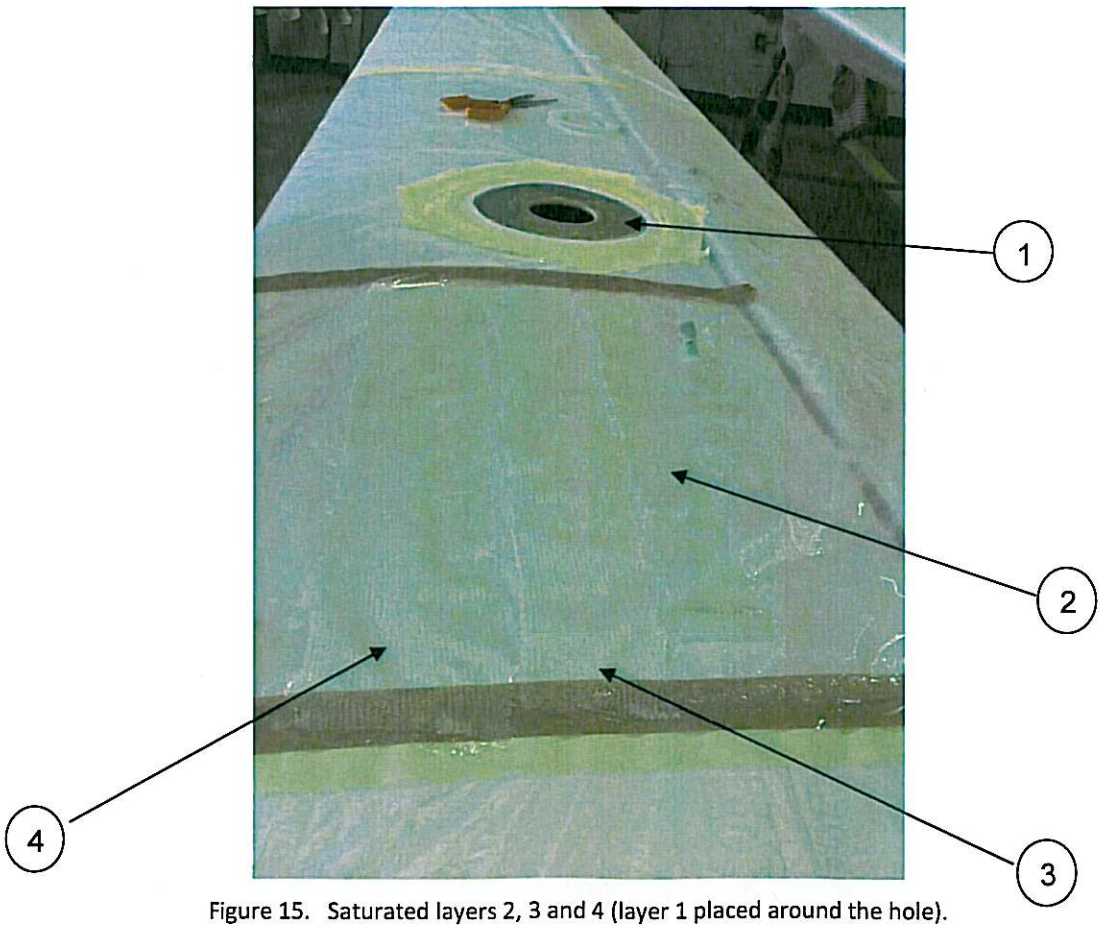


Figure 15. Saturated layers 2, 3 and 4 (layer 1 placed around the hole).

5.8 Lamination of inspection hole rand.

Figure 16. Placing layer 1.

