B.2102

BALÓNY KUBÍČEK spol. s r.o.
Seat: Francouzská 81, 602 00 Brno
Office: Jarní 2a, 614 00 Brno
Czech Republic
tel.: +420 545 422 620
fax: +420 545 422 621
info@kubicekballoons.cz
www.kubicekballoons.cz

Flight Manual

for use with the hot air balloon

(Applicable for balloons of serial number 640 and higher.)

Type: .....

Model: .....

Serial No.: .....

Registration: .....

This Manual is EASA initially approved under Approval Number: **EASA.BA.C.01171**
Date of initial approval: 20 February 2009
Subsequent revisions are approved either by EASA or by authority of DOA, no. EASA.21J.277 as detailed on page II.

This balloon is to be operated in compliance with information and limitations contained herein.
The Flight Manual has to be placed in the basket during flight.

REDUCED MAXIMUM TAKE-OFF WEIGHT

Applicable MTOW	Date of change	Signature for Balóny Kubíček spol. s r. o

See notes in section 1.4 for an explanation of Applicable MTOW

BALLOON WEIGHT RECORD

Component	Serial number	Weight
Envelope		
Burner		
Basket		

TOTAL EMPTY WEIGHT _____

No.	Cylinder type	Cylinder serial number	Empty weight	Full weight
1				
2				
3				
4				
5				
6				
7				
8				

0.1 RECORD OF REVISIONS

Any revision of the present Manual, except actual weighing data, must be recorded in the following table.The new or amended text in the revised page will be indicated by a black vertical line in the margin, and the Revision No. and the date will be shown on the bottom of the page.

All changes to the Flight Manual which were made before the date of the issue stated on the title page have been incorporated into this Manual.

Revision Number	Affected Section	Affected Pages	Date of Issue	Approval	Date of Approval
1	0 2 9	II, IV 7 1	24 Feb 2009	EASA.BA.C.1179	20 Mar 2009
2	0 1 2 4 5 6 8	II, IV 3 1, 4, 6 6, 10, 15 4 3, 4, 5 1	11 May 2009	EASA.BA.C.1182 EASA.BA.C.1184	15 Jun 2009
3	0 1 2 6 8	II, IV, VIII 4 5, 6, 7 13 2	20 Jun 2009	EASA.BA.C.1185	31 Aug 2009
4	0 2 6 8	II, IV 7 10 2	01 Sep 2009	EASA.BA.C.1196	25 Aug 2009
5	0 2 5 8	II, IV 4, 6, 8 4 1, 4	26 Nov 2009	EASA.BA.C.1180	26 Nov 2009
6	0 2 5 8	II, IV 1, 4, 6, 7,8 4 1, 4	28 Jan 2010	EASA.BA.C.01207	28 Jan 2010
7	0 1 2 4 5 8	II, IV 1 1, 4, 5, 6, 7, 8 10, 14, 15 2, 3, 4 1, 2, 3, 5	25 Feb 2010	EASA.BA.C.01203	25 Feb 2010
8	0 2 4 8	III, IV 5, 6, 7, 8, 9, 10 9, 10, 15 2, 3, 4, 5, 6, 7, 8, 13, 14	22 Jul 2010	10031034	22 Jul 2010

Revision Number	Affected Section	Affected Pages	Date of Issue	Approval	Date of Approval
9	0 1 2 4 5 6 8	III, IV, VI 2 1 - 12 2, 4 4 1, 2 1	27 Oct 2010	10032328	27 Oct 2010
10	0 2 4 8	III, IV 6, 7, 8 15 2, 3	01 Dec 2010	10032780	01 Dec 2010
11	0 2 8	III, IV 6, 7, 8, 10, 11 2, 3	30 Sep 2011	10036702	30 Sep 2011
12	0 2 8	III, IV 6, 7, 8 9, 10, 11, 12	17 Nov 2011	10037230	17 Nov 2011
13	0 4	III, IV 8, 9	21 Oct 2011	DOA approved	21 Oct 2011
14	0 2 4	III, IV 1, 8 1, 2, 3	14 May 2012	10039606	14 May 2012
15	0 2 8	III, IV 6, 7, 8, 10, 11 2	08 Jun 2012	10039993	08 Jun 2012
16	0 2 4 5 6 8	III, IV, VII, VIII 1, 5, 8, 9, 10, 11 1 4, 5, 6 2, 4 - 14 1 - 6	05 Nov 2012	10042046	05 Nov 2012
17	0 2 5 6 8	III, IV, VII, VIII 5, 8, 9, 4, 5 2 1, 2	11 Jan 2013	11 Jan 2013	11 Jan 2013
18	0 2 4	II, III, IV 11 12-16	02 Apr 2013	10044278	02 Apr 2013
19	0 2 3 4 6 7 8	III, IV, VI, VII, VIII 7, 10 1, 3 1, 2, 13 7 - 16 3 13, 14	19 Jun 2013	10045366	19 Jun 2013

Revision Number	Affected Section	Affected Pages	Date of Issue	Approval	Date of Approval
20	0 2	IV, V 3, 4	02 Sep 2014	10050282	02 Sep 2014
21	0 8	IV, V 5, 7	26 Feb 2015	DOA approved	26 Feb 2015
22	0 2	IV, V 6	13 Apr 2015	DOA approved	13 Apr 2015
23	0 2 8	IV, V, VIII 6, 7, 8, 11 3 - 16	05 Apr 2016	10057624	05 Apr 2016
24	0 2 4 6 8	IV, V, VII 11 1 - 18 13 6	09 Dec 2016	10060415	09 Dec 2016
25	0 2 5 8	IV, V, VI 5, 8, 9, 10, 11, 12 4, 5 2	19 Dec 2016	10060516	19 Dec 2016
26	0 2 4 5 8	IV, V,VII 5,8,9,10,11 5-18 4,5 1,2	15 Mar 2017	10061289, 10061292	15 Mar 2017
27	0	Title page IV, V	21 Aug 2017	DOA approved	21 Aug 2017

0.3 LIST OF EFFECTIVE PAGES

Section	Page	Date of Issue
0	I	15 Dec 2008
	II	02 Apr 2013
	III	19 Jun 2013
	IV	21 Aug 2017
	V	21 Aug 2017
	VI	19 Dec 2016
	VII	15 Mar 2017
	VIII	05 Apr 2016
	IX	15 Dec 2008
1	1 - 1	25 Feb 2010
	1 - 2	27 Oct 2010
	1 - 3	11 May 2009
	1 - 4	20 Jun 2009
	1 - 5	15 Dec 2008
	1 - 6	15 Dec 2008
2	2 - 1	05 Nov 2012
(Appr.)	2 - 2	27 Oct 2010
	2 - 3	02 Sep 2014
	2 - 4	02 Sep 2014
	2 - 5	15 Mar 2017
	2 - 6	05 Apr 2016
	2 - 7	05 Apr 2016
	2 - 8	15 Mar 2017
	2 - 9	15 Mar 2017
	2 - 10	15 Mar 2017
	2 - 11	15 Mar 2017
	2 - 12	19 Dec 2016
3	3 - 1	19 Jun 2013
(Appr.)	3 - 2	15 Dec 2008
	3 - 3	19 Jun 2013
	3 - 4	15 Dec 2008
	3 - 5	15 Dec 2008
	3 - 6	15 Dec 2008
4	4 - 1	09 Dec 2016
(Appr.)	4 - 2	09 Dec 2016
	4 - 3	09 Dec 2016
	4 - 4	09 Dec 2016
	4 - 5	15 Mar 2017
	4 - 6	15 Mar 2017
	4 - 7	15 Mar 2017
	4 - 8	15 Mar 2017
	4 - 9	15 Mar 2017
	4 - 10	15 Mar 2017
	4 - 11	15 Mar 2017
	4 - 12	15 Mar 2017
	4 - 13	15 Mar 2017
	4 - 14	15 Mar 2017

Section	Page	Date of Issue
4	4 - 15	15 Mar 2017
(Appr.)	4 - 16	15 Mar 2017
	4 - 17	15 Mar 2017
	4 -18	15 Mar 2017
5	5 - 1	15 Dec 2008
	5 - 2	25 Feb 2010
	5 - 3	25 Feb 2010
	5 - 4	15 Mar 2017
	5 - 5	15 Mar 2017
	5 - 6	05 Nov 2012
6	6 - 1	27 Oct 2010
	6 - 2	11 Jan 2013
	6 - 3	11 May 2009
	6 - 4	05 Nov 2012
	6 - 5	05 Nov 2012
	6 - 6	05 Nov 2012
	6 - 7	19 Jun 2013
	6 - 8	19 Jun 2013
	6 - 9	19 Jun 2013
	6 - 10	19 Jun 2013
	6 - 11	19 Jun 2013
	6 - 12	19 Jun 2013
	6 - 13	09 Dec 2016
	6 - 14	19 Jun 2013
	6 - 15	19 Jun 2013
	6 - 16	19 Jun 2013
7	7 - 1	15 Dec 2008
	7 - 2	15 Dec 2008
	7 - 3	19 Jun 2013
	7 - 4	15 Dec 2008
8	8 - 1	15 Mar 2017
	8 - 2	15 Mar 2017
	8 - 3	05 Apr 2016
	8 - 4	05 Apr 2016
	8 - 5	05 Apr 2016
	8 - 6	09 Dec 2016
	8 - 7	05 Apr 2016
	8 - 8 (Appr.)	05 Apr 2016
	8 - 9	05 Apr 2016
	8 - 10	05 Apr 2016
	8 - 11 (Appr.)	05 Apr 2016
	8 - 12 (Appr.)	05 Apr 2016
	8 - 13	05 Apr 2016
	8 - 14	05 Apr 2016
	8 - 15	05 Apr 2016
	8 - 16	05 Apr 2016
9	9 - 1	24 Feb 2009

NOTE:
The sections or specific pages identified with "Appr." have been approved by EASA.

CONTENTS

INTENTIONALLY LEFT BLANK

SECTION 1 - GENERAL

1.1 INTRODUCTION

The Flight Manual (hereafter referred to as the Manual) has been prepared to provide pilots and instructors with information for the safe and efficient operation of hot air balloons manufactured by Balóny Kubíček spol. s r.o.

Revisions to this Manual are published on the Kubicek Balloons web site at **www.kubicekballoons.cz**. Moreover, revisions that introduce important changes are also announced by a Service Bulletin.

In addition with compliying with this Manual a pilot must also comply with national regulations of both the country in which the balloon is registered and in which the balloon is being flown.

1.2 APPLICABILITY

This Manual applies to Balóny Kubíček spol. s.r.o. baloons of BB type and to BB-S of envelope serial number **640** and higher. For BB-S type the respective supplement must be inserted.

1.3 CERTIFICATION BASIS

BB type balloons have been approved by EASA under the Type Certificate No. EASA BA.003.

BB-S type balloons have been approved by the EASA under the Type Certificate EASA.BA.017.

1.4 DEFINITIONS AND ABBREVIATIONS

Throughout this Manual the abbreviation **KB** is used for reffering to the manufacturer Balóny Kubíček spol. s r. o of the balloons described in this Manual.

Throughout this Manual the terms mass and weight are interchangeable and have an identical meaning.

Maximum Take-off Weight (MTOW)

The maximum permissible total weight of the balloon and all its equipment at take-off, including fuel, instruments, passengers and crew.

Reduced Maximum Take-off Weight (RMTOW).

The owner or operator of a specific balloon may, in agreement with Balóny Kubíček spol. s r.o., choose to fly a balloon at a figure lower than the MTOW specified by the balloon manufacturer but within the limitations specified in section 2.10 of this Manual. In this case the MTOW is to be recorded by Balóny Kubíček spol. s r. o. on the second page of this Manual in place of the MTOW. The RMTOW may be changed but the new figure only becomes effective when the figure on page two of this Manual has been altered and the alteration signed by Balóny Kubíček spol. s r.o.

Applicable MTOW.

This figure, entered on page I of this Manual by Balóny Kubíček spol. s r.o., is either the MTOW of the balloon as specified in this Manual or the RMTOW if one has been designated by the owner operator of the balloon. See the paragraph above.

Minimum Landing Weight (MLW).

Is the minimum permissible total weight of the balloon and all its equipment on landing, including fuel, instruments, passengers, crew and instruments.

Surface windspeed

The wind speed 10 m (30 ft) above ground.

The following definitions apply to Warnings, Cautions and Notes used in the Flight Manual:

WARNING:

Means that the non-observation of the corresponding procedure will lead to an immediate or important degradation of flight safety.

CAUTION:

Means that the non-observation of the corresponding procedure will lead to a minor or to a longer term degradation of flight safety.

NOTE:

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

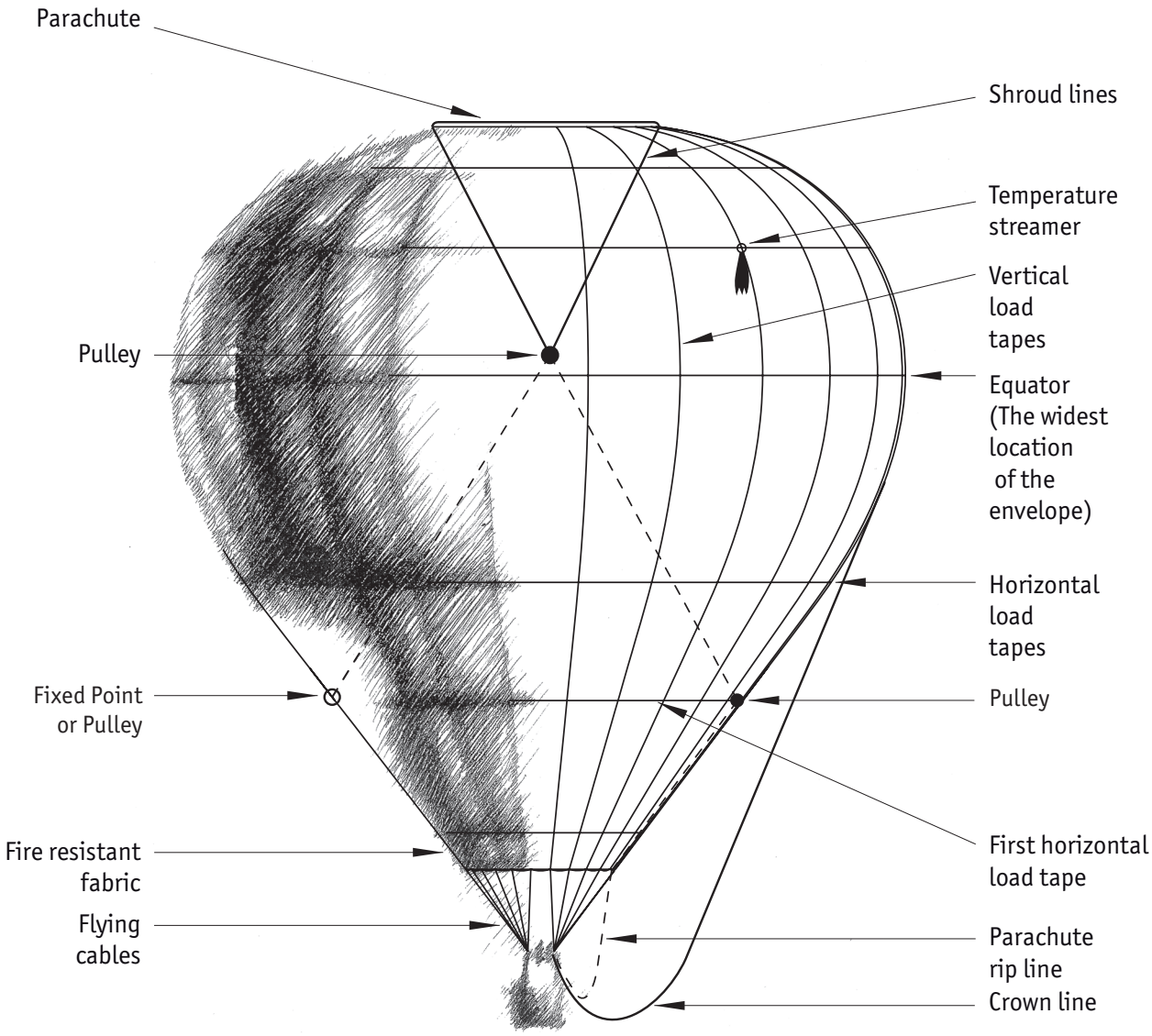
1.5 DESCRIPTIVE DATA

A complete description of a balloon and all its systems is given in section 6 (Ballon and System Description) of this Manual.

1.5.1 Envelopes

Envelopes are of a sewn construction and are made from either polyester or nylon fabric with polyester load bearing tapes.

A detailed list of envelopes is given in section 8 (Equipment List and Appendices) of this Manual.

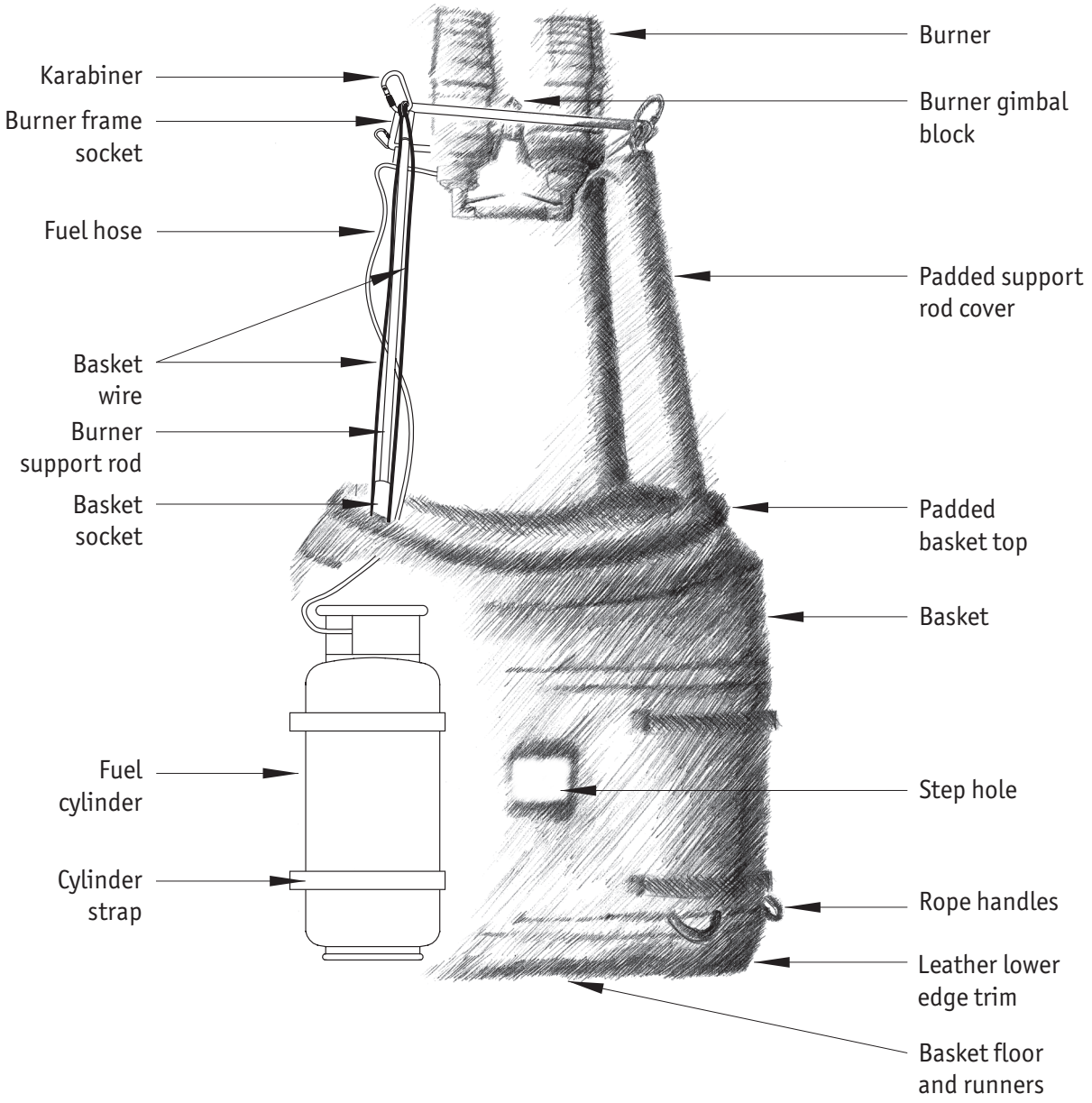


Envelope Description

1.5.2 Baskets

Baskets have solid wooden or composite floors and sides woven from cane. The top edges of the baskets are padded and covered by suede or leather. The weight of the basket and contents is carried by basket wires that run from the burner frame, through the sides of the basket, under the floor of the basket and back to the burner frame.

A detailed list of baskets is given in section 8 (Equipment List and Appendices) of this Manual.



Bottom End Description

1.5.3 Burners

Burners are the power source of a balloon. Fuel is taken from the fuel cylinders through fuel hoses and burnt to heat the air within the balloon envelope.

A detailed list of burners is given in section 8 (Equipment List and Appendices) of this Manual.

1.5.4 Fuel Cylinders

Fuel is stored in liquid form within fuel cylinders that are strapped within the basket. Each cylinder has a contents gauge and a liquid take-off through which fuel is supplied to the burner. In addition Master cylinders have a vapour take-off that supplies fuel to vapour pilot lights if required.

A detailed list of the cylinders that are approved for use in balloons covered by this Manual is given in section 8. (Equipment List and Appendices) of this Manual.

1.6 USE OF OLDER TYPES OF EQUIPMENT

Older types of baskets and burners not listed in this Manual may be used with new balloon envelopes provided the appropriate supplement to this Manual is used.

The weights of the basket and burner must be recorded in the Balloon Weight Record of this Manual (page I) or in the appropriate section of aircraft's log book. The weights of specific baskets and burners may be taken from the log book of the balloon of which they were originally a part or they may be determined by weighing.

The procedures given in sections 3 to 5 of this Manual and its supplements apply to all Kubicek baskets and burners.

The inspection schedule given in section 6 (Ballon and Systems description) of this Manual apply to all Kubicek envelopes, baskets, burners and fuel systems.

INTENTIONALLY LEFT BLANK

SECTION 2 - OPERATIONAL LIMITATIONS

2.1 INTRODUCTION

This section specifies the operational limitations for the balloon and its standard equipment.

2.2 WEATHER LIMITATIONS

Maximum allowed surface wind speed during take-off and landing for:

	All BB balloons except further mentioned	XR models	BB70Z with K32T or K32Y basket
Free flight take-off (with quick release)	**7.5 m/s (14.6 kts)**	**7.5 m/s (14.6 kts)**	**5.5 m/s (10.7 kts)**
Free flight take-off (with quick release) at the reduced fabric strength *	**7.5 m/s (14.6 kts)**	**5.0 m/s (10 kts)**	**5.5 m/s (10.7 kts)**
Tethered operation	**4.0 m/s (7.8 kts)**	**7.5 m/s (14.6 kts)**	**4.0 m/s (7.8 kts)**

*Reduced fabric strength means the grab test carried out according to the Maintenance Manual has proven the fabric strength in the range 10 - 13 kg.

In case the envelope fabric strength is reduced, this is indicated in the balloon logbook and on the Envelope fabric index plate (if applicable).

Balloons must not be flown or tethered if there is thunderstorm or extensive thermic activity, turbulences or another meteorological conditions (e.g. wind shear) that give raise to erratic or gusty wind in the vicinity of flight path.

WARNING:

Flights near cumulonimbus clouds must be rigorously avoided. Near these clouds, which often form thunder-storms, there may be dangerous turbulence and a risk of either the envelope being deflated or of the balloon being carried up to altitudes where oxygen and temperatures are low.

The following issues related to weather needs to be considered, when planning a flight and choosing launch site:

Turbulence / gusty wind — Any wind gust make the balloon much more difficult to operate. Wind gusts should be avoided on launch site especially when operating balloons of volume higher than 7000 m^3

Maximum wind speed — The values in the table above indicate maximum, not the mean wind speed. In case of gusty wind also the gusts must be within the limits given by the table (e.g. for mean speed 5 m/s (10 kts) the gust up to 2,5 m/s (5kts) is allowed, for mean speed 7.5 m/s (15 kts) no gust is allowed). Moreover, gusts above 5.1 m/s (10 kts) above mean speed are to be avoided at all.

