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LAK-19T

Inspection Program

To Extend the Service Life

The following document specifies an inspection program for the LAK-19T sailplane reaching the 3000 hours' service life and thus extending it to 6000 hours.




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This document confirms that the following inspection was done for the glider:

Type	Serial Number	Year of construction	Number of take-offs		Total time of service
			Winch launch.	Aero towing	
LAK-19T					

General NOTES

- 1) The inspection results must be recorded into this document or into the report (commenting every inspection step). If the inspection is carried out not by the manufacturer, then the copy of this document and report must be sent to him for evaluation and possible updates of the inspection program.
- 2) The Inspection Program for the service life extension is based on the gained experience and knowledge. An inspection requires additional thoroughness, attention, and thus shouldn't be restricted by the steps detailed in the program.
- 3) A detailed study of Flight and Maintenance manual, Airworthiness Directives (Ads), Airworthiness Notices (ANs), technical notes and repair instructions is essential.
- 4) For the inspection use common instruments (such as mirrors, torches and magnifying glass). And for the difficult to access areas the endoscope should be used.
- 5) In case if it is difficult to inspect any elements, control system's connecting points, gluing joints and etc., it might be necessary to make an inspection holes. These inspection holes must be located on non-structural areas (contact the manufacturer for detailed layout of inspection holes). After inspection all holes must be repaired according the Maintenance Manual (Section 8. "Repair").
- 6) When disassembling control surfaces and other parts or components, refer to detailed information or instructions provided in the Maintenance Manual. If it needs, make the sketches (example: assembled parts sequence, number and position of washers and etc.) to ensure proper functioning after re-assembly.
- 7) If the sailplane was operated in the high humidity levels (e.g. long-time parking in the airfield) all metal components must be inspected for corrosion. Special

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care must be given to control rod's ends (those which have a control holes for the threaded fittings) due the possibility of water accumulation in these hollow rods. Also the power plant unit must be thoroughly inspected for the damages of corrosion.

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List of Airworthiness Directives (Ads), Airworthiness Notices (ANs), Bulletins and Technical Notes done for the current sailplane

Document number	Date of completion	Total time of service	Number of take-offs	Remarks


(**example:** 019T.8.65.006 A – 2008/04/22 – 1281 flight hours – Inspection shaft and bracket 580-22 of electric actuator CARR 22 from engine extraction-retraction system)

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List of Maintenance Actions and Repairs done for the current sailplane

Description	Date of completion	Total time of service	Number of take-offs

(**example:** The oxygen system installation – 2005/03/21 – 730.5 flight hours)

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Inspecting the rigged sailplane

- 1 Inspection of the wing-fuselage connection (the free play of the locating pins)
 - 1.1 During the sailplane rigging check that the ailerons shaft, the air brakes control shaft and the water ballast control shaft correctly and without any exceeded forces connects with the wing's control shafts.
 - 1.2 During the sailplane rigging check that the main pins properly and firmly connects both wings spars (see the Maintenance Manual Fig.2-20d). Check these pins for the damage, wear or rust. Inspect the pin's handle welding joint (as it may be damaged) and fixation of pins (see the Maintenance Manual Fig.3-2c).
 - 1.3 Check the vertical free play. Before inspection support the fuselage to make sure it will not move. Apply the force approximately 20 daN upward and downward at the tip of the inner wing (without the outer wing). The free play measured at the tip of the wing must not exceed 10 mm.
 - 1.4 Check the horizontal free play. Before inspection support the fuselage to make sure it will not move. Apply the force approximately 20 daN forward and backward (in the horizontal plane of the wing) at the tip of the inner wing (without the outer wing). The free play measured at the tip of the wing must not exceed 10 mm.

Be sure do not confuse the free play with elasticity of the wing. The free plays can be eliminated by adjusting the inserts located in the root rib of the wing.

RESULTS:

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2 Inspection of the wing-wing tip connection (the free play of the locating pins)

- 2.1 During the sailplane rigging check that the wing tip properly connects with the wing (see the Maintenance Manual Fig.2-20c). Check the fixation of the wing tip. The fixing unit, located in the upper wing skin, should be working without any restrictions and firmly locate the wing tip. The wing tip's aileron should firmly connect with the main wing's aileron.
- 2.2 Inspect the horizontal free play. Before inspection support the wing to make sure it will not move. Apply the force approximately 5 daN forward and backward at the tip of the wing-tip in the horizontal plane. The free play measured at the tip must not exceed 5 mm.

