

Table 1: Balloon Component Weight Record

| | |
|-----------------------------|--|
| Registration | |
| Year Of Construction | |
| Constructors Number | |
| Balloon Type | |

| Component | Drawing Number | Serial Number | Weight (kg) |
|------------------|-----------------------|----------------------|--------------------|
| Envelope | | | |
| Burner | | | |
| Basket | | | |
| Total | | | |

| Cylinder | Drawing Number | Serial Number | Weight (kg) | |
|-------------------|-----------------------|----------------------|--------------------|-------------|
| | | | Empty | Full |
| Cylinder 1 | | | | |
| Cylinder 2 | | | | |
| Cylinder 3 | | | | |
| Cylinder 4 | | | | |
| Cylinder 5 | | | | |
| Cylinder 6 | | | | |
| Total | | | | |

Total Fuel Weight _____ kg

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| Amendment Number | Description | Pages Affected | Date | Approval |
|------------------|--|--|------------|---|
| 1 | Record of Amendment, List of Effective pages, Contents and List of Supplements Updated. Page 2-2: Permitted Damage increased. Page 4-2: Cylinder Orientation guidance added. Page 5-6: "Total" boxes added to tables. Page 6-10; Caution regarding vapour regulators at low ambient temperature added. 45 was 60. Pages 7-1, 7-2 revised, 7-3 and 7-4 added. Supplement 8.1: Addition of Turtle-120 Special Shape, Colt Sugar Box 90, Buddy-90, Head One-105, Lightbulb-110, Bierkrug-90, Condom -105, Apple-90, RX-105, Tiger 90 and Cup-110. Supplement 8.6: Addition of Record of Amendments, T&C and Cameron burners and burner frame information. Supplement 8.8: Introduction of basket maximum payloads and minimum burner requirements in accordance with EASA.BA.016. Extension to include T&C envelopes. Supplement 8.9: Kubiček Bottom Ends with Cameron and T&C Envelopes. Supplement 8.12: Addition of Cameron H20, H24, H34, Colt 17A, 21A and Thunder AX6-56S1. Supplement 8.15: Addition of Basket List. Supplement 8.19: Demountable double, triple and quad burners. Supplement 8.21: Deletion of A1 category (moved to type specific supplements), Addition of Basket CB3394, CB3006, CB3027, CB3120, CB3448 and CB3449, added. Type 3 cylinders added to CB950 and CB3175. Supplement 8.22: Addition of Paragraph 22.6.3.10.1. Burner Assemblies CB2051, CB2065, CB2081, CB2089, CB2095, CB2096, CB2097, CB2130, CB2145, CB2298, CB2299 added. Supplement 8.32: Out of Production Hoppers. Supplement 8.33: Sky Bottom Ends with Cameron and Thunder & Colt Envelopes. | i-iii, i-vii, i-viii, i-ix, i-xiv, ixv, i-xvi, 2-2, 2-3, 4-2, 5-6, 6-10, 6-11, 7-1 to 7-4, Supplement 8.1: All, Supplement 8.6: All, Supplement 8.8: All, Supplement 8.9: New Supplement, Supplement 8.12: All, Supplement 8.15: All, Supplement 8.19: New Supplement, Supplement 8.21: All, Supplement 8.22: All, Supplement 8.32: New Supplement, Supplement 8.33: New Supplement, | 17:12:2007 | Approved by EASA under Approval Number EASA.BA.C.01128 |
| 2 | Supplement 8.10: Chaize Baskets. | Supplement 8.10: New Supplement, | 21:12:2007 | Approved by EASA under Approval Number EASA.BA.A.01013 |
| 3 | Page 9-6 Burner frame applicabilities corrected, key updated, Page 9-8: Assembly CB2424 added, Supplement 8.8: Cameron Burners Added; Supplement 8.9: Baskets K12/K12A/K15 added, Cameron Burners Added. Supplement 8.21: T&C Burner Frame applicabilities updated, key updated. | i-iii, i-vii, i-ix, 9-6, 9-8, Supplement 8.8: All, Supplement 8.9: All, Supplement 8.21: All | 01:02:2008 | Revision nr Amendment 3 to AFM ref. HABFM-Issue 10 is approved under the authority of DOA nr EASA.21J.140 |
| 4 | Section 2: Permitted Damage limits revised, TR-77 Variant added. Section 6: TR-77 added, Section 9: TR-77 added, Supplements 8.1 Issue 10: Satzenburger Bottle 56, Colt Flying Jeans, Cameron Cabin and Box 105 added. Supplement 8.2 "Kevron" Load Tapes added, 8.16 Single Airchair added, Supplement 8.21: Issue 6 Basket CB8280 added. Supplement 8.22: Issue 3 Burner assemblies CB2103, CB2104, CB2119 and CB2242 added. | i-iii, i-vii, i-ix, Page 2-2 to 2-6, 6-2, 9-2, 9-3. Supplement 8.1: All, Supplement 8.2: New Supplement 8.16: New Supplement 8.21: Issue 6 Supplement 8.22: Issue 3 | 03.03.08 | Approved by EASA under Approval Number EASA.BA.C.01145 |

| Amendment Number | Description | Pages Affected | Date | Approval |
|------------------|--|---|------------|--|
| 5 | Approval statement revised, Record of Amendments updated, List of effective pages updated, List of supplements removed (now on website). Section 1: Clarification of amendment procedure, Type certificate references now in title only "envelopes" added to Section 1.5. Section 2: Limitations Format revised, 2.17 Z-425LW added, Table 1 now only lists volumes (not variant prefixes). Section 8: Supplement Section revised to allow the use of approved data from old manuals. Section 9: Table 8-CB2941 added. Appendix 2 Load Calculation revised. Supplement 1: Egg-120 (new), House-60, Can-60, Newspaper 90, Flying Lager Bottle 2, Tub-80, Club-90 (all approved data) added. Supplement 9: Ignis double and triple burner added. Supplement 21: CB310-5A, CB994, CB3380 and CB3482 added, Type 2 Cylinders added to CB3018 | i-i, i-iv, i-vii, i-ix, i-x, 1-1, 1-2, 2-1, 2-2, 2.5, 2.6, 2-7, 8-1, A2-1 Supp 8.1: All, Supp 8.9 : All, Supp 8.21: All | 31:07:2008 | Approved by EASA under Approval Number EASA.BA.C.01161 |
| 6 | Record of Amendments updated. Section 2, Section 5 "35" and "50" Variants added. Section 6 Envelope descriptions tabulated. Section 9 A-225, C-50 and TR-84 added. Supplements incorporated: 8-1 Issues 12 and 13 (Furness -56 Building, Colt Flying Head, Elephant-77, S-Can-100, Inverted Balloon-105, Orange-120, Ball-70, Fire Truck-100, N-120MW, Beer Crate-120), 8-7 Iss 2 (MK21, BMK008, BMK-050 burners added, C-12 basket added) 8-9 Iss 4 (K-16 and K-18 baskets added), 8-21 Issues 8 and 9 (CB3490, CB3497 added) | i-iv, i-vii, i-xiv, 2-6, 5-4, 5-5, 6-1,6-2, 9-1to 9-3, Supp 8.1: All, Supp 8.7 : All, Supp 8.9 : All, Supp 8.21: All | 25:06:2009 | Approved by EASA under Approval Number EASA.BA.C.01197 |
| 7 | Record of Amendments updated. LEP updated. Contents updated. Section 2: Windspeed limitation reworded for clarity. Minimum equipment list amended, Pilot qualification deleted, Rates of climb and descent amended (relative wind limit restored from issue 7), 2.13 Deleted (now in Supplement 8.3), 2.14 Tethering limits revised for large balloons, 2.17 A450LW added. Section 3: Approval statement added. Fire in the air amended Section 4: Completely revised Section 5: Cross reference updated, Table 2 and 3 A-450LW added Section 6: Parachute edge tempilabel deleted. Section 9: A-450 LW added, basket applicability for large balloons amended, Burner frame CB2665 added Table 5A added. 4 tonne karabiner note deleted (already in limitations) Appendix 5 added. Supplements 8.3 and 8.4 Introduced Supplement 8.9 raised to issue 5 (burner frame CB855 added). Supplement 8.21 raised to issue 10 (burner frame CB2475 and basket CB3502 added. | i-iv, i-v, i-vii, i-viii, i-xi to i-xvi, 2-1, 2-3, 2-4, 2-5, 2-7, 3-1, 3-2, 4-1 to 4-20 (4-21 to 4-28 deleted), 5-1, 5-4, 5-5, 6-4, 6-5, 9-1, 9-3 to 9-5, A5-1, A5-2. Supp 8.3 all, Supp 8.4 all, Supp 8.9 all, Supp 8.21 all | 29:04:2010 | Approved by EASA under Approval Number 10029886 |

| Amendment Number | Description | Pages Affected | Date | Approval |
|------------------|---|---|------------|---|
| 8 | Record of Amendments updated, List of effective pages updated, Section 2: 2.10 Ambiguity for 340 000 corrected Section 9: Burner Frame CB2371 added to basket CB754. Supplement 8.1: Colt Beer Glass, Colt Flying Kiwi and Super FMG-100 Special Shape added. Supplement 8.21: CB3157 Description corrected, CB947 and CB3505 added, burner frame CB2269 added to basket CB3394 | i-v, i-vii, 2-4, 9-6, Supp 8.1: All, Supp 8.21: All, | 14:07:2010 | Approved by EASA under Approval Number 10030936 |
| 9 | Record of Amendments updated, List of effective pages updated, Section 9, Table 6: Page 9-5, table completely revised, no new equipment introduced. Page 9-6, Burner Frame CB2192 (older non gimbal style) added to basket CB3360 Appendix 3, A3-1, Conversion factor standardised, reference to tables corrected. Supp. 8-13 Duo Airchair: Addition of Duo Skychariot and Duo Airchair. Supp. 8-14 Cloudhopper Millennium: Addition of part number of chair assembly and applicable cylinders. Supp. 8-15 Wheelchair Baskets: Limitations on occupancy moved from Section 6 to Section 2. Descriptions, cylinder and burner frame applicability updated. Supp. 8-21 Special Baskets: Cylinder and burner frame applicability updated. Baskets CB3520, CB3525 and CB3528 added. | i-v, i-vii, i-viii, 9-5, 9-6, A3-1. Supp 8.13: All, Supp 8.14: All, Supp 8.15: All, Supp 8.21: All. | 02:03:2011 | Approved by EASA under Approval Number 10034058 |
| 10 | Record of Amendments updated, List of effective pages updated. Section 6: Description of out of production cylinders moved to new supplement. Section 9: Table 5: Envelopes, Type R baskets added to Z-425, Z-450, Z-600. Table 6: Burner Frames CB750, CB2860 and CB2863 added, burner frame applicability to CB8000 series updated Table 7: out of production cylinders deleted, Table 8: Solenoid and removable burners moved to supplements. Appendix III: Out of production cylinders moved to new supplement, Supplements 8.2-8.4, 8.6-8.8, 8.12-8.16, 8.19-8.20, 8.23-8.26, 8.30, 8.32, 8.35 and 8.36: Maintenance Sections removed (published with Maintenance Manual i10-Amdt 3), editorial updates, previously approved equipment added to 8.13 and 8.16. Supplement 8.21: LBL Burner frame (BA-152-A-002) added to CB994, Baskets CB3196, CB3537, CB3541, CB3543 and CB3545 added. Supplement 8.39: New Supplement, "Out of production cylinders" (approved data) | i-v, i-vii, i-viii, i-xv, 6-10, 6-11, 9-3, 9-5-9-8 A3-1. Supp 8.2-8.4, 8.6-8.8, 8.10, 8.13-8.16, 8.19-8.21, 8.23-8.26, 8.30, 8.32, 8.35, 8.36 and 8.39 All, | 25:01:2012 | Approved by EASA under Approval Number 10038169 |
| 11 | Section 2 : Z-750 Added, Z-600 classification corrected (AX14). Section 9 : Table 5: Z-750 added, Z-600 now R type baskets only. Table 6: Baskets CB3060, CB3081 deleted (in Supp 8.15), burner frame applicabilities updated. Basket CB3550 added, Supp. 8.6 Basket Nos. 244 and 265 added, Supp. 8.21 CB301 Series baskets added. | i-v, i-vii, 2-2, 2-4, 2-7, 5-4-5-5, 9-3, 9-6, Supp 8.6: All, Supp 8.21: All | 13:07:2012 | Approved by EASA under Approval Number 10040615 |