TOW — The balloon loaded closely to its MTOW is much easier to operate in wind speed close to the maximum allowed values than the balloon loaded just above the MLW **.** It is highly recommended to load the balloon as much as possible when launching balloon under such conditions.

Pilot experience — The values from the table above express limitations of the balloon, the pilot-in-command must consider lowering of these limitation according to his / her experience and ability. The pilot-in-command should not fly the balllon if surface winds are likely to be significantly stronger than winds in which he / she have previously flown. The experience with particular ballloon size needs also to be considered.

WARNING:

Gusty winds or turbulence on launch site can cause tipping of the basket on the short side. This can cause a serious injury of passengers in the basket. The probability of basket tipping is increased with less loaded balloon.

*During take-off in winds speed **5.0 m/s (10 kts)** and higher the controllability of the balloon is difficult.*

Additional limitations apply when baskets K32T or K40Y fitted with burner frames without the symbol "S/N" before its serial number are used. See the Flight Manual Supplement number B.2102-0BBF.

NOTE:

For limitations for tethered flights see also para 2.17.

2.3 FUEL

The approved fuel is either propane or a propane-butane mix.

Maximum admissible fuel pressure: **12 bar (174 psi)**

When pressurising fuel cylinders with Nitrogen care must be taken not to exceed **12 bar (174 psi)**.

Minimum admissible fuel pressure: **3 bar (44 psi)**

WARNING:

Fuel cylinders must not be heated by a direct flame and should not be left in direct sunshine. Cylinders must not be overfilled because, if the temperature rises, the propane will expand and the increased pressure may cause the pressure relief valve to open and vent gas.

CAUTION:

Care must be taken if the fuel pressure is below 5.5bar (80 psi). At low fuel pressure a balloon will be less responsive particularly at high all up weights.

Be aware that the pressure in cylinders that have been pressurised with nitrogen will reduce as the content of the cylinder reduces. Pilot flame failure may occur when nitrogen used.

At high burner pressures the burner flame will be longer than usual and care must be taken to avoid damage to the parachute lines which could happen if the burner was operated for long periods.

Minimum Fuel Quantity

The minimum fuel quantity required at take-off is one full fuel cylinder per burner unit unless a single burner is fitted when the minimum fuel at take-off is two full fuel cylinders.

2.4 INSTRUMENT MARKING

Instrument markings and color code meaning are tabulated below.

Table of Manometer Indicated Overpressure:

Red Radial Line	Yellow Arc	Green Arc	Yellow Arc	Red Radial Line
Minimum Limit	Caution Range	Normal Operating	Caution Range	Maximum Limit
3 bar (0.3 MPa) (44 psi)	3 - 4 bar (0.3 - 0.4 MPa) (44 - 58 psi)	4 -11 bar (0.4 - 1.1 MPa) (58 - 160 psi)	11 -12 bar (1.1 - 1.2 MPa) (160 - 174 psi)	12 bar (1.2 MPa) (174 psi)

2.5 MINIMUM EQUIPMENT

The following list of equipment must be carried on every flight:

- Altimeter.
- Variometer.
- Envelope temperature indicator. This may be either one that gives a direct reading or one that gives a warning signal (temperature streamer attached with a melting link).
- Two sources of ignition. Matches or ignitor or similar source in addition to ignitors built into the burner.
- Fire extinguisher.
- Heat-resistant cloth.
- Drop line.
- Fuel quantity gauge.

CAUTIONS:

The melting link provides security against envelope over-heating above the permitted limit. There is the A124 melting link, which detaches at temperature of 124°C (255°F).

If the maximum permitted envelope temperature is lower than 124°C (255°F), a thermometer indicating fabric temperature in the top part of the envelope must be used.

In addition it is recommended that the following equipment is carried

- Protective gloves for the pilot.
- A watch.
- First aid kit.

All equipment must be functioning correctly.

2.6 ADMISSIBLE DAMAGE

No damage is permitted to the burner or fuel system, to the load tapes or to any load bearing part of the envelope or basket suspension system.

Any damage to the fabric below the first horizontal load tape above the nomex is permitted. Elsewhere unrepaired tears or damage of the maximum size 5 mm (1/5") are permitted.

Any damage which is outside these limits must be repaired in accordance with the instructions contained in the KB Maintenance Manual.

2.7 CREW

The minimum crew: One pilot suitably qualified to carry out the flight.

The maximum number of occupants: See 2.9 and 2.10 below.

CAUTION:

During a solo flight (min. load) with the balloon of the max take-off weight higher than 1000 kg, the low take-off weight imposes low inner overpressure in the envelope. As a result of the matter, the envelope become inclined to deformations, under worse weather conditions. Considering the balloon under low loads, you have to take into account hard balloon initiation to descent.

2.8 ENVELOPE TEMPERATURE AND LOADING

The temperature within the envelope must not exceed 124°C (255°F) for envelopes made entirely from Polyester above the last horizontal load tape under the equator.

In case any other type of fabric is used the appropriate maximum temperature is indicated on the Envelope fabric index plate located on the tape on the envelope mouth.

The temperature of the envelope must be controlled either by use of an envelope temperature gauge or by loading according to the loading chart in section 5 (Weight).

CAUTION:

If the maximum permitted envelope temperature is lower than 124°C (255°) the thermometer is to be used for monitoring envelope fabric temperature instead of temperatue streamer.

2.9 WEIGHT RANGE

The Take-off Weight (TOW) of the balloon must never exceed the Maximum Take-off Weight (MTOW) shown in table at the end of this article or the Reduced MTOW (RMTOW) shown on the page I of this Manual, whichever is lower.

The owner/operator of a balloon may, by agreement with Balóny Kubíček spol. s r.o., designate a RMTOW for a specific balloon which is lower than the MTOW for this size of balloon. This RMTOW must not be less than 55% of the MTOW shown in following table for this size of balloon or the sum of weight of a complete balloon with a minimum crew and a minimum equipment, whichever is greater.

The MTOW or RMTOW, as appropriate, will be entered in the page I of this Manual.

The RTOW may be revised at any time by agreement with Balóny Kubíček spol. s r.o. Any revision becoming valid when the revised figure is entered on the page I of this Manual and countersigned by Balóny Kubíček spol. s r.o.

CAUTION:

If a balloon is flown very lightly loaded then there will be a relatively low pressure in the envelope and it will distort easily in either light turbulence or when passing through wind shear in the climb or descent.

CAUTION:

If it the envelope temperature has been exceeded (signalled by dropping of the temperature streamer) then a grab test of the envelope fabric is suspected. See KB Maintenance Manual (document no. B.2202, section 3.4) for details.

Envelope Weight Limits:

Envelope Model	Max. Take-off Weight (MTOW)		Min. Landing Weight (MLW)	
	[kg]	[lb]	[kg]	[lb]
BB9, BB9E	295	650	135	297
BB12, BB12E	385	849	180	397
BB16, BB16E	470	1 036	230	507
BB17GP, BB17XR	495	1 090	250	551
BB18E	550	1 211	255	562
BB20, BB20E, BB20ED	630	1 389	280	617
BB20GP, BB20XR	730	1 609	280	617
BB22E, BB22ED	680	1 498	300	661
BB22, BB22D, BB22N, BB22Z	730	1 609	300	661
BB22XR	780	1 720	300	661
BB26E, BB26ED	730	1 609	340	749
BB26, BB26D, BB26N, BB26Z, BB26XR	840	1 852	340	749
BB30E, BB30ED	840	1 852	340	749
BB30D, BB30N, BB30Z, BB30XR	945	2 083	410	904
BB34E, BB34ED	945	2 083	455	1 003
BB34D, BB34Z	1 040	2 291	455	1 003
BB37D, BB37N, BB37Z	1 150	2 535	500	1 102
BB40D, BB40Z	1 310	2 885	580	1 278
BB42D, BB42Z	1 410	3 109	630	1 389
BB45D, BB45N, BB45Z	1 520	3 351	670	1 477
BB51D, BB51Z	1 690	3 726	780	1 720
BB60D, BB60N, BB60Z	1 940	4 277	930	2 050
BB64Z	2 100	4 626	1 000	2 203
BB70D, BB70Z	2 300	5 071	1 060	2 337
BB78Z	2 600	5 727	1 200	2 643
BB85D, BB85Z	2 820	6 217	1 350	2 976
BB92Z	3 000	6 608	1 450	3 194
BB100D, BB100Z	3 200	7 055	1 600	3 527
BB105P	3 500	7 709	1 700	3 744
BB106P	3 500	7 709	1 700	3 744
BB113P	3 600	7 930	1 800	3 965
BB120P	3 700	8 150	1 850	4 075
BB130P	4 200	9 251	1 950	4 295
BB142P	4 500	9 912	2 000	4 405

Check on page I of this Manual that the MTOW has not been reduced by the operator. If a reduction has been made then the weight, shown on the page I of this Manual as Applicable MTOW, must not be exceeded.

2.10 BASKETS

Each occupant within a basket must be provided with reasonable space for comfort during the flight and safety on landing. Details are given in Appendix 2.

Within a compartment there must be at least one hand hold for each passenger.

Smoking in the basket, or within 30 m (100 ft) of the balloon, is prohibited.

The limitations in two tables below apply for baskets of s/n 400 and higher. The appropriate data for baskets up to s/n 399 are stated in the Appendix 4 of this Manual.

Baskets Limitations:

Basket	Minimum floor area		Load capacity		Max. Number of Occupants
	[m^2]	[sq. ft]	[kg]	[lb]	
K7	0.72	7.8	450	991	2
K10	0.99	10.7	600	1 322	3
K11	1.14	12.2	650	1 432	3
K12, K12A	1.35	14.5	700	1 542	4
K13	1.22	13.1	700	1 542	4
K13S	1,20	12,9	550	1 210	3
K15	1.57	16.9	800	1 762	5
K16	1.68	18.1	900	1 982	5
K17	1.68	18.1	900	1 982	5
K18	1.80	19.4	950	2 093	6
K19	1.80	19.4	950	2 093	6
K19L	1.88	20.2	950	2 093	6
K22	2.25	24.2	980	2 159	8
K23	2.25	24.2	980	2 159	6
K25P	2.62	28.2	1 000	2 203	8
K28	3.52	37.9	1 100	2 423	8
K28H	3.76	40.5	1 100	2 423	8
K30PP	3.25	35.0	1 100	2 423	10
K32Y, K32T	3.84	41.3	1 100	2 423	10
K32TT	4.00	43.1	1 100	2 423	10
K40Y, K40T	4.32	46.5	1 200	2 643	12
K50	4.80	51.7	1 400	3 084	14
K50TT	4.80	51.7	1 400	3 084	14
K50TT8	4.80	51.7	1 400	3 084	14
K55X	5.52	59.4	1 400	3 084	16
K58HH	6.08	65.4	1 400	3 084	14
K60	6.08	65.4	1 800	3 965	18
K60X	6.24	67.2	1 800	3 965	18
K70	7.04	75.8	3 000	6 608	22
K80	7.68	82.7	3 400	7 489	26

Basket	Minimum floor area		Load capacity		Max. Number of Occupants
	[m²]	[sq. ft]	[kg]	[lb]	
K85	8.32 (8.80 option)	89.6 (94.7 option)	3 400	7 489	26
K90	8.32 (8.80 option)	89.6 (94.7 option)	3 400	7 489	26
K100	9.76	105.1	4 000	8 811	30
K110	10.56	113.7	4 000	8 811	34

Occupancy of Compartmentalised Baskets:

Basket	Max.Occupancy of Passenger Compartments	Max. Occupancy of Pilot Compartment	Pilot Compartment Floor Area	
			[m²]	[sq. ft]
K25P	6 persons	pilot + 1 person	0.96	10.3
K28	3 persons	pilot + 1 person	1.32 (variant T) 1.12 (variant Y)	14.2 (variant T) 12.1 (variant Y)
K28H	2 persons	pilot + 1 person	1.32	14.2
K30PP	4 persons	pilot + 1 person	0.96	10.3
K32T	4 persons	pilot + 1 person	1.32	14.2
K32Y	4 persons	pilot + 1 person	1.12	12.1
K32TT	2 persons	pilot + 1 person	1.32	14.2
K40T	5 persons	pilot + 1 person	1.32	14.2
K40Y	5 persons	pilot + 1 person	1.12	12.1
K50	6 persons	pilot + 1 person	1.32 (variant T) 1.12 (variant Y)	14.2 (variant T) 12.0 (variant Y)
K50TT	3 persons	pilot + 1 person	1.32	14.2
K50TT8	3 persons	pilot + 1 person	1.32	14.2
K55X	outer comp.: 3 persons middle comp.: 4 persons	pilot + 1 person	1.32	14.2
K58HH	2 persons	pilot + 1 person	1.32	14.2
K60X	4 persons	pilot + 1 person	1.32	14.2
K60	4 persons	pilot + 1 person	1.32	14.2
K70	5 persons	pilot + 1 person		
K80	6 persons	pilot + 1 person		
K85	6 person	pilot + 1 person	1.32 (1.84 option)	14.2 (19.8 option)
K90	outer comp.: 2 persons inner comp.: 4 persons	pilot + 1 person	1.32 (1.84 option)	14.2 (19.8 option)
K100	outer comp.: 3 persons inner comp.: 4 persons	pilot + 1 person	1.84	19.8
K110	4 persons	pilot + 1 person	1.84	19.8

NOTE:

The number of fuel cylinders is to be established according to instructions given in the Appendix 2.

A simplified general practice for passenger compartments is: "one cylinder in - one person out".

2.11 FITMENT INTERCHANGEABILITY

Approved Combinations of BB Envelopes and Baskets:

Envelope model	Basket model															
	K7	K10	K11,K12,K12A	K13, K13S	K15, K16, K17, K18, K19, K19L, K22	K23	K25P, K28, K28H, K30PP	K32T, K32Y	K32TT, K40T, K40Y	K50	50TT	K50TT8, K55X,K58H	K60X	K60, K70	K80	K85, K90, K100, K110
BB9, BB9E		124														
BB12, BB12E		124														
BB16, BB16E		124														
BB17XR		124														
BB17GP		124														
BB18E		124														
BB20, BB20ED, BB20E, BB20GP		124														
BB20XR		124														
BB22, BB22D, BB22ED, BB22E, BB22N, BB22Z BB22XR		124														
BB26, BB26D, BB26ED, BB26E, BB26N, BB26Z BB26XR		124														
BB30D, BB30ED, BB30E, BB30N, BB30Z, BB30XR																
BB34D, BB34ED, BB34E, BB34Z																
BB37D, BB37N, BB37Z							RV	RV								
BB40D, BB40Z							RV	RV								
BB42D, BB42Z							RV	RV								
BB45D, BB45N, BB45Z							RV	RV	RV	RV	RV	RV				
BB51D, BB51Z							RV	RV	RV	RV	RV	RV				
BB60D, BB60N, BB60Z							RV	RV	RV	RV	RV	RV	RV	RV		
BB64Z								RV	RV	RV	RV	RV	RV	RV		
BB70D, BB70Z								RV	RV	RV	RV	RV	RV	RV	RV	

Envelope model	Basket model															
	K7	K10	K11,K12,K12A	K13, K13S	K15, K16, K17, K18, K19, K19L, K22	K23	K25P, K28, K28H, K30PP	K32T, K32Y	K32TT, K40T, K40Y	K50	50TT	K50TT8, K55X,K58H	K60X	K60, K70	K80	K85, K90, K100, K110
BB78Z									RV	Rv	RV	RV	RV	RV	RV	
BB85D, BB85Z									# RV	# RV	‡ RV	RV	RV	RV	RV	
BB92Z												RV	RV	RV	RV	
BB100D, BB100Z												RV	RV	RV	RV	RV
BB105P													RV	RV	RV	RV
BB106P													RV	RV	RV	RV
BB113P													RV	RV	RV	RV
BB120P													RV	RV	RV	RV
BB130P													RV	RV	RV	RV
BB142P													RV	+ RV	+ RV	RV

Explanation:

	= approved combination
124	= K10 baskets of s/n 124 and higher are to be combined with Komet Duo and Ignis - two units burners
RV	= rotation vent must be fitted
#	= only the burner frame with the symbol **S/N** before its serial number may be used
‡	= only the burner frame K50TT may be used
+	= only the burner frame K60 STRONG may be used

NOTE:

A complete list of baskets and eligible burner frames is provided in the Table of Baskets of the section 8.1 Equipment list.

Approved Combinations of BB Envelopes and Burners:

Envelope model	Burner					
	KOMET DUO up to 104	KOMET DUO 105+	KOMET TRIO	IGNIS 2 units	IGNIS 3 units	IGNIS 4 units
BB12, BB12E	■					
BB16, BB16E	■					
BB17GP, BB17XR	■	■		■		
BB18E	■	■		■		
BB20, BB20ED, BB20E, BB20GP, BB20XR	■	■		■		
BB22, BB22D, BB22ED, BB22E, BB22N, BB22Z, BB22XR	■	■		■		
BB26, BB26D, BB26ED, BB26E, BB26N, BB26Z, BB26XR	■	■		■		
BB30D, BB30ED, BB30E, BB30N, BB30Z, BB30XR	■	■		■		
BB34D, BB34ED, BB34E, BB34Z	■	■		■		
BB37D, BB37N, BB37Z	■	■		■		
BB40D, BB40Z	■	■	■	■	■	
BB42D, BB42Z	■	■	■	■	■	
BB45D, BB45N, BB45Z		■	■	■	■	■
BB51D, BB51Z		■	■	■	■	■
BB60D, BB60N, BB60Z			■	■	■	■
BB64Z			■		■	■
BB70D, BB70Z			■		■	■
BB78Z					■	■
BB85D, BB85Z					■	■
BB92Z						■
BB100D, BB100Z						■
BB105P						■
BB106P						■
BB113P						■
BB120P						■
BB130P						■
BB142P						■

Explanation:

■ = approved combination

CAUTION:

Before changing a combination of envelope and basket to another approved combination care need to be taken to dimensions of the burner frame. If the new frame has different dimensions than the original one ask Balóny Kubíček spol. s r.o. to consider eligibility of the lengths of flying wires. For bigger differences the flying wires need to be replaced. Instruction for correct replacement are provided in the Maintenance Manual.

2.12 OTHER MANUFACTURERS EQUIPMENT

Baskets and burners from certain other manufacturer may be combined with Kubicek envelopes. If so, the instructions given in the bulletin BB/22b-1 must be observed.

Moreover, any bulletin or airworthiness directive issued and applicable for the parts used as a replacement for Kubicek part shall be considered mandatory for compliance of the balloon according to the same terms that the bulletin or airworthiness directive is required for compliance of the respective non-Kubicek parts.

2.13 RATE OF CLIMB AND DESCENT

Vertical Speed Limitations

Model	Maximum Rate of Climb		Maximum Rate of Descent	
	[m/s]	[ft/min]	[m/s]	[ft/min]
All BB models except below mentioned	4.0	800	6.5	1 300
BB9, BB9E	4.0	800	5.0	900
BB17GP, BB20GP	6.0	1 200	6.5	1 300
XR models	9.0	1 800	9.0	1 800
XR models at the reduced fabric strength*	5.0	1 000	5.0	1 000

*Reduced fabric strength means the grab test carried out according to the Maintenance Manual has proven the fabric strength in the range 10 - 13 kg.

In case the envelope fabric strength is reduced, this is indicated in the balloon logbook and on the Envelope fabric index plate (if applicable).

2.14 PARACHUTE VALVES

The parachute must be closed:

- During descent with a cool balloon
- Whilst operating the burner
- If, during flight, the mouth of the envelope deforms

2.15 SMART VENT, SLIDE VENT AND LITE VENT

Except in an emergency opening the Smart Vent, Slide Vent or Lite Vent by means of the rip line is prohibited if the underside of the basket is higher than 2 m (6.5 ft) above the ground.

2.16 VELCRO RIP PANELS

Except in an emergency velcro rip panels are not to be opened at a height greater than 2 m (6.5 ft) above the ground.

2.17 TETHERED FLIGHT

Balloons must not be tethered in surface winds greater than **4.0 m/s (7.8 kts)**.

When tethering the balloon Take-off Weight is limited to a maximum of 75% of the normal MTOW (In the case a balloon with a RMTOW, them use either the RMTOW or 75% of the normal MTOW, whichever is the lower).

The maximum height for tethered flight is **30 m** (**100 ft**) between the underside of the basket and the ground.

For baskets K28, K28H, K30PP, K32Y, K32TT, K50TT, K50TT8, K55X, K58H, K60X, K70, K80, K85, K90, K100 and K110 an approved set of tethering components must be used.

WARNING:

The limitations stated above are based on the balloon structure. In every case the pilot must consider his skills, experience and actual condition when making decision about tethered flight.

NOTE:

In some countries tethered flights of the hot-air balloon may be prohibited by a local aviation authority.

2.18 FUEL CYLINDERS

All fuel cylinders must be fitted with an outer water resistant protective layer. The limitations for material and thickness of the protective layer established by cylinder manufacturer must be observed.

No part of any fuel cylinder may overlap the upper edge of the basket.

Each fuel cylinder must be secured to the inside of the basket with at least 2 cylinder straps of an approved design.

WARNING:

Leather straps must not be used!

2.19 OTHER LIMITATIONS

Operational Categories

Balloon flights under Visual Flight Rules (VFR) are permitted only.

For night flying the respective supplement to this Manual must be used.

Flight Level

The balloon without oxygen apparatuses and masks must not be flown at altitudes with ambient air pressure lower than 700 hPa (10 psi). This pressure corresponds to the altitude 3 000 m (10 000 ft) in ISA conditions.

Smoking

Smoking in the balloon and within 30 m (100 ft) is prohibited.

SECTION 3 - EMERGENCY PROCEDURES

3.1 INTRODUCTION

This section provides checklists and procedures for dealing with emergencies. With proper pre-flight planning and properly maintained balloons emergency situations are extremely rare. Should an emergency arise, the guidelines in this section are to be followed.

If an emergency does occur, the pilot must remember that his or her speed of reaction should be appropriate to the prevailing conditions.

3.2 AVOIDANCE OF DANGEROUS OBSTACLES

When confronted with an obstacle at low level the pilot must decide whether or not there is time to climb over the obstacle.

If there is time to climb away then the pilot must make sure that the maximum amount of fuel is passed to the burners. On a single burner open the main blast valve from one fuel supply and the quiet burner from the second fuel supply. On a double, triple or quad burner each burner should use its own fuel supply. Do not use the cross-flow (if one is fitted) and run two or more burners from a single fuel supply if it is possible to use separate fuel supplies.

If the pilot believes that he can not avoid a major obstruction on his flight path then he should take the following action:

Passengers	Adopt the correct landing position using the basket edge away from obstruction. Hold on to the rope handles and keep low in the basket with heads below the basket edge. Prepare for a hard landing.
Venting	Vent so that the balloon will not fly on after contact with the obstruction.
Cylinders	Turn them off and empty the fuel hoses.
Basket	Once the balloon has stopped moving, secure it to the obstruction using the handling/drop line if this is appropriate.
Basket evacuation	Evacuate the basket only when it is safe to do so and on the instruction of the pilot.

When making an emergency landing the parachute, Smart Vent, Slide Vent or Lite Vent may be partially opened at heights below 15 m (50 ft).

3.3 CONTACT WITH ELECTRIC POWER LINES

If the pilot considers that contact with power lines is unavoidable then he should take the following action:

Passengers	Adopt the correct landing position using the basket edge away from the power lines. Hold on to the rope handles and avoid contact with the cylinders and other metal objects, keep low in the basket with heads below the basket edge. Prepare for a hard landing.
Venting	Vent so that it will be the envelope and not the basket or flying wires that hit the power lines.
Cylinders	Turn them off and empty the fuel hoses.
Leaving the basket	Evacuate the basket only when it is safe to do so and on the instruction of the pilot. If the basket is suspended from power wires then stay in the basket and away from the wires until rescue arrives.
Equipment recovery	Stay clear of anything attached to the power lines and do not attempt to remove any equipment until the Electricity authorities have confirmed that it is safe to do so.