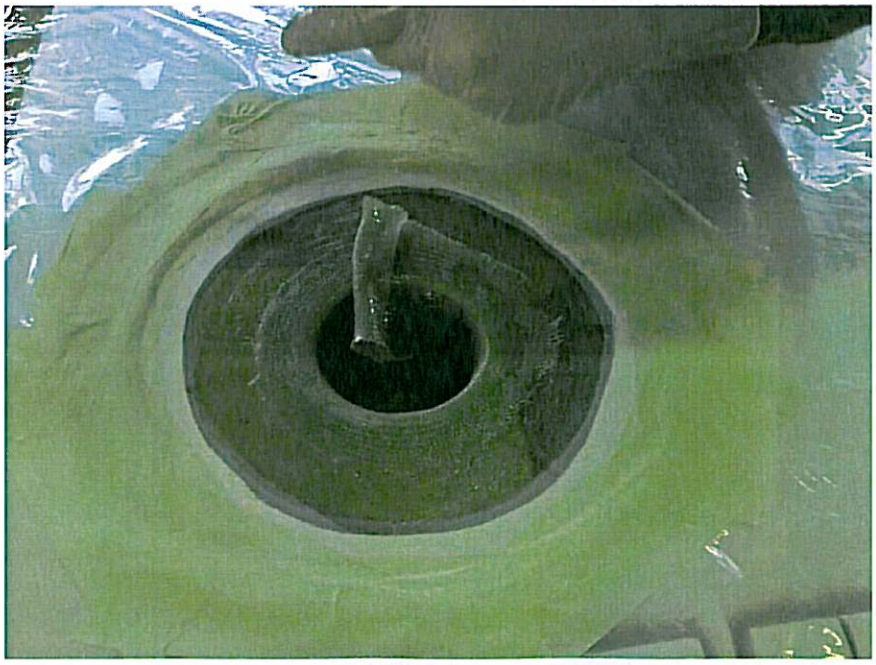


Figure 17. Placing layer 2.

Figure 18. Placing layer 2... part 2.

Figure 19. Placing layer 3.

Figure 20. Placing layer 3... part 2.

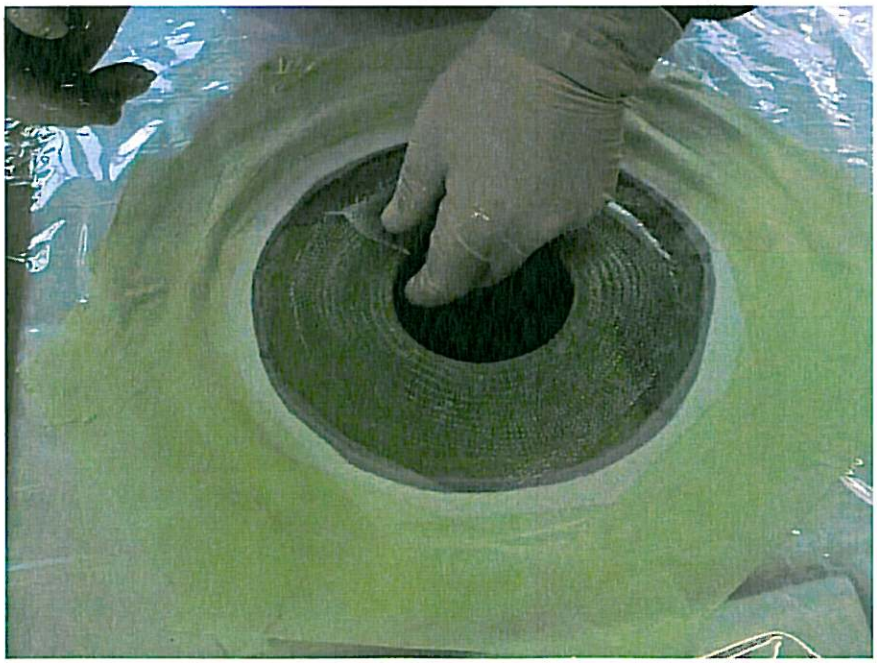


Figure 21. Placing layer 3... part 3

Figure 22. Placing layer 4.

Figure 23. Placing layer 4... part 2.

Figure 24. Placing layer 4... part 3.

Figure 25. Placing layer 4... part 4.