| Amendment Number | Description | Pages Affected | Date | Approval |
|------------------|--|---|------------|--|
| 12 | Record of Amendments updated, List of effective pages updated, Section 2: A-530LW added, Para 2.9, Para 2.17 and Table 1 updated (MLM now referenced to table 1) Section 4: Damage check on launch restraint added to pre-flight checklist. Reference to approved hose blanks added to para 4.5.3.1 Section 5: A-530LW added Section 9: A-530LW added, A-450LW basket applicability updated. Z-400, Z-425LW and Z-450 basket applicability updated. Basket CB3570 added | i-v, i-vi, i-vii, 2-4 to 2-7, 4-6, 4-12, 5-4, 5-5, 9-1, 9-3, 9-6. | 03:05:2013 | Approved by EASA under Approval Number 10044755 |
| 13 | Record of Amendments updated, List of effective pages updated, Section 2: Minimum Equipment updated. A-425LW, A-500LW added, Para 2.17 and Table 1 updated. Section 4: Table 4.2 flying wire grouping updated, 4.12 Drop Line added. Section 5: Total Permitted lift tables updated. Section 6: 6.3.6 The word "Liquid" added for clarity, 6.5.5: Quick release updated. Section 9: Burner frame compatibility updated, Table 5 updated, Table 6 Burner frame compatibility updated CB2282, CB2283, CQ2018, CQ2027, CQ2028 and obsolete burner frames added for reference. Para 9.3 added for equipment not requiring approval. Supplement 8.21 Basket CB3625 added (C653) | i-v, i-vi, i-vii, i-viii, i-xiii, i-xvi, 2-5, 2-7, 4-20, 5-4, 5-5, 6-6, 6-13, 9-1 to 9-3, 9-5, 9-6, 9-9, 9-10, Supp 8.21: All | 10:02:2016 | Approved by EASA under Approval Number 10056665/10056666 |
| 14 | Record of Amendments updated, List of effective pages updated and corrected, Contents updated, Section 1: Applicability update to include Lindstrand Envelopes, Section 2: Minimum Equipment updated to include pilot restraint. Table 4.2: Rigging information updated, Sections 4.7 and 6.5.4 updated (pilot restraint), Section 6.2.15, 128 was 127, Section 9: Burner Frame CB2264 added to CB3233 and CB3238 | i-vi, i-vii, i-xi, 1-2, 2-3, 4-4, 4-15, 6-5, 6-13, 9-6 | 23:03:2017 | Approved by EASA under Approval Number 10061396 |
| 15 | Record of Amendments updated, List of effective pages updated, contents updated. Section 2, 2.5 Permitted Damage para 6 "Before Further Flight" added. Section 6 para 6.5.5 "Passenger Positioning Blocks" added. Section 6.5.6 was 6.5.5. Section 9. Table 6 "Burner Frame Compatability" corrected: CB983 was CB993, CB2282 deleted from CB3360, CB3361 and CB3288 baskets and added to CB3387 basket. Appendix 5 - Personnel Handling: Inflator fan and passenger briefings amended. Section "Passenger Fitness to Fly" added. | i-vi, i-vii, i-viii, i-xv. 2-5, 6-13, 6-14, 9-6, A5-2, A5-3, A5-4 | 07:07:2017 | Approved under the authority of DOA nr EASA.21J.140 |
| | Section 2: Table 1 O-26 added. Section 5 Table 2 and 3 "26" added. Section 9 Table 5 O-26 added. | 2-6, 5-4, 5-5, 9-2 | 07:07:2017 | Approved by EASA under Approval Number 10062543 |

| Amendment Number | Description | Pages Affected | Date | Approval |
|------------------|---|--|------------|---|
| 16 | Table 4 moved to Page i-iii and renamed Table 1. Tables 1,2,3 renumbered as 2,3,4. Sirocco burner deleted from 6.3.10 and 6.3.11. Cameron 'V' (Viva), Cameron 'GP', Colt 'A', Thunder Series I and Thunder Series II deleted from 6.2 and Table 5. Paragraph 3.8 wording revised. | i-iii to i-viii, i-xi to i-xx, 1-2, 2-3, 2-4, 2-6, 2-7, 3-3, 5-1, 5-2, 5-4 to 5-6, 6-1, 6-8, 6-9, 9-3, 9-4, 9-7, 9-8, A3-1, A3-2, Supp 8.12: All, Supp 8.22: All | 14:03:2018 | Approved under the authority of DOA nr EASA.21J.140 |
| | Cameron 'Sport' type added to 6.2, Sport-50, Sport-60, Sport-70, Sport-80, Sport-90 added to Table 5. | 6-1, 9-2 | 14:03:2018 | Approved by EASA under Approval Number 10025916 |
| | TR-65 16 gore added to 6.2. TR-65 added to Table 5. | 6-1, 9-2 | 14:03:2018 | Approved by EASA under Approval Number 10064545 |

Note: Any new or amended text in the revised page will be indicated by a black vertical line in the right hand margin, and the Amendment Number and the date will be shown at the bottom of the page.

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| Section | Page | Date | Section | Page | Date |
|---------|---------|------------------|---------|------|------------------|
| i | i-i | 31 July 2008 | 4 | 4-11 | 29 April 2010 |
| | i-ii | 10 April 2006 | (cont) | 4-12 | 03 May 2013 |
| | i-iii | 14 March 2018 | | 4-13 | 29 April 2010 |
| | i-iv | 14 March 2018 | | 4-14 | 29 April 2010 |
| | i-v | 14 March 2018 | | 4-15 | 23 March 2017 |
| | i-vi | 14 March 2018 | | 4-16 | 29 April 2010 |
| | i-vii | 14 March 2018 | | 4-17 | 29 April 2010 |
| | i-viii | 14 March 2018 | | 4-18 | 29 April 2010 |
| | i-ix | Deleted | | 4-19 | 29 April 2010 |
| | i-x | Deleted | | 4-20 | 10 February 2016 |
| | i-xi | 14 March 2018 | | 4-21 | Deleted |
| | i-xii | 14 March 2018 | | 4-22 | Deleted |
| | i-xiii | 14 March 2018 | | 4-23 | Deleted |
| | i-xiv | 14 March 2018 | | 4-24 | Deleted |
| | i-xv | 14 March 2018 | | 4-25 | Deleted |
| | i-xvi | 14 March 2018 | | 4-26 | Deleted |
| | i-xvii | 14 March 2018 | | 4-27 | Deleted |
| | i-xviii | 14 March 2018 | | 4-28 | Deleted |
| | i-xix | 14 March 2018 | | | |
| | i-xx | 14 March 2018 | 5 | 5-1 | 14 March 2018 |
| | | | | 5-2 | 14 March 2018 |
| 1 | 1-1 | 31 July 2008 | | 5-3 | 10 April 2006 |
| | 1-2 | 14 March 2018 | | 5-4 | 14 March 2018 |
| | 1-3 | 10 April 2006 | | 5-5 | 14 March 2018 |
| | 1-4 | 10 April 2006 | | 5-6 | 14 March 2018 |
| | | | | | |
| 2 | 2-1 | 13 July 2012 | 6 | 6-1 | 14 March 2018 |
| | 2-2 | 07 July 2017 | | 6-2 | 25 June 2009 |
| | 2-3 | 14 March 2018 | | 6-3 | 10 April 2006 |
| | 2-4 | 14 March 2018 | | 6-4 | 29 April 2010 |
| | 2-5 | 10 February 2016 | | 6-5 | 23 March 2017 |
| | 2-6 | 14 March 2018 | | 6-6 | 10 February 2016 |
| | 2-7 | 14 March 2018 | | 6-7 | 10 April 2006 |
| | 2-8 | 10 April 2006 | | 6-8 | 14 March 2018 |
| | | | | 6-9 | 14 March 2018 |
| 3 | 3-1 | 29 April 2010 | | 6-10 | 25 January 2012 |
| | 3-2 | 29 April 2010 | | 6-11 | 25 January 2012 |
| | 3-3 | 14 March 2018 | | 6-12 | 10 April 2006 |
| | 3-4 | 10 April 2006 | | 6-13 | 07 July 2017 |
| | 3-5 | 10 April 2006 | | 6-14 | 07 July 2017 |
| | 3-6 | 10 April 2006 | | | |
| | | | 7 | 7-1 | 17 December 2007 |
| 4 | 4-1 | 29 April 2010 | | 7-2 | 17 December 2007 |
| | 4-2 | 07 July 2017 | | 7-3 | 17 December 2007 |
| | 4-3 | 29 April 2010 | | 7-4 | 17 December 2007 |
| | 4-4 | 23 March 2017 | | | |
| | 4-5 | 10 February 2016 | 8 | 8-1 | 31 July 2008 |
| | 4-6 | 03 May 2013 | | 8-2 | 31 July 2008 |
| | 4-7 | 29 April 2010 | | | |
| | 4-8 | 29 April 2010 | 9 | 9-1 | 10 February 2016 |
| | 4-9 | 29 April 2010 | | 9-2 | 14 March 2018 |
| | 4-10 | 29 April 2010 | | 9-3 | 14 March 2018 |

| Section | Page | Date | Section | Page | Date |
|------------|-------------|------------------|---------|------|------|
| 9 | 9-4 | 14 March 2018 | | | |
| (cont) | 9-5 | 10 February 2016 | | | |
| | 9-6 | 07 July 2017 | | | |
| | 9-7 | 14 March 2018 | | | |
| | 9-8 | 14 March 2018 | | | |
| | 9-9 | 10 February 2016 | | | |
| | 9-10 | 10 February 2016 | | | |
| | | | | | |
| Appendices | A1-1 / A1-2 | 10 April 2006 | | | |
| | A2-1 / A2-2 | 31 July 2008 | | | |
| | A3-1 / A3-2 | 14 March 2018 | | | |
| | A4-1 / A4-2 | 10 April 2006 | | | |
| | A5-1 / A5-4 | 07 July 2017 | | | |
| | | | | | |

APPROVAL

BALLOON COMPONENT WEIGHT RECORD

RECORD OF AMENDMENTS

LIST OF EFFECTIVE PAGES

CONTENTS

SECTION 1: GENERAL INFORMATION

- 1.1 INTRODUCTION
- 1.2 CERTIFICATION BASIS
- 1.3 DEFINITIONS
- 1.4 DESCRIPTION
- 1.5 USE OF OLDER TYPES OF EQUIPMENT
- 1.6 APPLICABILITY

SECTION 2: LIMITATIONS

- 2.1 INTRODUCTION
- 2.2 WEATHER
- 2.3 FUEL
 - 2.3.1 Fuel Pressures
- 2.4 MINIMUM BURNER REQUIREMENTS
- 2.5 PERMITTED DAMAGE
- 2.6 SAFETY EQUIPMENT (MINIMUM EQUIPMENT)
- 2.7 CREW
- 2.8 ENVELOPE TEMPERATURE AND LOADING
- 2.9 WEIGHT RANGE
- 2.10 RATES OF CLIMB AND DESCENT
 - 2.10.1 Conventionally Shaped Balloons (excluding TR Types)
 - 2.10.2 TR Type Balloons
- 2.11 PARACHUTE VALVE
- 2.12 RAPID DEFLATION SYSTEMS
- 2.13 DELETED
- 2.14 TETHERED FLIGHT
- 2.15 BASKETS
- 2.16 CYLINDERS
- 2.17 ENVELOPE RIGGING

