

Issue 12 to Supplement 8.6  
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## 8.6 LINDSTRAND 'BOTTOM ENDS'

### 8.6.1 GENERAL INFORMATION

This supplement shall be inserted in the Flight Manual, in Section 8: 'Supplements' with the revisions record sheet amended accordingly.

Information contained herein supplements, or in the case of conflict, supersedes that contained in the basic Flight Manual. For Limitations, Procedures, and Performance Data not contained in this supplement, consult the basic Hot Air Balloon Flight Manual.

Throughout this supplement the term "Cameron" refers to envelopes, burners and cylinders manufactured by Cameron, Lindstrand Hot Air Balloons Limited, Sky and Thunder & Colt.

Issue 12 of this supplement consists of eight pages.

There are no additional continued airworthiness requirements associated with this supplement.

Note: Throughout this document "Lindstrand" refers to Lindstrand Hot air Balloons Limited.

### 8.6.2 LIMITATIONS

#### 8.6.2.3 FUEL

##### 8.6.2.3.1 Fuel Pressures (alternative)

1. The operating pressure range of the Jetstream burners is 4-15 bar (60-225 psi). However, flying with a fuel pressure below 5 bar (75 psi) requires caution. It is advised that the fuel pressure is increased if it is below this level.

### 8.6.2.4 MINIMUM BURNER REQUIREMENTS

Burner Configuration	Permitted Envelope Volume
Jetstream Single	42,000 ft <sup>3</sup> (1190 m <sup>3</sup> ) - 90,000 ft <sup>3</sup> (2549 m <sup>3</sup> )
Jetstream Supersingle	42,000 ft <sup>3</sup> (1190 m <sup>3</sup> ) - 105,000 ft <sup>3</sup> (2975 m <sup>3</sup> )
Jetstream Double	42,000 ft <sup>3</sup> (1190 m <sup>3</sup> ) - 210,000 ft <sup>3</sup> (5950 m <sup>3</sup> )
Jetstream Series 2 Double	
Jetstream Double + CLF	120,000 ft <sup>3</sup> (3398 m <sup>3</sup> ) - 315,000 ft <sup>3</sup> (8920 m <sup>3</sup> )
Jetstream Triple	
Jetstream Series 2 Triple	
Jetstream Triple +CLF	150,000 ft <sup>3</sup> (4248 m <sup>3</sup> ) - 500,000 ft <sup>3</sup> (14158 m <sup>3</sup> )
Jetstream Quad	180,000 ft <sup>3</sup> (5098 m <sup>3</sup> ) - 600,000 ft <sup>3</sup> (16992 m <sup>3</sup> )
Jetstream Series 2 Quad	180,000 ft <sup>3</sup> (5098 m <sup>3</sup> ) - 500,000 ft <sup>3</sup> (14158 m <sup>3</sup> )
Jetstream Series 2 Super Quad	500,000 ft <sup>3</sup> (14158 m <sup>3</sup> ) - 600,000 ft <sup>3</sup> (16992 m <sup>3</sup> )

### 8.6.2.18 EQUIPMENT INTERCHANGEABILITY

1. The burners and baskets manufactured by Lindstrand Balloons which may be used in combination with Cameron envelopes are listed in Section 8.6.9 of this supplement.
2. Lindstrand Baskets may be used in conjunction with Thunder & Colt Stratus, C3T (Magnum), C3 and C2 burners where the burners are fitted in compatible frames. A listing of compatible frames is given in Table 9.
3. Lindstrand Baskets may be used in conjunction with Cameron Shadow, Shadow/Stealth and Sirocco burners where the burners are fitted in compatible frames. A listing of compatible frames (additional to compatible Lindstrand frames) is given in Table 9.
4. Lindstrand Burners may be fitted to Cameron/ T&C burner frames where the frame has been fitted with a suitable crossbar (denoted by -6 (double), -7 (triple), -8 (quad) after the part number).

### 8.6.2.19 PANORAMIC WHEELCHAIR BASKET

1. The Panoramic Wheelchair Basket is limited to a maximum take-off and landing wind speed of 10 knots. In addition, the basket must not be flown in conditions which would prevent a landing on the designated downside. All four wheelchair restraining straps and four-point passenger harness must be attached and tightened for the duration of the flight. All door latches are to have the safety hooks in position prior to take-off.
2. There must be at least one attendant in the wheelchair passenger compartment when a wheelchair is being carried.