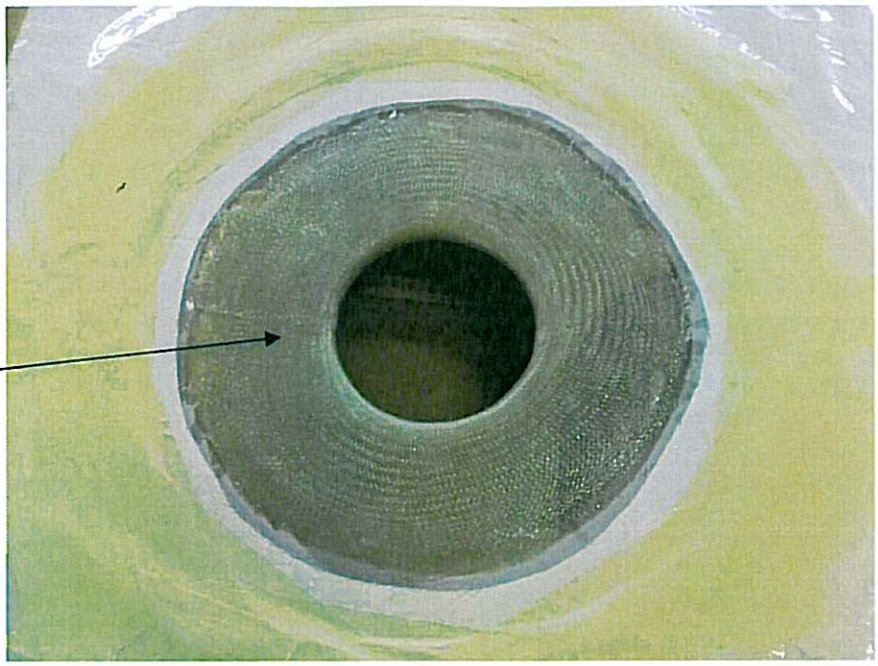


Figure 26. View of the hole after reinforcement of rand with layers 1 to 4.

5.9 Preparation of the insert pad for bonding.

Before applying laminating composition (L285/H286 + Aerosil) scarf the insert pad according to marking in the sketch.

Figure 27. Insert pad grinding.

Figure 28. Application of gluing composition to insert pad

5.10 Insert pad installation/ bonding.

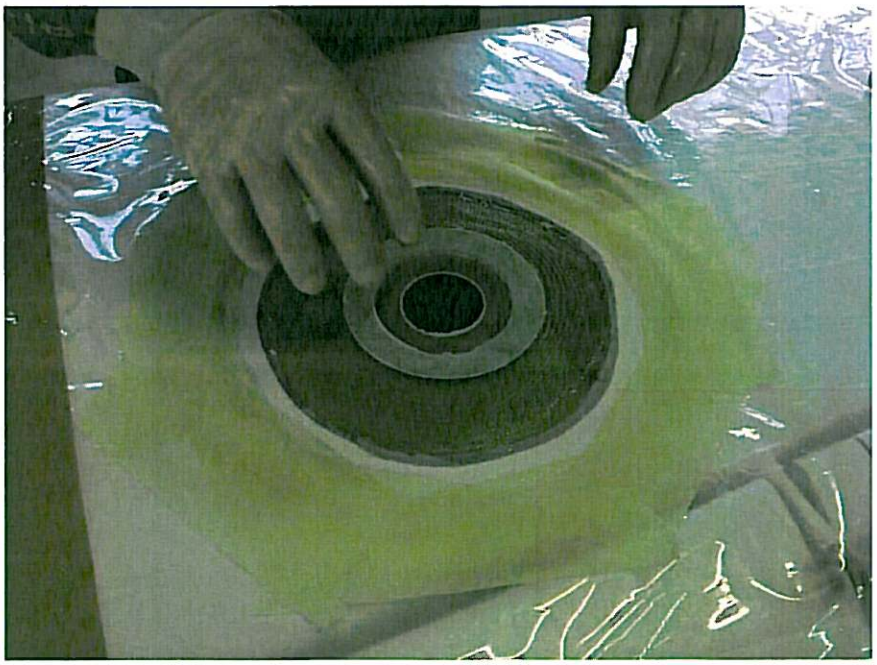


Figure 29. Embedding insert in the wing.

Figure 17. Press down the insert pad gently.