TABLE 2: ENVELOPE WEIGHT LIMITS AND VOLUMES

SECTION 3: EMERGENCY PROCEDURES

3.1 INTRODUCTION

3.2 AVOIDANCE OF DANGEROUS OBSTACLES AT LOW LEVEL

3.2.1 Emergency Climb

3.2.2 Emergency Landing

3.3 CONTACT WITH ELECTRIC POWER LINES

3.4 FIRE - IN THE AIR

3.5 FIRE - ON THE GROUND

3.6 DAMAGE TO ENVELOPE IN FLIGHT

3.7 ACCIDENTAL OPERATION OF THE RAPID DEFLATION SYSTEM

3.8 PREPARATION FOR A HARD LANDING

3.9 ENVELOPE OVER TEMPERATURE

3.10 BURNER FAILURE

3.11 PILOT LIGHT FAILURE

SECTION 4: NORMAL PROCEDURES

4.1 INTRODUCTION

4.2 PREPARATION AND RIGGING

4.2.1 Site Selection

4.2.2 Basket rigging

4.2.3 Burner Rigging

4.2.3.1 Flexible Corner Socket Burner Frames

4.2.3.2 Fixed Corner Socket Burner Frames

4.2.3.3 Adjustable Height Burner Frames

4.2.3.4 Rigging of Basket Wires to Burner Frame (All Burner Frames)

4.2.3.5 Mini Vapour Cylinder

4.2.4 Envelope Rigging

4.2.4.1 Parachute/Lock Top Deflation System

4.2.4.2 RDS Deflation System

4.2.4.3 Launch Restraint (Quick Release)

4.3 INFLATION

4.3.1 Cold Inflation

4.3.1.1 Lock Top Deflation System

4.3.1.2 RDS Deflation System

- 4.3.2 Hot Inflation
- 4.4 TAKE-OFF
 - 4.4.1 Pre Take-Off Checks
 - 4.4.1.1 Parachute
 - 4.4.1.2 Lock Top
 - 4.4.1.3 RDS
 - 4.4.1.4 Mini Vapour Cylinder
 - 4.4.2 Take-Off- Calm Conditions
 - 4.4.3 Take-Off- Windy Conditions, Sheltered Site
 - 4.4.4 Quick Release
- 4.5 CONTROL IN FLIGHT
 - 4.5.1 Burner Control
 - 4.5.2 Venting in Flight
 - 4.5.2.1 Parachute Valve/RDS
 - 4.5.2.2 Lock Top
 - 4.5.2.3 Turning Vents
 - 4.5.3 Fuel Management
 - 4.5.3.1 Use Of cylinder manifolds
 - 4.5.4 Climbing
 - 4.5.5 Descending
 - 4.5.6 Flight At Higher Altitudes
- 4.6 LANDING
 - 4.6.1 Approach to Land
 - 4.6.1.1 Turning Vents
 - 4.6.2 Touchdown
 - 4.6.2.1 Parachute
 - 4.6.2.2 Lock Top
 - 4.6.2.3 RDS
 - 4.6.3 Action after Landing
- 4.7 PILOT RESTRAINT HARNESS
- 4.8 TETHER OPERATION
 - 4.8.1 Site
 - 4.8.2 Rigging
 - 4.8.3 During Tethered Flight
 - 4.8.4 Tethering Weak Link (Optional)
- 4.9 REFUELLING
 - 4.9.1 Use Of Fuel Safe
 - 4.9.2 Emptying Fuel Cylinders
- 4.10 FUEL PRESSURISATION
- 4.11 USE OF A MINI VAPOUR CYLINDER
 - 4.11.1 Refuelling a Mini Vapour Cylinder
- 4.12 DROP LINE

SECTION 5: WEIGHT CALCULATIONS

5.1 INTRODUCTION

5.2 LOADING CHART

5.2.1 Instruction For Use Of The Chart

5.3 INVERSION CONDITIONS

5.4 SAMPLE CALCULATIONS

Table 3: Total Permitted Lift (kg)

Table 4: Total Permitted Lift (lb)

SECTION 6: BALLOON AND SYSTEMS DESCRIPTION

6.1 INTRODUCTION

6.2 ENVELOPE

6.2.1-6.2.8 Paragraphs Deleted

6.2.9 Parachute Valve

6.2.10 Lock-Top

6.2.11 Rapid Deflation System (RDS)

6.2.12 Paragraph Deleted

6.2.13 Paragraph Deleted

6.2.14 Turning Vent

6.2.15 Temperature Streamer

6.2.16 Tempilabel

6.3 BURNER

6.3.1 General

6.3.2 Main Burner

6.3.3 Whisper Burner

6.3.4 Pilot Light

6.3.5 Pressure Gauge

6.3.6 Fuel Supplies

6.3.7 Simultaneous Multiple Burner Operation

6.3.8 Shadow and Stealth Burners

6.3.8.1 Shadow Single Burner

6.3.8.2 Shadow And Shadow / Stealth Combination Burners

6.3.9 Stratus Burner

6.3.9.1 Stratus Single Burner

6.3.9.2 Stratus Double, Triple And Quad Burners

- 6.3.10 Deleted
- 6.3.11 Deleted
- 6.3.12 Fixed Height Burner Frame
- 6.3.13 Adjustable Height Burner Frame
- 6.4 FUEL CYLINDERS
 - 6.4.1 Deleted
 - 6.4.2 Cameron Duplex Stainless Steel Fuel Cylinders
 - 6.4.3 Deleted
 - 6.4.4 Mini Vapour Cylinder
 - 6.4.5 Fuel Manifolds
- 6.5 BASKET
 - 6.5.1 Concept Basket
 - 6.5.2 Aristocrat And Classic Baskets
 - 6.5.3 Partitioned Baskets
 - 6.5.4 Pilot Restraint Harness
 - 6.5.5 Passenger Positioning Blocks
 - 6.5.6 Quick Release
- 6.6 FLIGHT INSTRUMENTS

SECTION 7: BALLOON MAINTENANCE, HANDLING AND CARE

- 7.1 INTRODUCTION
- 7.2 INSPECTION PERIODS
- 7.3 ALTERATIONS OR REPAIRS
- 7.4 TRANSPORTATION
 - 7.4.1 Envelope
 - 7.4.2 Burners
 - 7.4.3 Cylinders
 - 7.4.4 Baskets
- 7.5 STORAGE

SECTION 8: SUPPLEMENTS

- 8.1 INTRODUCTION
- 8.2 LIST OF SUPPLEMENTS INSERTED
- 8.3 ADDITIONAL DATA

SECTION 9: EQUIPMENT LIST

9.1 INTRODUCTION

9.2 EQUIPMENT LIST

Table 5: Envelopes

Table 6: Baskets

Table 7: Fuel Cylinders

Table 8: Burners

9.3 ADDITIONAL EQUIPMENT

9.3.1 Hand Fire Extinguisher

9.3.2 Fire Blanket

9.3.3 Knife

9.3.4 First Aid Kit

9.3.5 Drop Line

9.3.6 Accurate Time Piece

APPENDIX 2: LIFT CALCULATIONS FOR BALLOONS**APPENDIX 3: STANDARD COMPONENT WEIGHTS****APPENDIX 4: BASKET OCCUPANCY****APPENDIX 5: PERSONNEL HANDLING**

A5.1 INTRODUCTION

A5.2 CREW BRIEFINGS

A5.2.1. General

A5.3 PASSENGER BRIEFINGS

1.1 INTRODUCTION

This balloon flight manual has been prepared to provide pilots and instructors with information for the safe operation of all Cameron manned free hot air balloons.

Revisions to this Manual are published on the Cameron Balloons Limited website at www.cameronballoons.co.uk. Mandatory revisions to this manual will be introduced by Service Bulletin.

Email notification of revisions can be received by subscribing to the Technical Update Service on this website.

1.2 CERTIFICATION BASIS

The types of balloon for which this manual is applicable have been approved by EASA, under the following Type Certificates:

EASA.BA.013: Conventionally shaped envelopes

EASA.BA.012: Cameron 'Special' shaped envelopes

1.3 DEFINITIONS

Checklists are given in **blue text**, while important information is given in **bold text**.

The following definitions apply to warnings, cautions and notes used in this flight manual.

WARNING: Means the non-observation of the corresponding procedure leads to an immediate or important degradation of flight safety.

CAUTION: Means the non-observation of the corresponding procedure leads to a minor long-term degradation of flight safety.

Note: Draws attention to any special item not directly related to safety, but which is important or unusual.

The Maximum take-off Mass (MTOM) is the maximum permissible total weight of the balloon and all its equipment at take-off, including fuel, instruments, passengers and crew.

The Minimum Landing Mass (MLM) is the minimum permissible total weight of the balloon and all its equipment at landing, including fuel, instruments, passengers and crew.

Throughout this manual, the terms 'mass' and 'weight' are interchangeable and have an identical meaning.

1.4 DESCRIPTION

Envelopes are of sewn construction. Envelopes are made from high tenacity nylon fabric and polyester load-bearing tapes.

The main heat source for balloon flight is a high-output burner fuelled by liquid propane (LPG).

The fuel is carried in liquid form under pressure in metal cylinders.

Occupants are carried in a basket of traditional wickerwork construction.

A full description of the balloons and their systems is given in Section 6.

1.5 USE OF OLDER TYPES OF EQUIPMENT

Older types of envelopes, baskets and burners not listed in Issue 10 of Flight Manual may be used provided the appropriate approved Cameron Balloons Flight Manual supplement is used.

The weights of the envelope basket and burner must be recorded in the Component Weight Record of this manual (Table 1, Page i-iii) and the appropriate Section of the aircraft logbook.

These weights are listed in the log book of the balloon the items were originally supplied with, or determined by weighing.

The limitations and procedures given in Sections 2 to 5 of this Flight Manual and supplements apply to all Cameron burner and basket types. The inspection schedule given in Section 6 of the Cameron Balloons Maintenance Manual Issue 10 applies to all Cameron envelope, burner, cylinder and basket types.

1.6 APPLICABILITY

This is the recommended Flight Manual for all serially produced Hot Air Balloons for which Cameron Balloons Limited is the Type Certificate Holder (i.e. Cameron, Colt, Lindstrand Hot Balloons, Sky Balloons, Thunder, Thunder & Colt).

Where the envelope model is not listed or where national regulations require, the Flight Manual supplied with the balloon should be used (unless changed by Airworthiness Directive or Service Bulletin).

Note: Throughout this document the term “Lindstrand” refers to Lindstrand Hot Air Balloons Limited.

2.6 SAFETY EQUIPMENT (MINIMUM EQUIPMENT)

The following minimum equipment must be carried:

1. Protective gloves must be available to the pilot.
2. Matches or other independent means of ignition in addition to any igniters built into the burner.
3. A hand fire extinguisher.
4. A rate of climb and descent indicator (variometer) where required (Refer to Section 2.10).
5. An envelope temperature indicator which may either be of the continuous reading type or a type which gives a warning signal.
6. For baskets having a separate pilot compartment, there must be a suitable restraint for the pilot.

All minimum equipment must be functional.

2.7 CREW

1. The minimum crew is one pilot.
2. The maximum number of occupants (consisting of crew and passengers) is determined by Sections 2.8, 2.9 and 2.15 below.

2.8 ENVELOPE TEMPERATURE AND LOADING

1. The envelope temperature must not exceed 120°C, (250°F).
2. The envelope temperature must be controlled either by use of the envelope thermometer, or by loading according to the loading chart in Section 5.

2.9 WEIGHT RANGE

1. The take-off Mass (TOM) of the balloon must never exceed the Maximum TOM (MTOM) shown in table 2. The applicability of the MTOM, either Standard or Reduced is given on page i-i.
2. If it is desired, for operational or insurance reasons, to alter the MTOM of the balloon, either the Standard or Reduced MTOM, appropriate to the balloon model, may be selected. These permitted MTOM values are shown in Section 2 Table 2. The MTOM in use must be entered as an amendment on page i.i and used for loading calculations. The MTOM change must be notified to the relevant National Aviation Authority, if their regulations require this.