### 8.6.3 EMERGENCY PROCEDURES

#### 8.6.3.11 PILOT LIGHT FAILURE

##### 8.6.3.11.1 Liquid Fire As Pilot Light

If a liquid fire which has a 90° ball valve is fitted to the burner, then this can be turned on and adjusted to give a 1 m (3 ft) high flame. This flame can then be used as the pilot light for the main burner until an emergency landing is completed. If the liquid fire valve is the toggle action type, then the toggle valve should be opened fully and the cylinder valve which is supplying the fuel should be adjusted until the resulting flame is 1.5 m (5 ft) in length.

The alternative fuel system or burner should then be used to supply fuel to the main burner. In a double burner, cross-ignition will occur.

##### 8.6.3.11.2 Second Burner As Pilot Light

In a similar manner to using the liquid fire as a pilot light, in a single burner with a dual fuel system (the minimum requirement) or a double burner system, the "second" burner can be used as a pilot light for the first.

If the main blast valve for the burner is a ball valve action with no spring return system fitted, then the ball valve should be opened sufficiently to achieve a flame length of 1 m (3 ft). The flame should be ignited using a hand igniter such as matches or gas lighter. The other burner can then be used normally to achieve a controlled landing as soon as possible.

If the main blast valve for the burner is a toggle action type of valve, then the procedure is similar to that described above for the liquid fire. The blast valve should be opened fully and the cylinder valve adjusted so that the resulting flame is 1 m (3 ft) in length. The other burner should be used as normal to achieve a landing.

##### 8.6.3.11.3 Partially Open Valves

In any of the above procedures, which include a valve being half opened to achieve a low fuel flow rate, it should be noted that this procedure will cause cooling of the valve which is partially open.

This cooling effect will eventually result in freezing of the valve and is not recommended for prolonged periods. The technique should only be used in an emergency and even then, a landing should be made as soon as possible.

### 8.6.3.12 Panoramic Wheelchair Basket

In the event of an emergency when using the Wheelchair basket, the pilot must instruct the attendant to check the tension of all restraining straps and harness before the emergency landing is accomplished. Once the straps are checked, the attendant is instructed to care for their own security first and foremost during the landing.

In the event of a ground based basket fire, the attendant should be briefed to release the disabled passengers' harness and carry the disabled person to a safe area once the evacuation order has been given by the pilot. If the attendant will be physically challenged by this process, the pilot should designate another person to assist with this procedure.

## 8.6.4 NORMAL PROCEDURES

### 8.6.4.12 PANORAMIC WHEELCHAIR BASKET

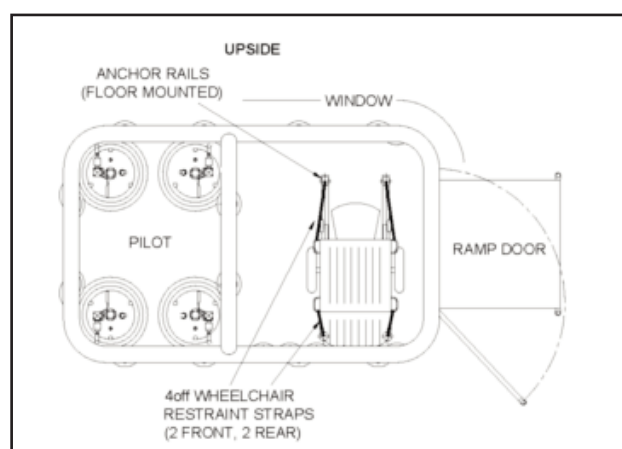
#### 8.6.4.12.1 Passenger Briefing

In the case of transportation of a disabled passenger and their attendant(s) within the 125 x 205 / 220 cm Wheelchair version basket, the attendant should be briefed in the use of the wheelchair restraints and passenger harness, in order to provide any necessary assistance.

#### 8.6.4.12.2 Securing of Wheelchair

Entry of the wheelchair into the basket is achieved by first removing the safety hooks from the three latches. Two latches are situated on the top of the fold down door and one latch is positioned on the safety bar. The latches are undone, the safety bar swung open and the door hinged downwards to create an entry ramp. The wheelchair may then be driven or pushed up the entry ramp and then positioned as shown in Figure 1, with the wheelchair occupant facing towards the window.