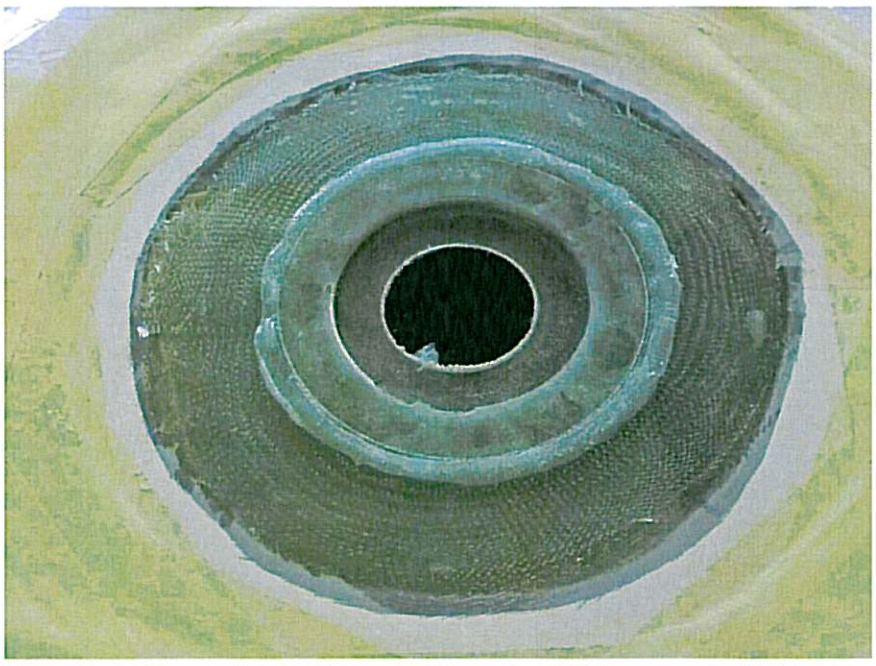


Figure 31. Insert pad after pressing.

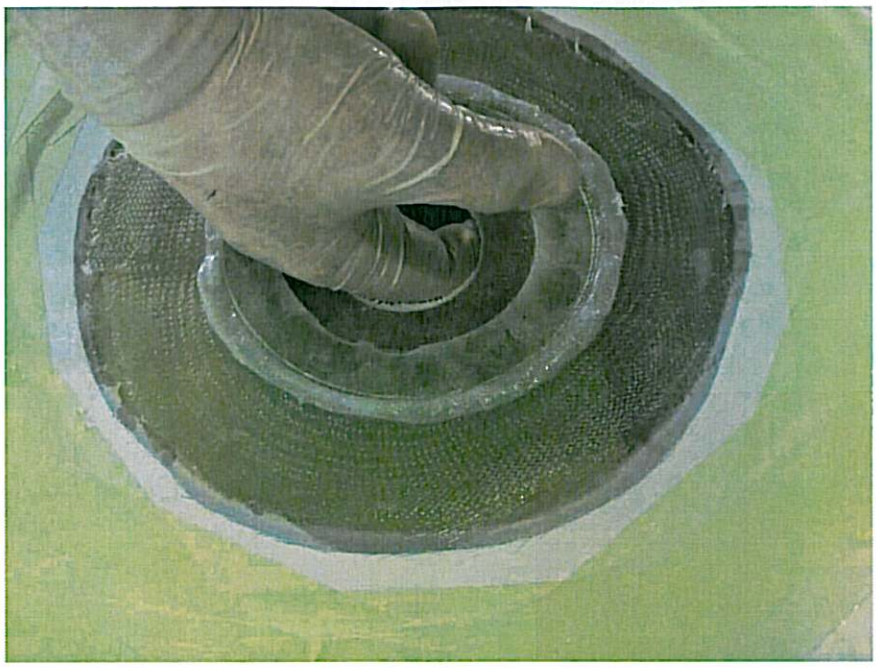


Figure 32. Removal of excess from wing inner surface.

Figure 33. Removal of excess from wings outer surface.