3. The Minimum Landing Mass (MLM) for normal operation is given in Table 2.
4. For special flights, record attempts etc., with only necessary crew on board, lower masses may be used at the pilot's discretion.

2.10 RATES OF CLIMB AND DESCENT

2.10.1 Conventionally Shaped Balloons (excluding TR Types)

1. For balloons with a volume of 105,000 cu.ft or less, extreme rates of climb, sufficient to cause a relative wind at basket level, should be avoided unless an envelope temperature gauge is fitted.
2. The maximum rate of climb and descent for balloons with a volume of greater than 105,000 cu.ft and less than 340,000 cu.ft is 1000 ft/min (5 m/sec).
3. The maximum rate of climb and descent for balloons with a volume of between 340,000 and 750,000 cu.ft is 800 ft/min (4m/sec).

2.10.2 TR Type Balloons

1. The maximum rate of climb and descent for 'TR' Type balloons is 1700 ft/min (8.5m/sec), except where the RDS is fitted, when the maximum rates of climb and descent are limited to 1000 ft/min (5 m/sec).

2.11 PARACHUTE VALVE

1. The parachute valve must not be held open for periods longer than 3 seconds during flight. The envelope must be allowed to re-inflate fully and the envelope mouth must be seen to be fully open before subsequent operations of the vent.
2. 'TR' Type balloons must not have the parachute valve opened at rates of descent greater than 500ft/min (2.5m/sec).

2.12 RAPID DEFLATION SYSTEMS

1. The parachute valve of the rapid deflation system, when used for the controlled release of hot air during flight, must not be held open for periods longer than 3 seconds. The envelope must be allowed to re-inflate fully between operations of the vent.
2. Use of the rip line is not permitted at heights greater than 2m (6ft) above ground level, except in an emergency.

2.13 DELETED

2.14 TETHERED FLIGHT

| Limitations | Balloons <180,000 ft ³ (5098 m ³) | Balloons >180,000 ft ³ <275,000 ft ³ (7788 m ³) | Balloons >275,000 ft ³ |
|--|--|--|--------------------------------------|
| Max. Surface wind speed | 15 knots (7.7 m/sec) | 5 knots (2.5 m/sec) | Calm |
| Max. Surface wind speed with passengers | 10 knots (5.1 m/sec) | 5 knots (2.5 m/sec) | Calm |
| Max. Height above ground (measured from underside of basket) | 30m (100ft) | 30m (100ft) | 30m (100ft) |
| Maximum Take-Off Mass | limited to 75% of the standard MTOM | | |

2.15 BASKETS

1. Each compartment must not contain more than six persons.
2. Reasonable space must be provided for each occupant, with regard to both comfort during the flight and to safety during the landing (Refer to Appendix 4).
3. There must be at least one restraint, e.g. hand hold, for each basket occupant.
4. Woven floor baskets must be fitted with load spreading boards when fitted with cylinders with a useable volume greater than 45 litres.
5. Where the ratio of length to width of the basket is greater than 1.4:1 the balloon must be equipped with envelope turning vents to allow the basket to be correctly orientated for landing.

2.16 CYLINDERS

1. All stainless steel, duplex stainless steel and titanium cylinders shall be equipped with an outer, water resistant protective layer at least 25mm thick made from structural cellular foam or similar material.
2. Each cylinder must be secured by a minimum of two cylinder straps. The straps must be of an approved design. Leather straps should not be used to secure cylinders with a useable volume greater than 60 litres.

2.17 ENVELOPE RIGGING

1. The following envelope types must be rigged using 4 tonne karabiners; Z-375, Z-400, A-425LW, Z-425LW, A-450LW, Z-450, A-500LW and A-530LW.

TABLE 2: ENVELOPE WEIGHT LIMITS AND VOLUMES

| Variant | Volume | | Standard MTOM | | Reduced MTOM | | MLM | | FAI Class. AX |
|---------|-----------------|----------------|---------------|------|--------------|------|------|------|------------------|
| | ft ³ | m ³ | kg | lb | kg | lb | kg | lb | |
| 25 | 25 000 | 708 | 227 | 500 | 227 | 500 | - | - | 4 |
| 26 | 26 000 | 736 | 236 | 520 | 236 | 520 | - | - | 4 |
| 31 | 31 450 | 890 | 285 | 629 | 285 | 629 | - | - | 4 |
| 35 | 35 000 | 991 | 317 | 700 | 317 | 700 | - | - | 5 |
| 42 | 42 000 | 1190 | 381 | 840 | 381 | 840 | - | - | 5 |
| 50 | 50 000 | 1416 | 453 | 1000 | 453 | 1000 | - | - | 6 |
| 56 | 56 000 | 1586 | 508 | 1120 | 499 | 1100 | - | - | 6 |
| 60 | 60 000 | 1700 | 544 | 1200 | 499 | 1100 | - | - | 7 |
| 65 | 65 000 | 1841 | 590 | 1300 | 499 | 1100 | - | - | 7 |
| 69 | 69 000 | 1954 | 626 | 1380 | 499 | 1100 | - | - | 7 |
| 70 | 70 000 | 1982 | 635 | 1400 | 499 | 1100 | - | - | 7 |
| 77 | 77 500 | 2195 | 703 | 1550 | 499 | 1100 | - | - | 7 |
| 80 | 80 000 | 2266 | 726 | 1600 | 499 | 1100 | - | - | 8 |
| 84 | 84 000 | 2379 | 762 | 1680 | 499 | 1100 | - | - | 8 |
| 90 | 90 000 | 2549 | 816 | 1800 | 499 | 1100 | - | - | 8 |
| 100 | 100 000 | 2832 | 907 | 2000 | 907 | 2000 | - | - | 8 |
| 105 | 105 000 | 2974 | 952 | 2100 | 952 | 2100 | 476 | 1050 | 8 |
| 120 | 120 000 | 3398 | 1088 | 2400 | 999 | 2202 | 544 | 1200 | 9 |
| 133 | 133 000 | 3767 | 1206 | 2660 | 999 | 2202 | 603 | 1330 | 9 |
| 140 | 140 000 | 3965 | 1270 | 2800 | 999 | 2202 | 635 | 1400 | 9 |
| 145 | 145 000 | 4106 | 1315 | 2900 | 999 | 2202 | 658 | 1451 | 10 |
| 150 | 150 000 | 4248 | 1361 | 3000 | 999 | 2202 | 681 | 1502 | 10 |
| 160 | 160 000 | 4531 | 1451 | 3200 | 999 | 2202 | 726 | 1601 | 10 |
| 180 | 180 000 | 5098 | 1633 | 3600 | 999 | 2202 | 817 | 1801 | 10 |
| 200 | 200 000 | 5664 | 1814 | 4000 | 999 | 2202 | 909 | 2004 | 10 |
| 210 | 210 000 | 5947 | 1905 | 4200 | 999 | 2202 | 952 | 2099 | 10 |
| 225 | 225 000 | 6372 | 2041 | 4500 | 1999 | 4406 | 1021 | 2251 | 11 |
| 240 | 240 000 | 6797 | 2177 | 4800 | 1999 | 4406 | 1088 | 2399 | 11 |
| 250 | 250 000 | 7080 | 2268 | 5000 | 1999 | 4406 | 1134 | 2500 | 11 |
| 260 | 260 000 | 7363 | 2358 | 5200 | 1999 | 4406 | 1179 | 2600 | 11 |
| 275 | 275 000 | 7788 | 2494 | 5500 | 1999 | 4406 | 1247 | 2750 | 11 |
| 300 | 300 000 | 8496 | 2721 | 6000 | 2699 | 5951 | 1361 | 3001 | 11 |
| 315 | 315 000 | 8920 | 2857 | 6300 | 2699 | 5951 | 1429 | 3151 | 11 |
| 340 | 340 000 | 9629 | 2857 | 6300 | 2699 | 5951 | 1429 | 3151 | 12 |

Table 2: Envelope Weight Limits And Volumes (continued)

| Variant | Volume | | Standard MTOM | | Reduced MTOM | | MLM | | FAI Class. AX |
|---------|-----------------|----------------|---------------|-------|--------------|-------|------|------|------------------|
| | ft ³ | m ³ | kg | lb | kg | lb | kg | lb | |
| 340HL | 340 000 | 9629 | 3084 | 6800 | 2699 | 5951 | 1542 | 3400 | 12 |
| 350 | 350 000 | 9912 | 3175 | 7000 | 2699 | 5951 | 1588 | 3502 | 12 |
| 375 | 375 000 | 10620 | 3401 | 7500 | 2699 | 5951 | 1700 | 3749 | 12 |
| 400 | 400 000 | 11328 | 3628 | 8000 | 2699 | 5951 | 1814 | 4000 | 12 |
| 415 | 415 000 | 11753 | 3764 | 8300 | 2699 | 5951 | 1882 | 4150 | 12 |
| 425LW | 425 000 | 12036 | 3662 | 8075 | 2699 | 5951 | 1831 | 4037 | 13 |
| 450LW | 450 000 | 12744 | 3815 | 8410 | 2699 | 5951 | 1907 | 4205 | 13 |
| 450 | 450 000 | 12744 | 4082 | 9000 | 2699 | 5951 | 2041 | 4500 | 13 |
| 500LW | 500 000 | 14158 | 4240 | 9350 | 2699 | 5951 | 2120 | 4674 | 13 |
| 530LW | 530 000 | 15010 | 4500 | 9922 | 2699 | 5951 | 2404 | 5301 | 13 |
| 530 | 530 000 | 15010 | 4807 | 10600 | 2699 | 5951 | 2404 | 5301 | 13 |
| 600 | 600 000 | 16992 | 5089 | 11215 | 5089 | 11215 | 2545 | 5612 | 14 |
| 750 | 750 000 | 21238 | 5103 | 11250 | 5103 | 11250 | 3062 | 6752 | 14 |

Note: Table 2 lists the complete range of envelopes produced by Cameron Balloons Limited.

The applicable envelope data in Table 2 corresponds to the specific envelope Type and Variant given on page i-i and in Table 1.

For details of Type Approval, reference should be made to the appropriate Type Certificate.

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Do not burn if the air loss from the balloon is sufficient to cause the mouth to close, as damage to suspension tapes could cause a catastrophic failure.

If the rate of descent cannot be controlled, consider jettisoning all disposable ballast, including fuel cylinders which are not in use, if it is possible to do so without endangering people or property on the ground.

3.7 ACCIDENTAL OPERATION OF THE RAPID DEFLATION SYSTEM

If the rip line is accidentally pulled in flight the vent will start to operate. The pilot will be warned by the difference in feel as the panel starts to open.

The rip line should immediately be released, and the panel closed by pulling on the venting line. The burner must be operated to replace lost heat.

WARNING: The panel will not automatically re-close on release of the rip line.

3.8 PREPARATION FOR A HARD LANDING

There are two possible hard landing situations. A burner or envelope failure results in a 'heavy' landing where the speed is mostly vertical, whereas a weather emergency may cause a 'fast' landing where the speed is mostly horizontal.

In a heavy landing the occupants should brace against vertical compression, with their knees only slightly bent. The rope handles or cylinder rims should be firmly held.

In a fast landing the basket may tip forward violently on impact, tending to throw the occupants out. The occupants should adopt a low down position (knees well bent) with their back or shoulder pressed against the leading edge of the basket, head level with the basket edge and rope handles or cylinder rims firmly held.

Remind passengers not to leave the basket until told to do so.

Extinguish the pilot light(s) and shut the fuel off at all cylinders in use. Empty the hoses if time permits.

The parachute operating / rip line should be firmly gripped before touchdown.

3.9 ENVELOPE OVER TEMPERATURE

Descend to the minimum practical altitude and keep to low rates of climb and descent. If the temperature remains too high, land as soon as possible.

Note: If the balloon is not overloaded for the altitude and ambient temperature it is extremely unlikely that the envelope temperature limits will be exceeded in normal flight.

3.10 BURNER FAILURE

Burner Unit Malfunction:

Transfer control to another burner unit or to the other fuel supply (single burner).