3.4 FIRE IN THE AIR

Cylinders	Turn them off and Vent the hoses.
Burner	Turn off the pilot lights.
Fire	Use the fire extinguisher and fire blanket to put out or smother the fire.
Landing	Identify the cause of the fire and decide if it is safe to relight the burner. If it is not safe to do so then the procedure for a heavy landing is to be followed (see section 3.8).
Escape	Prevent anybody from leaving the basket until you are sure that the balloon will not become airborne again.

CAUTION:

The fire extinguisher must always be used in the vertical position. Be aware that it will only last for a few seconds.

If a dry powder extinguishing is used to fight the fire then all traces of the powder must be removed as soon as possible after landing because the powder, when exposed to the air, is extremely corrosive.

3.5 FIRE ON THE GROUND

Cylinders	Turn them off.
Basket area	Clear the area of everyone not involved in fighting the fire.
Fire	Put out the fire using the fire extinguisher or fire blanket.
Escape	If the balloon was inflated then the pilot must pull the rip line so that the balloon does not become airborne while the passengers exit. The pilot should exit the basket last, with the rip line in his hand, so that the balloon does not become airborne.

WARNING:

If it is not possible to extinguish the fire immediately then evacuate everyone to a safe distance as soon as possible because the cylinders may explode.

CAUTION:

The fire extinguisher must always be used in the vertical position and it will only last for a few seconds.

If a dry powder extinguishing is used to fight the fire then all traces of the powder must be removed as soon as possible because, when exposed to the air, the powder is extremely corrosive.

3.6 DAMAGE TO THE ENVELOPE IN FLIGHT

Burner	Heat to replace lost lift whilst establishing and maintaining a steady rate of descent.
Altitude	Remain at a low level and land as soon as possible.
Take care	Do not burn if the air loss is so great that the mouth has closed because damage to the suspension tapes could cause a catastrophic failure.
Uncontrolled descent	If the rate of descent can not be controlled then consider jettisoning all disposable items, including non essential fuel cylinders, if it possible to do so without endangering people or property on the ground.
Hard landing	If the balloon is descending fast then brief the passengers for a hard landing as described in para 3.8

3.7 ACCIDENTAL OPERATION OF THE SMART VENT, SLIDE VENT OR LITE VENT IN FLIGHT

If the red line is accidentally operated in flight then the Vent will start to operate. The Vent must be closed at once by pulling on the Vent line in the case of a Smart Vent od Slide Vent and the resetting line in the case of a Lite Vent.

WARNING:

The Vent panel will not automatically re-close on release of the red line.

3.8 NON-STANDARD LANDINGS

3.8.1 Hard Landing.

A landing with a descent speed of 4 m/s (800 ft/min) or greater.

Passengers	Brief them to adopt the correct landing position, holding on to the rope handles, face into the basket with their legs only slightly bent and brace against vertical compression. Stow away all loose items. Be prepared for a hard landing.
Basket	By means of the rotation vent (if fitted) turn the balloon so that it lands on the longer side of the basket.
Retrieve crew	Warn them that you are making a hard landing.
Cylinders	Turn them off and Vent the fuel hoses before touching the ground.
Red line	Have it in your hand and open the deflation fully close to the ground.

3.8.2 Fast Landing.

A landning in the wind speed is higher than 7.5 m/s (14.5 kts).

Passengers	Stow loose objects. Adopt the correct landing position. Holding on to the rope handles and face away from the direction of travel. Adopt a low position with legs well bent and backs and shoulders pressed against the leading edge of the basket. Heads should be level with the basket edge. Be prepared for a hard landing with the basket tipping over and travelling along the ground at speed. Do not leave the basket until it comes to a stop and on the instruction of the pilot only.
Basket	By means of the rotation vent (if fitted) turn the balloon so that it lands on the longer side of the basket.
Field	Select a large landing field, or an area with an upslope, without powerlines on the overshoot.
Retrieve crew	Warn them that you are making a fast landing.
Descent	Gentle.
Cylinders	Turn them off and Vent the fuel hoses before touching the ground.
Red line	Open the deflation system completely close to the ground.

3.8.3 Deflation System Malfunction In a Strong Wind

Passengers	Brief them to adopt the correct landing position as detailed in Fast Landing above. Stow away all loose items. Be prepared for a long drag landing. The passengers may not leave the basket until it comes to a stop.
Basket	By means of the rotation vent (if fitted) turn the balloon so that it lands on the longer side of the basket.
Retrieve crew	Warn them that you are landing and that the deflation system has malfunctioned.
Descent	Gentle, using both rotation vents together (if fitted) to dump air.
Field	Select a large landing field, or an area with an upslope, without powerlines on the overshoot.
Cylinders	Turn them off and Vent the fuel hoses before touching the ground.
Venting	Keep trying to operate the deflation system during the drag landing and open both the rotation Vents.

3.9 OVER–HEATING OF THE ENVELOPE – TEMPERATURE STREAMER DROPS DURING FLIGHT

Burner	Stop burning and then continue using short burns.
Descent	Descend to the minimum practical altitude and keep to low rates of climb and descents.
Landing	Land on a suitable landing field.

CAUTION:

Grab test the fabric if envelope overheating is suspected. For details see the KB Maintenance Manual.

3.10 BURNER FAILURE

Burner	If a burner will not work then check the fuel quantity and pressure, hose connections and the cylinder valve. If one burner malfunctions then transfer to another burner or, in the case of a single burner, transfer to the other fuel supply.
Cylinder	Turn off the cylinder valve, Vent the fuel hose and use the other burner.
Landing	Land as soon as possible

Fuel system freezing

If a fuel hose, regulator or blast valve shows signs of freezing then the most probably cause is a restriction in the fuel supply. Check that all valves that relate to the frozen area are either fully open or fully closed as appropriate and that hose connections are fully tightened. Only when this has been done, and if the problem has not been cured, should you take the following action:

Burner	Transfer control to the other burner.
Cylinder	Vent the affected fuel hose. Connect to a fresh full fuel cylinder.

3.11 PILOT LIGHT FAILURE

Check the fuel quantity, hose connections and cylinder valve. Transfer to another functioning burner, descend and land on a suitable field. If all the pilot lights have failed it is not possible to relight a pilot light with ignitor or matches then:

Burner	Crack the burner blast valve open a small amount.
Matches	Light the main jets of the burner with a match or hand held igniter.
Burner	Control the size of the burner flame by opening and closing the blast valve. In order to maintain a small flame never close the valve completely.
Landing	Land on a suitable landing field.

NOTES:

The main causes of the pilot light failures are: lack of fuel, low gas pressure at the regulator, blocked jets and loose hose connections.

Tipping the burner to one side (away from the scoop) may make it easier to reach the main jets with an igniter.

3.12 IMPOSSIBILITY TO TURN OFF THE MAIN BLAST VALVE

Valve lever	Push the lever from the lower side. If it remains blocked proceed as follws:
Cylinder	turn off the fuel supple valve.
Heating	Use another burner unit for heating or control heating by the cylinder valve
Landing	Land as soon as possible.

INTENTIONALLY LEFT BLANK

SECTION 4 - NORMAL PROCEDURES

4.1 INTRODUCTION

This section provides checklists and amplified procedures for normal operation.

The procedures in paragraphs 4.3 to 4.7 inclusive are for a balloon fitted with a parachute or Paralite. If the balloon is fitted with a Smart Vent, Slide Vent, Lite Vent or a Rip Panel then these paragraphs must be read in conjunction with the appropriate paragraph for the deflation system fitted to the balloon. Smart Vent, Slide Vent Lite Vent and Rip Panels are described in paragraphs 4.8 to 4.10.

4.2 FLIGHT PLANNING AND WEATHER

Before starting to prepare the balloon for flying the pilot must calculate the balloons loading and check the suitability of the actual and forecast weather for the flying area.

In addition to the weather limitations given in section 2.2 it must be remembered that balloons should not be flown in thermic conditions, in an area where thunderstorms are active or forecast or in severe weather of any sort.

When looking at a weather forecast pay particular attention to warnings of Sea Breezes. Sea Breezes are most likely in the afternoons and they can arrive suddenly and dramatically change both the wind direction and its speed.

When considering a particular flying area make sure that the wind direction from the site and the amount of fuel onboard will allow the balloon to be landed clear of natural and man made obstructions and away from restricted airspace.

CAUTION:

Pay particular attention when intenging to take-off an envelope of bigger size with only a minimum allowed fuel on board, which allowes for only a short flight.

The pilot must make a final assessment of the weather before take-off. During flight the pilot must be constantly on the look out for changes in the weather, wind direction and speed.

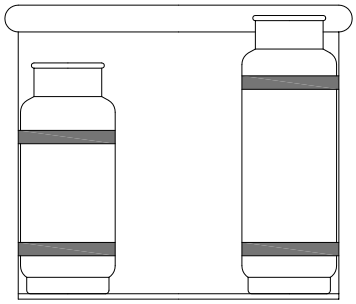
4.3 PREPARATION AND ASSEMBLING THE BALLOON

4.3.1 Launch Site

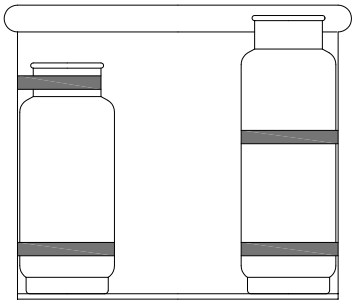
A launch site should be chosen that will, in the prevailing weather conditions, allow the balloon to be flown safely for the required amount of time. The site should be clear of obstructions on its downwind side and have a clear, ideally grassed, area large enough to lay the balloon out safely. In addition there should be no obstructions that could damage the balloon during inflation or if it moved around on the ground before taking off.

4.3.2 Assembling the Balloon

Place the basket on the upwind side of the launch field. Attach fuel cylinders to the basket walls with the straps passing through lugs in the basket wall and tighten well. The position of the upper strap is to be appropriate to the cylinder height as shown in the picture below - the strap is must encircle the cylinder body in its upper part, not its middle part or the fiting protection cover. Place one burner support rod into each of the four sockets in the top frame of the basket. Lift the burner up so that it rests onto the top of these support rods. Where a burner frame with an adjustable height mechanism is used the burner frame must be fitted so that the gas strut is on the underside of the burner during inflation to prevent overheating of the mechanism. Attach the basket suspension wires to the burner frame using the karabiners; close the screw gates on the karabiners. The correct attachment is shown on the illustration.

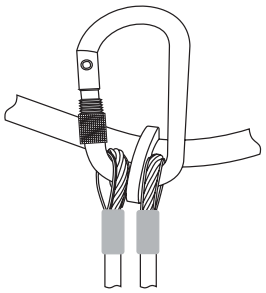


CORRECT



WRONG

Arrangement of Fuel Cylinder Straps



Basket Suspension Wires Attachment

Zip the rod covers over the basket wires, the burner support rods and the fuel hoses. Ensure that the hoses have sufficient slack at the top to allow the burner to gimbal.

Fuel hoses may never be bent sharply, the smallest bend radius allowed is 90 mm (3 1/2“). A template is provided in Appendix 5.

Connect the fuel to hoses to the cylinders that are to be used last and make a functional check of the burner. After that, verify that the fuel is correctly supplied to the burner from all fuel cylinders, that there is no leak in the system and make sure the fuel pressure is within limits. When a reconnection of fuel hoses is necessary, shut off the liquid valves on the cylinder and burn the remainder of the fuel from the hose by opening the main burner. Then switch off all pilot flames. The fuel cylinders intended to be used first should be checked as the last and remain connected and not vented.

WARNING:

Make sure that there is no flame at the burner when reconnecting the fuel hoses!

CAUTION:

Never vent unburned fuel from the hoses when reconnecting them!

NOTE:

The use of fuel T-manifolds is advisable because it eliminates reconnections of the fuel hoses.

If the burner has vapour pilot lights then the liquid hoses should be connected to master cylinders. Use these master cylinders a first and reconnect the liquid phase when 15% of the content remains to maintain vapour pressure for the pilot lights.

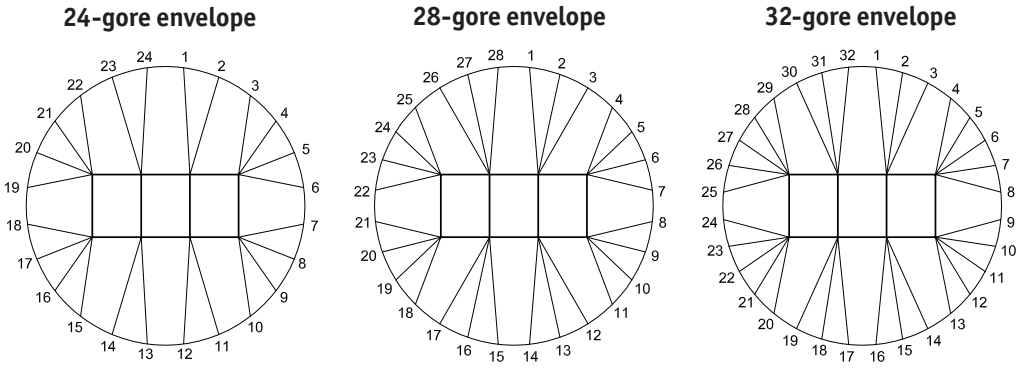
Instruments and accessories can then be fixed to the rod covers or inside the basket.

Lay the basket on its side with the burners pointing downwind with the red covered basket wires on the lower right corner.

Open the envelope bag and attach the flying cable karabiners to the basket karabiners. The envelope should be attached so that the envelope identification plate is on the upper side of the envelope and central to the basket. When 4 -point burner frame is used the envelope flying cables are to be distributed evenly among the attachment points. When 8-points burner frame is used the enelope flying wires are to be distributed as shown on the illustration below. The karabiner on the red flying cables attaches to the karabiner on the red basket wires. Check that the flying cables are not twisted and then close the screw gates on the karabiners.

Pull the envelope from its carrying bag and spread it out either directly onto the ground or onto a pre-positioned ground sheet. Fully deploy the crown line downwind and close the parachute. Spread the mouth of the envelope and attach the scoop and parachute lines to the burner frame. When using the electronic thermometer attach its sensor correctly onto the envelope, pay attention to confuse the temperature sensor wire and the antenna.

Attach a quick release to the upwind envelope karabiners and the secure the other end of the restraint rope to a secure anchor point.



Flying Wires Attachment - Pilot's View

Position the fan near to the left side of the basket. Make sure that someone stays with the fan whenever it is turned on.

NOTE:

If the wind speed is strong (more than 3.2 m/s [6 kts]), it is recommended that you use a launch site that gives protection from the wind.

WARNING:

All cylinders and heavy objects should be secured in the basket by cylinder straps so that they will not move around and cause injury to the basket occupants during the landing.

Attaching objects (except fabric banners, radio aerials and the envelope bag) on the outside of the basket is prohibited.

4.3.3 Pre-Inflation Checks

Inspect the following:

Paperwork	Check the validity of CoA, insurance and any other documentation (if required).
Basket	Assembly of the basket wires and the flying cables to the burner frame. Inspect the basket floor and basket walls for condition. Make sure that everything is assembled correctly and that the burner gimbals. Check that all necesary documentation is stowed in the basket
Cylinders	Cylinder correctly strapped into the basket. The hoses attached and the connectors properly tightened.
Equipment, Instruments and accessories	Installation and function of altimeter, variometer and envelope temperature indicator. Two sources of ignition, fire extinguisher, drop line and Nomex heat-resistant cloth all correctly stowed.
Burners	Whilst the basket was upright you will have checked the burner fully. Check now that all the burner valves are turned off and that the hoses are correctly attached to the cylinders that you intend to use first.
Adjustable heigth burner frame (if fitted)	Lock the burner in the lowest position.
Envelope	Ensure that the flying cables are connected correctly and that they are not twisted, crossed or kinked. Karabiners closed and gates screwed shut.

Kevlar flying wires (if fitted)	Check all the wires along their whole length. The yellow core must not be exposed, the wire must be flexible and free of mechanical damege. Incovenient wires must be repleced, instructions are given in the Appendix 2 of this Manual.
Parachute line and rotation Vents lines	Undamaged and secured to the burner frame.
Envelope mouth	Lower load tapes and the flying cables undamaged.
Envelope fabric and load tapes	Undamaged.
Crown ring	Crown ring and attachment tapes undamaged and the crown line properly attached and undamaged.
Quick release and restraint line	Quick release correctly attached to the envelope karabiners or burner frame lugs if fitted. Restraint line attached to an anchor point.

4.3.4 Deciding Whether to Fly

Weather	Do not fly in thermals, turbulence or in strong wind.
Launch site	No downwind obstacles.
Weight	The balloon is within its maximum Take-off Weight.
Fuel	The minimum fuel quantity required at take-off is one full fuel cylinders per burner unit unless a single burner is fitted when the minimum fuel at take-off is two full fuel cylinders.

CAUTION:

NO FLIGHT IS PERMITTED if there is a suspicion that the surface wind speed during the flight will exceed limitations for safe landing (see 2.2). Never attempt a balloon flight when there is thunderstorm activity in the area, ahead of approaching frontal systems, or near severe weather of any kind (turbulence, thermic or wave currents etc.).

4.4 BRIEFINGS AND INFLATION

The crew must be fully briefed before the inflation is started. Passengers must be briefed on how to behave around the balloon and how to enter the basket before the inflation is started. They may be briefed on the flight and on landing procedures either before the inflation or once they are in the basket with the balloon inflated.

4.4.1 Crew Briefing

CAUTION:

The most important instruction for all members of the crew is to let go immediately if there is any risk of them being lifted off the ground.

Mouth Crew Briefing

Crew who are anywhere near the burner flame should be wearing clothing made from natural fibre or heat resistant fabrics. Arms and legs should be covered to protect against the heat and they must wear fire-resistant gloves.

One crew person should be instructed on how to use the inflation fan. To direct the airflow into the mouth of the balloon parallel to the burner flame. When given the agreed signal by the pilot he should turn the fan off and move it

clear of the basket.

Two crew members will be required to hold the mouth of the envelope open and as circular as possible with the flying cables taut and clear of the burner flame. As the envelope fills with air they must take care to keep their feet and legs outside the flying cables so that they are not tripped or lifted off the ground. Once the envelope is suitably cold inflated and the pilot has made his internal inspection of the envelope the balloon will be hot inflated using the burner. If there is little wind then the pilot may ask the mouth crew to step away at this stage. If there is a breeze on the launch site then the crew may be asked to continue to hold the mouth of the envelope open. In either case these crew will be asked, as the balloon comes upright, to hold onto the top edge of the basket and use their weight to hold the basket on the ground.

Crown Crew Briefing

The crown crew should wear gloves and suitable footwear. It is important for the pilot to know how much weight is being applied to the crown. The crown crew must never accept help from extra people. The crown crew must always stay at the end of the crown rope and, as soon as the hot inflation starts, resist being pulled in by the lifting envelope. They must never wrap the crown rope around their waist or arm and they must inform the pilot if they see anything unusual about the top of the balloon.

The crown crew's task is to prevent the envelope swinging from side to side and prevent it rising before it is buoyant. It is not possible to fight against the wind so, if the wind direction changes slightly the crown crew should move sideways so that they are always downwind of the basket.

As the balloon is hot inflated the crown crew should allow themselves to be pulled in towards the basket whilst resisting as much as is practical without loosing their footing.

It is particularly important that, as the balloon comes upright, the crown crew continue to pull hard on the crown rope. This will prevent the momentum of the envelope swinging it over the basket towards the tether point. With the balloon upright the crown crew should stay holding the rope downwind of the basket until the pilot signals for them to bring the rope in and clip it to the burner frame or basket.

Additional Crew

Any additional crew should be briefed to hold the basket down as it comes upright.

4.4.2 Passenger Briefing

WARNING:

There is a risk of personal injury if an unexperienced person (e.g. passenger) is asked to help with the balloon handling before TakeOFF or after landing. If you do so always provide to such person detailed instruction which includes means of minimizing of the associated risks

Passengers may be briefed in the basket whilst it is upright before the envelope is connected or they may be briefed in the basket when the envelope is inflated and before the balloon takes off.

Passengers In Open Baskets

Passengers must	At all times listen to the pilot and obey his instructions.
	Before landing:
	Stow all loose items such as cameras.
	On landing:
	Stand sideways to the direction of travel.
	Hold on to rope handles to maintain this position.

Stand with legs together and with their knees slightly bent.

Keep feet flat on the basket floor.

Keep hands and arms within the basket.

Watch the progress of the landing and brace for the touch-down.

Be aware that the basket may, on landing, tip over and drag along the ground.

Remain in the basket until instructed to leave by the pilot.

Passengers must not

Hold onto the fuel hoses or touch the control lines or burner controls.

Use a mobile telephone in flight.

Smoke in the balloon or within 50 m (164 ft) of the basket.

On landing:

Wrap their arms around the burner support rods.

Leave the basket before instructed to do so by the pilot.

Passengers In Partitioned Baskets

Passengers must

At all times listen to the pilot and obey his instructions.

Before landing:

Stow all loose items such as cameras.

On landing:

Face away from the direction of travel.

Hold on with both hands to the rope handles in front of them.

Stand with legs together and with knees slightly bent and push backwards against the leading edge of the passenger compartment with their heads level with the top padding of the basket.

Keep their feet flat on the basket floor.

Keep their hands and arms within the basket.

If they have long hair make sure that their hair is tucked inside their jacket or sweater so that it can not be swept under the rim of the basket.

Be aware that the basket may, on landing, tip over and drag along the ground.

Remain in the basket until instructed to leave by the pilot.

Passengers must not

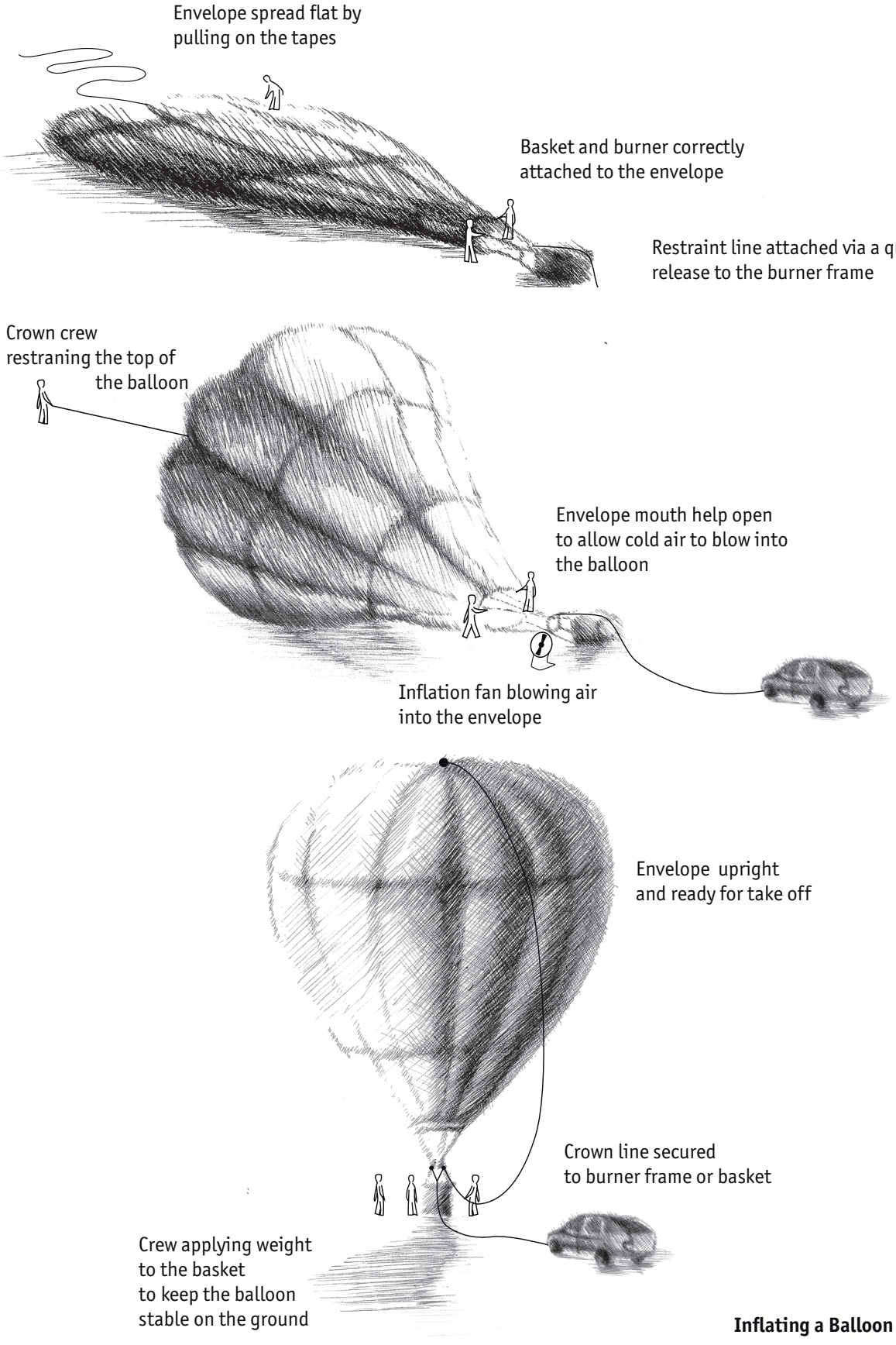
Hold onto the fuel hoses or touch the control ropes or burner controls.

