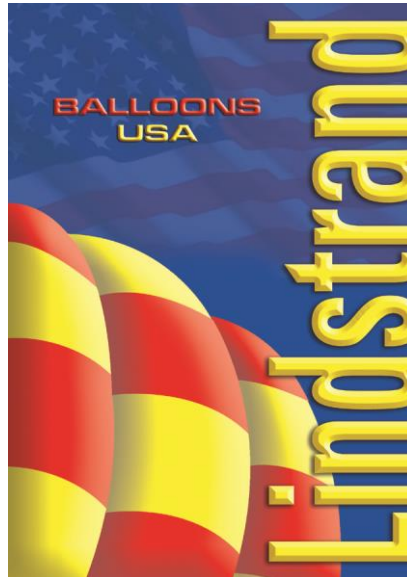


LINDSTRAND BALLOONS USA

MANUAL FOR CONTINUED AIRWORTHINESS

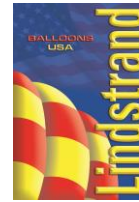


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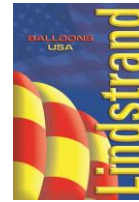
Record of Amendments

| No. | Date | Affected Pages | Approved |
|-----|----------|---|----------------------|
| 1.0 | 11.20.98 | Original Issue | <i>Paul Thompson</i> |
| 1.1 | 04.16.01 | ii, Sect. 3-1 | <i>Paul Thompson</i> |
| 1.2 | 11.01.02 | ii, Sect. 3-1 | <i>Paul Thompson</i> |
| 1.3 | 04.01.03 | ii, Sect. 1-1 | <i>Paul Thompson</i> |
| 1.4 | 08.14.06 | ii, Sect. 3-1 | <i>Paul Thompson</i> |
| 1.5 | 03.01.07 | Entire Contents of Manual | <i>Paul Thompson</i> |
| 1.6 | 11.02.09 | Sect. 0-2, Sect. 5-3, Sect. 6-2, Sect. 6-3, Appendix A | <i>Paul Thompson</i> |
| 1.7 | 12-10-10 | Sect 0-2 Sect, 5.1.1.1 | <i>Paul Thompson</i> |
| 1.8 | 12-01-11 | Entire Contents of Manual | <i>Paul Thompson</i> |
| 1.9 | 07-18-12 | 0-2, Appendix B 1-4 | <i>Paul Thompson</i> |
| 2.0 | 02-15-13 | 0-2 Appendix B 1-4 | <i>Paul Thompson</i> |
| 2.1 | 03-07-13 | 0-2 Appendix B 1-4 | <i>Paul Thompson</i> |
| 2.2 | 01-02-14 | 0-1, 0-2, 0-3 Sect 2 Page 1 Sect 2.2, Sect 2.5 Sect 5.1.1.1 Sect 5.4.1, Sect 6.1.4.2 c, Sect. 6.1.4.6, Appendix A 1-10 | <i>Paul Thompson</i> |

Amendments

This manual is kept up to date by amendments consisting of loose-leaf 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, e.g. the page marked Issue 1.4 is at Issue 1, modified by Amendment 4.

NOTE: Revised text on the affected page(s) indicated by a vertical black line along left margin.



Throughout this manual you will find the following messages:

NOTE: Offers information or instructions of special interest to the reader pertaining to a particular procedure or condition.

CAUTION: Denotes a hazardous procedure or condition which, if ignored could damage or destroy a part of the aircraft.

WARNING! Denotes information which if ignored could result in injury or death to persons.

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- 1.1 Purpose of this Manual
- 1.2 Applicability
- 1.3 Identification of Systems
- 1.4 Qualification

SECTION 2 - AIRWORTHINESS LIMITATIONS

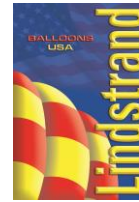
- 2.1 Approval Statement
- 2.2 Mandatory Replacement Time
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SECTION 3 - TECHNICAL DESCRIPTION

- 3.1 Envelopes
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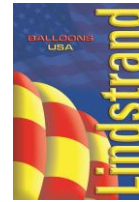
- 4.1 Paperwork
- 4.2 Envelopes
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- 4.5 Burners
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SECTION 2
AIRWORTHINESS LIMITATIONS

Record of Amendments

| NO | Date | Affected Pages | Approved |
|-----|-----------|----------------|---|
| 2.2 | 2-15-2014 | Sect 2, 1-2 |  2/1/14 |



2.1 Approval Statement

The Airworthiness Limitations section is FAA approved, and specifies maintenance required under Sections 43.16 and 91.403 of the Federal Aviation Regulations.

2.2 Mandatory Replacement Time

All fuel hoses, main burner and manifold must be replaced after 10 years in service

2.3 Inspection Interval

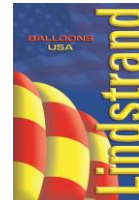
The inspection interval for Lindstrand balloons is 100 hours of operation, or one year; whichever is the sooner.

2.4 Inspection Procedure

The inspection procedure can be found in Section 6 of this manual.
The inspection checklist is specified in Appendix "A" of this manual.