Shut off the fuel supply to the defective burner unit at the cylinder valve.

Vent fuel from the defective burner unit and supply hose.

Land as soon as possible.

Note: If the blast valve fails in the open position, its flow can be controlled by opening and closing the cylinder valve (liquid offtake).

Crossflow Valve Leak (Stealth, Shadow and Stratus burners only)-

Close the two blast valves connected by the crossflow valve.

Transfer control to the whisper burners or burners not connected by the crossflow valve.
Land as soon as possible.

Note: Crossflow valve leaks are only evident with the main burner operating.

If a fuel leak cannot be controlled, shut off all fuel including the pilot light and brief passengers for a hard landing (Section 3.8).

Note: If the main fuel hoses are removed from the support rod covers they are long enough to reach fuel cylinders at the opposite end of the basket.

CAUTION: Care should be taken when operating with the fuel hoses outside of the support rod covers, as the liquid fuel pressure can cause the hose to deflect when the blast or whisper valve is operated. This may change the direction of the burner and flame.

3.11 PILOT LIGHT FAILURE

If a pilot light is extinguished for any reason, it should be relit.

Each burner unit is fitted with a pilot light, single burners having two independent pilot lights. All burners will operate with one failed pilot light. The failed pilot light should be turned off and a landing made as soon as possible.

5.1 INTRODUCTION

This Section gives the procedure to calculate the weight range within which the balloon may safely be operated.

5.2 LOADING CHART

Before each flight the take-off mass must be calculated, and a check made to ensure that this does not exceed the available lift, otherwise the envelope can easily be overheated.

The load which can be carried safely depends on-

1. The temperature of the surrounding air (ambient temperature).
2. The expected flight altitude.

The available lift may also be calculated using the information given in Appendix 2

5.2.1 Instruction For Use Of The Chart

1. Find the 'Lift (lb) per 1000 cu ft' for the expected flight altitude and temperature, using the chart.
2. Use Section 5, Table 3 or 4 to find total permitted lift for the size of balloon, interpolating if necessary.
3. Disposable lift is the total permitted lift minus the balloon empty weight.
4. Ensure that the combined weight of passengers and fuel cylinders does not exceed the disposable lift.

Notes

1. The dotted lines show typical temperature variations with height (I.S.A. is the International Standard Atmosphere). These are an approximation, and can be used to estimate the ambient temperature (and therefore the lift) at another altitude when the ambient temperature at one altitude is known. For flights to altitudes high above take-off altitude see Section 4.5.6.
2. The loading chart is based on static lift with an 100°C internal temperature, thus allowing for moderate rates of climb within the temperature limitation.
3. The applicable Maximum take-off Mass of the balloon must not be exceeded. (See Section 2, Table 2).

4. Empty weight includes the envelope, carrying bag, burner, karabiners and basket including poles, pole covers and fire extinguisher. (Not included are cylinders, accessories or occupants). The main component weights are listed on Page i-iii, Table 1 and the balloon's log book.
5. Fuel cylinder weights are given on Page i-iii, Table 1 and Table 9 in Appendix 3.

5.3 INVERSION CONDITIONS

When the temperature of the atmosphere increases with height, loading according to the temperature of the cool ground layer can lead to overheating after the initial climb.

On cool early morning flights, either use the expected midday temperatures for the calculations, or leave a good margin below the calculated maximum permitted weight.

5.4 SAMPLE CALCULATIONS

Dotted lines showing the sample calculations are marked on the chart.

Example 1: Ambient temperature at maximum altitude known.

The balloon is to be flown to a maximum altitude of 3000 ft and the forecast temperature at that altitude is 11°C.

Start with the ambient temperature at the maximum altitude on the horizontal scale. Follow up vertically to intersect the 3000ft curve. This point will show the lift at 3000ft on the vertical scale (16.7 lb per 1000 cu ft).

Example 2: Ambient temperature at maximum altitude not known

The balloon is to be flown to a maximum altitude of 10,000ft from a take-off altitude of 3000ft. The ambient temperature at take-off is 8°C.

Start with the ambient temperature at take-off on the horizontal scale. Follow up vertically to intersect the 3000 ft curve. This point will show the lift at 3000 ft on the vertical scale (17.4 lb per 1000cu ft).

To allow for the effect of altitude follow parallel to the ISA curves until the 10000 ft curve is reached. This point shows the theoretical ambient temperature at 10,000ft (-7°C) on the horizontal scale and the lift at 10,000ft (16.3 lb per 1000 cu ft) on the vertical scale.

LOADING CHART

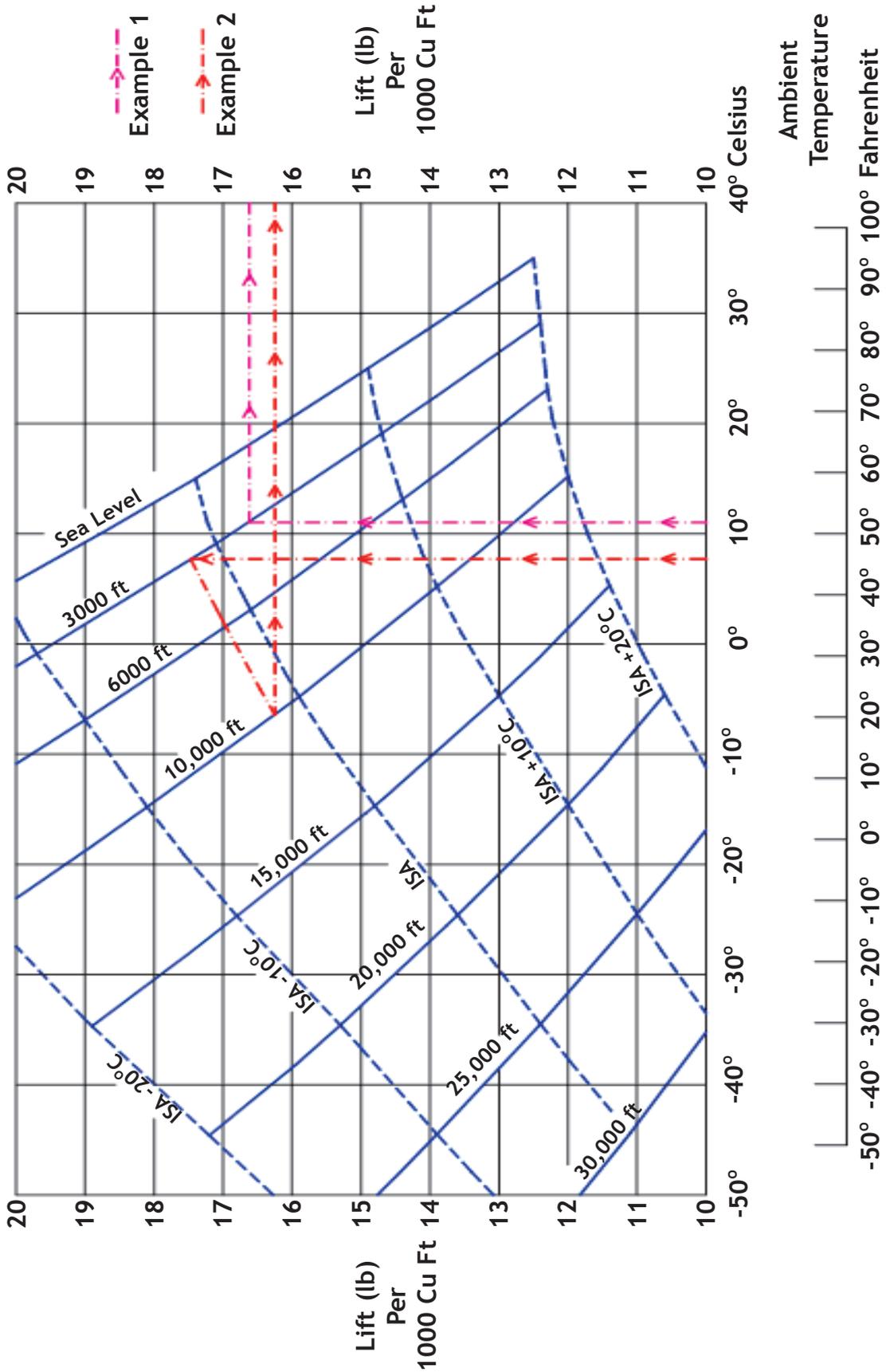


Table 3: Total Permitted Lift (kg)

| Balloon Size | Lift (lb) Per 1000 cu.ft. | | | | | | | | | | |
|--------------|---------------------------|------|------|------|------|------|------|------|------|------|------|
| | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 25 | 113 | 125 | 136 | 147 | 159 | 170 | 181 | 193 | 204 | 215 | 227 |
| 26 | 118 | 130 | 142 | 153 | 165 | 177 | 189 | 200 | 212 | 224 | 236 |
| 31 | 143 | 157 | 171 | 185 | 200 | 214 | 228 | 243 | 257 | 271 | 285 |
| 35 | 158 | 174 | 190 | 206 | 222 | 238 | 254 | 269 | 285 | 301 | 317 |
| 42 | 191 | 210 | 229 | 248 | 267 | 286 | 305 | 324 | 343 | 362 | 381 |
| 50 | 226 | 249 | 272 | 294 | 317 | 340 | 362 | 385 | 408 | 430 | 453 |
| 56 | 254 | 279 | 305 | 330 | 356 | 381 | 406 | 432 | 457 | 483 | 508 |
| 60 | 272 | 299 | 327 | 354 | 381 | 408 | 435 | 463 | 490 | 517 | 544 |
| 65 | 295 | 324 | 354 | 383 | 413 | 442 | 472 | 501 | 531 | 560 | 590 |
| 69 | 313 | 344 | 376 | 407 | 438 | 469 | 501 | 532 | 563 | 595 | 626 |
| 70 | 317 | 349 | 381 | 413 | 444 | 476 | 508 | 540 | 571 | 603 | 635 |
| 77 | 352 | 387 | 422 | 457 | 492 | 527 | 562 | 597 | 633 | 668 | 703 |
| 80 | 363 | 399 | 435 | 472 | 508 | 544 | 580 | 617 | 653 | 689 | 726 |
| 84 | 381 | 419 | 457 | 495 | 533 | 572 | 610 | 648 | 686 | 724 | 762 |
| 90 | 408 | 449 | 490 | 531 | 571 | 612 | 653 | 694 | 735 | 776 | 816 |
| 100 | 454 | 499 | 544 | 590 | 635 | 680 | 726 | 771 | 816 | 862 | 907 |
| 105 | 476 | 524 | 572 | 619 | 667 | 714 | 762 | 810 | 857 | 905 | 952 |
| 120 | 544 | 599 | 653 | 707 | 762 | 816 | 871 | 925 | 980 | 1034 | 1088 |
| 133 | 603 | 663 | 724 | 784 | 844 | 905 | 965 | 1025 | 1086 | 1146 | 1206 |
| 140 | 635 | 699 | 762 | 826 | 889 | 953 | 1016 | 1080 | 1143 | 1207 | 1270 |
| 145 | 658 | 723 | 789 | 855 | 921 | 987 | 1052 | 1118 | 1184 | 1250 | 1315 |
| 150 | 680 | 748 | 816 | 884 | 952 | 1020 | 1088 | 1156 | 1224 | 1293 | 1361 |
| 160 | 726 | 798 | 871 | 943 | 1016 | 1088 | 1161 | 1234 | 1306 | 1379 | 1451 |
| 180 | 816 | 898 | 980 | 1061 | 1143 | 1225 | 1306 | 1388 | 1470 | 1551 | 1633 |
| 200 | 907 | 998 | 1088 | 1179 | 1270 | 1361 | 1451 | 1542 | 1633 | 1723 | 1814 |
| 210 | 952 | 1047 | 1143 | 1238 | 1334 | 1429 | 1524 | 1619 | 1715 | 1810 | 1905 |
| 225 | 1020 | 1122 | 1224 | 1327 | 1429 | 1531 | 1633 | 1735 | 1837 | 1939 | 2041 |
| 240 | 1089 | 1197 | 1306 | 1415 | 1524 | 1633 | 1742 | 1851 | 1960 | 2068 | 2177 |
| 250 | 1134 | 1247 | 1361 | 1474 | 1588 | 1701 | 1814 | 1928 | 2041 | 2155 | 2268 |
| 260 | 1179 | 1297 | 1415 | 1533 | 1651 | 1769 | 1887 | 2005 | 2123 | 2241 | 2359 |
| 275 | 1247 | 1372 | 1497 | 1621 | 1746 | 1871 | 1995 | 2120 | 2245 | 2370 | 2494 |
| 300 | 1361 | 1497 | 1633 | 1679 | 1905 | 2041 | 2177 | 2313 | 2449 | 2585 | 2721 |
| 315 | 1429 | 1571 | 1714 | 1857 | 2000 | 2143 | 2286 | 2429 | 2571 | 2714 | 2857 |
| 340 | 1542 | 1696 | 1850 | 2005 | 2159 | 2313 | 2467 | 2621 | 2776 | 2857 | 2857 |
| 340HL | 1542 | 1696 | 1850 | 2005 | 2159 | 2313 | 2467 | 2621 | 2776 | 2930 | 3084 |
| 350 | 1587 | 1746 | 1905 | 2063 | 2222 | 2381 | 2540 | 2698 | 2857 | 3016 | 3175 |
| 375 | 1701 | 1871 | 2041 | 2211 | 2381 | 2551 | 2722 | 2892 | 3062 | 3232 | 3401 |
| 400 | 1814 | 1995 | 2177 | 2358 | 2540 | 2721 | 2902 | 3084 | 3265 | 3447 | 3628 |
| 415 | 1882 | 2070 | 2259 | 2447 | 2635 | 2823 | 3011 | 3200 | 3388 | 3576 | 3764 |
| 425LW | 1927 | 2120 | 2313 | 2506 | 2698 | 2891 | 3084 | 3277 | 3469 | 3662 | 3662 |
| 450LW | 2041 | 2245 | 2449 | 2653 | 2857 | 3061 | 3265 | 3469 | 3673 | 3815 | 3815 |
| 450 | 2041 | 2245 | 2449 | 2653 | 2857 | 3061 | 3265 | 3469 | 3673 | 3878 | 4082 |
| 500LW | 2268 | 2494 | 2721 | 2948 | 3175 | 3401 | 3628 | 3855 | 4082 | 4240 | 4240 |
| 530LW | 2404 | 2644 | 2884 | 3125 | 3365 | 3605 | 3846 | 4086 | 4327 | 4500 | 4500 |
| 530 | 2404 | 2644 | 2884 | 3125 | 3365 | 3605 | 3846 | 4086 | 4327 | 4567 | 4807 |
| 600 | 2721 | 2993 | 3265 | 3537 | 3810 | 4082 | 4354 | 4626 | 4898 | 5089 | 5089 |
| 750 | 3402 | 3742 | 4082 | 4423 | 4763 | 5103 | 5103 | 5103 | 5103 | 5103 | 5103 |

