LINDSTRAND HOT AIR BALLOONS

MAINTENANCE SCHEDULE

For use with all Lindstrand Hot Air Balloons

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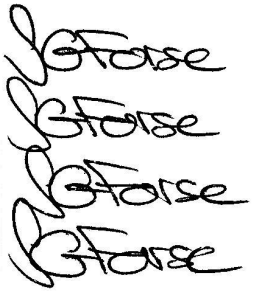
Record of Amendments

No.	Date	Affected Pages	Approval
	27.09.01	Initial Issue	
1	29.10.01	2, 7	
2	30.09.03	2, 4, 7, 8	
3	14.01.04	2, 7	

Amendments

This manual is kept up to date by amendments consisting of looseleaf pages, required to add new information or amend existing information. Pages affected by an amendment and the effective date are shown above. The pages themselves are identified by a change of the issue number at the bottom of each page. The number after the point in the issue number represents the amendment level of that page, eg the page marked Issue 1.4 is at Issue 1, modified by Amendment 4.

SECTION 1
MAINTENANCE SCHEDULES

1.1 Pre-Flight Inspection

1.1.1 Qualification

The pilot is responsible for the airworthiness of the balloon. The pre-flight inspection may be performed by the pilot or by a crew member who, in the opinion of the pilot, is suitably qualified.

1.1.2 Envelope Inspection

a) There must be no fabric damage above the first 4 m (13 ft) of envelope fabric panels, which is larger than 25 mm (1") in any one direction, or closer than 19 mm ($^3/_4$") to any load tape.

b) There must be no damage to load tapes. The connection between the load tapes and the flying wires should be carefully inspected for burn or friction damage. The load tape connection to the crown ring must be undamaged.

c) Inspect the flying wires for kinks or fraying. If any exists, then the wires must be replaced.

d) Check the security of the deflation lines. The parachute line tie off should be secure. Check the parachute line for fraying or heat damage and the parachute pulley(s) to ensure that they are free running and not worn. Check the rip panel deflation locks for correct operation and no damage. Check the correct operation of the Superchute lock, if fitted.

e) Check all carabiners for any distortion. If any is present, the carabiner must be replaced. The screw gate should operate correctly.

f) Check that the velcro rip deflation panel is correctly fitted.

1.1.3 Burners

a) Conduct a burner test to ensure the operation of all the systems.

b) There must be no leaks from the connectors, hoses or burner.

c) The pressure gauges should register once the fuel supply is connected and turned on.

d) Check the stiffness and security of the gimbal movement.

1.1.4 Basket

a) There must not be more than ten broken strands in any one basket wire. Any broken strands must be covered by protective tape. There must be no distortion of the thimble which prevents the attachment of the carabiner through the burner frame. There must be no damage to the swages.

b) There must be no holes in the wickerwork which would reduce the protection to occupants and no abnormal distortion of wickerwork.

c) There must be no distortion or cracking of the load frame.

1.1.5 Cylinders

a) There must be no leaks from any cylinder, or any damage to the cylinder body.

b) A burner test should be used to ensure that fuel flow from each cylinder is present.

c) The contents gauge should operate normally.

1.2 100 Hour / Annual Inspection

This inspection is to be carried out annually, or every 100 hours of flight time, whichever is the sooner. The following inspection schedule is the Lindstrand Balloons Maintenance Schedule.

1.2.1 Applicability

The Maintenance Schedule applies to all Lindstrand balloons for which a Certificate of Airworthiness is required to be maintained current in the Private, Aerial Work and Transport Category.

1.2.2 Qualification

Inspections must be carried out by an inspector who is approved by the relevant national airworthiness authority, to inspect the particular type of balloon in the category for intended operation. In the UK, BBAC Inspectors in categories 1, 2 and 3 are approved for all balloons in the Private and Aerial Work categories. Inspections for operation in the Transport Category must be undertaken by inspectors who are suitably approved.