The free plays can be eliminated by adjusting the inserts located in the root rib of the wing-tip.

RESULTS:

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3 Inspection of the stabilizer-fuselage connection (the free play of the locating pins)

- 3.1 During the sailplane rigging check that the stabilizer fixing pin properly and firmly locate the stabilizer on the fin (see the Maintenance Manual Fig.2-20b). There should not be any vertical free play. Check the pin for the damage, wear or rust and its fixation in the fin (see the Maintenance Manual Fig.3-3b).
- 3.2 Assure that elevator control unit properly and without any exceeded forces connects to the both elevator's surfaces. There shouldn't be any free plays.
- 3.3 Inspect the horizontal free play. Before inspection support the fuselage to make sure it will not move. Apply the force approximately 5 daN forward and backward

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at the tip of the stabilizer in the horizontal plane. The free play measured at the tip must not exceed 5 mm.

RESULTS:

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4 Control systems inspection for the free play

This inspection must be done when the control stick and pedals are fixed in the neutral position. The measuring location must be on the root section of the corresponding control surface. The allowed free play limits are shown in the Maintenance Manual (Section 2.7.2, table 2-3)

- 4.1 Measure the ailerons free play.
- 4.2 Measure the elevator free play.
- 4.3 Measure the rudder free play.

RESULTS:

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5 Control surfaces deflection angles measurement

All control surfaces must move freely, without any restrictions.

- 5.1 Measure the ailerons deflection angles. The limits are given in the Maintenance Manual (Section 2.3.1).
- 5.2 Measure the elevator deflection angles. The limits are given in the Maintenance Manual (Fig. 2-6 Elevator control).
- 5.3 Measure the rudder deflection angles. The limits are given in the Maintenance Manual (Fig. 2-8a Rudder control).

RESULTS:

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6 Inspection of the air brakes functioning

- 6.1 Check the firm and secure air brakes locking. Any free play of the air brake cover is not permissible. The cover should be aligned with the wing surface.
- 6.2 Check the bearing play in the air brake extension arms.

RESULTS:


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7 Inspection of the wing's water ballast control

- 7.1 Inspect the water tanks rubber seals (see the Maintenance Manual Fig.2-9b). If they are damaged or wear-out, the manufacturer can supply the new ones for replacement.

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- 7.2 Check the water ballast valve's functioning. It must close tightly and without "slipping out" effect.
- 7.3 Perform a water tank leakage test by air pressure. Properly seal a valve and through the drainage hole generate a pressure approx. 0.2 at (in case of using an airspeed indicator, the reading should be approx. 210 km/h). Perform the test for 3 min. and all this time the pressure shouldn't change.
- 7.4 Perform a water ballast valve's watertight test. Fill the tanks with water and keep for about 4 hours. Check if there isn't leakage around the valve.

RESULTS:

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8 Measurement of friction forces in control systems

Allowed forces in control systems are shown in the maintenance Manual (Section 2.7.3, table 2-4).

- 8.1 Measure the elevators control force (the trimmer must be in neutral position).
- 8.2 Measure the ailerons control force.
- 8.3 Measure the rudder control force (at the upper point of pedals).
- 8.4 Measure the airbrakes control force (at opening and closing positions). Check the proper airbrakes handle fixation.
- 8.5 Measure the towing hook control force (without loading on towing hook the force must not exceed the 10 daN, with load – 12 daN).
- 8.6 Measure the force for emergency canopy opening (min. 5 daN, max. 13 daN).
- 8.7 Measure the force for pedals adjustment (max. 15 daN).
- 8.8 Measure the water ballast control force (max. 4 daN).
- 8.9 Measure the ventilation control force (max. 3 daN).

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The landing gear control forces can be measured at this step or during the fuselage inspection (see the section 17.1). The results must be entered in section *17 Fuselage control systems functional inspection*.

RESULTS:

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9 Power plant inspection

- 9.1 Inspect the propeller according the annual inspection described in Propeller Operation Manual (Section 5. Inspection).
- 9.2 Inspect the power plant according the annual inspection described in SOLO Engine Manual (Section 5. Maintenance).
- 9.3 Check all metal parts of the power plant system for:
 - Deformations, cracks, wear, excess free plays, loose rivets, proper securing of bolted connections.
 - Corrosion, general condition, full protection by paint or coating. (observe "General NOTES" point 7).
 - Clearance of all levers, fittings, brackets from each other and from other assemblies and components.
 - Firm seating of all fittings and bearing brackets.
 - Lubrication of joints and bearings (refer to the Maintenance Manual section 3.2 for the detailed information for lubrication).