Smoke in the balloon or within 50 m (160 ft) of the basket.

On landing:

Wrap their arms around the burner support rods.

Leave the basket before instructed to do so by the pilot.



Inflating a Balloon

4.4.3 Cold Inflation

With the crew in position, start the inflation fan and blow air into the mouth of the envelope to free the parachute and operating lines and inflate the envelope. Secure the operating lines to the burner frame and lay them out to one side of the burner flame with any spare line, untangled, inside the mouth of the envelope.

Secure the parachute in place by attaching correctly the numbered velcro tabs on the parachute to the ones on the main body of the envelope.

Run the fan at a high setting until the envelope is fully cold inflated.

Pilot's checks once the envelope is fully cold inflated.

Fabric	Envelope fabric free from damage, holes or tears above the first horizontal load tape.
Parachute	Velcro tabs secured (parachute sealed) and rip-locks (if fitted) secured.Parachute and rotation Vent lines . Lines undamaged and without twists or tangles. Pulleys undamaged.
Equipment	Temperature streamer attached, via the melting link, to the envelope. Thermometer wire (if fitted) undamaged and correctly routed.

CAUTION:

The weight of fuel in the fuel cylinders may be confirmed either by weighing the cylinders and deducting the tare weight or by filling the cylinder using the maxfill bleed valve.

The temperature sensor must be placed in the same distance from the envelope skin as the melting streamer.

In windspeeds 5.0 m/s (10 kts) and higher the controllability of the balloon is difficult. It is recommended to use two inflation fans and sufficient number of crew members for envelopes of 7000 m^3 and bigger.

4.4.4 Hot Inflation

Crew	Briefed, in place and ready for the hot inflation.
Restraint	Balloon securely restrained.
Inflation fan	Fan running and the envelope cold inflated.
Heating	Short bursts of heat from the burner into the envelope.
As the envelope starts to lift	Move the basket into the vertical position as the crown crew move in towards the basket, but stop a distance away to prevent the envelope leaning back over the basket. Switch off the fan and remove it to a safe distance. With the basket upright extra crew put their weight on the basket to prevent it lifting.
Getting ready for take-off	Check that all the instruments and radios are in the basket. Load the passengers. Ask the crown crew to bring the crown rope in and secure it to the burner frame. Heat the balloon up carefully.

4.5 TAKE-OFF

Pre take-off checks

Parachute	Parachute velcro tabs separated by pulling on the parachute rip line (red). Parachute rip line attached to the burner frame and within the pilots reach.
Fabric	No fabric damage above the first horizontal tape.
Flying cables	Undamaged and not twisted.

Karabiners	Closed and locked.
Burners	All burners working correctly.
Pilot flames (KOMET s/n 105+)	Correct function of the pilot burner - flame only around the upper part, not blowing from the lower holes
Fuel system	Hoses connected, cylinder turned on as required. No leaks.
Radios and instruments	Altimeter set correctly. Instruments turned on. Thermometer working. Radio checked.
Maps	To hand.
Ignition sources	Within easy reach.
People	Passengers briefed and in the basket. Ground crew have the retrieve vehicle keys. Retrieve telephone number established. Non-briefed people are a safe distance away from the basket.
Balance	The balloon is in equilibrium and steady on the ground.
Ground crew	Clear of the basket.
Basket area	Area around the basket clear of equipment and people.
Airspace	Area around and above the balloon clear of other balloons and aircraft.
Heat	Heat the balloon until the basket lifts clear of the ground.
Quick release	Pin removed and then release.
Basket check	No person or object attached to the outside of the basket.
Climb	Climb to avoid downwind obtructions and to establish the balloon in free flight.
Time	Record the take-off time.

WARNING:

NO FLIGHT IS PERMITTED if there is a leak in the fuel system or a pilot flame malfunction!

CAUTION:

During taking-off the pilot must remember to climb at a rate appropriate to the prevailing wind speed and direction to ensure safe over-flight of downwind obstructions.

NOTE:

If, in windy conditions, you chose to inflate the balloon in the shelter of trees upwind then make sure that the shelter will protect the whole height of the inflated balloon.

- *In windy conditions it is particularly important to make sure that the balloon is securely restrained.*
- *If inflating in shelter, in windy conditions, be aware that as the balloon flies clear of the shelter the envelope may distort and lose lift that will have to be replaced by burning at once.*
- *If inflating in shelter, in even light winds, be aware that the balloon may, on lift off, suffer from 'false lift' that will be lost as the balloon accelerates to the prevailing wind speed. As 'false lift' decreases so it will have to be replaced by extra burning. 'False lift' is the lift generated by the wind blowing over the top of the balloon whilst it is stationary.*
- *Never use crew leaning on the basket to built up excess lift before leaving the ground.*

4.5.1 Quick Release

Standard Quick Release (baskets up to K25P)

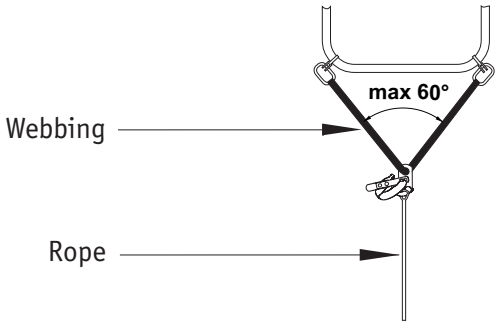
On these quick releases the webbing yoke should be attached to either to the envelope karabiners or the attachment lugs (if fitted) on the upwind side of the burner frame. During inflation a loop at the end of a short restraint line is fitted into the jaw of the quick release which is locked by a securing pin. The other end of this restraint line is fixed to an anchor point either on the ground or on the front of a heavy vehicle.

Y-type Quick Release (for use on balloons with 4-pole baskets)

On these quick releases the quick release is secured to the attachment lug closest to the pilot's compartment. A rope is connected to the second securing lug on the upwind side of the burner frame. This rope then passes through a ring at the end of the restraint line and is secured into the jaw of the quick release in the way described for a standard quick release. The other end of this restraint rope is fixed to an anchor point either on the ground or on the front of a heavy vehicle.

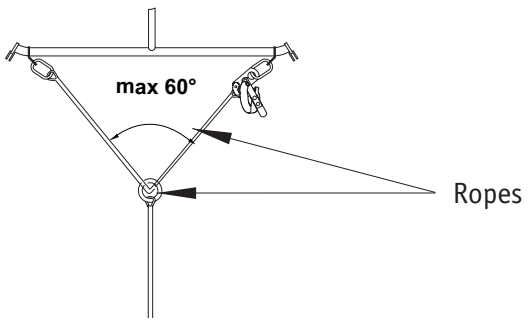
Standard Quick Release

(Burner Frames up to K25P)



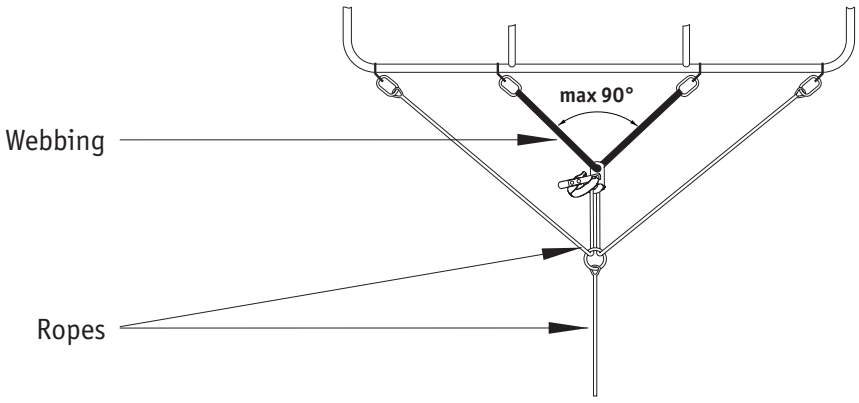
Y-type Quick Release

(Burner Frames K32T, K32TT, K50, K50TT type)



W-type Quick Release

(8 Poles Baskets)



Quick Releases

W-type Quick Release (for use on balloons with 8-pole baskets)

On baskets with 8 poles and a central pilot compartment a W type quick release may be used. A standard quick release is rigged using the method described it the paragraph above so that it is central to the pilot's compartment. A rope of the correct length is then attached to the outer two attachment lugs on the upwind side of the burner frame. This rope is then passed through the ring at the end of the restraint line and is secured into the jaw of the quick release in the way described for a standard quick release. The other end of this restraint rope is fixed to an anchor point either on the ground or on the front of a heavy vehicle.

When take-off is imminent the securing pin is removed arming the quick release. The final release is performed by the pilot who holds the release by the handle and, whilst resisting any motion of the release towards the basket, pulls sharply on the handle. The restraint rope will fall free of the handle and the balloon will be released.

WARNING:

The maximum angle between webing arms is limited to 60 or 90 degrees for preventing overstressing of the burner frame.

For 60 degrees the lengths of the webbing arms are to be at least the same as the distance between their attachment points - envelope karabiners or attachment lugs.

For verifying the 90 degrees the pilot can use any suitable rectangular object e.g. map folder, flight log etc.

The fixed point for attaching the quick release rope must be able to carry the following load:

- *in kg: MTOW of the respective balloon + 800 kg*
- *in lb: MTOW of the respective balloon + 1760 lb*

NOTES:

The quick release is best activated when the load on it is light to reduce the possibility of the release striking someone in the basket.

Take care when releasing a quick release under tension not to let the quick release strike someone in the basket and warn the crew to stand well clear so that they are not struck by the released rope.

4.6 IN-FLIGHT CHECKS

After Take-Off Checks

Quick release	Remove it and stow in the basket.
Fuel	Manage the fuel so that there are always cylinders with gas in connected to each burner. When using the last two cylinders use them at the same rate so that there is always fuel available to each burner. Land with a minimum of 20 % fuel in each of the last two cylinders.
Envelope	Mouth open, parachute closed, no envelope deformation. Temperature streamer in place.
Location	Mark your position on the map every 15 minutes.

The buoyancy of the balloon is controlled by use of the burner. In the hands of a skilled pilot a balloon can be flown very accurately and its height controlled precisely. At all times there should be fuel available to each of the balloon's burners.

When flying near livestock the pilot can consider using of the whisper burner which provides a quiter and less powerfull flame. The whisper burner should not be run continuously with the valve partially open as this may result to droplets of propane being produced at the nozzle. This liquid fuel may then collect in the burner can and present a fire risk. A long heating with whisper burner should also be avoided since it creates a risk of envelope mouth overheating.

Changing Fuel Cylinders in Flight

Altitude	Make sure that the balloon is clear of obstructions and establish a gentle climb before changing cylinders.
Preparation	Maintain a climb using a burner connected to a second fuel supply. Close the liquid valve on the empty cylinder. Open the burner blast valve to burn off the fuel from the liquid hose. Close the burner blast valve when the hose is empty.
Change cylinders	Disconnect the liquid hose from the spent cylinder and transfer it to a full cylinder. Open the liquid valve on the new cylinder and read the fuel pressure Check that there are no leaks.
Test	Test the reconnected burner. Make a note of the time that you changed cylinders.

Regular Checks Whilst Flying

It is essential that the pilot is at all times aware of where he is, the condition of the balloon and its passengers and the balloon's location.

Every 15 minutes the pilot should make the following checks:

Location	Mark the position of the balloon on a local area map and make sure that you can continue in flight for the required amount of time.
	Confirm that it is safe to continue flying at this height.
Fuel	Check the contents of the fuel cylinders connected to the burners and confirm how long the balloon can fly for.
Instruments	Check that the instruments are all functioning correctly.
Passengers	Confirm that your passengers are comfortable with the flight.
Retrieve	Consider calling your retrieve to confirm your plans for the next period of the flight.

Use of Fuel Cylinder Manifolds

Cylinder manifolds may be used to connect two or more fuel clyinders to a burner. However manifolds must not be used to connect two or more burners together. If a manifold is used then every fuel cylinder connection on the manifold must be connected to a cylinder.

When manifolded together only one fuel cylinder may be opened and in use at any one time. When changing from one cylinder on the manifold to another the connection of the open cylinder must be fully closed before another is opened.

WARNING:

Only manifolds supplied by Kubicek Balloons or another EASA approved balloon manufacturer may be used.

4.7 LANDING

The landing is the most critical part of every flight and it is important that the balloon is landed safely in an area where access is as easy as possible. It is particularly important that the approach is made in such a way as to reduce any possible disturbance to people or animals in the approach path.

Approach Checks:

Information	Inform the retrieve crew that you may be landing or that you are only making a practice

	approach.
Brief passengers	Rebrief the passengers for landing.
Basket	Use the rotation Vent (if fitted) to turn the balloon so that the basket will land on one of its longer side with the scoop down.
Burners	Check that all burners functioning correctly that they are connected to cylinders with fuel in.
Landing field	Select a field that is downwind and large enough for the prevailing wind conditions. The field should not have power lines in it nor any downwind obstructions.
Rip line	Check that the rip line and the rotation Vent lines (if fitted) are to hand.
Descent	Establish a descent into the selected landing field.

Landing checks:

Descend	Descend until 1 m above the ground.
Fuel	If practical turn off the pilot lights and cylinder valves.
Passengers	Make sure that the passengers have adopted the correct landing position.
Vent	Open the parachute and hold it open until the balloon has come to rest.
Burners and pilot lights	Burners turned off. Pilot lights extinguished. Cylinders turned off. Fuel hoses vented.
Passengers	Instruct the passengers to leave the basket.

NOTE:

If the balloon remains upright after landing then, if possible, cool the burner coils by passing a small amount of liquid fuel through the burner. This will reduce the possibility of damage if the envelope falls onto the burners.

Action After Landing:

Cylinders	All cylinder valves turned off.
Burner	Pilot lights extinguished. Fuel hoses vented. Burner valves all off.
Envelope	Deflated. Empty the envelope by folding it into a long ‚sausage' and then expel the remaining air by squeezing the envelope progressively from the mouth to the crown ring. Fold it into the bag, crown first.
Retrieve crew	Informed.
Paperwork	Enter the flight into both the aircraft log book and the pilots personal log book.

4.8 SMART VENT AND SLIDE VENT

Preparation of the Envelope

Attach the rip line (red) to the burner frame and the vent line (red and white) to the vent bag in the pilot compartment. Lay out the envelope in the normal way and tab the parachute velcros together.

Pre Take-Off Checks

Parachute venting check	Release the velcro tabs by pulling on the vent line (red and white), verify the vent opens and closes correctly.
Smart Vent / Slide Vent check	Pull on the rip line (red), open the Smart Vent / Slide Vent partially, close by the vent line (red and white).

Operating lines check	Verify the vent line (red and white) is stowed freely in the basket, preferably in the vent bag.

Landing and Final Deflation

Landing	Pull the rip line (red) as required before touchdown.
Final deflation	Pull the rip line (red) fully open.

NOTE:

The balloon with a Smart Vent or Slide Vent may be landed and packed away using just the vent line (red and white) but response times will be greater and it will take longer to vent the air from the envelope.

4.9 LITE VENT

Preparation of the Envelope

Attach the rip line (red) to the burner frame, the vent line (red and white) to the vent bag and the resetting line (white) to the reset bag. Both these bags are in the pilot compartment. Lay out the envelope in the normal way and tab the parachute velcros together.

Pre Take-Off Checks

Parachute venting check	Release the velcro tabs by pulling on the vent line (red and white), verify the vent opens and closes correctly.
Lite Vent check	Pull on the rip line (red), open the Lite vent partially, then close as possible by the vent line (red and white) and reset by the resetting line (white).
Activation lines check	Verify both vent line (red and white) and resetting line (white) are stowed freely in the basket, preferably in their vent bags.

Landing and Final Deflation

Landing	Pull the rip line (red) as required before touchdown.
Final deflation	Pull the rip line (red) fully open.

NOTE:

The balloon with a Lite Vent may be landed and packed away using just the vent line (red and white) but response times will be greater and it will take longer to vent the air from the envelope.

4.10 RIP PANELS

Preparation of the Envelope

The panel must be carefully closed before the envelope is inflated. The strength of the seal is dependent on how firmly the velcro is pressed together. In order to get a good seal each side of the panel must, in turn, be pulled taught from each end as the panel put in place and sealed hard throughout its length. Once the panel is correctly in place the rip lock (or rip locks) must be closed.

To close a rip lock insert the middle ring through the large ring, then insert the fabric loop through the middle ring. The securing pin is then inserted through the fabric loop and into the fabric pin housing. With the lock assembled the velcro on the top of the pin housing is sealed. See sketch under para 6.4.4.

Pre Take-Off Checks

Check visualy that the panel is correctly closed and the rip locks secure.

Landing and Final Deflation

On landing the rip line is pulled. Pulling this line first opens the rip locks and then opens the rip panel.

NOTE:

There is a full description of Rip Panels in section 6 (Ballon and System Description) of this Manual.

WARNING:

Once pulled and opened a velcro Rip Panel can not be reset in flight.

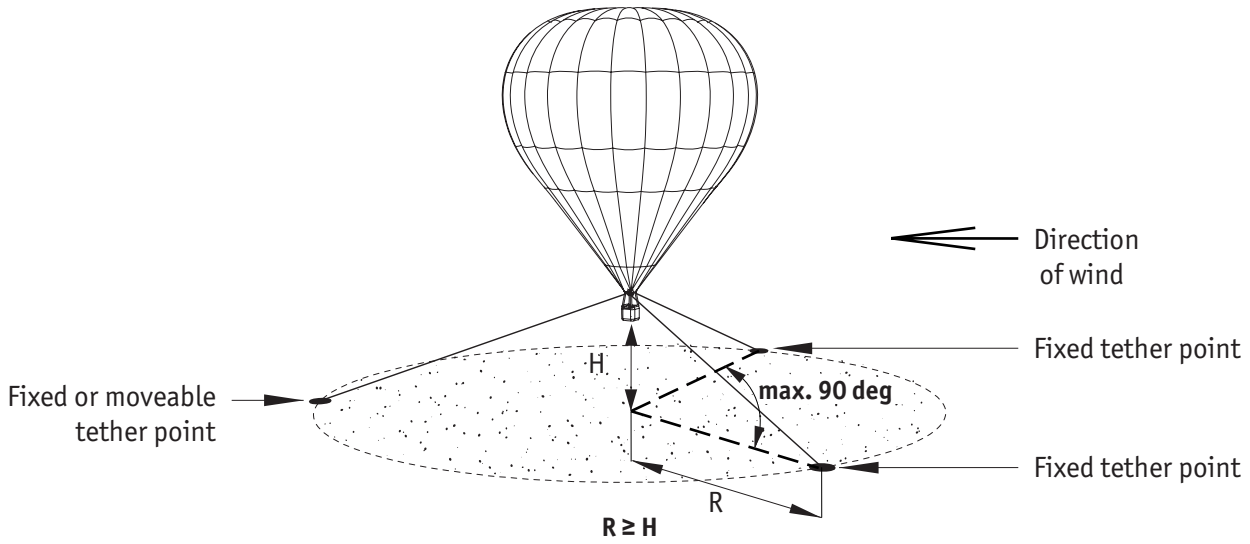
4.11 PILOT RESTRAINT HARNESS

A pilot restraint harness may be worn by the pilot to prevent him being thrown from the basket when the balloon lands. The harness fastens around the pilots waist and attaches securely to the floor or the rope on the lower side of the basket. A quick-release is fitted so that the pilot may release himself in an emergency.

4.12 TETHERED OPERATIONS

Tethering Site

A tethering site must be an open area with no overhead cables or obstructions. It must be large enough to allow the envelope to be inflated and the balloon to be tethered without hinderance. There must be facilities for crowd control and the area downwind must be clear of obstructions in case the balloon breaks away and has to be flown free.



Tether Layout

Rigging the Balloon

The best arrangement for a tether is a low tripod arrangement with three tether lines, two upwind and one downwind.

Two main ropes of the same length are anchored on the upwind side to the tethering lugs on the burner frame (if such frame is used) or directly to the envelope carabiners (when the burner frame without lugs is used). These ropes provide the main resistance to movement. The upwind ropes must be firmly attached to strong points on the ground and spread so that the angle between them is no more than 90 degrees. The distance between the basket and tether point (dimension R in the picture) and is to be equal or greater than the desired altitude (H).

The third rope is attached to the downwind side of the balloon to the burner frame lug or the envelope karabiner. It may either be fixed to a car or truck or held by a crew of up to three people. This third rope is used to restrict the height of the tethered balloon. If fixed to a car or truck this vehicle may be moved away from the balloon to restrict the height of the tether.

Ropes used for tethering should have a minimum strength of 4 000 kg (8 800 lb) and should be inspected before each flight. Where karabiners are required in the tethering system 4 000 kg (8 800 lb) karabiners should be used.

The length of ropes is to be appropriately adjusted so that all three ropes carry the load when the balloon is in desired position and height.

If the wind increases so that the controllability of the balloon is limited then the height is to be lowered. If the wind speed or gusting exceeds the limits in section 2 (Operational Limitations) of this Manual and/or the controllability is very poor the envelope must be deflated. The actual wind speed (e.g. read from a hand-held anemometer) must be available to the pilot during the entire tethered flight.

WARNING:

The minimum strength of fixed tether points for main ropes is the same as for attaching the quick release rope (see para 4.5.1).

When the downwind rope gets taut the pilot must not continue in heating.

NOTE:

Be aware that tethering in windy conditions puts considerable stress on the balloon, tethering equipment and tether points. If any of the equipment is thought to have been overstressed then the balloon must be deflated.

After every tether the ropes, tether points and balloon should be inspected by the pilot to make sure that nothing has been damaged. When inspecting the balloon particular attention must be paid to the burner frame.

Beside above instructions limitations stated in para 2.17 must be observed.

4.13 DROPPING OF PARACHUTISTS

Conditions for parachuting:

- The maximum balloon take-off weight must not be exceeded.
- The weight of parachutists that are to jump and their equipment must be taken into account in the pre-flight planning to ensure the balloon remains within applicable limits during the entire flight (Minimum Landing Weight!)
- All applicable national regulations must be complied with.
- Free fall parachuting is only permitted. Static line releases must not be used.
- Maximum number of parachutists to be released at once is three.

The pilot must react to a sudden drop of weight when the parachutists exit. For preventing the balloon from an excessive rise open the parachute is to be opened. It is also possible to drop the parachutists with the balloon in a moderate descent. The recommended value is 1 m/s (200 ft/min) per one parachutist dropped.

Dropping procedure:

Preparation	Parachutists sit on the basket edge
Clean exit	Parachutists are well free from control lines, fuel hoses or any other equipment
Airspace check	Airspace under the basket is free from any air traffic
Dropping	Parachutists leave the basket after the agreed pilot's signal
Vent	Open the parachute and hold it open until necessary

4.14 REFUELLING

Precautions when handling propane, butane or LPG

Propane, butane and LPG vapour are highly flammable and heavier than air. When refuelling or handling these gasses the following regulations must be complied with.