1.2.3 Documentation

The aircraft log book, Certificate of Airworthiness and Certificate of Registration must be present for all annual inspections, irrespective of the operational category. The number of flying hours, flights and modifications performed since the last inspection, should be correct

and up to date. The entries identifying the components of the balloon should be checked and verified to ensure agreement with the components inspected. For balloons that are operating in the Transport Category, all copies of the last Technical Log must also be presented and the remaining hours entered on the Technical log should be cross-referenced with the hours entered in the aircraft log book. On successful completion of the inspection, an Inspection Report Form (IR4) should be completed and distributed as required. Please have your BBAC Membership Card available.

1.2.4 Envelope

It is recommended that inspection of the envelope be achieved by an inflation test. This simplifies the checking of fabric for damage. If an inflation is not possible, a careful panel by panel inspection must be conducted. Inspect the following:

a) Temperature warning flag in position.

b) Check the temperature label for overheating. If the temperature shown exceeds 120ºC, then a new label should be fitted alongside the old and the maximum temperature reached noted in the log book.

c) Check the fabric for holes or tears. Small holes in the bottom 4 m of fabric above the nomex are acceptable, but any damage above this level must be repaired in the approved manner.

d) Check the fabric for porosity by trying to blow through it. If the porosity of the fabric is high, a flight test should be considered by the inspector to assess the controllability.

e) The fabric at the edge of the parachute should be checked for heat damage. If the fabric is weak or brownish in colour, this can indicate that the parachute is not sealing correctly. The parachute should be repaired/replaced and an inflation performed to ensure that the parachute is correctly adjusted.

f) Check all load tapes for security of stitching, especially around the crown ring and where the overlying tapes join the top rim tape. Inspect the ends of rotation vents for security.

g) Check the load tape loops that connect the flying wires to the envelope. There should be no burn damage to the load tape or fraying.

1.2.4.1 Parachute

h) Check the parachute line for wear, fraying or heat damage. If the kevlar core is visible through the outer coating, the complete line must be replaced. Check the tie off and safety knot.

i) Check that the parachute pulley is running freely and that there is no wear. Check that there are no threads wrapped around the pulley. Check all Q-Vent deflation system pulleys to ensure that the lines move freely through the pulleys.

j) Check that the retaining and release cords are in good condition. Stiffness of the cords indicates overheating.

k) Check the knots and loop stitching to the envelope and parachute.

l) If there is any doubt about the sealing of the parachute, it should be checked by conducting a hot inflation. The overlap should be equal around the circumference and there should be no daylight visible. There should not be excessive tension in any of the retaining lines, or stress wrinkles at the parachute edge.

1.2.4.2 Velcro Rip Panels

Check the operating line for fraying and security of attachment.

Check that the rip locks operate correctly.

Check the condition of the velcro. It should be clean and have good adhesion.

The fit of the velcro should be checked. The velcro on the rip panel itself must not be shorter than the velcro on the balloon.

The overlying tapes of the velcro rip panel must be up to 5% shorter than the corresponding panel seam length. If this is not the case, it should be reported to Lindstrand Balloons.

1.2.4.3 Load Bearing Attachments

Flying Wires

Check that there are no loose wires or severe kinks. Slight discolouration due to burning is permissible, provided that the flexibility is not reduced.

Check the thimbles and ferrules for distortion. Slight distortion of thimbles is permissible provided that a carabiner will still move through the thimble.

All suspension wires on Lindstrand balloons are manufactured from stainless steel. Replacement with galvanised mild steel is not acceptable.

Carabiners

Carabiners should be free of distortion and the screw gate should operate freely.

Basket Wires

These should be checked for damage and that the thimble and ferrule are intact. A slight distortion of the thimble is not critical, provided that the carabiner will still move freely through the thimble. There must not be more than ten broken strands in any one basket wire. Any broken strands must be covered by protective tape. There must be no damage to the ferrules.