Special attention should be taken for the electric actuator (CARR 22, fig. 2-22 in the Maintenance Manual) attaching brackets and fittings.
- 9.4 Inspect the engine retaining, propeller brake control and decompression valve control cables for:
 - Chafing, fractures, corrosion, wear of single wires.

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- Special attention should be taken to the cable's thimbles and sleeves inspection for the deformations, cracks or corrosion.

If any damage is detected, the cable must be replaced with the new one.

- 9.5 Inspect all composite parts in the power plant compartment. Check for parts damages, cracks, delamination and gluing joint damages.
- 9.6 Check the function of the propeller brake. Also inspect the brake's rubber hose for the damage, wear and replace if needed (see the Maintenance Manual Fig.2-24).
- 9.7 Check the function of the decompression valves.
- 9.8 Inspect all the fuel system components such as fuel pump, sensor, valve, fuel lines and other.
- 9.9 Inspect the electrical wiring for:
 - Damaged insulation, abrasion.
 - Connecting terminals condition: corrosion, damage of soldered joints, loose fitting with wires.
- 9.10 Perform the engine extraction/retraction on the ground. Assure that power plant unit moves properly from retracted position to extracted and backwards.
- 9.11 Perform the engine starting and stopping on the ground. It is highly important to support the fuselage to make sure it will not move during the test. Follow the instructions according the Flight Manual (Section 4.5.12-13 Engine starting – stopping).

Take in account all safety precautions!

The test must be done in clear area at safety distance from any objects. It is strictly prohibited to stand in the plane of the propeller!

RESULTS:

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Wing inspection

10 Assembled wing's inspection

10.1 Inspect the axial free plays of the control surfaces.

10.2 Check that the control surfaces have a gap between each other and wing, wing tip or winglet root planes. The gaps must be 2-3 mm width. These clearances are necessary to ensure that the control surfaces do not constrict each other when the wing deforms under the loads in flight.

RESULTS:

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11 Wing's console structure inspection

Disassemble the control surfaces from the wing before the inspection (observe "General NOTES" point 6).

11.1 Visually inspect the whole wing skin for fine cracks ("Hair cracks"). Harmless fine cracks, caused by thicker paints layer due the prior repairs or located in the corners, can be tolerated. However, it is best to remove them to protect the underlying composite laminate. For conviction, the paintwork should be removed to clearly inspect the possible damage for structural laminate.

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11.2 Inspect the wing root and wing-end ribs for:

- Damage of composite structure, delamination.
- Secure and firm installation of drag pin's inserts in the root rib. The damage or wear of these inserts.
- Secure and firm installation of drag pins in the wing-end rib. The damage or wear of these pins.

11.3 Inspect the external part of the wing spar.

Before the spar inspection the paint coating **must be cleaned!**

- Check for the secure and firm installation of the inserts in the spar. The damage or wear of these inserts. Clearly inspect the zones around the inserts for the possible formation of cracks.
- Damage of composite structure, delamination. Special attention must be taken to the spar shells. The tests, done to evaluate the wing life time resource, shows a potential opportunity for the damages in spar shells transition areas (see the Fig. 1). Any structural damage or indication of delamination in these areas is **not permissible**. The repair must be done according the manufacturer's instruction.