Table 4: Total Permitted Lift (lb)

| Balloon Size | Lift (lb) Per 1000 cu.ft. | | | | | | | | | | |
|--------------|---------------------------|------|------|------|-------|-------|-------|-------|-------|-------|-------|
| | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 25 | 250 | 275 | 300 | 325 | 350 | 375 | 400 | 425 | 450 | 475 | 500 |
| 26 | 260 | 286 | 312 | 338 | 364 | 390 | 416 | 442 | 468 | 494 | 520 |
| 31 | 315 | 346 | 378 | 409 | 441 | 472 | 504 | 535 | 567 | 598 | 620 |
| 35 | 350 | 385 | 420 | 455 | 490 | 525 | 560 | 595 | 630 | 665 | 700 |
| 42 | 420 | 462 | 504 | 546 | 588 | 630 | 672 | 714 | 756 | 798 | 840 |
| 50 | 500 | 550 | 600 | 650 | 700 | 750 | 800 | 850 | 900 | 950 | 1000 |
| 56 | 560 | 616 | 672 | 728 | 784 | 840 | 896 | 952 | 1008 | 1064 | 1120 |
| 60 | 600 | 660 | 720 | 780 | 840 | 900 | 960 | 1020 | 1080 | 1140 | 1200 |
| 65 | 650 | 715 | 780 | 845 | 910 | 975 | 1040 | 1105 | 1170 | 1235 | 1300 |
| 69 | 690 | 759 | 828 | 897 | 966 | 1035 | 1104 | 1173 | 1242 | 1311 | 1380 |
| 70 | 700 | 770 | 840 | 910 | 980 | 1050 | 1120 | 1190 | 1260 | 1330 | 1400 |
| 77 | 775 | 852 | 930 | 1007 | 1085 | 1162 | 1240 | 1317 | 1395 | 1472 | 1540 |
| 80 | 800 | 880 | 960 | 1040 | 1120 | 1200 | 1280 | 1360 | 1440 | 1520 | 1600 |
| 84 | 840 | 924 | 1008 | 1092 | 1176 | 1260 | 1344 | 1428 | 1512 | 1596 | 1640 |
| 90 | 900 | 990 | 1080 | 1170 | 1260 | 1350 | 1440 | 1530 | 1620 | 1710 | 1800 |
| 100 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 |
| 105 | 1050 | 1155 | 1260 | 1365 | 1470 | 1575 | 1680 | 1785 | 1890 | 1995 | 2100 |
| 120 | 1200 | 1320 | 1440 | 1560 | 1680 | 1800 | 1920 | 2040 | 2160 | 2280 | 2400 |
| 133 | 1330 | 1463 | 1596 | 1729 | 1862 | 1995 | 2128 | 2261 | 2394 | 2527 | 2660 |
| 140 | 1400 | 1540 | 1680 | 1820 | 1960 | 2100 | 2240 | 2380 | 2520 | 2660 | 2800 |
| 145 | 1450 | 1595 | 1740 | 1885 | 2030 | 2175 | 2320 | 2465 | 2610 | 2755 | 2900 |
| 150 | 1500 | 1650 | 1800 | 1950 | 2100 | 2250 | 2400 | 2550 | 2700 | 2850 | 3000 |
| 160 | 1600 | 1760 | 1920 | 2080 | 2240 | 2400 | 2560 | 2720 | 2880 | 3040 | 3200 |
| 180 | 1800 | 1980 | 2160 | 2340 | 2520 | 2700 | 2880 | 3060 | 3240 | 3420 | 3600 |
| 200 | 2000 | 2200 | 2400 | 2600 | 2800 | 3000 | 3200 | 3400 | 3600 | 3800 | 4000 |
| 210 | 2100 | 2310 | 2520 | 2730 | 2940 | 3150 | 3360 | 3570 | 3780 | 3990 | 4200 |
| 225 | 2250 | 2475 | 2700 | 2925 | 3150 | 3375 | 3600 | 3825 | 4050 | 4275 | 4500 |
| 240 | 2400 | 2640 | 2880 | 3120 | 3360 | 3600 | 3840 | 4080 | 4320 | 4560 | 4800 |
| 250 | 2500 | 2750 | 3000 | 3250 | 3500 | 3750 | 4000 | 4250 | 4500 | 4750 | 5000 |
| 260 | 2600 | 2860 | 3120 | 3380 | 3640 | 3900 | 4160 | 4420 | 4680 | 4940 | 5200 |
| 275 | 2750 | 3025 | 3300 | 3575 | 3850 | 4125 | 4400 | 4675 | 4950 | 5225 | 5500 |
| 300 | 3000 | 3300 | 3600 | 3900 | 4200 | 4500 | 4800 | 5100 | 5400 | 5700 | 6000 |
| 315 | 3150 | 3465 | 3780 | 4095 | 4410 | 4725 | 5040 | 5355 | 5670 | 5985 | 6300 |
| 340 | 3400 | 3740 | 4080 | 4420 | 4760 | 5100 | 5440 | 5780 | 6120 | 6300 | 6300 |
| 340HL | 3400 | 3740 | 4080 | 4420 | 4760 | 5100 | 5440 | 5780 | 6120 | 6460 | 6800 |
| 350 | 3500 | 3850 | 4200 | 4550 | 4900 | 5250 | 5600 | 5950 | 6300 | 6650 | 7000 |
| 375 | 3750 | 4125 | 4500 | 4875 | 5250 | 5625 | 6000 | 6375 | 6750 | 7125 | 7500 |
| 400 | 4000 | 4400 | 4800 | 5200 | 5600 | 6000 | 6400 | 6800 | 7200 | 7600 | 8000 |
| 415 | 4150 | 4565 | 4980 | 5395 | 5810 | 6225 | 6640 | 7055 | 7470 | 7885 | 8300 |
| 425LW | 4250 | 4675 | 5100 | 5525 | 5950 | 6375 | 6800 | 7225 | 7650 | 8075 | 8075 |
| 450LW | 4500 | 4950 | 5400 | 5850 | 6300 | 6750 | 7200 | 7650 | 8100 | 8410 | 8410 |
| 450 | 4500 | 4950 | 5400 | 5850 | 6300 | 6750 | 7200 | 7650 | 8100 | 8550 | 9000 |
| 500LW | 5000 | 5500 | 6000 | 6500 | 7000 | 7500 | 8000 | 8500 | 9000 | 9350 | 9350 |
| 530LW | 5300 | 5830 | 6360 | 6890 | 7420 | 7950 | 8480 | 9010 | 9540 | 9920 | 9920 |
| 530 | 5300 | 5830 | 6360 | 6890 | 7420 | 7950 | 8480 | 9010 | 9540 | 10070 | 10600 |
| 600 | 6000 | 6600 | 7200 | 7800 | 8400 | 9000 | 9600 | 10200 | 10800 | 11215 | 11215 |
| 750 | 7500 | 8250 | 9000 | 9750 | 10500 | 11250 | 11250 | 11250 | 11250 | 11250 | 11250 |

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6.1 INTRODUCTION

Section 6 provides a description of the standard component parts and assemblies that make up the balloon system.

Optional equipment is described in Section 8.

6.2 ENVELOPE

Envelopes are of sewn construction, and are made of high tenacity nylon fabric. The fabric is coated to make it airtight and to protect it from the effects of sunlight. All the main loads on the envelopes are carried by nylon or polyester load tapes and the designs use high factors of safety.

Horizontal tapes act as rip stoppers so that any damage to the envelope will be limited in extent.

The base panels of the balloon are made from Nomex heat resistant fabric so that the nylon is kept at a sufficient distance from the flame to prevent heat damage. The lower ends of the load tapes are formed into rigging loops to which stainless steel or Kevlar cables, called flying cables, are attached.

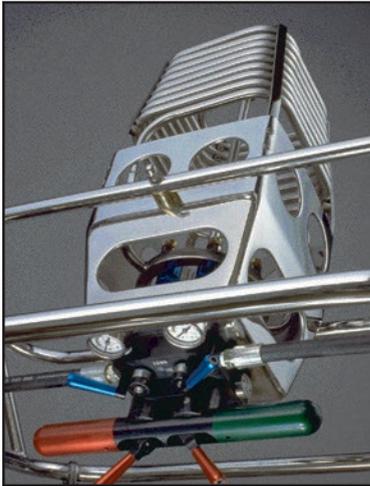
Envelopes are fitted as standard with a 'Parachute' deflation system in sizes of up to 150,000 cu.ft (4250m³) and a 'Lock-Top' deflation system in larger sizes. The Rapid Deflation System is available as an option on most models.

The base of the balloon may be fitted with a Scoop. This improves the performance of the balloon when taking off or tethering in wind, and during flight in turbulent conditions.