Always	Wear protective gloves.
	Wear natural rather than man-made fabrics to reduce the possibility of a static spark.
	Have at least one fire extinguisher available.
	Turn radios and mobile telephones off before refuelling.
	Earth all fuel cylinders.
	Refuel one cylinder at a time.
Never	Refuel cylinders in the basket unless an external venting kit is fitted,
	Refuel cylinders in an enclosed area.
	Refuel cylinders near drains, hollows, pits or anywhere where the vapour could accumulate.
	Have a source of ignition, matches, ignitor etc in the refueling area.

Procedure

Connect the refuelling hose to the liquid outlet of the fuel cylinder.

Open the maxfill valve on the flight cylinder just enough to hear the gas escaping.

Open the liquid valve on the cylinder.

Open the supply valve on the bulk tank.

Start the pump (if fitted).

When the flow from the maxfill valve changes from vapour to liquid turn the liquid valve on the cylinder off at once. Close the maxfill valve and turn the pump off.

Vent the refuelling hose and empty the liquid valve on the cylinder by depressing its central self-sealing spigot.

NOTE:

Follow the same procedure whether refuelling from a bulk tank or a smaller transportable cylinder. However if using a smaller transportable cylinder be aware that many are contaminated with other oil products and that you should try to avoid these being transferred to the flight cylinders. Invert the small transportable cylinder so that it is at an angle of 45 degrees. Refuel in the normal way.

When refuelling from a cylinder which does not have a pump transfer of the fuel can be speeded up by pouring hot water over the cylinder from which the fuel is being transferred.

4.15 FUEL CYLINDER PRESSURISATION

To increase fuel pressure in cold conditions fuel cylinders may be pressurised with Nitrogen.

The Nitrogen must come from a supply that can be regulated to provide a pressure of between 0 - 10 bar (0-145 psi) to the fuel cylinder. This Nitrogen must be operated in accordance with the suppliers instructions.

Nitrogen is supplied to a fuel cylinder that is already full of propane through the liquid valve until the desired pressure has been reached.

WARNING:

Fuel cylinders must never be pressurised with either air or oxygen as an explosive mix would occur in the cylinder.

CAUTIONS:

The maximum fuel cylinder pressure must not be greater than 10 bar (145 psi).

The maximum fuel cylinder pressure must not be greater than 7 bar (100 psi) if the cylinder is to be stored in a pressurised state.

If vapour pilot lights are to be used then sufficient master cylinders must be left unpressurised, and identifiable so that Nitrogen is not fed to the pilot lights.

Cylinders pressurised with Nitrogen should not be used for vapour pilot lights.

Fuel cylinders should be pressurised shortly before they are to be used and labelled to indicate that they are pressurised. If they are not used soon after pressurising then the pressure in these cylinders should be reduced to a maximum of 7 bar (100 psi) by opening the maxfill valve for 5 minutes. When venting in this way the same precautions are to be taken as for refuelling fuel cylinders.

After flight all fuel cylinders that had been pressurised should be depressurised as described in the paragraph above before being stored or refuelled.

SECTION 5 - WEIGHT

5.1 INTRODUCTION

This section details the procedure for calculating the maximum weight that a balloon is capable of lifting. It is essential that, once these calculations have been made, a balloon may not be flown at this weight until it has been checked that it is less than the MTOW of the balloon or the RMTOW of the balloon as detailed on page I of the balloon's Flight Manual. If the figure calculated from these tables is greater than the balloons MTOW or RMTOW then the lower figure must be used.

5.2 LOADING GRAPH AND TABLE

Before each flight the take-off mass of the balloon must be calculated and a check made that this figure does not exceed the maximum amount that this size of balloon can lift to its planned maximum operating altitude.

The maximum amount that a balloon can lift depends on:

- The size of the balloon.
- The altitude that the balloon is flying at.
- The temperature of the air surrounding the balloon.
- The MTOW or RMTOW recorded on page I of the balloon's Flight Manual.

5.2.1 Instructions for Using the Loading Graph and Table

1. Using the Loading Graph find the lift units per 1,000 cu ft for the maximum altitude that the balloon is to be flown at and the temperature at this height.
2. Enter the appropriate Loading Table with this figure and move down the table to the appropriate size of balloon.
3. Read off the maximum lifting capability of the balloon.
4. Add up the total empty weight of the balloon.
5. Deduct the empty weight of the balloon from the maximum lifting capability of the balloon.
6. The amount remaining is the Disposable Lift of the balloon in these conditions.
7. Ensure that the total weight of fuel, passengers and non essential equipment does not exceed the Disposable Lift.

NOTES:

In the Loading Graph the dashed lines represent temperatures relative to the International Standard Atmosphere (ISA) and the standard decrease in temperature with altitude. Although these figures are approximate they may be used to estimate the anticipated temperature at a particular height when the temperature at a different height is known. However read para 5.3 Flying in a Temperature Inversion.

The loading graph and charts are based on static lift with the maximum operational allowed envelope's internal temperature that allows for moderate rate of climb without overheating the envelope.

When flying a balloon at, or close to, its maximum lift care must be taken not to overheat the envelope by either climbing fast or rapidly changing a descent into a climb.

The empty weight of the balloon consists of the total of the basket, poles and covers, burner, envelope and bag and all essential equipment.

5.3 FLYING IN A TEMPERATURE INVERSION

The temperature graph presumes that the temperature decreases with height according to ISA. When the temperature increases with height instead of decreasing this is called a temperature inversion. A temperature inversion happens frequently in the early morning, particularly if there has been a clear sky overnight.

To prevent overheating the balloon when flying in an inversion enter the graph with either the anticipated temperature at your launch height at mid day or the known temperature at a specific height above the inversion.

5.4 SAMPLE CALCULATIONS

Dot-and-dashed lines show the following sample calculations are marked on the loading graph.

Example 1 – When the outside air temperature at your maximum planned altitude is known.

Your balloon is a BB20 (71 200 cu ft). The balloon will be flown at a maximum altitude of 6 000 ft and the met office has told you that the temperature at this height will be 6°C.

Enter the Loading Graph at 6°C on the bottom line and go up until you reach the 6 000 ft curve. From this point travel left parallel to the horizontal lines until you reach the left scale at 16.5.

Decide whether you want an answer in either kg or lb and enter the appropriate Loading Table with 16.5 along the top line. You will have to interpolate between 16 and 17. Go vertically downwards until you reach the horizontal line for a BB20. The result is 533 kg (1 175 lb).

Deduct from 533 kg the empty weight of the balloon (in this case 189 kg). The resulting 344 kg (758 lb) is the Disposable Lift.

Example 2 – Outside air temperature at your maximum planned altitude is not known

Your balloon is a BB22 (78 300 cu ft). The temperature, at the balloons 1 000 ft AMSL launch site, is 11°C and the balloon will be flown at maximum altitude of 6 000 ft.

Enter the Loading Graph at 11°C on the bottom line and go up until you reach the estimated 1 000 ft curve. To allow for altitude run from this point parallel to the temperature lines until you cross the 6,000 ft curve. From this point travel left parallel to the horizontal lines until you reach the left scale at 17.6.

Decide whether you want an answer in either kg or lb and enter the appropriate Loading Table with 17.6 along the top line. You will have to interpolate between 17 and 18. Go vertically downwards until you reach the horizontal line for a BB22. The result is 626 kg (1 378 bls).

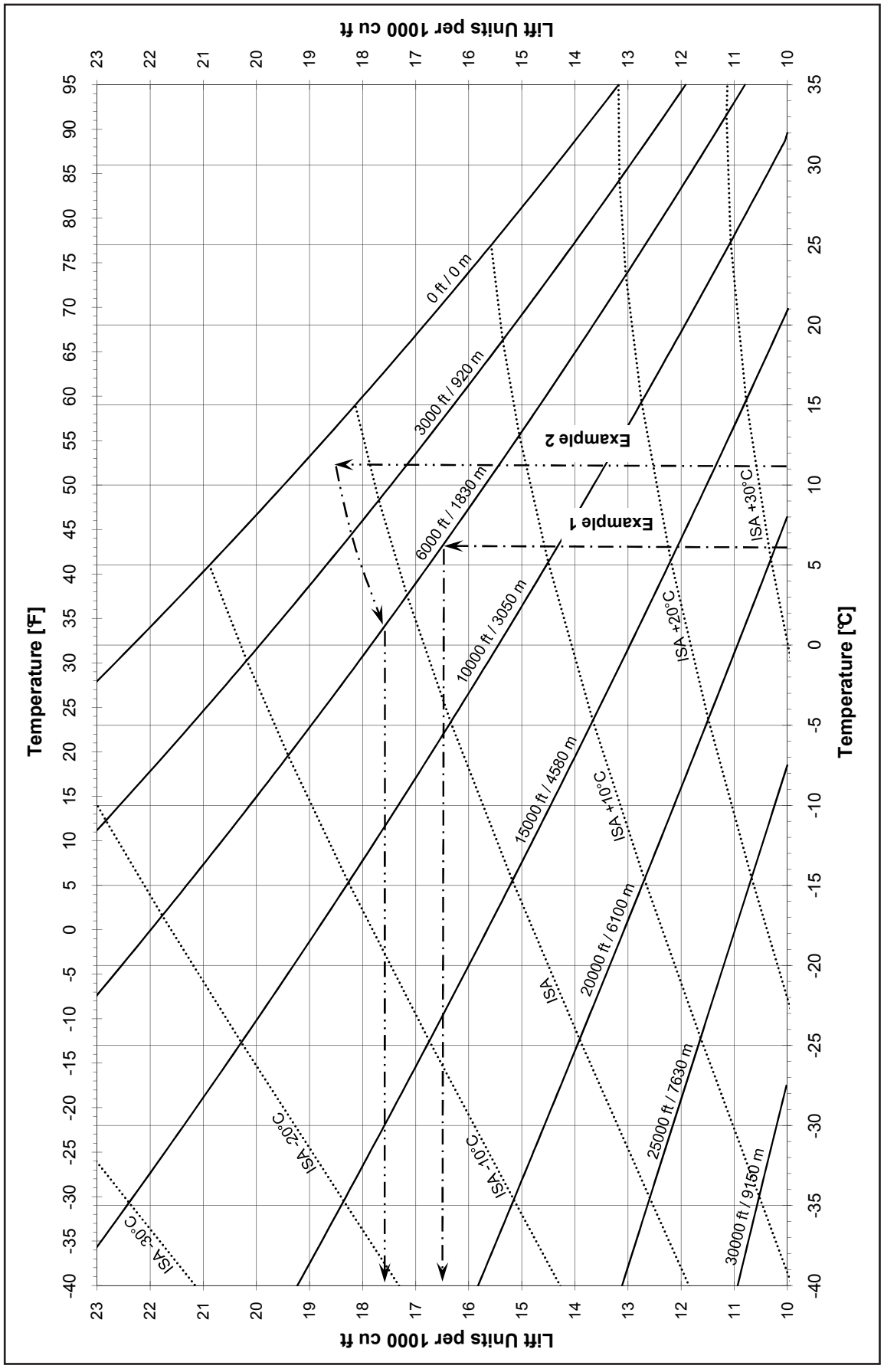
Deduct from 626 kg the empty weight of the balloon (in this case 224 kg). The resulting 402 kg (885 lb) is the Disposable Lift.

Example 3 – Flying in inversion conditions

In case the temperature inversion occurs the pilot can establish the lifting capacity of the balloon either by using the known temperature at maximum desired altitude (then use the procedure described in Example 1) or by using the anticipated mid-day temperature at the launch site (then use the procedure described in Example 2).

NOTE:
Pay particular attention to observing the MTOW at low temperatures. In no case may the intersection of temperature and desired flight altitude lie above the graph. This would lead to exceeding the MTOW.

5.5 LOADING GRAPH



5.6 LOADING TABLE

Maximum balloon lifting capacity [kg]														
Envelope	***Lift Units per 1000 cu ft***													
	10	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*	*19*	*20*	*21*	*22*	*23*
BB9, BB9E	145	160	175	189	204	218	233	247	262	276	291	295	295	295
BB12, BB12E	194	213	233	252	271	291	310	330	349	368	385	385	385	385
BB16, BB16E	259	284	310	336	362	388	414	439	465	470	470	470	470	470
BB17GP, BB17XR	272	299	326	354	381	408	435	462	490	495	495	495	495	495
BB18E	291	320	349	378	407	436	465	494	524	550	550	550	550	550
BB20, BB20E, BB20ED	323	355	388	420	452	485	517	549	582	614	630	630	630	630
BB20GP, BB20XR	323	355	388	420	452	485	517	549	582	614	646	679	711	730
BB22E, BB22ED	355	391	427	462	498	533	569	604	640	675	680	680	680	680
BB22, BB22D, BB22N, BB22Z	355	391	427	462	498	533	569	604	640	675	711	730	730	730
BB22XR	355	391	427	462	498	533	569	604	640	675	711	747	780	780
BB26E, BB26ED	420	462	504	546	588	630	672	714	730	730	730	730	730	730
BB26, BB26D, BB26N, BB26Z, BB26XR	420	462	504	546	588	630	672	714	756	798	840	840	840	840
BB30E, BB30ED	485	533	582	630	679	727	776	824	840	840	840	840	840	840
BB30D, BB30N, BB30Z, BB30XR	485	533	582	630	679	727	776	824	873	921	945	945	945	945
BB34E, BB34ED	549	604	659	714	769	824	879	934	945	945	945	945	945	945
BB34D, BB34Z	549	604	659	714	769	824	879	934	989	1 040	1 040	1 040	1 040	1 040
BB37D, BB37N, BB37Z	598	658	717	777	837	897	957	1 016	1 076	1 136	1 150	1 150	1 150	1 150
BB40D, BB40Z	646	711	776	840	905	969	1 034	1 099	1 163	1 228	1 293	1 310	1 310	1 310
BB42D, BB42Z	687	755	824	893	961	1 030	1 099	1 167	1 236	1 305	1 373	1 410	1 410	1 410
BB45D, BB45N, BB45Z	727	800	873	945	1 018	1 091	1 163	1 236	1 309	1 382	1 454	1 520	1 520	1 520
BB51D, BB51Z	824	906	989	1 071	1 154	1 236	1 318	1 401	1 483	1 566	1 648	1 690	1 690	1 690
BB60D, BB60N, BB60Z	969	1 066	1 163	1 260	1 357	1 454	1 551	1 648	1 745	1 842	1 939	1 940	1 940	1 940
BB64Z	1 034	1 138	1 241	1 344	1 448	1 551	1 655	1 758	1 861	1 965	2 068	2 100	2 100	2 100
BB70D, BB70Z	1 131	1 244	1 357	1 470	1 583	1 697	1 810	1 923	2 036	2 149	2 262	2 300	2 300	2 300
BB78Z	1 260	1 386	1 512	1 638	1 764	1 890	2 017	2 143	2 269	2 395	2 521	2 600	2 600	2 600
BB85D, BB85Z	1 373	1 511	1 648	1 785	1 923	2 060	2 197	2 335	2 472	2 610	2 747	2 820	2 820	2 820
BB92Z	1 487	1 635	1 784	1 933	2 081	2 230	2 378	2 527	2 676	2 824	2 973	3 000	3 000	3 000
BB100D, BB100Z	1 603	1 763	1 924	2 084	2 244	2 405	2 565	2 725	2 886	3 046	3 200	3 200	3 200	3 200
BB105P	1 697	1 866	2 036	2 206	2 375	2 545	2 715	2 884	3 054	3 224	3 393	3 500	3 500	3 500
BB106P	1 713	1 884	2 055	2 227	2 398	2 569	2 740	2 912	3 083	3 254	3 426	3 500	3 500	3 500
BB113P	1 826	2 008	2 191	2 374	2 556	2 739	2 921	3 104	3 287	3 469	3 600	3 600	3 600	3 600
BB120P	1 939	2 133	2 327	2 521	2 715	2 908	3 102	3 296	3 490	3 684	3 700	3 700	3 700	3 700
BB130P	2 101	2 311	2 521	2 731	2 941	3 151	3 361	3 571	3 781	3 991	4 200	4 200	4 200	4 200
BB142P	2 276	2 504	2 732	2 959	3 187	3 415	3 642	3 870	4 098	4 325	4 500	4 500	4 500	4 500

Maximum balloon lifting capacity [lb]														
Envelope	***Lift Units per 1000 cu ft***													
	10	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*	*19*	*20*	*21*	*22*	*23*
BB9, BB9E	320	352	384	416	448	481	513	545	577	609	641	650	650	650
BB12, BB12E	427	470	513	555	598	641	683	726	769	812	849	849	849	849
BB16, BB16E	570	626	683	740	797	854	911	968	1 025	1 036	1 036	1 036	1 036	1 036
BB17GP, BB17XR	599	659	719	779	839	899	959	1 019	1 079	1 090	1 090	1 090	1 090	1 090
BB18E	641	705	769	833	897	961	1 025	1 089	1 153	1 211	1 211	1 211	1 211	1 211
BB20, BB20E, BB20ED	712	783	854	925	997	1 068	1 139	1 210	1 281	1 353	1 389	1 389	1 389	1 389
BB20GP, BB20XR	712	783	854	925	997	1 068	1 139	1 210	1 281	1 353	1 424	1 495	1 566	1 609
BB22E, BB22ED	783	861	940	1 018	1 096	1 175	1 253	1 331	1 410	1 488	1 498	1 498	1 498	1 498
BB22, BB22D, BB22N, BB22Z	783	861	940	1 018	1 096	1 175	1 253	1 331	1 410	1 488	1 566	1 609	1 609	1 609
BB22XR	783	861	940	1 018	1 096	1 175	1 253	1 331	1 410	1 488	1 566	1 644	1 720	1 720
BB26E, BB26ED	925	1 018	1 111	1 203	1 296	1 388	1 481	1 573	1 609	1 609	1 609	1 609	1 609	1 609
BB26, BB26D, BB26N, BB26Z, BB26XR	925	1 018	1 111	1 203	1 296	1 388	1 481	1 573	1 666	1 758	1 852	1 852	1 852	1 852
BB30E, BB30ED	1 068	1 175	1 281	1 388	1 495	1 602	1 709	1 815	1 852	1 852	1 852	1 852	1 852	1 852
BB30D, BB30N, BB30Z, BB30XR	1 068	1 175	1 281	1 388	1 495	1 602	1 709	1 815	1 922	2 029	2 083	2 083	2 083	2 083
BB34E, BB34ED	1 210	1 331	1 452	1 573	1 694	1 815	1 936	2 057	2 083	2 083	2 083	2 083	2 083	2 083
BB34D, BB34Z	1 210	1 331	1 452	1 573	1 694	1 815	1 936	2 057	2 178	2 291	2 291	2 291	2 291	2 291
BB37D, BB37N, BB37Z	1 317	1 449	1 580	1 712	1 844	1 975	2 107	2 239	2 371	2 502	2 535	2 535	2 535	2 535
BB40D, BB40Z	1 424	1 566	1 709	1 851	1 993	2 136	2 278	2 420	2 563	2 705	2 848	2 885	2 885	2 885
BB42D, BB42Z	1 513	1 664	1 815	1 967	2 118	2 269	2 420	2 572	2 723	2 874	3 026	3 109	3 109	3 109
BB45D, BB45N, BB45Z	1 602	1 762	1 922	2 082	2 242	2 403	2 563	2 723	2 883	3 043	3 203	3 351	3 351	3 351
BB51D, BB51Z	1 815	1 997	2 178	2 360	2 541	2 723	2 904	3 086	3 268	3 449	3 631	3 726	3 726	3 726
BB60D, BB60N, BB60Z	2 136	2 349	2 563	2 776	2 990	3 203	3 417	3 631	3 844	4 058	4 277	4 277	4 277	4 277
BB64Z	2 278	2 506	2 734	2 961	3 189	3 417	3 645	3 873	4 100	4 328	4 556	4 626	4 626	4 626
BB70D, BB70Z	2 492	2 741	2 990	3 239	3 488	3 737	3 987	4 236	4 485	4 734	4 983	5 071	5 071	5 071
BB78Z	2 776	3 054	3 332	3 609	3 887	4 165	4 442	4 720	4 997	5 275	5 553	5 727	5 727	5 727
BB85D, BB85Z	3 026	3 328	3 631	3 933	4 236	4 538	4 841	5 143	5 446	5 748	6 051	6 217	6 217	6 217
BB92Z	3 275	3 602	3 930	4 257	4 585	4 912	5 239	5 567	5 894	6 222	6 549	6 608	6 608	6 608
BB100D, BB100Z	3 531	3 885	4 238	4 591	4 944	5 297	5 650	6 003	6 357	6 710	7 055	7 055	7 055	7 055
BB105P	3 737	4 111	4 485	4 859	5 232	5 606	5 980	6 354	6 727	7 101	7 475	7 709	7 709	7 709
BB106P	3 773	4 150	4 528	4 905	5 282	5 659	6 037	6 414	6 791	7 169	7 546	7 709	7 709	7 709
BB113P	4 022	4 424	4 827	5 229	5 631	6 033	6 435	6 838	7 240	7 642	7 930	7 930	7 930	7 930
BB120P	4 271	4 698	5 126	5 553	5 980	6 407	6 834	7 261	7 688	8 115	8 150	8 150	8 150	8 150
BB130P	4 627	5 090	5 553	6 015	6 478	6 941	7 404	7 866	8 329	8 792	9 251	9 251	9 251	9 251
BB142P	5 015	5 516	6 018	6 519	7 021	7 522	8 023	8 525	9 026	9 528	9 912	9 912	9 912	9 912

NOTE:
Values of the lifting capacity for the highest Lift Units are modified so that the balloon MTOW cannot be exceeded.

INTENTIONALLY LEFT BLANK

SECTION 6 - BALLOON AND SYSTEM DESCRIPTION

6.1 INTRODUCTION

A balloon consists of an envelope, a burner or burners, a basket and a number of fuel cylinders and other equipment. Each of these component parts is described within this section of the Manual.

Tables of envelopes, baskets, burners and acceptable combinations of these items are contained in Chapter 8, Equipment lists.

6.2 ENVELOPES

Envelopes are of a sewn construction and are made from either polyester or nylon fabric with polyester load bearing tapes. The fabric is coated to make it airtight and to protect it from UV degradation. The vertical load tapes take the majority of the load of the equipment suspended beneath it, whilst the horizontal tapes act as rip-stoppers to limit any damage to the envelope.

The panels around the mouth of the balloon are made from a fire resistant fabric, as is the scoop which fits between the base of the envelope and the burner frame. Where the vertical load tapes reach the lower edge of the mouth of the envelope they are looped and turned back securely. Stainless steel flying wires are attached to these loops and continue the load path to the points where they are attached to the burner frame. The attachment loops at the end of the vertical load tapes are covered by protectors made from fire resistant fabric.

Each envelope is constructed from a number of vertical gores. A gore is the fabric section between two adjacent vertical load tapes. The number of gores in a balloon will depend on the size and design of the envelope. All envelopes are built with a Vent hole.

Envelopes are, as standard, fitted with a Parachute. When the envelope is inflated the parachute fills the Vent hole at the top of the envelope. In flight the parachute can be displaced downwards to Vent air by pulling on the rip line (red). When the rope is released the parachute automatically reseats and closes the Vent hole.

At the top of the envelope all the load tapes are secured to a crown ring so that the load path runs smoothly over the envelope. A rope, called the crown line, slightly longer than the height of the balloon, is fixed to the crown ring and is used to hold the top of the envelope close to the ground until the envelope is inflated with cold air.

6.3 TYPES AND DESIGNS OF ENVELOPES

There are several standard types of envelope, all of which are natural shapes, not unlike the shape of an inverted drop of water.

6.3.1 O Type of Envelope, O Type of Design

O type envelopes have either 8 or 12 semi bulbous gores and the same number of flying wires as there are gores.

6.3.2 E Type of Envelope, E Type of Design

E type envelopes have 12 gores. Their shape is similar to O-type with smaller diamer of gore bulbing and horizonal cut.