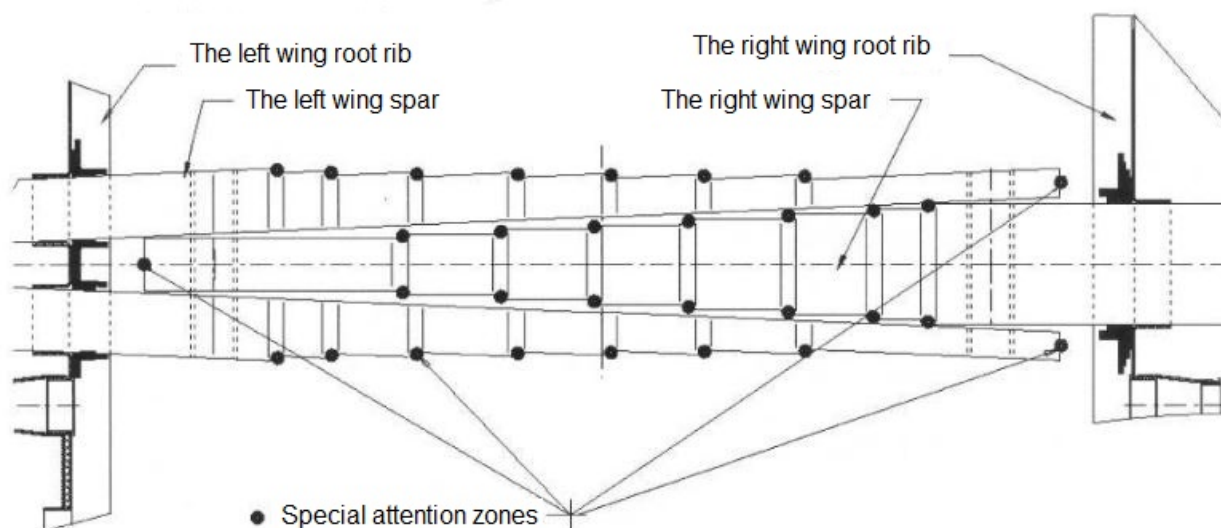


Fig. 1. The inspection of the wing spar external part

11.4 Inspect the wing trailing edge and the spar for the damages of composite structure, delamination.

11.5 Gluing joints inspection.

The wing structure gluing joints can be inspected using a metal object (approx. 20 to 40 g. weight). The damaged zones can be found by taping the metal object

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to the wing skin, the sound in these zones will be softer or more muffled than the sound of an undamaged structure. Tapping of the wing skin in the direction of flight (starting at the leading edge and proceeding to the trailing edge) allows the examiner to locate the position of the spar and other internal structures. Mark these structures with a soft pencil.

The wing's root zone (transition from spar shells to the wing skin, the root rib), the leading and trailing edges must be checked with exceptional thoroughness. Any delamination or failure of gluing joints in these zones are not allowable and needs to be repaired.

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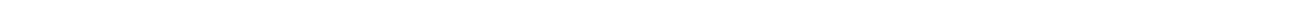
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12 Wing's internal structure inspection

It is recommended to use a suitable flexible endoscope for this inspection. Inspection openings are located on the lower wing skin, also there is possibility to check the inner wing components through the aileron control rod's covers (over the spar). If necessary, suitable openings can be drilled, which must be located on non-structural areas (contact the manufacturer for detailed layout of inspection holes). Afterwards it must be closed according the layout scheme as specified in the Maintenance Manual (Section 8, "Repair").

12.1 Wing's inner components inspection.



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- Check all parts and components for damage of composite structure, deformation, cracks or delamination.
- Inspect the gluing joints for debonding.

Special attention should be taken inspecting the main spar in the most highly stressed area (between the wing root and the airbrake box).

12.2 Check for the foreign bodies of any kind inside the wing.

All foreign bodies (e.g. hardened gluing mixture particles) must be entirely removed to prevent the control rods and levers from struggling.

12.3 Inspection of all metal wing parts for:

- Wear, excessive free play, deformation and cracks, loose rivets.
- Corrosion, general condition, protecting coating or painting condition. Observe the General NOTES, point 7.
- Lubrication of parts and units (refer to the Maintenance Manual section 3.2).
- All control systems must function freely without any disturbance.

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13 Wing's control surfaces inspection

13.1 Control surfaces structural inspection.

- Visually inspect the whole control surface's skin for damages, deformation, delamination or fine cracks (observe the section 11.1).
- Inspect the root ribs for composite structure damages. Special care should be taken checking the ailerons connecting ribs.
- Check the gluing joints (especially the leading and trailing edges).

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- Inspect the hinges and the control brackets for wear, excessive free play, deformation and cracks (observe the section 12.3).

13.2 Checking the control surfaces weights and balancing (the scheme and limits are specified in the Maintenance Manual section 7.4). This check is necessary if any repair or repainting has been accomplished.

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Wing tip (18m) inspection

14 Wing tip structural inspection

Disassemble the aileron from the wing tip before the inspection (observe "General NOTES" point 6).


14.1 Visually inspect the whole wing tip skin for damage, deformation, delamination or cracks (see the section 11.1).

14.2 Inspect the wing tip closing ribs for:

- Damage of composite structure, delamination.
- Secure and firm installation of drag pin's inserts in the root rib. The damage or wear of these inserts.
- Secure and firm installation of drag pins in the rearmost rib. The damage or wear of these pins.

14.3 Inspect the external part of the wing tip spar.

- Check for the secure and firm installation of the fixing bracket on the spar. Clearly inspect the spar tip zone.

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- Inspect the spar for damage of composite structure, delamination.