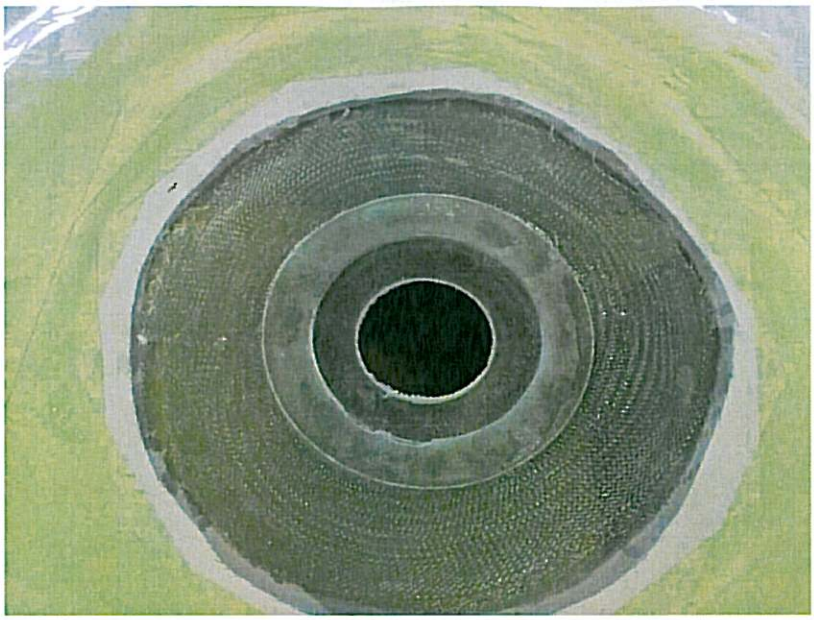


Figure 34. Insert pad before applying force.

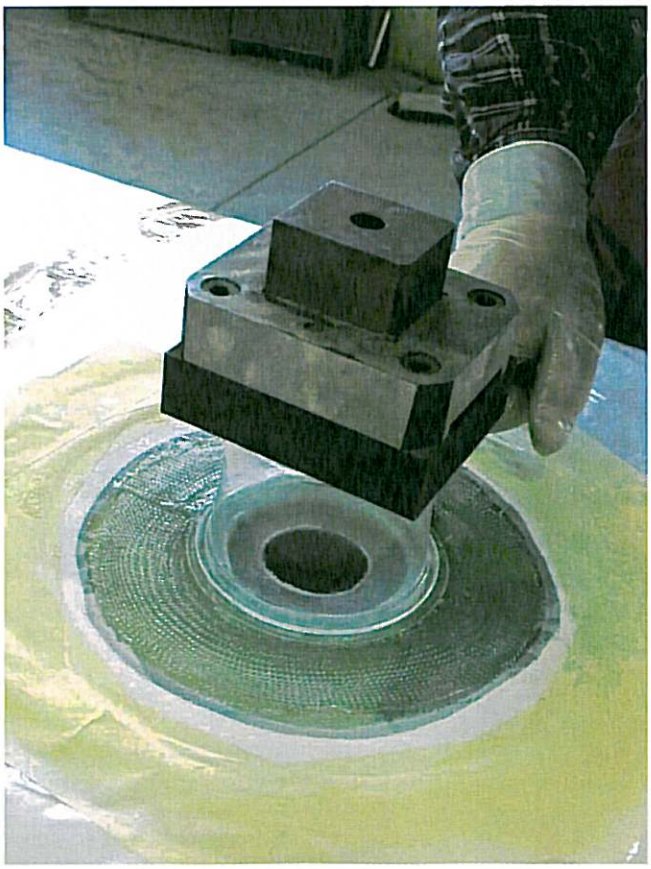


Figure 35. Insert pad loaded (max load 3 kg for 8 hours).