6.3.3 N Type of Envelope, N Type of Design

N type envelopes have between 24 and 32 gores and the envelopes look almost flat sided. The panels within each

gore are vertically cut. On the smaller envelope sizes the load tapes are joined together in pairs, as they pass over the fire resistant fabric at the base of the envlope, so each envelope has half as many flying wires as it has gores. Larger envelopes have one flying wire for each gore.

6.3.4 Z Type of Envelope, Z Type of Design

Z type envelopes have 24 to 32 gores and the envelopes look almost flat sided. The panels within each gore are horizontally cut so there are more panels in a Z type than in a N type. On the smaller envelope sizes the load tapes are joined together in pairs, as they pass over the fire resistant fabric at the base of the envlope, so each envelope has half as many flying wires as it has gores. Larger envelopes have one flying wire for each gore.

6.3.5 GP Type of Envelope

Designed as a competition balloon. The GP type envelopes have 24 gores and the envelopes look almost flat sided. The panels within each gore are horizontally cut. The number of flying wires and gores is the same.

6.3.6 XR Type of Envelope

Designed as competition balloon allowing for high vertical speeds. The XR type envelopes have 16 to 24 gores and the envelopes look almost flat sided. The panels within each gore are horizontally cut. The BB17XR and BB20XR envelopes have identical number of gores and flying wires. At BB22XR, BB26XR and BB30XR envelopes the load tapes are joined together in the lower part so there are half as many flying wires as gores

6.3.7 P Type of Envelope

P type envelopes are designed especially for passenger flying. They have 28 or 32 gores and the look almost flat sided. The panels within each gore are horizontally cut so there are more panels in a P type than in a N type. The number of flying wires and gores is identical.

6.3.8 Special Shapes

Special shaped envelopes are often made to replicate products or characters. Each special shape is fully described in its own specific supplement which is included within its Flight Manual.

6.3.9 D Type of Envelope, D type od design

D type envelopes have 24 or 28 gores and the shape is similar to the Z-types. The orientation of the panels is diagonal, i.e. the angle between weft fibers and horizontal direction is 45 degrees.

6.3.10 ED Type of Envelope, ED Type od Design

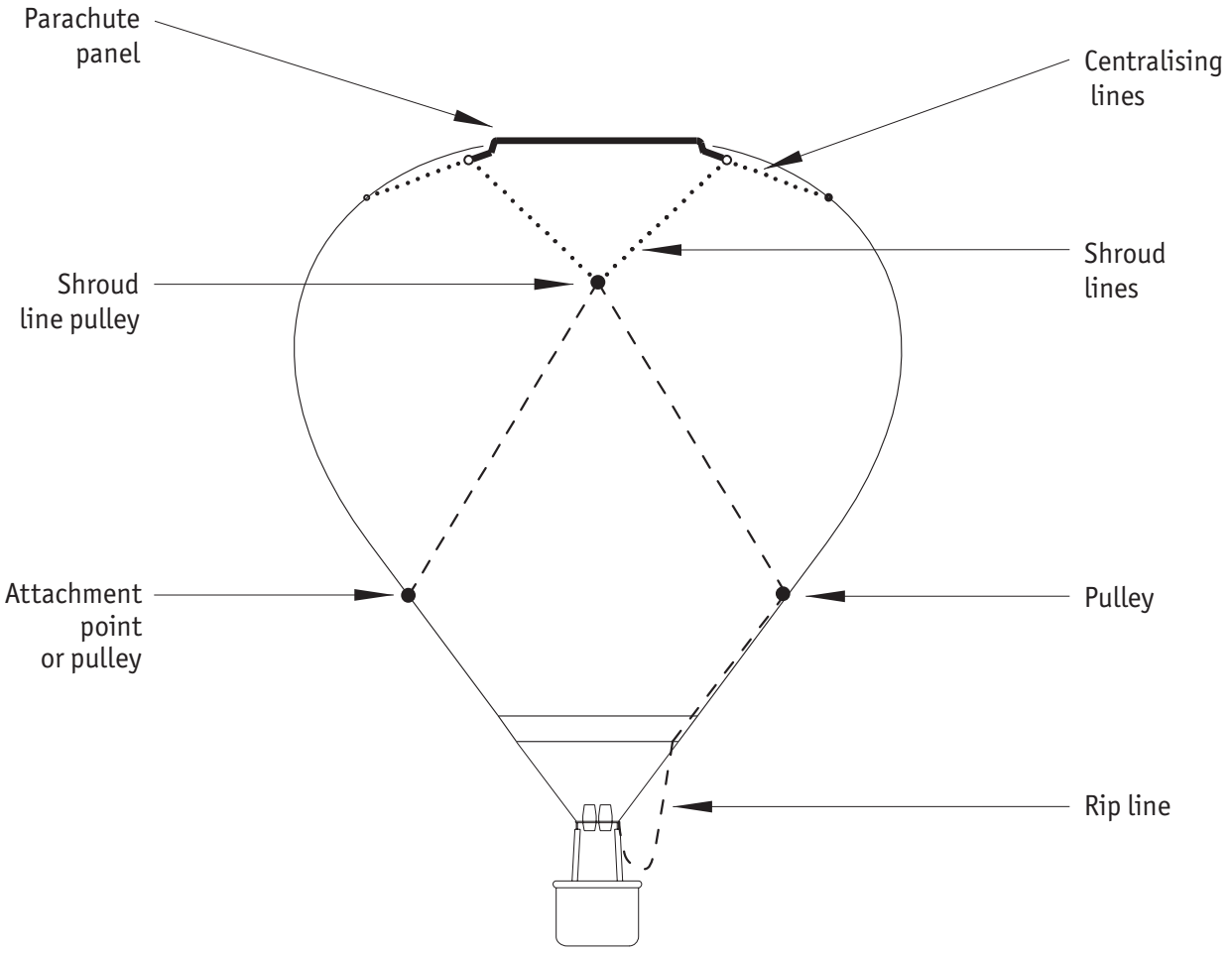
D type envelopes have 12 gores and the shape is similar to the E-types. The orientation of the panels is diagonal, i.e. the angle between weft fibers and horizontal direction is 45 degrees.

6.4 ENVELOPE DEFLATION SYSTEMS AND EQUIPMENT

Envelopes are fitted with either a parachute or an alternative deflation system and they may also be fitted with rotation Vents to enable the balloon to be turned in flight. All envelopes are fitted with a temperature streamer and a tempilabel.

6.4.1 Parachute

This deflation system takes the form of a circular parachute-style panel inside the top of the balloon, sealing a circular opening in the top of the envelope (Vent aperture). The lateral position of the parachute is controlled by centralising lines, which join its edge to the inside surface of the balloon. Companion velcro tabs are sewn at the edge of Vent hole and to the parachute to seal them together during inflating. After envelope inflation, the parachute is held in position by internal overpressure. The parachute is operated by pulling on the rip line (red). The parachute resets itself to the closed position when the rip line is released

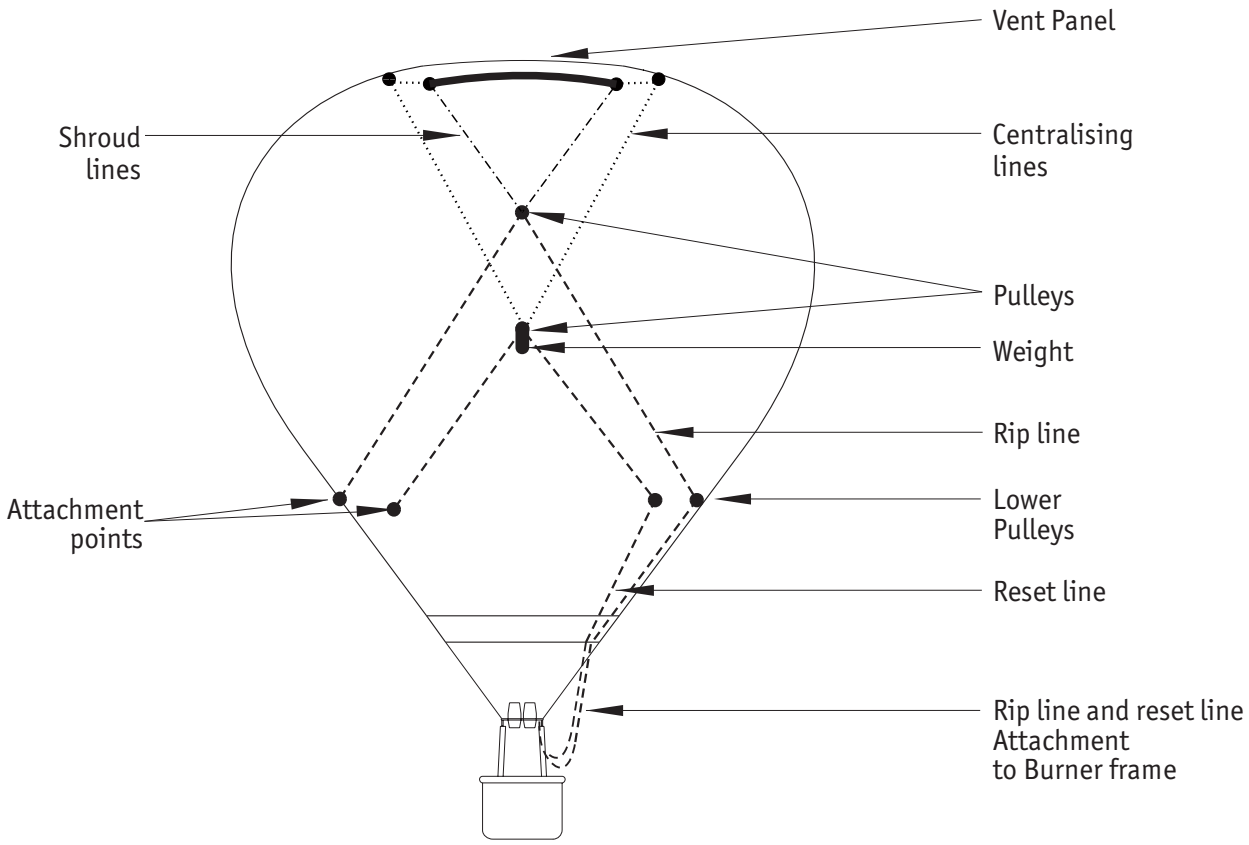


Parachute Valve

6.4.2 Paralite

The Paralite deflation system is very similar to the parachute except the centralising lines are free to travel in pulleys at the vent aperture edge. At the other ends the centralising lines are connected together to a weight that provides for an easier resetting of the vent panel.

Two activation lines are fitted - the rip line (red) is used for venting. When released the Paralite resets itself by internal overpressure and action of the weight. The reset line (white) is used only for a propper resetting of the vent if necessary.

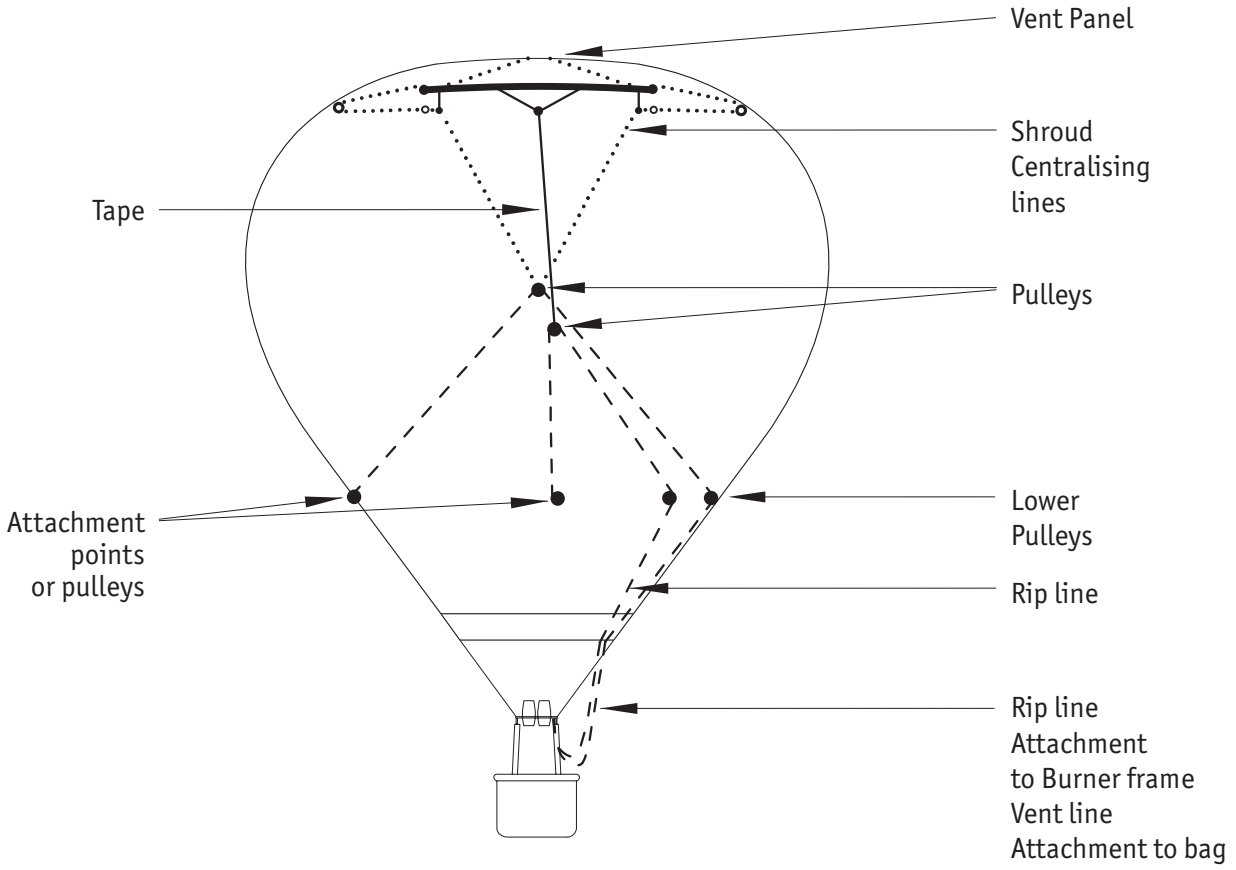


Paralite

6.4.3 Smart Vent

The Smart Vent is similar in appearance and use to a parachute in all respects except during landing. Two activation lines are fitted, one coloured red/white for in-flight venting and for resetting the Smart Vent during intermediate landings and the other, the rip line, coloured red for venting during landing and final deflation.

After envelope inflation the Smart Vent is held in place by internal overpressure. In order for the Smart Vent to function correctly the velcro tabs must be released, after inflation, by pulling on the Vent line (red and white) until all the velcro tabs separate. With the tabs separated and the envelope fully inflated once more, the rip line (red) is pulled smartly. As the rip line is pulled the centre of the Vent panel is pulled down into the envelope until it forms a vertical plume in the centre of the Vent hole allowing a clear path for air to escape quickly out of the envelope. Before the envelope empties too much the Vent is respread to fill the Vent hole by pulling smartly on the Vent line (red and white). Once the Vent is in place the Vent line is released. A second operation of the Vent line may be required to obtain a good seal.



Smart Vent

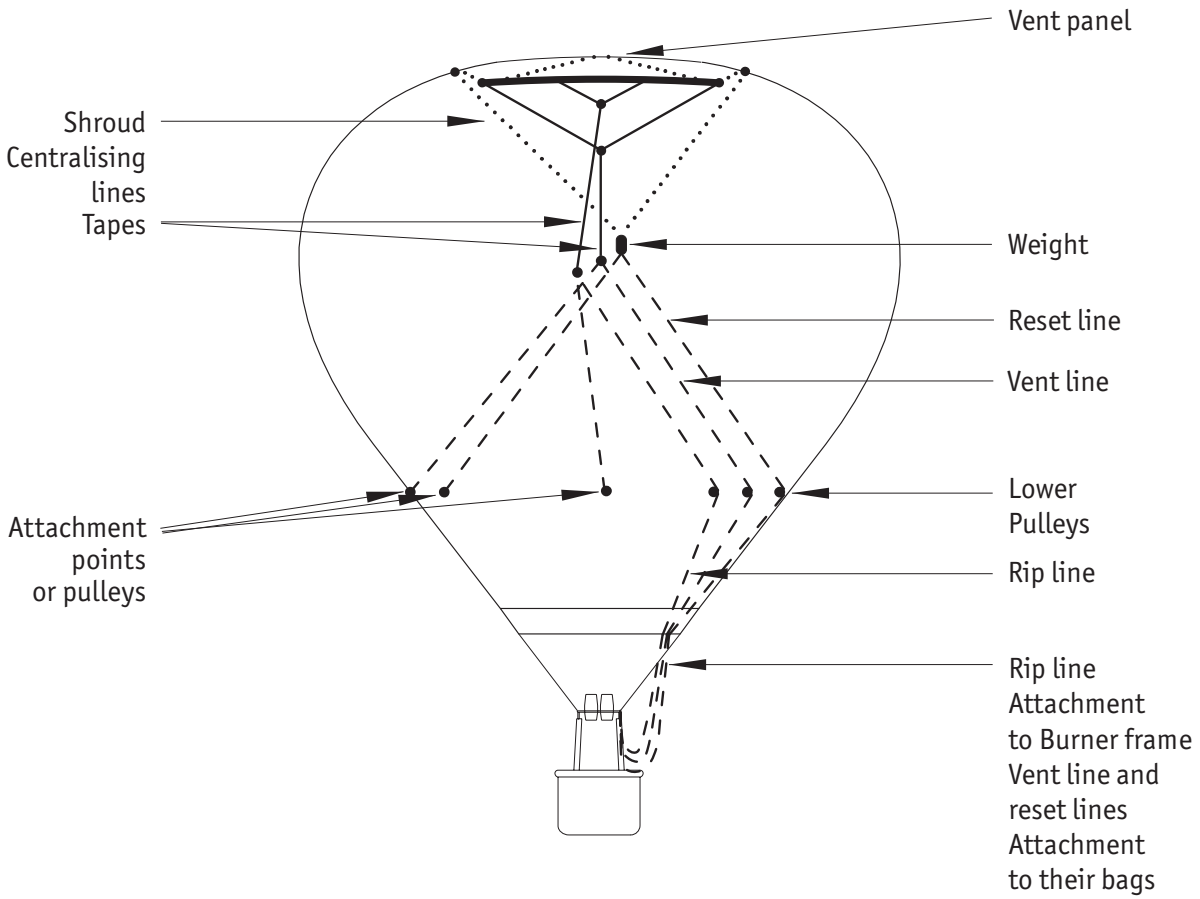
6.4.4 Lite Vent

Lite Vent is a rapid deflation system, similar to a Smart Vent, but with a more efficient venting action. It is fitted with three activation lines a rip line (red) a reset line (white) and a Vent line (red and white). The red/white line is for in-flight venting only.

After envelope inflation the Lite Vent is held in place by internal overpressure. In order for the Lite Vent to function correctly the velcro tabs must be released, after inflation, by pulling on the Vent line (red and white) until all the velcro tabs separate. With the tabs separated and the envelope fully inflated once more, the rip line (red) is pulled smartly. As the rip line is pulled the centre of the Vent panel is pulled down into the envelope until it forms a vertical plume in the centre of the Vent aperture allowing a clear path for air to escape quickly out of the envelope. Before the envelope empties too much the Vent is respread to fill the Vent hole by pulling smartly on the reset line (white). Once the Vent is in place the reset line is released. A further operation of the Vent line (red and white) may be required to obtain a good seal.

CAUTION:

On envelopes that are fitted with both Lite Vent and rotation Vents care must be taken to use the correct lines for rotating the balloon and reseating the Lite Vent.



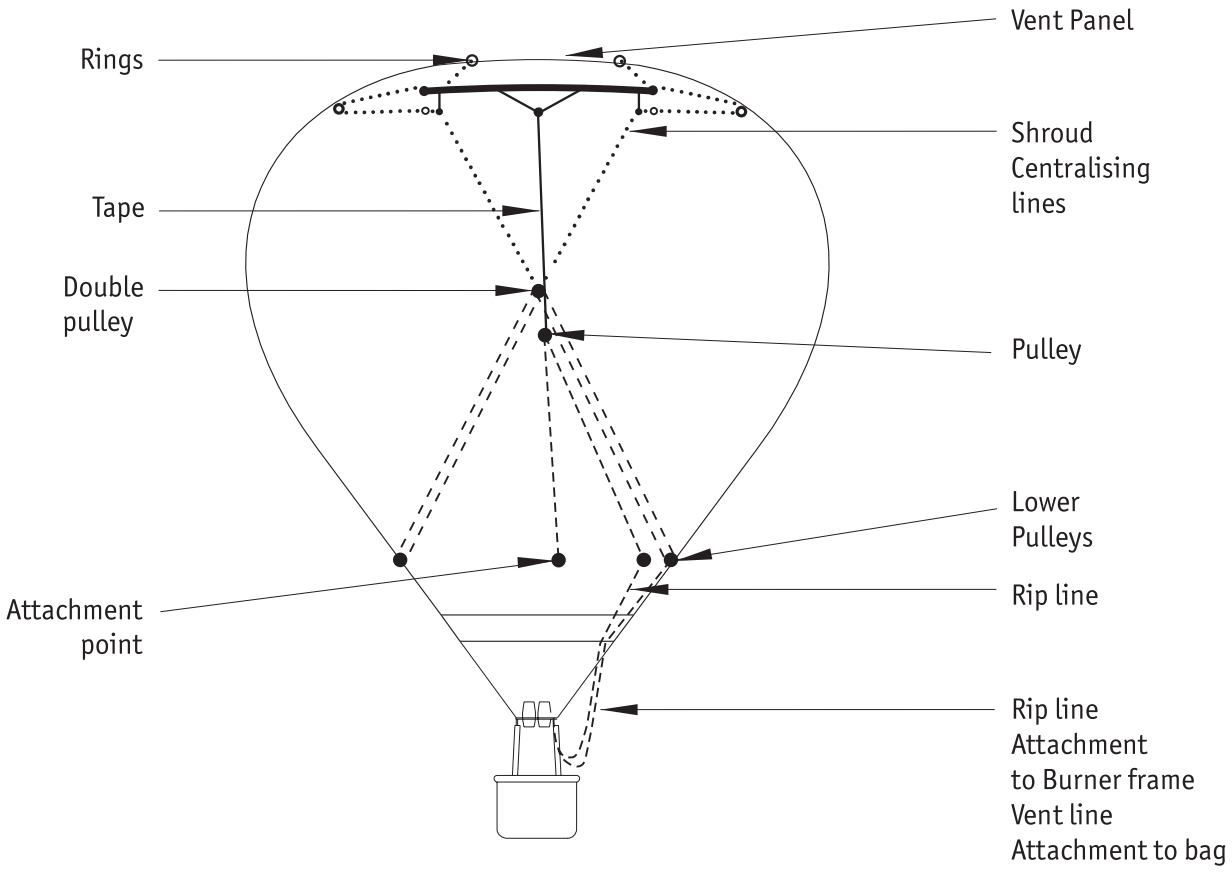
Lite Vent

6.4.5 Slide Vent

The Slide Vent deflation system resembles to the Smart Vent with several differences in design: The Slide Vent's valve panel has a more complex shape than that of Smart Vent for better seal. Centralizing lines are shoter than on Smart Vent for the same reason.A collar sewn at the Smart Vents's deflation aperture edge is not used. An excentic arrangement of shroud lines at Smart Vent parachute mode is replaced by a double pulley on the red and white control line. The upper centralizing lines are replaced by shorther lines attached to rings pulled on load tapes that enable the line to move while opening the valve. These lines are mainly used to prevent the valve from collapsing if pulled too strong.

Smart mode shroud lines are identical on both systems. Small envelopes use a direct pull, larger have a pulley system. The lower control lines attachment points or pulleys are placed lower than at Smart Vent (closer to envelope mouth) for a lesser control forces (smaller angle between the lines).

Functions and colours of controls lines (red line and red and white line) are identical as at the Smart Vent.