There are seven standard types of envelope, all of which are of the conventional 'inverted teardrop' shape. Approved volumes and variants are listed in the Type Certificate Data Sheet [EASA.BA.013](#).

| Type | No. of Gores | Suspension Cables | Profile |
|----------------------------|--------------|-------------------|--------------|
| Cameron 'C' Type (Concept) | 12-16 | 12-16 | Smooth |
| Cameron 'O' Type | 12 | 12 | Semi-Bulbous |
| Cameron 'A' Type | 20 | 20 | Semi-Bulbous |
| Cameron 'N' Type | 24-32 | 12-16 | Smooth |
| Cameron 'Z' Type | 16-32 | 12-32 | Smooth |
| Cameron 'TR' Type | 16-24 | 12-16 | Smooth |
| Cameron 'Sport' Type | 16 | 16 | Semi-Bulbous |

6.2.1-6.2.8 Paragraphs Deleted



▲ Shadow Single Burner

The Stealth burner uses a sophisticated foil jet ring system to achieve a considerable reduction in noise output. The Stealth has a 'soft start - soft finish' burn, with a gradual build up and decay of burner noise.

The lower flame speed produced results in a 'softer' flame which is more easily deflected by wind or turbulence. Radiant heat is also slightly increased.

Cleaning of the Stealth jet ring may be required after using dirty propane (Maintenance Manual Section 4.5.6). If dirty propane is suspected a fuel filter should be incorporated into the refuelling hose.

Shadow and Stealth burners are fitted with a liquid pilot light. A vapour pilot light is available as an option. Both types of pilot lights are fitted with filters which require periodic cleaning (Maintenance Manual Section 4.5.2).

6.3.8.1 Shadow Single Burner

The Shadow single burner consists of a single burner coil with a dual feed manifold block. The manifold block has two independent fuel supplies each with its own blast valve, whisper valve and pilot light.

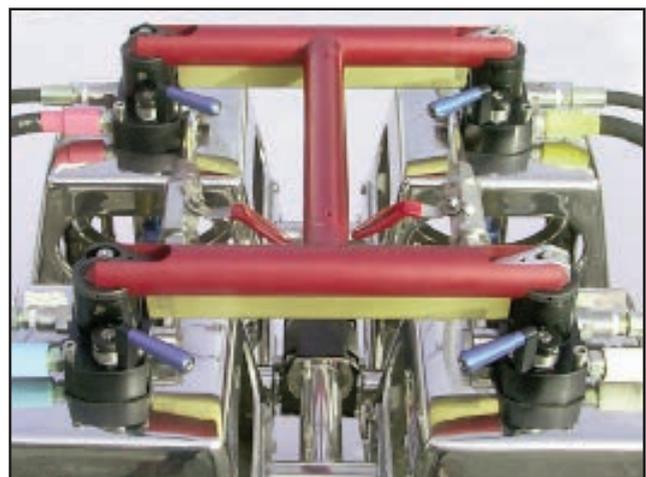
6.3.8.2 Shadow And Shadow / Stealth Combination Burners

Shadow and Shadow/Stealth combination burners are available as double, triple and quad burners.

The Shadow and Stealth burners share the same manifold block and control layout, and differ only in the main burner jet ring and coil arrangement.

The Stealth burner is only fitted in combination with Shadow units to create double, triple or quad combination burners.

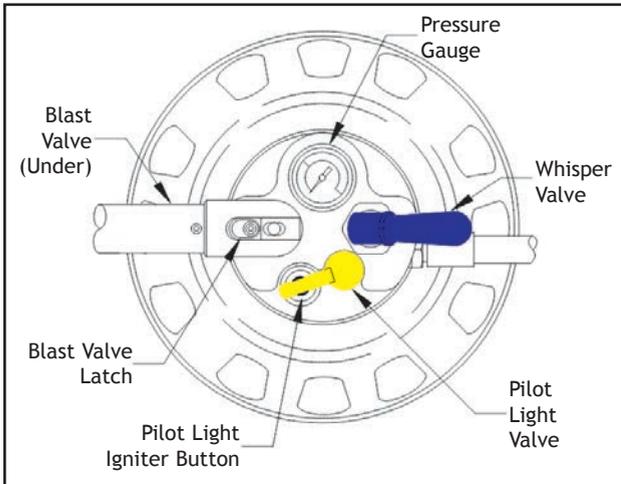
Double burners are fitted with crossflow valves. Triple and quad burners can be fitted with crossflow valves or dual action handles ("squeeze bar action") between paired burner units.



▲ Stealth / Shadow Quad Burner

6.3.9 Stratus Burner

The Stratus Burner is available as a single, double, triple or quad burner.



The main burners are fitted with squeeze action blast valves which are operated by squeezing the control lever towards the hand grip. Each handle has a latch fitted on its underside to allow the valve to be locked on in an emergency (Section 3.11). The blast valve handles are arranged so that pairs of burners be operated simultaneously with one hand.

The Whisper burner is operated by a toggle valve, which may be rotated to give a convenient operating position.

▲ Stratus Control Layout

The Stratus burner is fitted with a liquid pilot light. A vapour pilot light is available as an option. Both types of pilot lights are fitted with filters which require periodic cleaning (Maintenance Manual Section 4.7.2).

6.3.9.1 Stratus Single Burner

The Stratus single burner has two independent fuel supplies. Each fuel supply feeds a pilot and whisper burners. One main blast valve is fitted and its fuel supply is denoted by a red arrow on the block. The Stratus single burner has two igniters.

6.3.9.2 Stratus Double, Triple And Quad Burners

Triple and quad burners can be fitted with crossflow valves between adjacent burners. When a crossflow valve is open, two burners can be operated from one burner valve. This enables all the burners to be operated with one hand.

6.3.10 Paragraph Deleted

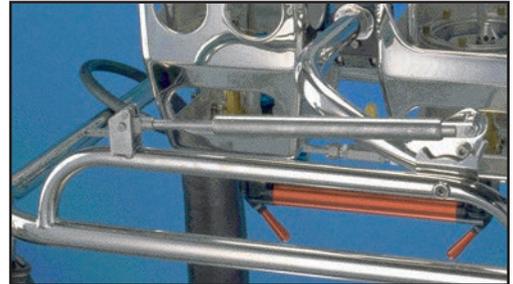
6.3.11 Paragraph Deleted

6.3.12 Fixed Height Burner Frame

The burner assembly is mounted on a gimbal in the burner frame. The burner frame has a socket in each corner to accept a nylon support rod. In addition, there are rigging points at each corner through which karabiners are hooked to join the basket wires to the envelope flying cables. Larger frames are fitted with four additional sockets and rigging points. Heat shields may be fitted to larger burner frames to reduce radiant heat.

6.3.13 Adjustable Height Burner Frame

The adjustable height burner frame allows the burner to be raised and lowered relative to the basket floor. This adjustment can be safely carried out in flight. The adjustable burner frame is only available for use with single and double burners.



▲ Adjustable Burner Frame

6.4 FUEL CYLINDERS

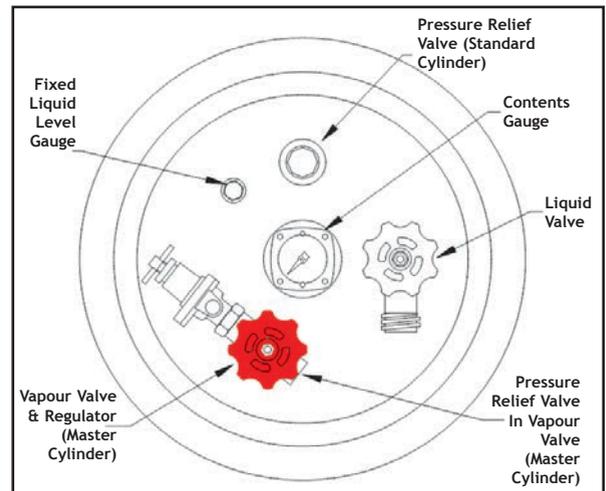
The fuel cylinders contain the liquid propane fuel under pressure. The cylinders are supplied in two configurations.

'Standard' cylinders: supplying liquid fuel feed only.

'Master' cylinders : supplying liquid fuel feed with an additional pressure regulated vapour supply for vapour pilot lights.

The liquid fuel is drawn from the bottom of the cylinder via an internal dip tube. The liquid supply is controlled by an external valve, either a handwheel type valve with a Rego type (screw-on) hose connector or a 'quick shutoff' lever-operated valve. The quick shutoff valve may be fitted with either a Rego type screw-on connector or a Tema push-on connector.

The regulated vapour pilot light supply (master cylinders only) is taken directly from the top of the cylinder through a handwheel type valve and an adjustable regulator. The vapour hose is connected using a quick release coupling.



▲ Fuel Cylinder Valve Layout - Master Stainless Steel Cylinder Shown

Caution: The Vapour Regulator requires an internal cylinder vapour pressure of 0.5 Bar (7 p.s.i) before it operates correctly. Care must be taken at low ambient temperatures when using fuel which is predominantly butane.

All fuel cylinders are fitted with:

A contents gauge which indicates from approximately 33% of capacity until the cylinder is empty.

A fixed liquid level gauge (bleed valve) which indicates when the cylinder is full.

A pressure relief valve (PRV) which protects the cylinder against excessive internal pressure.

A padded cover with integral map pocket. The padded cover must be used at all times.

The cylinders are strapped vertically inside the basket. Load spreading boards must be fitted to the internal runners of woven floor baskets if cylinders with a useable volume greater than 45 litres are used.

6.4.1 Deleted

9.1 INTRODUCTION

This Section lists the major components which may be combined with each envelope to make a complete balloon. Additional equipment, not requiring approval, is listed in Section 9.3.

9.1.1 Burner Frame Compatability

Table 6 lists the compatible burner load frames for each basket type. The burner load frames are divided into two categories:

Applicable Burner Frames (specific): These are frames design specifically to fit a given basket type.

Applicable Burner Frames (with Assembly check):

These are structurally and dimensionally similar frames which have been designed for similar baskets that incorporate minor design changes (e.g. additional restraint lugs, offset crossbar, changed rod socket angles etc.). These frames may only be combined with the listed basket after an assembly check by a competent person (normally an inspector).

9.2 EQUIPMENT LIST

Tables 5, 6, 7 and 8 list the envelopes, baskets, fuel cylinders, burners and burner frames which are compatible.

Table 5: Envelopes

| Envelope Type | Drawing Number | Applicable Burners | Applicable Baskets |
|----------------------|-----------------------|---------------------------|---------------------------------|
| A-105 | CB115 | B | B, C, D, E, F, G, H, I, J, K |
| A-120 | CB617 | B | C, D, E, F, G, H, I, J, K, L |
| A-140 | CB105 | B | D, E, F, G, H, I, J, K, L, M |
| A-160 | CB653 | B, C | D, E, F, G, H, I, J, K, L, M, N |
| A-180 | CB692 | B, C, D | E, F, G, H, I, J, K, L, M, N, O |
| A-200 | CB1199 | B, C, D | G, H, I, J, K, L, M, N, O, P, Q |
| A-210 | CB199 | B, C, D | G, H, I, J, K, L, M, N, O, P, Q |
| A-225 | CB1618 | B, C, D | G, H, I, J, K, L, M, N, O, P, Q |
| A-250 | CB463 | C, D | H, I, J, K, L, M, N, O, P, Q |
| A-275 | CB1147 | C, D | I, J, K, L, M, N, O, P, Q |
| A-300 | CB603 | C, D | K, L, M, N, O, P, Q |
| A-315 | CB1028 | C, D | K, L, M, N, O, P, Q |
| A-340 | CB1166 | D | L, M, N, O, P, Q |
| A-340HL | CB1148 | D | L, M, N, O, P, Q |
| A-375 | CB761 | D | M, N, O, P, Q |
| A-400 | CB1248 | D | N, O, P, Q |
| A-415 | CB1311 | D | N, O, P, Q |
| A-425LW | CB1716 | D | N, O, P, Q |
| A-450LW | CB1626 | D | P, Q, R |
| A-500LW | CB1725 | D | P, Q, R |
| A-530LW | CB1672 | D | P, Q, R |
| A-530 | CB197 | D | O, P, Q |