Load Frame

Check for distortion of the load frame and all the welds.

Check the security of the burner attachment to the inner frame and the inner frame into the outer. The pivot of the burner should be slightly stiff, but not to the extent that movement is prevented.

Ensure that the nylon rods are free from fractures and the steel stubs on basket and burner frame are intact.

1.2.4.4 Burner

Check the burner for external damage.

Check the main jets for blockage and tightness.

Perform burner test to ensure correct function of all valves and that no leaks exist.

Check the condition of the fuel hoses, including any manifolds that are fitted. The outer cover of the hose must be free of cuts, abrasion and excessive bends.

1.2.4.5 Fuel Cylinders

Check for external damage to the pressure vessel. Damage to the protective top and bottom rings is not critical, provided there are no sharp edges that could cause injury.

Check the operation of the contents gauge.

Check that when no hoses are connected, the self-sealing function of the liquid connectors is leak-tight by opening the valve. After testing, release the pressure.

Check that there are no leaks and that all valves function correctly.

A hydrostatic structural inspection of cylinders manufactured by Lindstrand Balloons is required after ten years and thereafter every ten years. The pressure relief valve must be replaced as part of the ten year hydrostatic structural inspection. For convenience, cylinder tests may be carried out in advance of the annual inspection and the results noted in the log book.

After ten years in service and every five years thereafter, an internal visual inspection must be conducted on Lindstrand Balloons supplied cylinders.

1.2.4.6 Baskets

Check the wickerwork for excessive distortion or holes which would cause danger to occupants.

Check the condition of the plywood floor. Any cracks longer than 150 mm (6”) must not be transmitted through the floor. Check that there is no wood rotting, especially at the edges of the floor.

Damage to the runners is not critical, provided that they are not broken in two.

Check the security of internal rope handles.

Check the condition of the rawhide. This is a protective layer so not critical to structural strength, but if it is damaged, it can result in sharp edges.

Check the tension of the lightweight partition rigging wires.

Check the fire extinguisher by weighing, or in accordance with the instructions shown on the extinguisher.

Check the tension of cross-bracing straps.

1.3 Fabric Strength Test

If the total number of hours on the balloon envelope is greater than 250 at the time of the annual inspection, then a fabric test must be carried out. This may be conducted directly on the envelope by using one of the proprietry 1" grab testers, or alternatively a section of the fabric may be removed from the envelope and submitted to a textile testing laboratory. The test specification is ASTM-D-1682. The 1" grab test strength should exceed 13.6 kg (30 lbs) in both warp and weft directions.

The strength test should be conducted on the panels in the crown of the balloon. Usually, the panels next to the top rim tape and on the parachute itself, age the most quickly. If an envelope has been fitted with replacement top half, be sure to test the older fabric in the lower half of the envelope as well.

1.4 Inspection After Overheating

All Lindstrand balloons are fitted with a temperature warning flag which will descend when the solder link melts at 127ºC. If this occurs, the two temperature tags stitched to the inside surface of the parachute should be inspected. These tags have heat sensitive windows which change colour once a particular temperature level has been reached and provide a more accurate indication of the surface temperature.

If the maximum temperature indicated on the temperature tags is less than 120ºC, then no further action is required. The temperature flag must be replaced with a new one. Do not re-solder the old flag back together. If the indicated temperature of the temperature tags is 120ºC or greater, inspect the top of the envelope.

Pay particular attention to the edges of the parachute fabric and the parachute retaining lines. Excessive heat on fabric tends to cause cracking, due to stiffness. Discolouration is also another sign of overheating. If any signs are visible, then a fabric strength test should be conducted at various positions, both on the top panels and the parachute panels, as described in Section 4.3. If no signs of overheating are visible and the fabric strength test indicates sufficient fabric strength, then replace the temperature flag and tags. Always record the maximum temperature reached in the log book.