There are four restraining straps and tie-down positions fitted into the basket. With the wheelchair positioned equally over the floor mounted anchor rails as shown, use the two plain straps to secure the wheelchair to the anchor rails below and behind. When attaching the straps to the rail ensure the clips are exactly opposite each other in the rails and the plungers fully engaged. The two straps with the plastic reel body (titled Unwin - Quattro) are used to attach and tension the wheelchair to the anchor rail running across the front of the wheelchair. Again, ensure the plungers are fully engaged to the rail. Press the Quattro release button and extend the webbing to allow the Snaplock to pass around a suitable structural member of the wheelchair. Secure the Snaplock and turn the tensioning knob to ensure final and equal tension is applied. The straps should be at an even angle and even tension in a manner which prevents movement of the wheelchair relative to the basket.



▲ Fig 1: Panoramic Wheelchair Basket

#### **8.6.4.12.3 Securing the Wheelchair Occupant**

A full four point harness is provided to provide security to the wheelchair occupant. Adjust the slack in each leg of the harness such that the release buckle is situated on the chest of the wheelchair occupant. Position the sliding shoulder pads such that they provide some cushioning between the two shoulder straps and the occupants' shoulders. Carefully tighten the four legs of the harness to provide security to the occupant whilst not causing them discomfort.

The safety harness is opened by turning the outer cover in a clockwise direction when viewing the release buckle from the front. To secure the harness, turn the outer cover in the anti-clockwise direction. The wheelchair attendant should observe the harness release buckle during the flight, to ensure it is not released accidentally.

#### **8.6.4.12.4 Test of Wheelchair Restraint**

In order to test the security of wheelchair and occupant restraints and to demonstrate to the wheelchair occupant the type of motion the basket will adopt on landing, the basket should be slowly turned from the upright position into the inflation position. The wheelchair and occupant should be observed for any motion independent of the basket. If there is any motion, the basket should be returned to the upright position and the strap or harness tightened as appropriate.

#### **8.6.4.12.5 Wheelchair Removal**

If the basket has ended the flight in the horizontal position, then it should be restored to the vertical position prior to releasing the restraining straps. The straps securing the wheelchair are best released by pulling them tight and releasing the locking plate by pressing it. Release the four-point harness and then open the safety bar and fold down ramp. The wheelchair and occupant may exit from the basket once the pilot's permission has been given.

### **8.6.5 WEIGHT CALCULATIONS**

No change.

### **8.6.6 BALLOON AND SYSTEMS DESCRIPTION**

#### **8.6.6.3 Burner**

Refer to applicable Lindstrand Flight Manual.

#### **8.6.6.4 Fuel Cylinders**

Refer to applicable Lindstrand Flight Manual.

#### **8.6.6.5 Basket**

Refer to applicable Lindstrand Flight Manual.

### **8.6.7 BALLOON MAINTENANCE, HANDLING AND CARE**

Refer to the applicable Lindstrand Flight Manual.

**Note:** The use - including handling, transportation and filling - of transportable gas cylinders manufactured prior to 2004 could be prohibited by legislation (e.g. ADR, RID, ADN) in many countries unless the cylinder has been reassessed for conformity against accepted design/manufacturing standards (e.g. pi-marked).

The owner/operator of the cylinder is responsible for establishing if compliance is required and ensuring that compliance is maintained. Cameron Balloons Ltd. is unable to provide advice on this matter and local guidance should be sought in the country of operation.

## 8.6.9 EQUIPMENT LIST

Tables 6, 7 and 8 list the Lindstrand baskets, burners and fuel cylinders which may be used with Cameron envelope types.

Table 9 lists equivalent compatible burner frames for Cameron products.