Table 5: Envelopes (continued)

| Envelope Type | Drawing Number | Applicable Burners | Applicable Baskets |
|----------------------|-----------------------|---------------------------|---------------------------------|
| C-50 | CB1611 | A, B | A, B, C, D |
| C-60 | CB996 | A, B | A, B, C, D, E, F, G |
| C-70 | CB1256 | A, B | A, B, C, D, E, F, G, H |
| C-80 | CB1025 | A, B | A, B, C, D, E, F, G, H, I |
| C-90 | CB1460 | A, B | A, B, C, D, E, F, G, H, I, J |
| C-100 | CB1048 | A, B | B, C, D, E, F, G, H, I, J, K |
| | | | |
| N-31 | CB476 | A | A, B, C, D |
| N-42 | CB476 | A | A, B, C, D, E |
| N-56 | CB476 | A, B | A, B, C, D, E, F, G |
| N-65 | CB476 | A, B | A, B, C, D, E, F, G, H |
| N-70 | CB476 | A, B | A, B, C, D, E, F, G, H |
| N-77 | CB476 | A, B | A, B, C, D, E, F, G, H, I |
| N-90 | CB476 | A, B | A, B, C, D, E, F, G, H, I, J |
| N-100 | CB476 | A, B | B, C, D, E, F, G, H, I, J, K |
| N-105 | CB476 | B | B, C, D, E, F, G, H, I, J, K |
| N-120 | CB476 | B | C, D, E, F, G, H, I, J, K, L |
| N-133 | CB476 | B | C, D, E, F, G, H, I, J, K, L |
| N-145 | CB476 | B, C | D, E, F, G, H, I, J, K, L, M |
| N-160 | CB476 | B, C | E, F, G, H, I, J, K, L, M, N |
| N-180 | CB476 | B, C, D | E, F, G, H, I, J, K, L, M, N, O |
| N-210 | CB476 | B, C, D | G, H, I, J, K, L, M, N, O, P, Q |
| | | | |
| O-26 | CB1752 | A | A,B,C |
| O-31 | CB110 | A | A, B, C, D |
| O-42 | CB101 | A | A, B, C, D, E |
| O-56 | CB45 | A, B | A, B, C, D, E, F, G |
| O-65 | CB54 | A, B | A, B, C, D, E, F, G, H |
| O-77 | CB112 | A, B | A, B, C, D, E, F, G, H, I |
| O-84 | CB49 | A, B | A, B, C, D, E, F, G, H, I |
| O-90 | CB658 | A, B | A, B, C, D, E, F, G, H, I, J |
| O-105 | CB167 | B | B, C, D, E, F, G, H, I, J, K |
| O-120 | CB505 | B | C, D, E, F, G, H, I, J, K, L |
| O-140 | CB772 | B, C | D, E, F, G, H, I, J, K, L, M |
| O-160 | CB368 | B, C | D, E, F, G, H, I, J, K, L, M, N |
| | | | |
| Sport-50 | CB1759 | A, B | A, B, C, D |
| Sport-60 | CB1755 | A, B | A, B, C, D, E |
| Sport-70 | CB1756 | A, B | B, C, D, E, F |
| Sport-80 | CB1757 | A, B | B, C, D, E, F |
| Sport-90 | CB1758 | A, B | B, C, D, E, F |
| | | | |
| TR-60 | CB1520 | A, B | A, B, C, D, E, F |
| TR-65 | CB1749 | A, B | A, B, C, D, E, F |
| TR-70 | CB1519 | A, B | A, B, C, D, E, F |
| TR-77 | CB1591 | A,B | A, B, C, D, E, F |
| TR-84 | CB1612 | A,B | A, B, C, D, E, F |

Table 5: Envelopes (continued)

| Envelope Type | Drawing Number | Applicable Burners | Applicable Baskets |
|----------------------|-----------------------|---------------------------|---------------------------------|
| Z-25 | CB1461 | A | A, B, C |
| Z-31 | CB1462 | A | A, B, C, D |
| Z-35 | CB-1619 | A | A, B, C, D |
| Z-42 | CB1463 | A | A, B, C, D, E |
| Z-56 | CB1464 | A, B | A, B, C, D, E, F, G |
| Z-65 | CB1346 | A, B | A, B, C, D, E, F, G, H |
| Z-69 | CB1465 | A, B | A, B, C, D, E, F, G, H |
| Z-77 | CB1342 | A, B | A, B, C, D, E, F, G, H, I |
| Z-90 | CB1340 | A, B | A, B, C, D, E, F, G, H, I, J |
| Z-105 | CB1345 | B | B, C, D, E, F, G, H, I, J, K |
| Z-120 | CB1348 | B | C, D, E, F, G, H, I, J, K, L |
| Z-133 | CB1349 | B | C, D, E, F, G, H, I, J, K, L |
| Z-140 | CB1477 | B, C | D, E, F, G, H, I, J, K, L, M |
| Z-145 | CB1350 | B, C | D, E, F, G, H, I, J, K, L, M |
| Z-150 | CB1473 | B, C | D, E, F, G, H, I, J, K, L, M |
| Z-160 | CB1351 | B, C | D, E, F, G, H, I, J, K, L, M, N |
| Z-180 | CB1352 | B, C, D | E, F, G, H, I, J, K, L, M, N, O |
| Z-210 | CB1353 | B, C, D | G, H, I, J, K, L, M, N, O, P, Q |
| Z-225 | CB1466 | C, D | G, H, I, J, K, L, M, N, O, P, Q |
| Z-250 | CB1459 | C, D | H, I, J, K, L, M, N, O, P, Q |
| Z-275 | CB1467 | C, D | I, J, K, L, M, N, O, P, Q |
| Z-315 | CB1468 | C, D | K, L, M, N, O, P, Q |
| Z-350 | CB1469 | D | L, M, N, O, P, Q |
| Z-375 | CB1470 | D | M, N, O, P, Q |
| Z-400 | CB1471 | D | N, O, P, Q |
| Z-425LW | CB1502 | D | N, O, P, Q |
| Z-450 | CB1472 | D | N, O, P, Q |
| Z-600 | CB1565 | D | R |
| Z-750 | CB1663 | D | R |

Table 5A: Tether Equipment

| Item | Part Number | Description |
|-------------|--------------------|-------------------------------------|
| 1 | CB-6043-1000 | V-Bridle |
| 2 | CU-3000-0001 | Tether Ring, Large |
| 3 | CU-9780-0001 | Karabiner, 5 Tonne |
| 4 | CB-6043-3000 | V-Bridle complete with Tether Rings |

Note: Item 4 is alternative to items 1 to 3

Table 7: Fuel Cylinders

| Cylinder Category | Drawing Number | Cylinder Material | Cylinder Description |
|--------------------------|-----------------------|--------------------------|-----------------------------|
| 1a | CB901 | ALUMINIUM | MINI WORTHINGTON |
| 2 | CB2900 | DUPLEX STAINLESS STEEL | 45 |
| 2 | CB2901 | DUPLEX STAINLESS STEEL | 60 |
| 3 | CB2902 | DUPLEX STAINLESS STEEL | 54 |
| 3 | CB2903 | DUPLEX STAINLESS STEEL | 72 |

Table 8: Burners

Shadow and Stealth burners have their pilot light configuration denoted, with the following drawing numbers being appended with -1 for vapour, -2 for liquid or -3 for mixed vapour and liquid.

Table 8: Burners (continued)

| Burner Category | Drawing Number | Burner Description |
|------------------------|-----------------------|--|
| A | CB2245 | Single Shadow, Fixed Frame |
| A | CB2246 | Single Shadow, Adjustable Height Frame |
| | | |
| A | CB2233 | Single Shadow Mini, Fixed Frame |
| | | |
| A | CB8710 | Single Stratus, Liquid Pilot Light |
| A | CB8712 | Single Stratus, Vapour Pilot Light |
| B | CB2222 | Double Shadow, Fixed Frame |
| | | |
| B | CB2215 | Double Shadow, Adjustable Height Frame |
| B | CB2243 | Double Shadow / Stealth, Fixed Frame |
| | | |
| B | CB2244 | Double Shadow / Stealth, Adjustable Height Frame |
| | | |
| B | CB8720 | Double Stratus, Liquid Pilot Light |
| B | CB8721 | Double Stratus, Vapour Pilot Light |
| C | CB2255 | Triple Shadow |
| C | CB2424 | Triple Shadow, Crossflow to Single Burner |
| C | CB2520 | Triple Shadow, Squeeze Bar Action, with Crossflow |
| C | CB2301 | Triple Stealth (double) / Shadow (single) |
| C | CB2289 | Triple Shadow (double) / Stealth (single) |
| C | CB2446 | Triple Shadow / Stealth (double) / Shadow (single) |
| C | CB2459 | Triple Stealth (double) / Shadow (single), Squeeze bar Action |
| C | CB2467 | Triple Shadow (double) / Stealth (single), Squeeze bar Action |
| C | CB2469 | Triple Shadow / Stealth (double) / Shadow (single), Squeeze bar Action |
| C | CB2941 | Triple Shadow (double) / Stealth (single), Squeeze bar Action |
| | | |
| C | CB8730 | Triple Stratus, Liquid Pilot Light. |
| C | CB8731 | Triple Stratus, Liquid Pilot Light, 'T' Baskets |
| C | CB8732 | Triple Stratus, Liquid Pilot Light, 'TT' Baskets |
| C | CB8733 | Triple Stratus, Vapour Pilot Light |
| C | CB8734 | Triple Stratus, Vapour Pilot Light, 'T' Baskets |
| C | CB8735 | Triple Stratus, Vapour Pilot Light, 'TT' Baskets |
| D | CB2256 | Quad Shadow |
| D | CB2351 | Quad Shadow, Dual Squeeze Bar |
| D | CB2305 | Quad Shadow (double) / Stealth (double) |
| D | CB2342 | Quad Shadow (double) / Stealth (double), Dual Squeeze Bar |
| D | CB2395 | Quad Shadow / Stealth (double) / Shadow / Stealth (double) |
| | | |
| D | CB8740 | Quad Stratus, Liquid Pilot Light |
| D | CB8741 | Quad Stratus, Liquid Pilot Light, Crossflow |
| D | CB8742 | Quad Stratus, Vapour Pilot Light |
| D | CB8743 | Quad Stratus, Vapour Pilot Light, Crossflow |

Table 9: Fuel Cylinder Weights And Volumes

| Cylinder Material | Cylinder Type | Volume (Litres) | | Configuration | (Including Cover & Straps) | | | |
|------------------------|---------------|-----------------|--------|---------------|----------------------------|----|-------------|-----|
| | | Total | Usable | | Empty Weight | | Full Weight | |
| | | | | | kg | lb | kg | lb |
| Duplex Stainless Steel | CB2900 '45' | 56 | 45 | Master | 21 | 46 | 44 | 97 |
| | | | | Standard | 20 | 44 | 43 | 95 |
| | CB2901 '60' | 75 | 60 | Master | 23 | 51 | 53 | 117 |
| | | | | Standard | 22 | 49 | 52 | 115 |
| | CB2902 'T60' | 68 | 54 | Master | 24 | 53 | 51 | 112 |
| | | | | Standard | 23 | 51 | 50 | 110 |
| | CB2903 '72' | 90 | 72 | Master | 27 | 60 | 63 | 139 |
| | | | | Standard | 26 | 57 | 62 | 137 |

Table 10: Burner Weights

| Burner (Including Karabiners) | kg | lb |
|--|----|-----|
| ¹ Single (Shadow / Stratus) | 17 | 37 |
| ¹ Double (Shadow / Stealth / Stratus) | 24 | 53 |
| ² Triple (Shadow / Stealth / Stratus) | 44 | 97 |
| ² Quad (Shadow / Stealth / Stratus) | 52 | 115 |

¹In adjustable height frame add 3kg / 7lb

²If metal heat shields are fitted add 7kg / 15lb

Note: The component weights given in Tables 9 and 10 are approximate and for guidance purposes only. For pre-flight weight calculations, the actual component weights given in Table 1 and the aircraft log book should be used.

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