2.5 Fabric Replacement

For all models of balloons manufactured by Lindstrand Balloons under Type Certificates B82EU, B87EU and B00010CH, replacement of envelope fabric is limited to a one time replacement of up to 65% of the original fabric at the time of manufacture, except for minor patches or repairs.



SECTION 5 REPAIR AND MAINTENANCE

5.1 Envelopes

5.1.1 Envelope Construction Materials

It is important to ensure that any repairs performed on the envelope are achieved by using the correct material. This section describes the materials to be used. In case of doubt, please consult the factory.

CAUTION:

IT IS CRITICAL THAT ALL REPAIRS MAINTAIN THE INTEGRITY OF THE ORIGINAL DESIGN OF THE AIRCRAFT. CONSEQUENTLY THE SAME MATERIALS (FABRIC, THREAD, LOAD TAPE) AND SEWING TECHNIQUES USED DURING MANUFACTURE MUST BE USED FOR REPAIR AND MAINTENANCE OF THE AIRCRAFT.

5.1.1.1 Envelope Fabric

There are four primary fabrics available for use in the construction of the envelope:

The standard fabric is high tenacity woven ripstop nylon with a soft polyurethane fluorocarbon elastomeric coating. The fabric is supplied on 55" and 60" wide rolls and this complete width will be required for some panel replacements. This fabric can be used in conjunction with Hyperlife

An alternative to the standard ripstop is a high tenacity nylon fabric which is woven in a diamond pattern with a polyurethane coating. This fabric can be used in conjunction with Hyperlife.

Hyperlife is a taffeta weave heavier nylon base cloth with a silicone elastomeric coating.

Optional lightweight ripstop nylon base cloth with a silicone coating.

When replacement fabric is not obtained from Lindstrand Balloons, there must be documentation showing the fabric used to be of equivalent specification. An STC (Supplemental Type Certificate) or 337 Form whichever is appropriate must be completed to create a legal repair. Use of non-Lindstrand supplied parts will void the warranty on the aircraft. If Lindstrand-supplied fabric is used for repairs requiring more than 50 yards of fabric, the Lindstrand invoice number and fabric batch number for the replacement fabric must be entered in the balloon logbook.

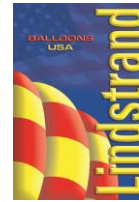
WARNING:

FOR ALL MODELS OF BALLOONS MANUFACTURED BY LINDSTRAND BALLOONS, REPLACEMENT OF ENVELOPE FABRIC IS LIMITED TO A ONE TIME REPLACEMENT OF 65% OF THE ORIGINAL FABRIC AT THE TIME OF MANUFACTURE, EXCEPT FOR MINOR PATCHES OR REPAIRS

5.1.1.2 Load Tapes

Several of the load tapes used are common to all Lindstrand envelopes. The top rim tape is always 1" (25 mm) wide. The bottom rim tape is always 2" (50 mm) wide tape. This wider tape is used mainly to provide greater tolerance to burn damage in the mouth area.

There are three weights of $\frac{3}{4}$ " (20 mm) vertical load tape used depending on the size of the envelope. On all envelopes 310 and larger, vertical load tapes are 1" (25 mm) wide. During construction one of the heavier weight load tapes may be substituted for a lighter tape.



5.3.7 Contents Gauge

Each different type of cylinder is fitted with a different gauge and care must be taken to ensure that the correct type is fitted. The indicating dial on top of the cylinder can be replaced by unscrewing the two retaining screws and fitting a replacement. Any other work on the gauge requires the cylinder to be completely vented. If problems are encountered, it is best to check whether the float is moving by inverting the cylinder and listening for the movement of the float. If the float is moving and there is no indication, replace the dial and re-test. If there is still no movement of the pointer, the gauge must be removed and replaced with a new one. There are no serviceable items on the gauge itself.

5.3.8 Cylinder Bodies

If the cylinder pressure vessel body is damaged in any way, it must be submitted to the factory or a qualified inspector for assessment. Damage to the top and bottom protective rings is not important provided that there is no damage to the join between the cylinder body and the rings. Under no circumstances must welding be performed on the cylinders to repair damage, unless undertaken by the manufacturer.

5.3.9 Cylinder Straps

Cylinder (Tank) straps are used to restrain the fuel cylinder in place. Special care must be taken to place cylinder straps in the appropriate position on the cylinder to avoid ejection of the cylinder in a hard landing. (upper tank strap over top shoulder of tank) (See Figure 5.3.9)

5.4 Burners

When any work is performed on the burners, it is very important to ensure that a high standard of cleanliness is achieved. Components should be cleaned and dried with soft lint-free cloth, or left to dry naturally.

Once any type of service work has been performed on the burner, a functional test must be conducted to ensure there are no fuel leaks within the burner. Each burner function is tested to ensure correct operation. A soap solution or commercial leak detector may be applied to all threaded connections to detect very small leaks.

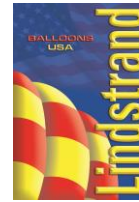
5.4.1 Hose Replacement

All hoses, main burner and manifold, must be replaced after 10 years in service.