14.4 Inspect the wing tip trailing edge and the spar for the damages of composite structure, delamination.

14.5 Gluing joints inspection (observe the section 11.5).

The wing tip's root zone (transition from spar shells to the wing tip skin, the root rib), the leading and trailing edges must be checked with exceptional thoroughness. Any delamination or failure of gluing joints in these zones are not allowable and needs to be repaired.

14.6 Inspection of all metal wing tip parts for:

- Wear, excessive free play, deformation and cracks, loose rivets.
- Corrosion, general condition, protecting coating or painting condition. Observe the General NOTES, point 7.
- Lubrication of parts and units (refer to the Maintenance Manual section 3.2).

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15 Wing tip's aileron inspection

15.1 Aileron structural inspection.

- Visually inspect the whole aileron's skin for damages, deformation, delamination or fine cracks (observe the section 11.1).
- Inspect the root ribs for composite structure damages. Special care should be taken checking the aileron connecting rib.

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- Check the gluing joints (especially the leading and trailing edges).
- Inspect the hinges for wear, excessive free play, deformation and cracks (observe the section 12.3).

15.2 Check the aileron weight and balancing (the scheme and limits are specified in the Maintenance Manual section 7.4). This check is necessary if any repair or repainting has been accomplished.

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Wing tip (15m) inspection

16 Wing tip structural inspection

16.1 Visually inspect the whole wing tip skin for damage, deformation, delamination or cracks (see the section 11.1).


16.2 Inspect the wing tip closing rib for:

- Damage of composite structure, delamination.
- Secure and firm installation of drag pin's inserts in the root rib. The damage or wear of these inserts.

16.3 Inspect the external part of the wing tip spar.

- Check for the secure and firm installation of the fixing bracket on the spar. Clearly inspect the spar tip zone.
- Inspect the spar for damage of composite structure, delamination.

16.4 Gluing joints inspection (observe the section 11.5).

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The wing tip's root zone (transition from spar shells to the wing tip skin, the root rib), the leading and trailing edges must be checked with exceptional thoroughness. Any delamination or failure of gluing joints in these zones are not allowable and needs to be repaired.

16.5 Inspection of all metal wing tip parts for:

- Wear, excessive free play, deformation and cracks, loose rivets.
- Corrosion, general condition, protecting coating or painting condition. Observe the General NOTES, point 7.
- Lubrication of parts and units (refer to the Maintenance Manual section 3.2).

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Fuselage inspection

17 Fuselage control systems functional inspection

Use a proper equipment for fuselage support during the inspection, to prevent the uncontrolled fuselage's movements (banking, tilting or turning).

17.1 Measure the landing gear control force at releasing and retracting positions (allowed forces are shown in the maintenance Manual Section 2.7.3, table 2-4). Check the proper landing gear handle fixation.

17.2 Inspection of the fin water ballast control.

Perform a water tank leakage test by air pressure. Properly seal a drainage hole and through the water filling hole generate a pressure approx. 0.2 at (in case of

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using an airspeed indicator, the reading should be approx. 210 km/h). Perform the test for 3 min. and all this time the pressure shouldn't change.

In addition to this test you can perform water tank leakage test filling with water and keeping for about 4 hours.

RESULTS:

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18 Fuselage structure inspection

- 18.1 Check the entire fuselage skin for damage of composite structure, deformation, cracks or delamination (observe the section 11.1).
- 18.2 Inspect all fuselage's composite parts for deformation, cracks or delamination.
- 18.3 Inspect the gluing joints (see the section 11.5).

Special attention must be taken to these parts/zones:

- The front and rear fuselage bulkheads (located at the wing connection zone).
- The tow release hooks bulkheads.
- The power plant compartment zone.
- The spar of the fin.
- The fuselage-stabilizer connection zone. Carefully check the gluing joints of the upper fin's spar zone (the T shape of spar, where the connecting pins are located).
- The rudder hinges zones and elevator's control unit hinges zones.
- The transition area between the tail boom and fin, as this zone is highly stressed during a ground loop.

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18.4 Inspection of all metal fuselage parts for:

- Wear, excessive free play, deformation and cracks, loose rivets.
- Corrosion, general condition, protecting coating or painting condition. Observe the General NOTES, point 7.
- Lubrication of parts and units (refer to the Maintenance Manual section 3.2).

RESULTS:

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19 Fuselage control systems inspection

19.1 Inspect all control systems:

- Proper functioning and easy operation.

Additionally check if the components in the instruments panel do not limit the control stick movements (e.g. the ventilation handle or switches may contact with wheel brake control lever).

