

# E-78 . E-78 B

## « SILENE »

SERVICE MANUAL

*Contact us !*



**ISSOIRE-AVIATION**

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THIS SERVICE MANUAL IS A TRANSLATION OF THE FRENCH "MANUEL D'ENTRETIEN"  
APPROVED BY BUREAU VERITAS ON 25 TH JANUARY 1983. FOR ANY DOUBT, REFER  
TO FRENCH MANUAL.

I - GENERAL CARE

Each 100 flight hours, inspect the glider as follows :

- Control system connections
- Check for cracks or other defects in the outside of the sailplane, specially over lower surfaces
- Check and clean the canopy surfaces and its locking
- Clean the cockpit, specially the front floor
- Control surfaces : check for free movements or wear
- Towhooks : good working
- Landing gear : inspect the wheel and check air pressure
- Instrument panel : check for markings on the instruments and on the panel , inspect connection hoses
- Clean static and dynamic pressure

DATE

SIGNED

II - EACH YEAR and FIVE YEARS INSPECTION

II.1 - Documentation

You need :

- This service manual
- Flight manual
- Individual inspection report
- All Service Bulletins and A.D.

II.2 - General inspection of outside surfaces to find :

- Cracks or breakings on external gel-coat
- Unusual looseness on :
  - . Rudder
  - . Horizontal stabilizer
  - . Wing fittings
  - . Ailerons
  - . Airbrakes
  - . Control system
- Check the cloth on the rudder

II.3 - Remove :

- The moving canopy
- Horizontal stabilizer
- Wings
- Rudder
- Seats
- Instrument panel

II - Each year and five years inspection (continued)

 II.4 - Wings

<u>Parts</u>	<u>Check</u>	<u>Annual</u>	<u>5 Years</u>
Skin	Cracks, loosen bounding, breakings	+	+
Structure	Bondings, root spars and wing tip wheel or skid (if fitted)	+	+
Wings Attachment	Pins and ball-bearings	+	+
Ailerons	Clean and lubricate bearings, hinges and bell-crank. Check for unusual looseness - State of cloth (if fitted)	+	+
Airbrakes	General state - Cap springs tension Unusual looseness in all articulations Cracks in airbrakes box	+	+
Airbrakes control	Check for a good locking of airbrakes and for a good state of pushrods at the root wing	+	+
Ailerons control	Check quick connections, ball-bearings, push-rods and bell crank in the wing	+	+

 II.5 Fuselage

Skin	Cracks, loosen bondings, breakings	+	+
Metal parts fixed on laminate parts	Inspect all these parts to find any loose or cracks on fixations	+	+
Remove	Forward part of the canopy and rudder pedals system - clean and lubricate - Check for wear		+



II - Each year and five years inspection (cont'd)

II.5 - Fuselage

<u>Part</u>	<u>Check</u>	<u>Annual</u>	<u>5 Years</u>
Rudder pedal:	Inspect the system and check for unusual looseness and good working of locking system	+	+
Tow hooks	Inspect the control cable of winch tow hook (if fitted) Inspect the push-rod of aerotow hook and the tow hooks	+	+
Control system:	Remove the sticks, trim spring and push rods. Clean and check - Change all wearred pins or bearings  Clean all parts, protect and paint in case of oxydation - Lubricate all bearings	+	+
Seats	Clean and check	+	+
Landing gear:	Remove the wheel fairing - remend or replace if necessary (E 78B only) Remove the wheel and the brake - Clean and check the wheel, tire, brake and wheel axle - Replace if necessary. Check the damper system Check the whole structure of retracting mechanism : banded tubes or cracks Inspect the attachment of landing gear on the structure. Lubricate every coupling (E 78 only) Lubricate wheel bearings and check state and air pressure of tire (2,4Bar) Adjust the brake	+	+



II - Annual and five years inspection (cont'd)

II.5 - Fuselage (cont'd)

<u>Part</u>	<u>Check</u>	<u>Annual</u>	<u>5 Years</u>
Landing Gear	Inspect the structure and the attachment of retracting system on the structure - state of locking springs and control actuator - lubricate - lift the fuselage and retract the wheel several times : check the correct lockings and doors adjustment. Adjust if necessary (E-78 only)	+	+
Tail knob (if fitted)	General state and bonding on the structure. Replace the wearing plate if necessary	+	+
Tail skid (if fitted)	General state - Lubricate the axle Replace the wearing plate if necessary	+	+
Tail wheel (if fitted)	Remove the wheel and tire - clean - Lubricate the bearings Inspect the state of the wheel and the tire - Replace if necessary - Check air pressure (1,5 Bar)	+	+
Canopy	General inspection and polishing - Stop all cracks - Good working of the windows and hinges - Good locking -	+	+
Ventilation	Works - clean	+	+
Safety harness	Good sewing - good working - good fixations on the structure	+	+
Markings	fitted (report to flight manual)	+	