5.11 Insert pad lamination

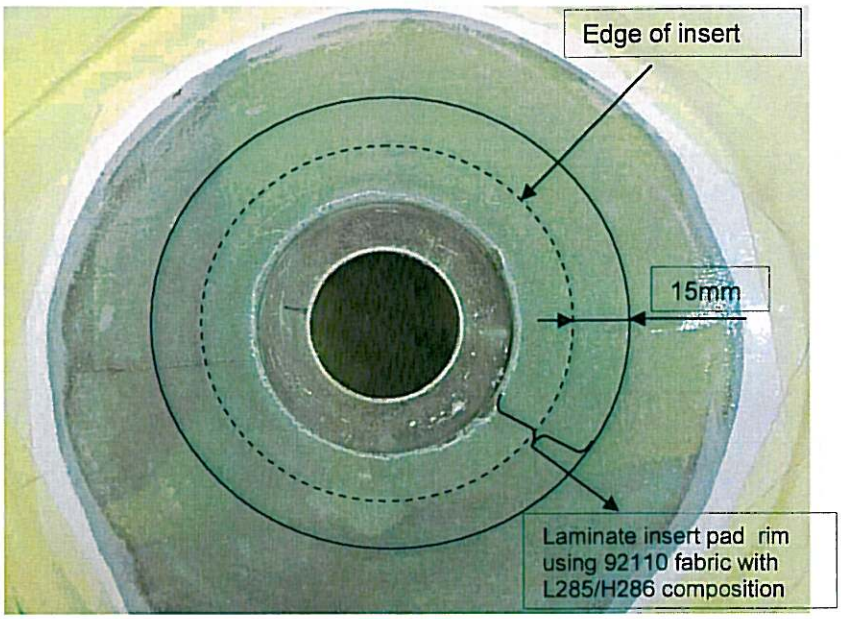
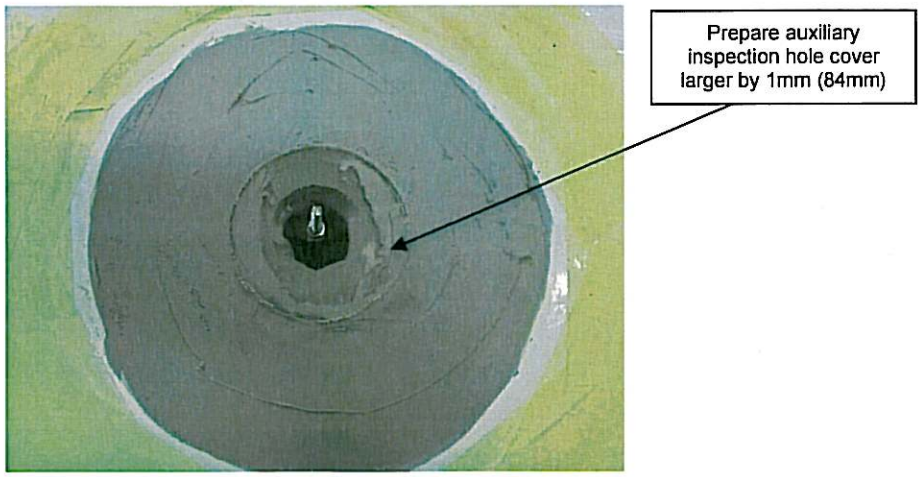


Figure 36. Insert pad pressed with rim laminated.

Note:

In the left wing, remove the push rod protection foil.
After finishing lamination perform spot curing at 65 ° C for 15h.
Protect hole with foil before im-print, to permit easy disassembly when im-print is ready.

5.12. Im-print with aid of inspection hole cover.



Rys. 37. Performing print for inspection hole cover.

Note:

Cover laminated surfaces with hard putty (Novol), and then in a wet putty make im-print with a round auxiliary item, of 5 mm thickness and diameter of 84mm (by 1 mm larger than the diameter of final inspection hole - 83mm, covered with release layer). After the putty has dried, remove the auxiliary item, prepare the surface for painting by hand grinding with fine sandpaper (600), and finally remove the protective foil.

5.13 Riveting nuts.

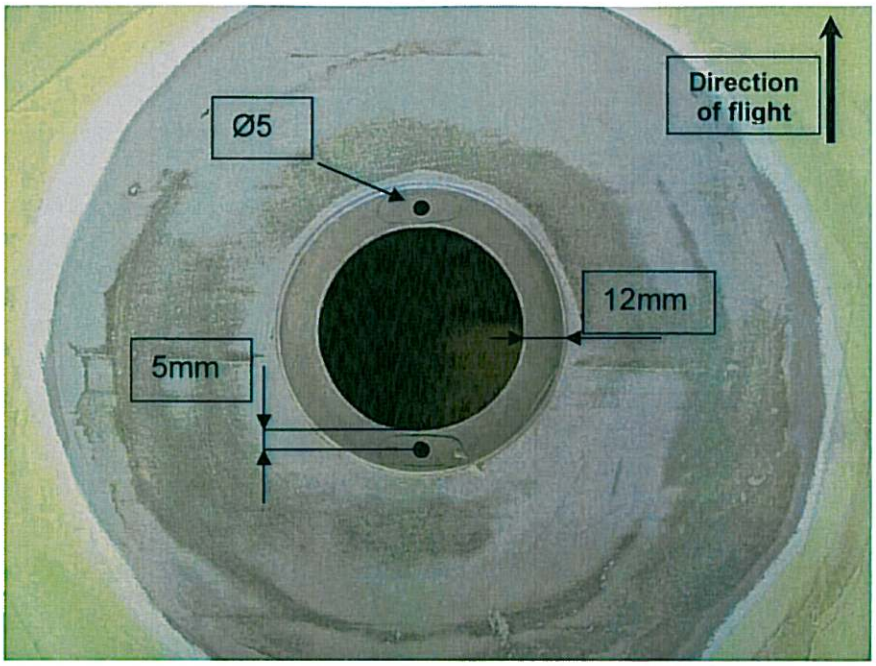


Figure 38. Im-print for inspection hole cover with drilled holes Ø5 for anchor nuts (M5).