- Excess plays and sufficient stiffness.
- Check the limiting stops for control systems.
- Proper control handles fixation. Special attention must be shown for the landing gear and air brakes handles fixation.

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20 The cockpit inspection

20.1 The canopy system inspection.

- Visually check the canopy for damages, cracks or scratches.
- Check the canopy locking. The handles system must be easily operated and ensure the proper canopy locking.
- Inspect the emergency canopy release system.
- Check the proper canopy's hatch function.


20.2 The pilot's seat inspection.

- Remove the seat and inspect it for any damages, deformations or cracks.
- Inspect the seat positioning slots (at the bottom of the armrests).

20.3 Safety harness inspection.

- Check the maximum operating period expiration data.
- Inspect the firm and secure attachment to the fuselage structure.
- Inspect for damages, cracks, enlarged hole, corrosion, signs of rotting and undue wear.

Repair or replacement is unavoidable if the harness shows any of the following or similar damages.

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21 Rudder inspection

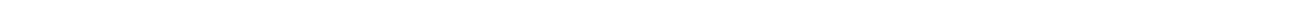
21.1 Rudder structural inspection.


- Visually inspect the whole rudder’s skin for damages, deformation, delamination or fine cracks (observe the section 11.1).
- Inspect the closing wall for composite structure damages (special attention should be taken inspecting the zones near the hinges).
- Check the gluing joints (especially the trailing edge).
- Inspect the hinges and the control bracket for wear, excessive free play, deformation and cracks (observe the section 12.3).

21.2 Check the rudder weight and balancing (the scheme and limits are specified in the Maintenance Manual section 7.4). This check is necessary if any repair or repainting has been accomplished.

RESULTS:

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Stabilizer inspection

22 Stabilizer structural inspection

Disassemble the elevator control surfaces from the stabilizer before the inspection (observe "General NOTES" point 6).

22.1 Visually inspect the whole stabilizer skin for damage, deformation, delamination or cracks (see the section 11.1).

22.2 Inspect the stabilizer spar for:

- Damage of composite structure, delamination.
- Secure and firm installation of drag pin's inserts. The damage or wear of these inserts.

22.3 Gluing joints inspection (observe the section 11.5).

The leading edge and the spar must be checked with exceptional thoroughness. Any delamination or failure of gluing joints in these zones are not allowable and needs to be repaired.

22.4 Inspection of all metal stabilizer parts for:

- Wear, excessive free play, deformation and cracks, loose rivets.
- Corrosion, general condition, protecting coating or painting condition. Observe the General NOTES, point 7.

22.5 Lubrication of parts and units (refer to the Maintenance Manual section 3.2).

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23 Stabilizer’s elevators inspection

23.1 Elevators structural inspection.


- Visually inspect the whole elevators skin for damages, deformation, delamination or fine cracks (observe the section 11.1).
- Inspect the root ribs for composite structure damages. Special care should be taken checking the elevators connecting ribs.
- Check the gluing joints (especially the leading and trailing edges).
- Inspect the hinges for wear, excessive free play, deformation and cracks (observe the section 12.3).

23.2 Check the elevators weights and balancing (the scheme and limits are specified in the Maintenance Manual section 7.4). This check is necessary if any repair or repainting has been accomplished.

RESULTS:

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Final checking

24 Sailplane final checking

- 24.1 Check the tow release couplings and other "time limited" components compliance with service life limits.
- 24.2 Check the proper marking of all operation limits according the manuals. Placards and colour markings in the cockpit must be checked as well as the registration letters/numbers on the exterior of the sailplane.

RESULTS:

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CONFIRMATION OF EXTENSION OF SERVICE LIFE

After the inspection program was successfully completed and any found defects have been repaired, this Inspection Program with the Acknowledgement of its accomplishment signed by an appropriately licensed inspector must be sent to JSC "Sportine Aviacija ir Ko" - manufacturer of the sailplane.

On receipt and examination of the Inspection program manufacturer will issue a confirmation of receipt and will return the document to the owner of the sailplane.

Only then the inspector can certify the accomplishment of this *Inspection Program To Extend the Service Life* in the sailplane's log book and inspection papers as follows:

"Herewith the service life of the sailplane is increased from hours to hours."


Date: Name (print): Signature:

Acknowledgment of accomplishment:

This is to certify that the *Inspection Program To Extend the Service Life* has been accomplished and all found defects have been properly repaired. This certification is applicable to the sailplane serial number stated on Page 4 of the present Inspection Program.

Name (print): Details of license:

Place, Date: Signature:

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NOTES