II - Annual and five years inspection (cont'd)

II.6 - Horizontal stabilizer

Part	Check	Annual	5 years
Skin	Look for cracks, loosen bonding, breakings - Careful : Every remend on the elevator needs q check of its balance	+	+
Metalic parts	Cracks, scratches, oxydation, etc.. Clean and lubricate. Look for unusual plays and change parts if necessary	+	+

II.7 - Vertical stabilizer

Skin	Good state of the cloth	+	+
Structure	No breakings or cracked bondings Metallic parts are tightened.	+	+

II.8 - Miscellaneous

All parts	Inspect and clean all water drain and pressure relief holes	+	+
Instrument panel	Control all pneumatic instrument in an authorized firm Inspect the instrumentation tubing for leaks or bad connection. Check markings	+	+
Sailplane assembled	Check the control surface deflections Check the good locking of airbrakes and the free movement of all flight control system Check instrument panel fitting and connections	+	+



II - Annual and 5 years inspection (cont'd)II.C - Miscellaneous

Part	Check	Annual	5 Years
Sailplane assembled	Weight the complete glider and determine actual center of gravity and maximum and minimum pilot weight		+
Documentation	Check all A.D. and S.B. has been applied - Sign the log book	+	+
Control flight : Necessary after :			
	- A five years visit		+
	- Removing a control surface or every safety part	+	+

III - REPAIRING THE REINFORCED PLASTIC LAMINATES

III.1 - Use of material

Gel coat : We can find it on the whole white surface of the glider. Use only a gel coat furnished by the manufacturer and use it as indicated with the material.

Resin : Use only the resin furnished by the manufacturer. It is polyester resin. Use a very clean and dry jar, pour in the usefull resin and add hardener as indicated with the resin. Mix during two or three minutes. Never prepare more than 250 gr resin in one time. Work in a ventilated and warm (20°C) room.

Glass fiber clothes : Use only the clothes furnished by the manufacturer. The clothes must be clean and dry.

Core material : Use only PVC Continel 60 core.

III.2 - Repairing in general

Small repairs can be done in a club, when they are minor and cannot affect security : little hole or cracks ( $\leq 50\text{mm}$ ) or shock on a leading edge.

For more important damage, contact the manufacturer or their representative. Major repairs must be accomplished by an authorized firm.

III. REPAIRING THE REINFORCED PLASTIC LAMINATES (Cont'd)

III.2 - Repairing in general (cont'd)

Before beginning a minor repair, be sure you can work in good conditions with all necessary tools :

- Clean jars for mixing the resin
- Brushes
- Scissors for cutting glass fiber cloth
- Sandpaper of different degrees of fineness
- Knife
- Protective gloves
- Acetone
- Tape
- Hot air blower

Be sure you have always enough :

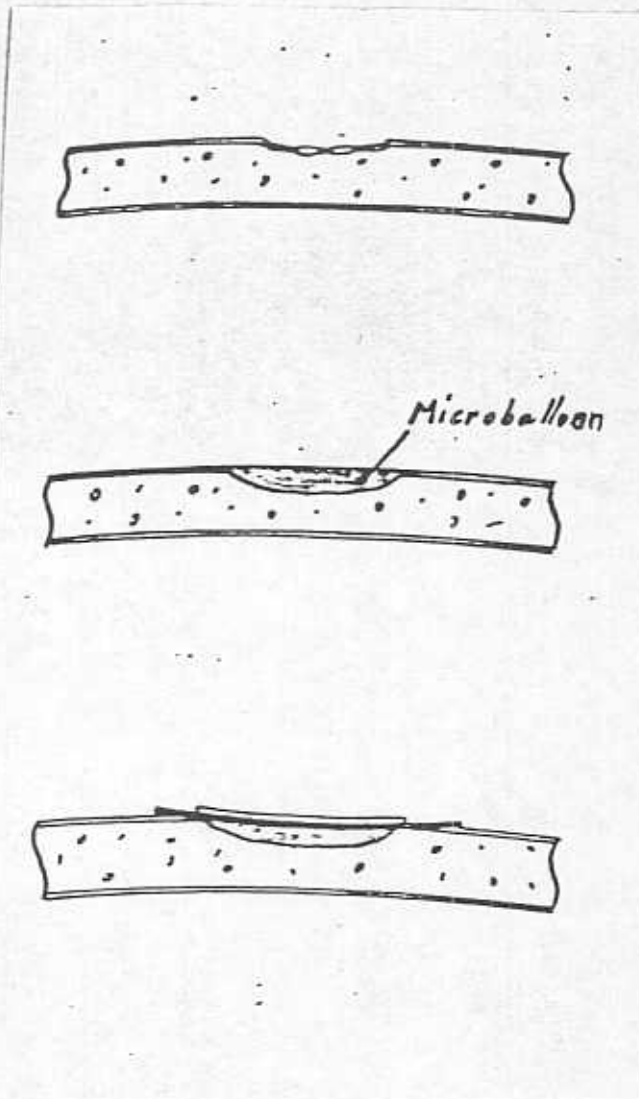
- Resin with hardener
- Gel coat
- Clothes
- Microballoon or talc

First determine the exact laminate composition : cut out a little piece in the damaged place and burn it. In this way you can see the number, quality and direction of clothes clearly. But remember from which place and direction the piece of lamination has been removed !