Figure 39. Kit for nuts mounting: anchor nuts - point 2, item. 8 + rivets - point 2, item 10 + Riveter - point 2, item 12.

Figure 40. Ø 3 Hole drilling for nuts riveting, and chamfering for rivet head 1x45 ° - stage 1.

Figure 41. Ø 3 Hole drilling for nuts riveting, and chamfering attachement for rivet head 1x45 ° - stage 2.

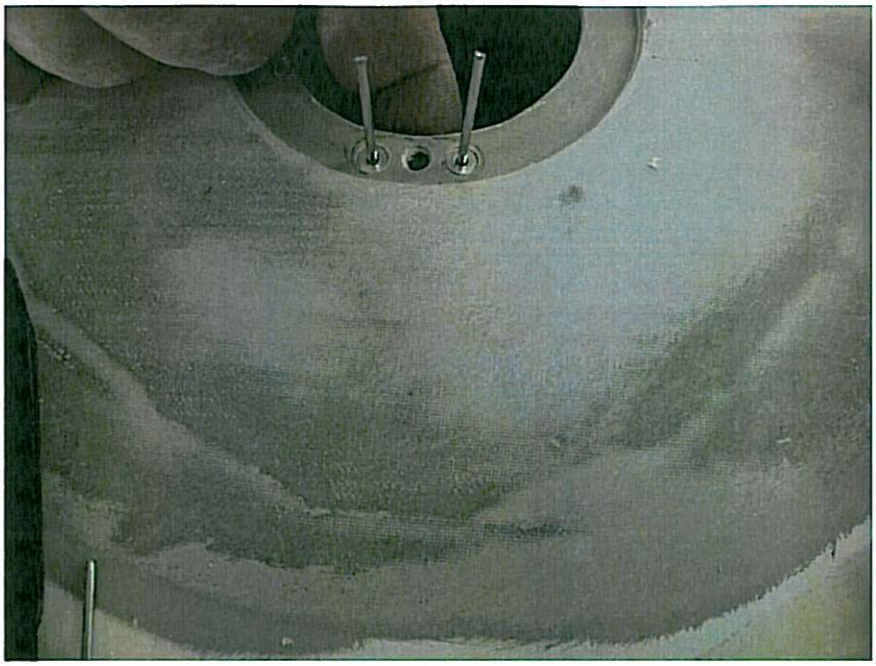


Figure. 42. Nuts riveting.

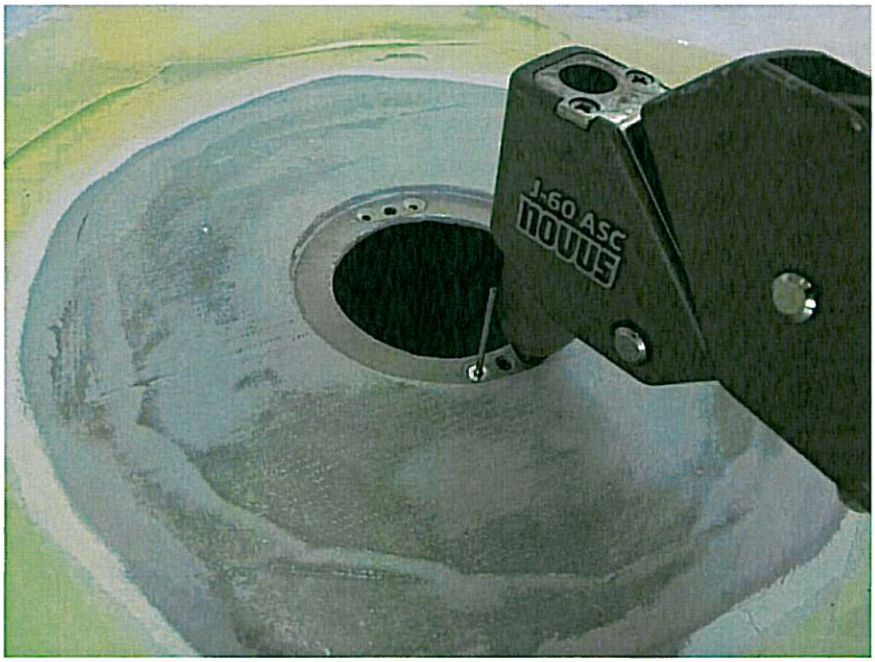


Figure 43. Nuts riveting– part 2.