With the burner held steady; unscrew the hose at the entry point into the burner block. Once loosened, it is best to unscrew the hose by holding it straight and turning the connector on the end of the hose. If the connector is serviceable, it may be removed by unscrewing from the other end of the hose. Pre-fabricated hose replacements are available from the factory in differing lengths. Measure the length of the existing hose and order a replacement (see Figure 4.4.3). Ensure that the correct hose end fittings are selected to suit the particular type of liquid connector.

| Connector Type | Hose End Fittings | |
|----------------|--------------------------|--|
| | Burner End | Cylinder End |
| Rego 7141 F | $\frac{3}{8}$ " BSP Male | $\frac{1}{4}$ " NPT Male or $\frac{3}{8}$ " BSP Male |
| Tema 3800 F | $\frac{3}{8}$ " BSP Male | $\frac{3}{8}$ " BSP Male |

When reassembling the replacement hose, new sealing washers must be used with the $\frac{3}{8}$ " BSP male threads. $\frac{1}{4}$ " NPT threads should be sealed using medium thread lock compound or teflon tape applied to the male thread only. Once the hose has been fitted, the hose must be pressure tested for integrity.



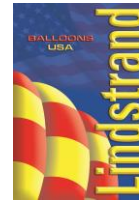
- d) If excessive porosity is suspected, check the fabric for porosity by trying to blow through it. If the porosity of the fabric is high, a flight test should be considered, by the inspector, to assess the controllability.
- e) The fabric at the edge of the parachute should be checked for heat damage. If the fabric is weak or obviously discolored, this can indicate that the parachute is not sealing correctly. The parachute should be repaired/replaced and inspected 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.
- g) Check the load tape loops that connect the envelope cables to the envelope. There should be no burn damage to the load tape or fraying.

6.1.4.1 Parachute

- a) Check the parachute deflation line for fraying. If the kevlar core is visible through the outer coating, this may necessitate complete line replacement. Check that the termination knot is secure.
- b) Check that the parachute pulley is running freely and that there is no wear. Check that there are no threads wrapped around the pulley. Lubricate with silicone spray
- c) Check that the retaining and pulldown cords are in good condition. Stiffness of the cords indicates overheating.
- d) Check the knots and loop stitching to the envelope and parachute.
- e) 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 radial stress wrinkles at the parachute edge.

6.1.4.2 Q-Vent

- a) Check the parachute (Candy Stripe) and Q-Vent (Red) deflation lines for fraying. If the kevlar core is visible through the outer coating, this may necessitate complete line replacement. Check that the termination knot is secure.
- b) Check that the parachute and Q-Vent deflation line pulleys are running freely and that there is no wear. Check that there are no threads or debris wrapped around the pulleys. Lubricate with silicone spray
- c) Check that the combination centering/pull down cords are in good condition. Discoloration of the cords indicates overheating. In balloons flown in dusty conditions, the cords may collect dirt causing an increased effort to operate the Q-Vent. It is recommended that in this case the condition of the cords be evaluated for replacement. Additionally, the condition of the pulleys or rings throughout the Q-vent rigging should also be evaluated for replacement.
- d) Check the combination centering/pull down cord rings or pulleys at the cap edge for wear. Lubricate pulleys with silicone spray. Check for abrasion at attachment loop
- e) Check the knots and loop stitching to the envelope and parachute.



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.

On a center-gimbal burner, check tightness of center block bolts and tension adjusting bolts.

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

6.1.4.6 Burner

Inspect all fuel connectors, pressure gauge, pilot, main and liquid controls. Clean and lubricate per annual / 100 hour inspection checklist.

All fuel hoses, main burner and manifold, must be replaced after 10 years in service

Check condition of fuel hoses, including any manifolds that are fitted and perform functional burner test

WARNING!

ONLY APPROVED LINDSTRAND FUEL HOSES MAY BE USED! INSTALLATION OF ANY OTHER HOSES OR MANIFOLDS IS DANGEROUS AND IS SPECIFICALLY NOT APPROVED. IF UNAPPROVED HOSES ARE FOUND CONNECTED TO THE AIRCRAFT FUEL SYSTEM, THEY MUST BE REPLACED WITH APPROVED PARTS.

6.1.4.7 Fuel Cylinders

Check for external damage to the pressure vessel. Damage to the protective top and bottom rings is not critical, provided there is no damage to cylinder body at points where these rings are attached.

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.

An internal inspection of cylinders manufactured by Lindstrand Balloons is required after twelve years, and thereafter every five years. For convenience, cylinder tests may be carried out in advance of the annual inspection and the results noted in the logbook.

6.1.4.8 Baskets

Inspect the interior and exterior of the basket for any damage to the wicker. If more than 4 vertical strands of wicker out of 12 consecutive vertical strands are broken they must be repaired. If more than 12 horizontal strands in a 24 inch by 24 inch area are broken they must be repaired. If a hole in the wicker exists larger than 2.5 inches at the widest dimension, it must be repaired. In woven floor baskets, any broken primary rattan (approx. 3/4 inch) supports must be replaced

On solid floor baskets check the condition of the plywood floor. Any cracks present must not be transmitted to the underside of the floor