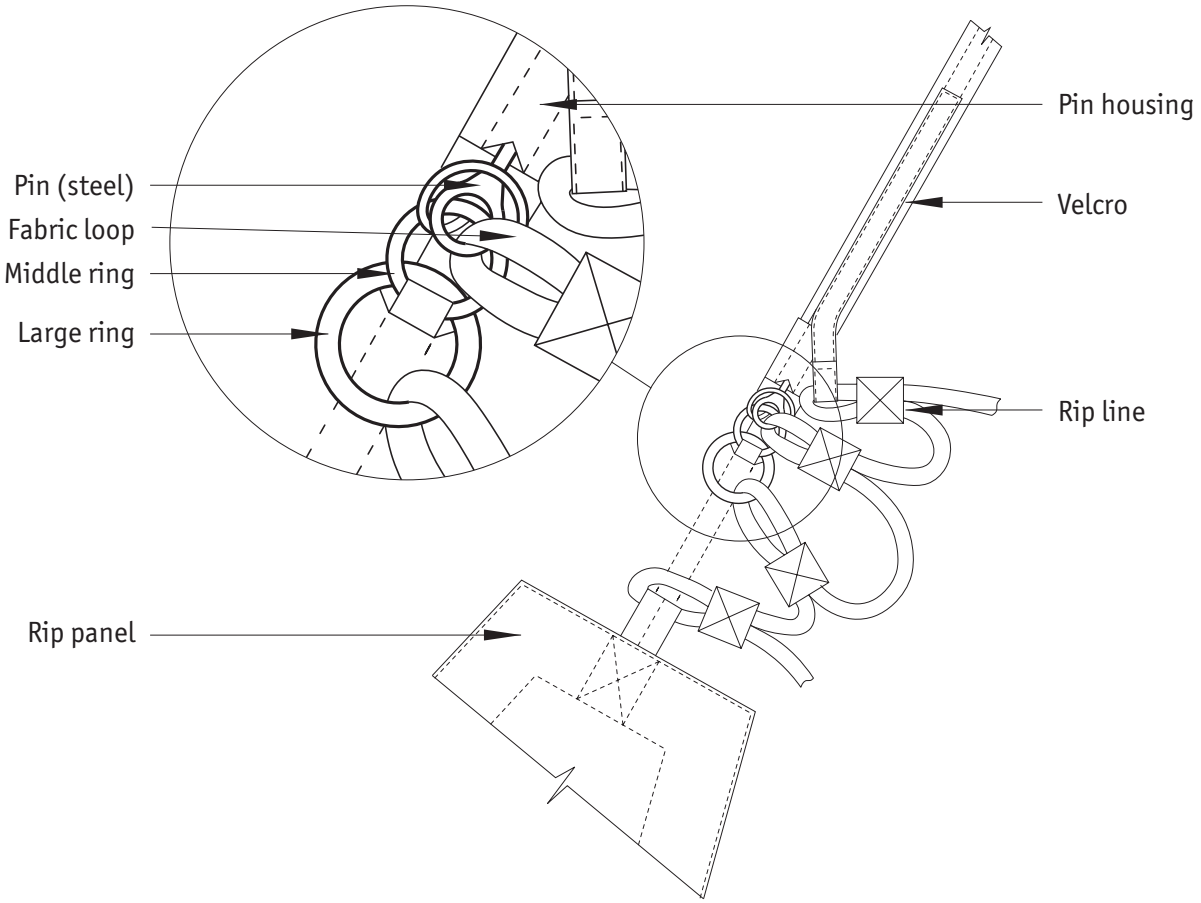


Slide Vent

6.4.6 Rip Panel

A Rip Panel may be used in a special shape in place of, or in addition to, a conventional parachute to aid final deflation; once opened it can not be reset and must never be used in flight.

A Rip Panel is a partially removable fabric panel, sewn to the envelope along one edge and held in place around the remaining edges by velcro. The panel must be carefully closed before the envelope is inflated. The strength of the seal is dependent on how firmly the velcro is pressed together. In order to get a good seal each side of the panel must, in turn, be pulled taught from each end as the panel put in place and sealed hard throughout its length. The removable rip panel is designed to be slightly larger than the hole that it fills in the envelope. Once the panel is correctly in place the rip lock (or rip locks) must be correctly fitted in accordance with this illustration below.



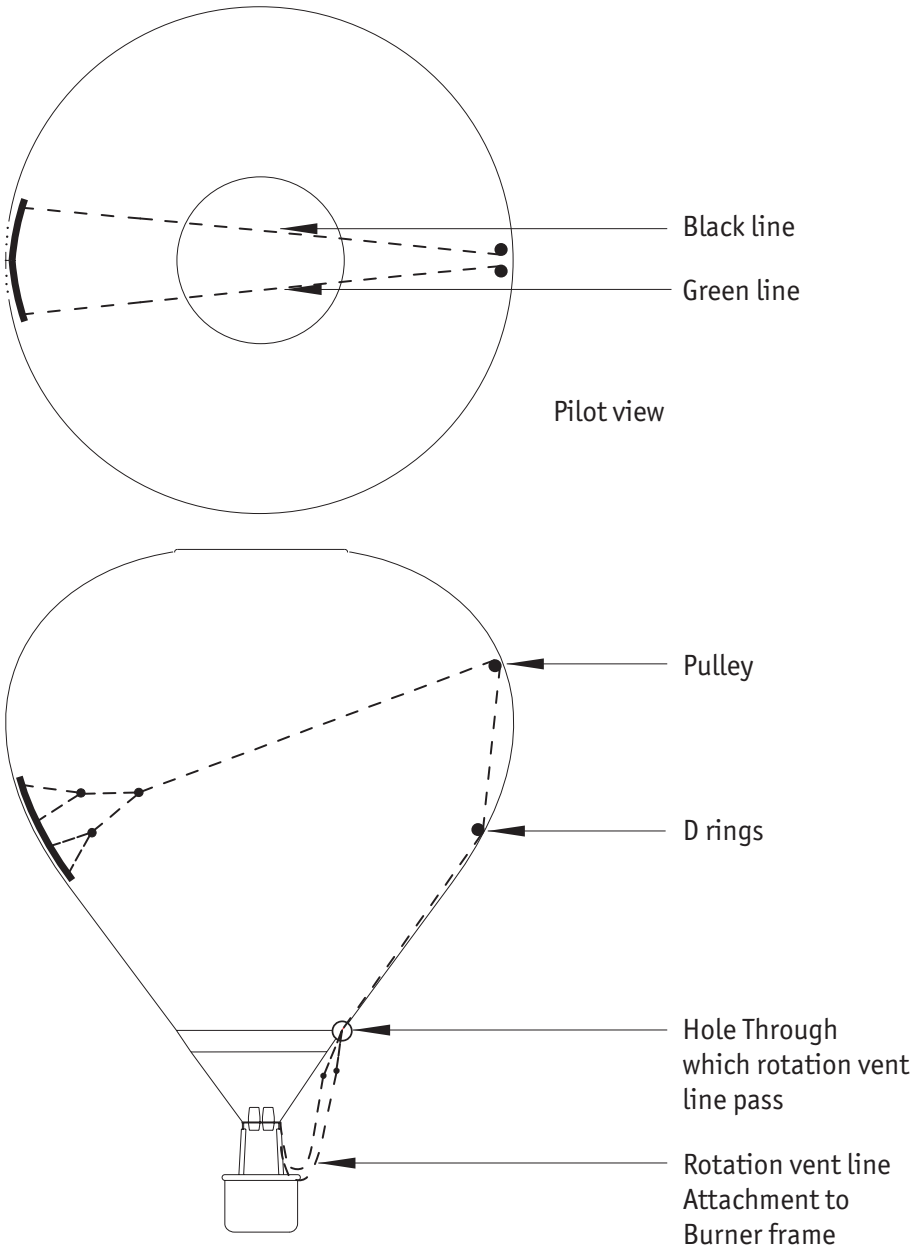
Rip Panel

6.4.7 Rotation Vents

Rotation Vents may be fitted at the equator of an envelope. These rotation Vents, when used in flight, Vent air through vertical slits at the equator, and rotation the balloon about its vertical axis. The rotation Vents are controlled by means of two lines one coloured black which turns the balloon to the pilot's left and one coloured green which turns the balloon to the pilot's right.

CAUTION:

On envelopes that are fitted with both Lite Vent and rotation Vents care must be taken to use the correct ropes for rotating the balloon and reseating the Lite Vent.



Rotation Vents

6.4.8 Temperature Streamer

A melting link attached to a streamer of a contrasting colour to the envelope is fitted inside the top of the envelope. If the envelope is overheated the solder in the melting link will melt and the flag will fall out of the envelope warning the pilot. The flag will fall at 124°C (255°F).

6.4.9 Tempilabel

A Tempilabel is sewn inside the top of the envelope. This lable has temperature sensitive areas which change colour permanently. This provides a permanent record of the maximum temperature that the envelope has reached.

6.5 BURNER

6.5.1 General

The burner unit is the heat source of the balloon and consists of one or more burner units and a burner frame. Within the burner liquid gas is vaporized and burnt to heat the air within the envelope. The gas is ignited by a pilot light that runs all the time that the balloon is inflated.

All burners are controlled from a manifold block on the underside of the burner.

NOTE:

Burner malfunction due to oxygen insufficiency in the ambient air appears in altitudes above 23 000 ft.

6.5.2 Main Burner

The high output Main Burner is fed with liquid propane which passes through a vaporizing coil prior to combustion. Fuel flow is controlled by an on/off valve called the Main Blast Valve.

6.5.3 Whisper Burner

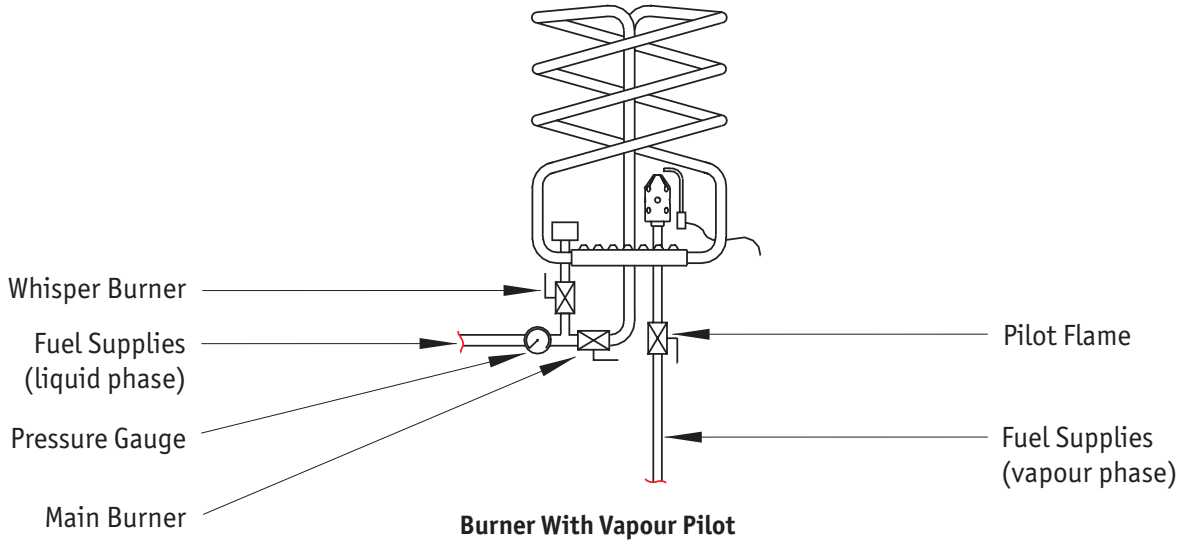
A whisper burner (Liquid Fire or Cow burner) may be fitted to each burner unit. The Whisper Burner feeds liquid fuel directly to a multi hole jet without passing through the vaporizing coil. This provides a quieter and less powerful flame, intended for use near livestock.

6.5.4 Pilot Flame

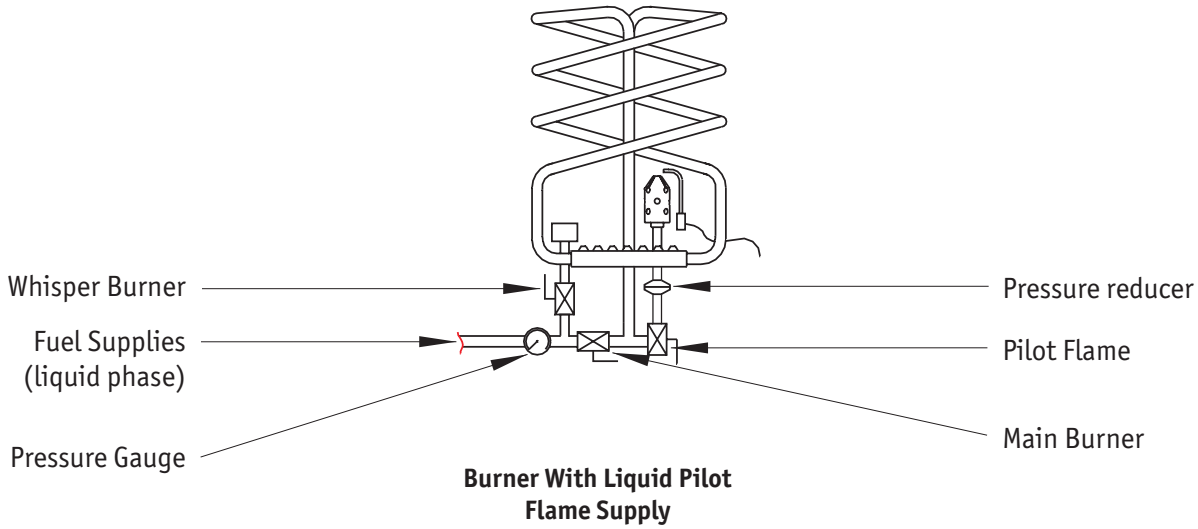
Burner ignition is provided by a pilot flame. A pilot flame is fuelled either by liquid propane taken from the burner block and vaporized in the pressure reducer or from vapour taken by a separate hose from the fuel cylinder. Each pilot flame has its own piezo igniter which is covered by the handle of the pilot flame lever when the pilot flame is in the off position.

To run the pilot flame open the valve and ignite the vapour using the piezo igniter. To turn the pilot light off move the pilot flame lever to the closed position.

The piezo igniter is activated by pressing on the piezo button. Pressing the button causes a spark between the upper point of the igniter and the pilot light cup and ignites the pilot flame.



Burner With Vapour Pilot Flame Supply



Burner With Liquid Pilot Flame Supply

6.5.5 Pressure Gauge

A Pressure Gauge is fitted to each burner unit. This gauge shows the pressure of the liquid gas in the fuel system, and will read whenever there is liquid fuel in the burner.

6.5.6 Fuel Supplies

In double, triple or quad burners each burner has its own independent fuel supply. In the case of a single burner two independent fuel supplies must be connected, one to each liquid fuel hose.

The liquid fuel hoses on double, triple and quad burners are identified by matching coloured bands at each end of a hose.

6.5.7 Fixed Height Burner Frames

The burner frame is made from stainless steel tubing. The burner units are swivel-mounted on a gimbal block on a horizontal bar that runs across the centre of the burner frame (this provides a two-axis gimbaled system). At each corner the burner frame has lugs, where the envelope and basket karabiners hook up, and tube sockets, either swinging or fixed. The nylon rods that support the burner above the basket are fitted into these sockets.

6.5.8 Adjustable Height Burner Frames

A variable height burner frame allows the burner to be raised and lowered relative to the basket floor. This adjustment can safely be carried out in flight.

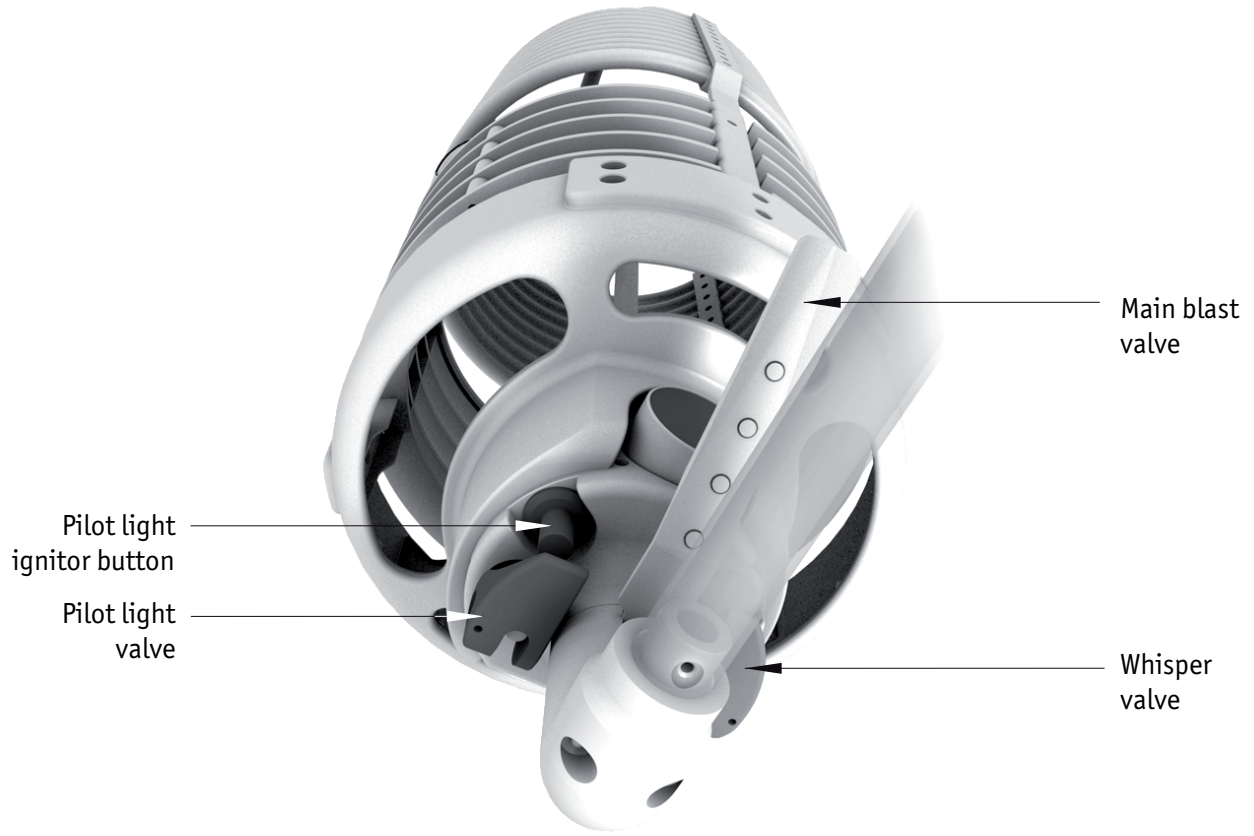
6.5.9 Ignis Burner

The Ignis burner is available as a double, triple or quad burner.

The main burners are fitted with blast valves that are operated by squeezing the control lever towards the hand grip. The blast valves handles are arranged so that pairs of burners may be operated together by using one hand.

The whisper burner is operated by a silver lever that is rotated downwards to open the valve.

The Ignis burner is fitted with either a vapour or liquid pilot flame. The red pilot light lever covers the pilot light igniter when it is in the closed position. The pilot light lever is rotated downwards through 180 degrees to open the pilot light flame.



Ignis Burner

6.5.10 Komet Duo and Komet Trio Burners

The Komet Duo burner was produced in two variants:

- Burners up to serial number 104 are fitted with the crossflow valve and smaller vaporizing coil.
- Burners of serial number 105 and higher don't have the crossflow valve. The vaporizing coil is greater for higher heat output and modified controls enable for operating both burner units with only one hand. Burners of these serial numbers were also assembled in Komet Trio (triple) version.

Komet burners are fed by two hoses of vapour and liquid phase. The amount of pilot flame is regulated by the valve on the fuel cylinder.

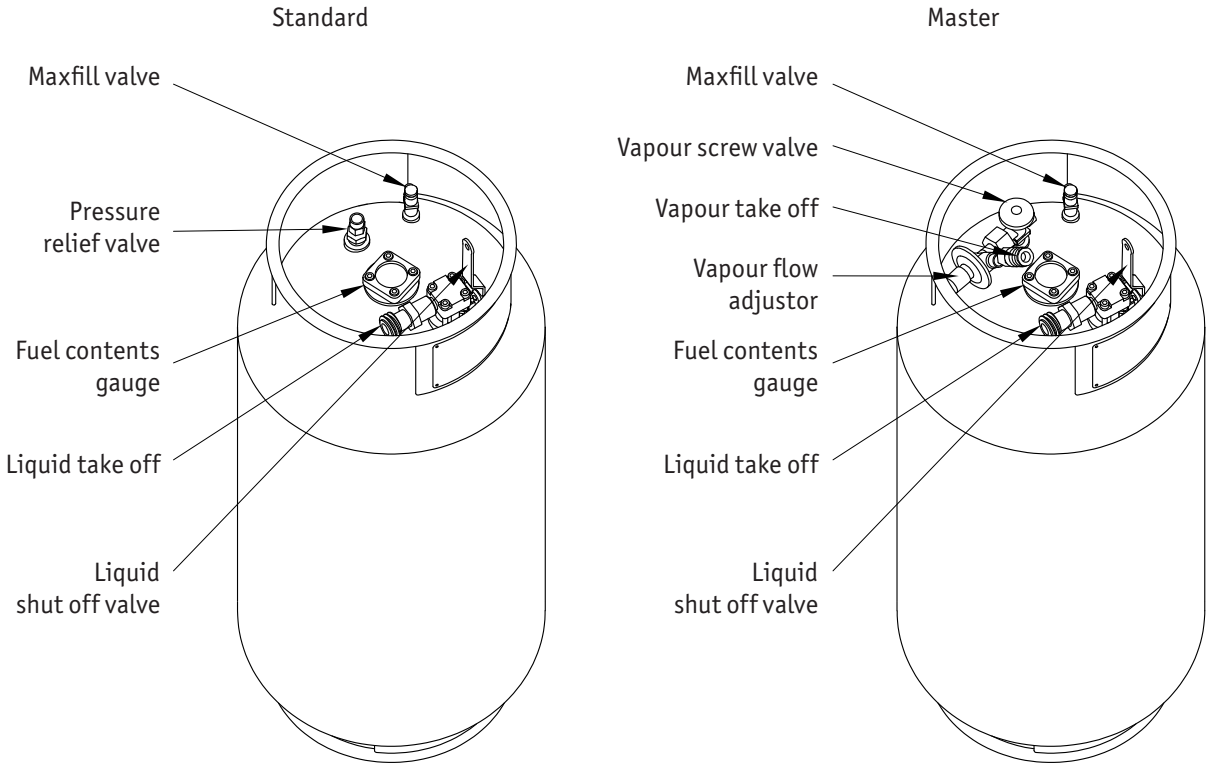
NOTE:

Burners Komet Duo up to serial number 104 are fitted with crossflow valve. With the crosflow valve open the fuel is supplied from one fuel cylinder when both main blast valves are operated at the same time.

6.6 FUEL CYLINDERS

6.6.1 General

Propane is carried in liquid form under pressure in cylinders which are either 'Standard', supplying liquid fuel feed only, or 'Master' with an additional pressure regulated vapour supply to feed pilot lights.



Fuel Cylinders
(Rubber handhold and padding not drawn)

Liquid fuel is drawn from the bottom of the fuel cylinder via an internal dip tube. The supply is controlled by an external valve with either a quick shut off lever or a hand wheel. Quick shut off valves may be fitted with either a Rego type screw connection or a Tema push-on connector. Hand wheel valves have a Rego type screw connection.

On Master cylinders a regulated vapour pilot flame supply is taken direct from the top of the cylinder through a hand wheel valve and a suitable regulator. The vapour hose is connected by using a quick release coupling.

Fuel cylinders that are approved for use in Kubicek balloons are listed in section 8. Equipment List and Appendicese of this Manual.

Each fuel cylinder is fitted with a contents gauge which registers the last 35% of the content of the cylinder.

Each fuel cylinder is fitted with a Maxfill tube connected to a screw valve. This valve is opened when the cylinder is being refilled to prevent the cylinder being overfilled.

All cylinders may by fitted with a padded cylinder cover to protect both the cylinder from damage in transit and the pilot's knees from damage on landing.

6.6.2 Fuel Manifolds

Approved Fuel Manifolds may be used to join the outlets of several fuel cylinders to one burner's fuel hose.