For your security, you can use an easy system : use always one layer more than original laminate. When finishing, if you sand a little the upper cloth, you know it remains enough.

III. REPAIRING THE REINFORCED PLASTIC LAMINATES (Cont'd)

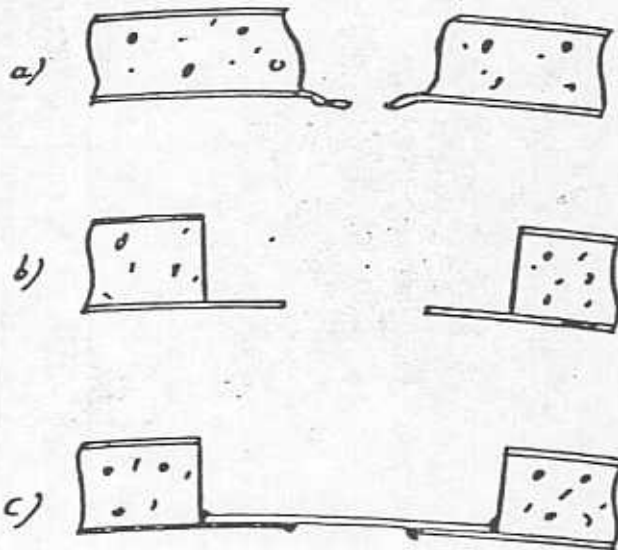
III.3 - Little damage : 1st sample



The inside skin has not been hurt. Mark the damage place on outside skin and cut it with a knife. Sand the whole place and PVC core to make it very clean. Fill the hole in PVC core with a mixture of resin and microballoon. When the resin has hardened, sand the microballoon to make it clean and a little less thick than original core. Lamine your clothes with resin. First cloth is at least as big as damaged area and each other cloth is a little smaller to have less work for finition. To harden the resin, warm it to 60°C during 3 or 4 hours with an hot air blower. Sand the repair area and fill it if necessary with polyester putty to get the original shape and spray three layers of gel coat. Then, sand the gel-coat with very thin wet paper and polish.

III - REPAIRING THE REINFORCED PLASTIC LAMINATES (Cont'd)

III.4 - Hole in sandwich : second sample



The hole looks like first drawing (a). Cut and sand the inside skin and PV core as shown on the second drawing (b). Make a plate with clothes as original inside skin on a surface near the hole on the outside skin of the glider protected by a plastic film. Let it harden, cut it just at the shape of your hole and stick it in place with resin as shown on the third drawing (c). Finish the repairing as shown on first sample. Don't forget to warm it ! (60°C)

III.5 - Third sample

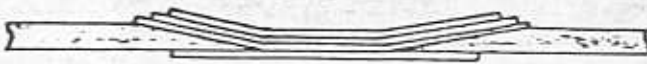


The damaged place is not in a sandwich area and there is no hole. First sand all around the damaged place to find all white laminate plastic which is the broken area.

Sand the whole damaged place to give it a beveled shape (40°) as shown on the drawing. If you have to dig a hole, see 4th sample. Laminate the different clothes, beginning by the largest one and finish as in the 1st sample.

III.- REPAIRING THE REINFORCED PLASTIC LAMINATES (Cont'd)

III.6 - Fourth sample



You get a hole in an area without sandwich. Sand the broken place to determine the broken area and remove it. The hole must have an oval shape and the hedges are bevelled approximately 40/1. Sand the inner surface

to stick in thin plate of plywood inside as shown on the drawing. Make this plate approximately 15 mm wider than the hole and stick it with resin.

You are now as in third sample and can finish as it.

IV - MISCELLANEOUS

IV.1 - Broken parts

Following parts can be changed :

- Standart parts

- . Control surfaces : Ailerons  
Rudder  
Elevator (right or left)
- . Landing gear and wheel
- . Tail wearing plates or wheel (if fitted)
- . Wheel fairing (if fitted : E 78 B only)
- . Metal parts which can be removed are :  
axels, bell cranks, bushings, pins, bearings, push rods,  
control system...

- Exchange part needing adjusting

- . Canopies (must be adjusted on the fuselage)  
For other parts contact the manufacturer or their representative.

IV - MISCELLANEOUS (Cont'd)

IV-2 - Balancing the control surfaces

Can be done only in an authorized factory. The different weights can be found in the individual inspection report.

IV.3 - Control surfaces deflections

Report to the individual inspection report or flight manual to get the correct values.