5.14 Inspection hole prepared for painting.

Figure 44. Repair area prepared for painting.

Note: Before varnishing check wing interior and remove the potential dirtiness, protect the hole in the wing, prepare surface for painting.

5.15 Painting and surface finishings

Varnish prepared surface of the wing, choose lacquer mating the coat on whole wing. After painting polish affected area surface for flattening differences between remaining surface of the wing.

Figure 45. Painting the surface.

5.16 Assembly of inspection hole cover

Adjust inspection hole cover with laminated insert pad (leave the clearance of 0.5-1mm between the walls of insert pad and cover), mark on the cover the location for opening drilling, then drill ø5holes, 5 in cover and prepare it for installation.
Mount inspection hole cover with M5 screws

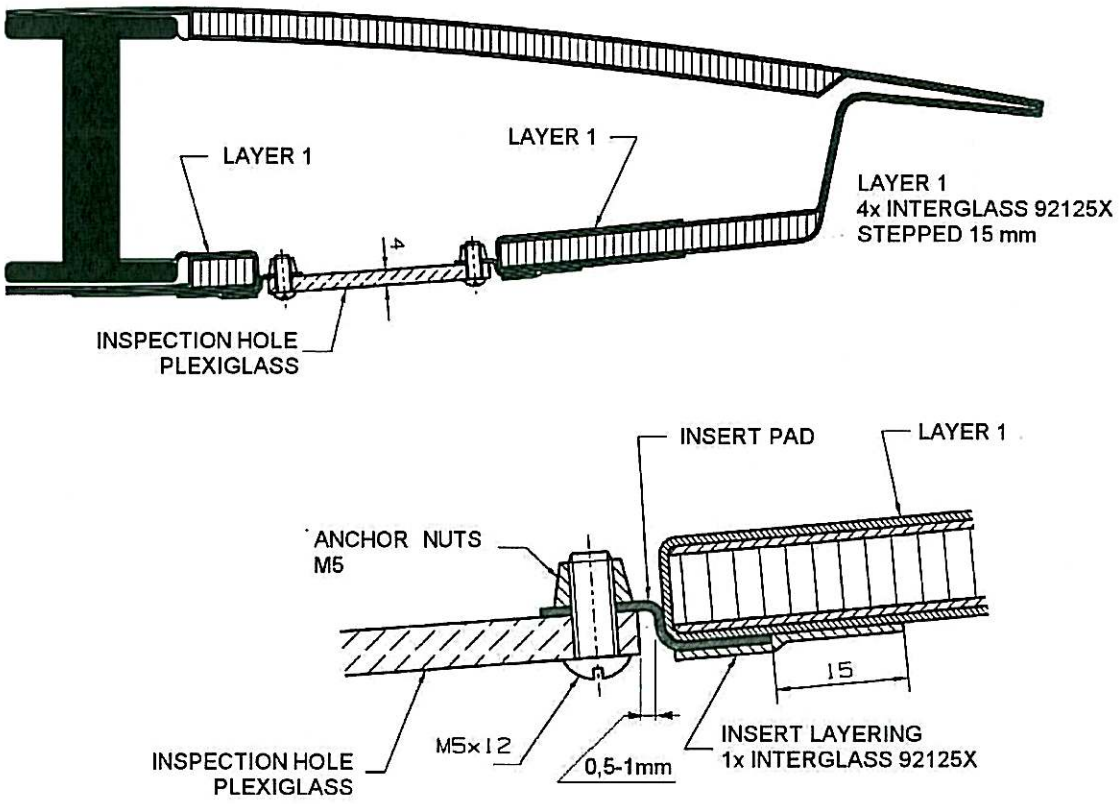


Figure 46. Assembly of inspection hole cover.