**Table 6: Lindstrand Baskets (additional)**

Basket Category	Basket Number	Basket Description*	Applicable Cylinders	Applicable Burner Frames
A	04	100 x 85 O	1a, 1, 2, 3	Mini
C	01	110 x 115 O	1a, 1, 2, 3	Small
C	05	98 x 113 O	1a, 1, 2, 3	Small
C	09	96 x 102 O	1a, 1, 2, 3	Small
D	02	110 x 130 O	1a, 1, 2, 3	Small
D	06	100 x 125 O	1a, 1, 2, 3	Small
D	07	100 x 137 O	1a, 1, 2, 3	Small
E	03	110 x 155 O	1a, 1, 2, 3	Small
E	08	122 x 145 O	1a, 1, 2, 3	Medium
F	10	122 x 125 O	1a, 1, 2, 3	Medium
G	11	122 x 165 O	1a, 1, 2, 3	Medium
G	16	125 x 175 O	1a, 1, 2, 3	Medium
G	12	122 x 185 T	1a, 1, 2, 3	Medium
I	13	122 x 205 T	1a, 1, 2, 3	Medium
I	244	125 x 205 P	1a, 1, 2, 3	Medium
I	17	125 x 205 P	1a, 1, 2, 3	Medium
I	14	122 x 220 T	1a, 1, 2, 3	Medium
I	265	125 x 220 P	1a, 1, 2, 3	Medium
I	15	122 x 260 TT	1a, 1, 2, 3	Medium
I	20	152 x 205 T	1a, 1, 2, 3,6	Large
I	40	129 x 247 T	1a, 1, 2, 3	Large
J	34	140 x 240 TT	1a, 1, 2, 3	Large
J	35	140 x 240 T	1a, 1, 2, 3	Large
L	21	152 x 240 T	1a, 1, 2, 3, 6	Large

**Table 6: Lindstrand Baskets (additional)**

Basket Category	Basket Number	Basket Description*	Applicable Cylinders	Applicable Burner Frames
M	22	152 x 270 T	1a, 1, 2, 3, 6	Large
M	23	152 x 260 TT	1a, 1, 2, 3, 6	Large
M	30	152 x 280 TT	1a, 1, 2, 3, 6	Large
M	39	152 x 280 TT	1a, 1, 2, 3, 6	Large
M	31	140 x 270 TT	1a, 1, 2, 3	Large
M	32	140 x 300 TT	1a, 1, 2, 3	Large
M	36	140 x 270 T	1a, 1, 2, 3	Large
M	37	140 x 340 TT	1a, 1, 2, 3	Large
M	41	135 x 285 T	1a, 1, 2, 3	Large
N	24	152 x 300 TT	1a, 1, 2, 3, 6	Large
N	25	152 x 350 TT	1a, 1, 2, 3, 6	Large
N	28	152 x 300 T	1a, 1, 2, 3, 6	Large
N	29	152 x 325 TT	1a, 1, 2, 3, 6	Large
Q	26	152 x 390 TT	1a, 1, 2, 3, 6	Large
Q	27	152 x 430 TT	1a, 1, 2, 3, 6	Large / Super Large
Q	33	140 x 390 TT	1a, 1, 2, 3, 6	Large
Q	204	170 x 360 TT	1a, 1, 2, 3, 6	Large
Q	42	152 x 470 TT	1a, 1, 2, 3, 6	Super Large
R	45	152 x 550 TT	1a, 1, 2, 3, 6	Hanson Big Boy
R	50	152 x 610 TT	1a, 1, 2, 3, 6	Hanson Big Boy

**Table 7: Lindstrand Fuel Cylinders**

Cylinder Category	Cylinder Material	Cylinder Model
2	STAINLESS STEEL	V20
2	STAINLESS STEEL	V30
3	STAINLESS STEEL	V40

**Table 8: Lindstrand Burners (additional)**

Burner Category	Burner Model
A	Jetstream Single
A	Jetstream Super Single
B	Jetstream Double
B	Jetstream Series 2 Double
C	Jetstream Double + CLF
C	Jetstream Triple
C	Jetstream Series 2 Triple
D	Jetstream Triple + CLF
D	Jetstream Quad
D	Jetstream Series 2 Quad
D	Jetstream Series 2 Super Quad

**Table 9: Lindstrand / Thunder & Colt / Cameron - Compatible Burner Frames**

Lindstrand Frame Designation	Thunder & Colt Frame Designation	Applicable Cameron / Thunder & Colt Part Numbers
Small (700x700)	Small (700x700)	A0/BFS/500A Series, CB2278, CB8810, CB8811, CB8820, CB8821, CB8864, CB8894, CB8902, CB8903, CB2203, CQ 2018
Medium (850x850)	Medium (850x850)	A0/BFM/600 Series, CB8822, CB8823, CB8824, CB8825, CB8830, CB8831