6.7 BASKETS

Baskets are made with traditional wickerwork sides above a solid marine ply floor. The basket walls have small openings to permit straps to be fed through so that the fuel cylinders can be secured to the inside walls of the basket. Flexible rods fit into sockets on the top rim of the basket and into sockets on the underside of the burner frame to support the weight of the burner.

Load-bearing basket cables form a continuous sling around the basket and are connected at both ends to the burner frame to support the weight of the basket when the balloon is in flight. The support rods and the cables that are beside them should be covered by removable padded suede sleeves that also protect the fuel hoses.

Equipment and instruments that are carried in the balloon may be strapped to the basket, put into padded bags that are secured to the sides of the basket or, in the case of light weight flight instruments and radios, attached to the rod covers by velcro straps. Below the inside rim of the basket there are rope handles for use by passengers during landing.

6.7.1 Partitioned Baskets

Larger baskets have internal partitions woven into the walls and floor of the basket. These partitions provide greater structural integrity to the basket and separation between groups of passengers. In these baskets the pilot and fuel cylinders are contained in a separate compartment from the passengers.

6.7.2 Pilot Restraint Harness

Pilot restraint harness (if fitted) is designed to secure the pilot inside the basket during landing. The harness consists of the waist belt secured with the seat belt type buckle and a strap of adjustable length with the clips on both ends. One clip is to be fixed to a D ring on the waist belt, the other to the D ring on the basket floor.

The pilot should wear and adjust the waist belt before landing and adjust the strap length during approach. The length of the strap must allow the pilot to reach all controls while preventing him from falling over the basket rim. In emergency the waist belt can be released by the "PRESS" button.

6.7.3 Quick Release

A quick release is designed to restrain the balloon during inflation and whilst the balloon is being readied for flight. A quick release should be used whenever it is planned to fly the balloon but should never be used if the balloon is to be tethered.

A quick release is attached to the envelope karabiners or to the burner frame lugs and the jaw is fixed to a restraining line which is in turn secured to either an anchor point on the ground or to the front of a heavy vehicle. A securing pin or other safety device prevents the release being opened inadvertently.

6.7.4 K13S Basket

The K13S have a multilayer aramid - carbon composite sandwich floor instead of plywood. Both upper and lower tube frames are made of aluminium alloy.

6.8 INSTRUMENTS

The instruments used in a balloon are an altimeter (for height measurement), a variometer (to show the balloon's rate of climb or descent), and an envelope temperature gauge (to show the envelope's actual internal temperature or overheating).

6.9 OTHER EQUIPMENT

6.9.1 Drop Line

The drop line may be used, by ground crew, to manoeuvre the balloon in light wind conditions. When not in use the drop line, rolled up in a fabric bag, is secured inside the basket.

6.9.2 Fire Extinguisher and Fire Blanket

These items, contained within padded bags in the basket, must always be carried in the basket for use in an emergency

INTENTIONALLY LEFT BLANK

SECTION 7 - BALLOON HANDLING, CARE AND MAINTENANCE

7.1 INTRODUCTION

This section contains the manufacturer´s recommended procedures for ground handling and servicing of the balloon. It also identifies certain inspection and maintenance requirements which must be followed if the balloon is to retain that new-balloon performance and dependability.

7.2 INSPECTION PERIODS

In order to maintain continued airworthiness the following inspections must be made at the appropriate times. In addition any inspection required by the country in which the balloon is registered and operated must also be complied with.

Details of inspections, procedures and the licensing requirements of those people who may carry out inspections is contained in the Maintenance Manual for a specific balloon.

Summary of inspections prescribed by the manufacturer:

Inspection Type	Operating Period	Inspect
Annual inspection	100 flight hours or 12 calendar months, whichever is the sooner	Balloon envelope, basket, burner, fuel cylinders, instruments, equipment and accessories
Ten yearly inspection	Ten years*	Fuel cylinders (see the Maintenance Manual)

* Determination of inspection dates is based on the date of production, or date of inspection, if any marked on each cylinder.

7.3 BALLOON MAINTENANCE, REPAIRS AND ALTERATIONS

All balloon maintenance and repairs must be carried out in accordance with to the Kubicek Balloons Maintenance Manual (document no. B2202). If in doubt contact Balóny Kubíček spol. s r. o approved repair shop.

For repair procedures refer to the Kubicek Balloons Maintenance Manual.

7.4 GROUND HANDLING AND ROAD TRANSPORT

After a flight is completed, pack the envelope and transport it in the original envelope bag. The envelope should be kept dry during transport.

Always Vent the burner hoses, check that the fuel cylinder valves are closed and burner hoses disconnect from the fuel cylinders.

Burners with liquid pilot flames should be transported and stored with the coils uppermost. This will prevent any oil residue in the vapouriser units running into and blocking the pilot flame jets.

Whilst in transit secure the various components of the balloon to eliminate the possibillity of damage.

Fuel cylinders should be transported in a vertical position with the valves uppermost, and in accordance with the procedures recommended by your national regulatory authority for the transport of liquefied gas tanks.

7.5 CLEANING AND CARE

7.5.1 Envelope

Soiled areas should be cleaned by using a damp cloth. Mild domestic detergents diluted with water may also be used. Then, before packing, the envelope should be thoroughly dried.

7.5.2 Basket

The basket requires periodical cleaning. The cane and floor should be cleaned with flowing water and a brush, or pressure washed (protect the upper suede rim from getting wet). Once cleaned the basket should be allowed to dry completely before being stored.

Preserve the cane from becoming too dry because it will become brittle. Clean and protect the leather on the basket bottom and suede on the top rim using products for leather and suede care. If there is a suede cover on the upper rim, simply restore it by brushing with a suede shoe-brush.

7.5.3 Burner

After each flight clean carbon deposits from the burner. Check that the moveable parts on the frame, frame suspension and hose fittings are free of dirt and mud. Clean and lubricate with silicone oil as required.

Check periodically that the burner valves move smoothly. Lubricate the valves, as described in the Kubicek Balloons Maintenance Manual, if they are becoming stiff.

7.5.4 Fuel Cylinders

Check that the control valves move smoothly and that the pressure regulator is correctly adjusted. Consult your Balóny Kubíček spol. s r. o approved repair shop if there is any suspicion that they are not working properly or if there is damage to the body of the cylinder.

Lubricate ‚O' ring seals when required. Keep the areas around the valves and end connectors clean.

7.5.5 Instruments

Follow the respective manual of the instrument.

7.6 STORAGE

The balloon must be stored in a clean dry airy place with the envelope, in its bag, if possible on a pallet.

The envelope should not be stored damp or wet for more than a few days because residual moisture can result in fabric deterioration due to mould or mildew. A wet envelope should be gently dried by keeping it cold inflated with a fan, turning it over as necessary. Hot inflating a wet envelope may damage the fabric. Do not expose the envelope to the direct sunshine or direct heat when drying.

If possible store the basket on a pallet so that it is clear of the ground. Water soaking into the wicker and hide of the basket will cause it to deteriorate so always remove soil from the basket and make sure that it stays dry.

Cylinders should be stored in a vertical position, with their valves uppermost, in a well ventilated area with no source of ignition or excessive heat.

Burner hoses must be vented of all fuel as trapped fuel will expand and may cause damage to the hose. While packing the burner the hoses should be rolled on the frame so that is no sharp bend on the hose mainly next to the output of the fitting. Fuel hoses may never be bent sharply, the smallest bend radius allowed is 90 mm (3 1/2“). A template is provided in Appendix 5.

CAUTION:

Fuel cylinders that have been pressurized with nitrogen but not used at once should be vented (see para 4.14 in this Manual)

INTENTIONALLY LEFT BLANK

SECTION 8 - EQUIPMENT LIST AND APPENDICES

This section lists the major components and the way in which they may be combined to make a complete balloon.

8.1 EQUIPMENT LISTS

Table of Envelopes

Model	Volume		Gores, Envelope Design
	[m^3]	[cu ft]	[pcs.]
BB9	900	31 800	8, O-type
BB9E	900	31 800	8, E-type
BB12	1 200	42 700	8, O-type
BB12E	1 200	42 700	8, E-type
BB16	1 600	57 000	8, O-type
BB16E	1 600	57 000	8, E-type
BB17GP	1 700	59 900	16, Z type
BB17XR	1 700	59 900	16, Z type
BB18E	1 800	64 100	12, E-type
BB20	2 000	71 200	12, O-type
BB20ED	2 000	71 200	12, ED-type
BB20E	2 000	71 200	12, E-type
BB20GP	2 000	71 200	24, Z-type
BB20XR	2 000	71 200	20, Z-type
BB22D	2 200	78 200	24, D-type
BB22ED	2 200	78 200	12, ED-type
BB22E	2 200	78 200	12, E-type
BB22	2 200	78 300	12, O-type
BB22N	2 200	78 300	24, N-type
BB22Z	2 200	78 300	24, Z-type
BB22XR	2 200	78 300	24, Z-type
BB26D	2 600	92 500	24, D-type
BB26ED	2 600	92 500	12, ED-type
BB26E	2 600	92 500	12, E-type
BB26	2 600	92 500	12, O-type
BB26N	2 600	92 500	24, N-type
BB26Z	2 600	92 500	24, Z-type
BB26XR	2 600	92 500	24, Z-type
BB30D	3 000	106 800	24, D-type
BB30E	3 000	106 800	12, O-type
BB30ED	3 000	106 800	12, ED-type
BB30N	3 000	106 800	24, N-type
BB30Z	3 000	106 800	24, Z-type
BB30XR	3 000	106 800	24, Z-type
BB34D	3 400	121 000	24, D-type
BB34E	3 400	121 000	12, O-type

Model	Volume		Gores, Envelope Design
	[m^3]	[cu ft]	[pcs.]
BB34ED	3 400	121 000	12, ED-type
BB34Z	3 400	121 000	24, Z-type
BB37D	3 700	131 700	24, D-type
BB37N	3 700	131 700	24,N-type
BB37Z	3 700	131 700	24, Z-type
BB40D	4 000	142 400	24, D-type
BB40Z	4 000	142 400	24, Z-type
BB42D	4 250	151 300	24, D-type
BB42Z	4 250	151 300	24, Z-type
BB45D	4 500	160 200	24, D-type
BB45N	4 500	160 200	24, N-type
BB45Z	4 500	160 200	24, Z-type
BB51D	5 100	181 500	24, D-type
BB51Z	5 100	181 500	24, Z-type
BB60D	6 000	213 600	24, D-type
BB60N	6 000	213 600	32, N-type
BB60Z	5 950	209 700	24, Z-type
BB64Z	6 400	227 900	24, Z-type
BB70D	7 000	249 200	24, D-type
BB70Z	7 000	249 200	24, Z-type
BB78Z	7 800	277 600	24, Z-type
BB85D	8 500	302 600	28, D-type
BB85Z	8 500	302 600	28, Z-type
BB92Z	9 200	327 500	28, Z-type
BB100D	10 000	353 100	28, D-type
BB100Z	10 000	353 100	28, Z-type
BB105P	10 500	373 700	28, Z-type
BB106P	10 600	377 300	28, Z-type
BB113P	11 300	402 200	28, Z-type
BB120P	12 000	423 800	28, Z-type
BB130P	13 000	462 700	32, Z-type
BB142P	14 200	500 000	32, Z-type

NOTE:

The actual envelope weight is indicated on the envelope identification plate, in the Balloon Weight Record (page I of this Manual).

Table of Baskets

The below data apply for baskets of s/n 400 and higher. The appropriate data for baskets up to s/n 399 are stated in the Appendix 4 of this Manual.

Basket Model	Basket Description	Typical Basket Weight*		Applicable Burners Frames
		[kg]	[lb]	
K7	85 x 85 Open	50	110	Fixed or Vario Frame - basic
K10	86 x 116 Open	60	132	
K11	98 x 116 Open	70	154	
K12, K12A	116 x 116 Open	80	176	
K13	116 x 125 Open	80	176	
K13S	100 x 120 Open	40	88	
K15	116 x 135 Open	85	187	
K16	116 x 145 Open	90	198	
K17	116 x 145 Open	90	198	
K18	116 x 155 Open	100	220	
K19	116 x 155 Open	90	198	
K19L	116 x 162 Open	110	242	
K22	125 x 180 Open	120	264	
K23	125 x 180 Open	120	264	Fixed Frame - K23 type
K25P	125 x 210, two partitions	140	308	Fixed Frame - K25P type
K28	160 x 220, T or Y three partitions	150	330	Fixed Frame - K32T type
K28H	160 x 235, H four partitions	170	374	Fixed Frame - K32T type
K30PP	125 x 260, three partitions	230	507	Fixed Frame - K30PP type
K32T	160 x 240, T three partitions	210	463	Fixed Frame - K32T type
K32Y	160 x 240, Y three partitions	210	463	Fixed Frame - K32T type
K32TT	160 x 250, double T five partitions	210	463	Fixed Frame - K32TT or K50TT type
K40Y	160 x 270, Y three partitions	230	507	Fixed Frame - K50 type
K40T	160 x 270, T three partitions	230	507	
K50	160 x 300, T or Y three partitions	270	594	
K50TT	160 x 300, double T five partitions	300	661	Fixed Frame - K32TT or K50TT type
K50TT8	160 x 300, double T five partitions	310	683	Fixed Frame -K60 type
K55X	160 x 345, X five partitions	335	738	Fixed Frame - K60X type
K58HH	160 x 380, double H eight partitions	375	826	Fixed Frame -K60 type
K60X	160 x 390, X five partitions	378	833	Fixed Frame - K60X type
K60	160 x 380, double T five partitions	350	775	Fixed Frame -K60 type
K70	160 x 440, double T five partitions	400	881	
K80	160 x 480, double T five partitions	450	991	Fixed Frame - K100 type
K85	160 x 520, (160 x 550 option) double T five partitions	500 (510 option)	1 101 (1 123 option)	

Basket Model	Basket Description	Typical Basket Weight*		Applicable Burners Frames
		[kg]	[lb]	
K90	160 x 520, (160 x 550 option) double double T nine partitions	500 (510 option)	1 101 (1 123 option)	Fixed Frame - K100 type
K100	160 x 610, nine partitions, double double T	550	1 211	
K110	160 x 660, nine partitions, double double T	600	1 322	

* Typical basket weight includes the minimum equipment specified in para 2.5

Table of Burners

Burner Model	Burner Description	Applicable Burners Frames	Burner weight including frame and hoses	
			[kg]	[lb]
IGNIS - 2 units	Double burner	Fixed Frame - basic	23	51
		Vario Frame – basic	24	53
		Fixed Frame - K23 type	26	57
		Fixed Frame - K25P type	26	57
		Fixed Frame - K30PP type	36	79
		Fixed Frame - K32T type	36	79
		Fixed Frame - K32TT type	38	84
		Fixed Frame - K50TT type	43	95
IGNIS - 3 units	Triple burner	Fixed Frame - K25P type	41	90
		Fixed Frame - K30PP type	45	99
		Fixed Frame - K32T type	42	93
		Fixed Frame - K32TT type	47	104
		Fixed Frame - K50 type	53	117
		Fixed Frame - K50TT type	52	115
		Fixed Frame - K60 type	56	123
		Fixed Frame - K60X type	60	132
		Fixed Frame - K60 STRONG type	59	130
IGNIS - 4 units	Quad burner	Fixed Frame - K32TT type	56	123
		Fixed Frame - K50 type	60	132
		Fixed Frame - K50TT type	61	134
		Fixed Frame - K60 type	63	139
		Fixed Frame - K60X type	68	150
		Fixed Frame - K60 STRONG type	66	145
		Fixed Frame - K100 type	102	225
KOMET DUO	Double burner	Fixed Frame - basic	21	46
		Vario Frame – basic	22	49
		Fixed Frame - K25P type	24	53
KOMET TRIO	Triple burner	Fixed Frame - K25P/K32T type	38	84
		Fixed Frame - K40Y type	42	93

NOTE:

The actual weight of a particular basket and burner is indicated in the Balloon Weight Record (page I of this Manual). This number includes the minimum equipment and - if applicable - the optional equipment such as extra padding, extra bags, pulpit rails etc.

Table of Fuel Cylinders:

Manufacturer	Material	Type	Weight			
			Empty		Full	
			[kg]	[lb]	[kg]	[lb]
Balóny Kubíček	Stainless steel	KB72L	20	44	54	119
		KB97L	24	53	70	154
Schroeder Fire Balloons	Stainless steel	VA 50	15	33	36	80
		VA 70	18	40	48	107
Cameron Balloons	Aluminium	Worthington (CB250)	14	31	34	75
		CB2990	13	26	34	71
	Stainless steel	CB497	16	35	34	75
		CB599	20	44	41	90
		CB2088	22	48	50	110
		CB426	22	48	51	112
		CB 959	25	55	61	135
	Titanium	CB2385	11	24	34	75
		CB2387	14	31	41	90
		CB2380	13	29	42	93
		CB2383	15	33	52	114
	Duplex stainless steel	CB2900	21	46	44	96
		CB2901	23	51	53	117
		CB2902	24	53	51	113
		CB2903	27	60	63	139
Lindstrand Balloons	Stainless steel	V20	14	31	34	75
		V30	18	40	48	106
		V40	20	44	60	132
	Titanium	T30	10	22	40	88
Thunder & Colt	Stainless steel	V20	14	31	34	75
		V30	18	40	48	106
		V40	20	44	60	132
Ultramagic	Stainless steel	M-20, M-20D	15	33	35	77
		M-30, M-30D	20	44	50	110
		M-40, M-40D	24	53	64	141

Fuel cylinders listed above are approved for use in balloons covered by this Manual.

INTENTIONALLY LEFT BLANK

8.2 APPENDICES

Appendix 1: Balloon Performance

The folowing table indicates balloon performance based of flight tests performed at the maximum takeoff weight and using average piloting techniques.

Model	Minimum Climb in first 60 s		Altitude Drop to Reach Max. Rate of Descent		Maximum Altitude Drop to Recover from the Max. Descent	
	[m]	[ft]	[m]	[ft]	[m]	[ft]
All BB models *	95 **	310 **	450	1 475	450	1 475
BB9	95 **	310 **	200	656	200	656
BB17GP, BB20GP	135	420	490	1 605	250	820
XR models	135	420	460	1 508	250	820

* Applicable to all models of BB type models except below mentioned

** The minimum attainable height for all BB type models

CAUTION: (FOR BB9)

Compared to larger envelopes the BB9 has a lower heat inetria that gives it an agile response to heating and early tendence to a fast descent.

Appendix 2: Basket Occupancy

In addition to the limitations in section 2 (Operational Limitations and section) and 5 (Weight) the following factors should be considered when deciding how many occupants may be carried in a basket. This guidance assumes that the standard occupant is an adult with a mass of 77 Kg (170 lb).

The pilot should take into account the relative mass of the passengers and evenly distribute the payload when a compartmentalised basket is used.

The maximum number of occupants in each compartment or in open basket is limited by the remaining floor area not occupied by fuel cylinders.

In all open baskets and in all separate compartments each passenger must have a minimum of 0.25 m^2 (2.6 sq ft) of floor area.

Floor areas occupied by fuel cylinders (CA) are:

0.15 m^2 (1.6 sq ft) - all cylinders if not placed in corner

0.11 m^2 (1.4 sq ft) - cylinders VA50, CB599, CV2385, CB2088, CB2387, V20, M-20, M-20D placed in corner

0.13 m^2 (1.18 sq ft) - all other cylinders listed above placed in corner

Calculation of maximum occupancy of each compartment or open basket: $N = \frac{FA - (NFC \times CA)}{0.25}$

where N - maximum number of persons in compartment or open basket

FA - floor area in m^2, taken from section 2.10

NFC - number of fuel cylinders

CA - floor area occupied by cylinder

The non-whole results must be rounded down to the nearest whole number!

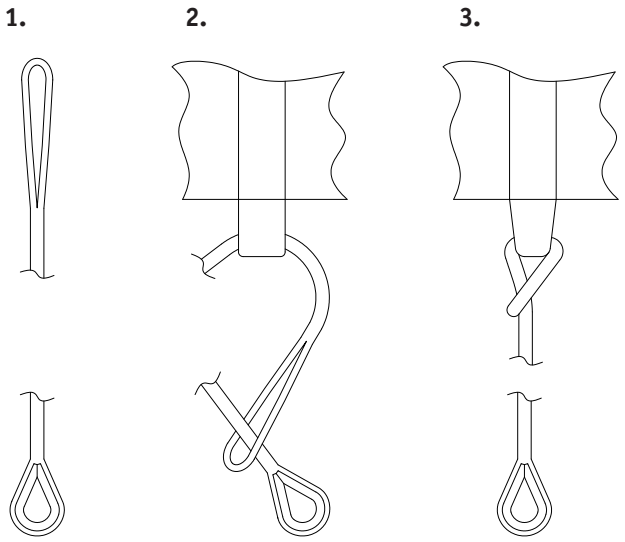
Appendix 3: Kevlar Flying Cables Replacement

Kevlar flying wires are designed for simple replacement without any tools.

The kevlar flying cables consist of the Kevlar core covered with the heat resistant braid. Metal thimble on one end attaches to a karabiner at the burner frame, the other loop end to the envelope load tape loop.

Kevlar flying cables are to be inspected before every flight (see para 4.3.3) and, if necessary, replaced as follows:

1. Remove the existing cable by loosening the loop passing through the load tape loop at the envelope mouth. Prepare the new cable and check it is of the same length as the removed one.
2. Insert the flying cable loop into the load tape loop, then pass the thimble end through the loop end.
3. Tighten the loop by pulling the cable while arranging the joint of the loops so the bends were as least sharp as possible.



Installation of Kevlar Flying Cables

Appendix 4: Baskets up to s/n 399

Baskets Limitations:

Basket	Floor area		Load capacity		Max. Number of Occupants
	[m^2]	[sq. ft]	[kg]	[lb]	
K7	0.72	7.8	450	991	2
K10	0.89	9.6	600	1 322	3
K11	1.14	12.2	650	1 432	3
K12, K12A	1.35	14.5	700	1 542	4
K13	1.22	13.1	700	1 542	4
K13S	1,15	12,4	550	1 210	3
K15	1.45	15.6	800	1 762	5
K16	1.62	17.5	900	1 982	5
K17	1.68	18.4	900	1 982	5
K18	1.80	19.4	950	2 093	6
K22	2.24	24.1	980	2 159	8
K25P	2.60	28.0	1 000	2 203	8
K28	3.52	37.9	1 100	2 423	8
K32T	3.84	32.4	1 100	2 423	10
K32Y	3.84	32.4	1 100	2 423	10
K32TT	4.00	43.1	1 100	2 423	10
K40Y	4.08	43.9	1 200	2 643	12
K50	4.80	51.7	1 400	3 084	14
K50TT	4.80	51.7	1 400	3 084	14
K60	5.95	64.0	1 800	3 965	18
K70	6.48	70.0	3 000	6 601	22
K80	7.5	80.7	3 400	7 489	26
K100	9.76	105.0	4 000	8 811	30
K110	10.56	113.7	4 000	8 811	34

Occupancy of Compartmentalised Baskets:

Basket	Max.Ooccupancy of Passenger Compartments	Max. Occupancy of Pilot Compartment	Pilot Compartment Floor Area	
			[m^2]	[sq. ft]
K28	3 persons	pilot + 1 person	1.32 (variant T) 1.12 (variant Y)	14.2 (variant T) 12.0 (variant Y)
K32T	4 persons	pilot + 1 person	1.19	12.8
K32Y	4 persons	pilot + 1 person	1.12	12.0
K32TT	2 persons	pilot + 1 person	1.32	14.2
K40Y	5 persons	pilot + 1 person	1.19	12.8
K50	6 persons	pilot + 1 person	1.32	14.2
K50TT	3 persons	pilot + 1 person		
K60	4 persons	pilot + 1 person	1.4	15.1
K70	5 persons	pilot + 1 person		
K80	6 persons	pilot + 1 person		
K100	outer comp.: 3 persons inner comp.: 4 persons	pilot + 1 person	1.84	19.8
K110	4 persons	pilot + 1 person	1.84	19.8

Table of Baskets

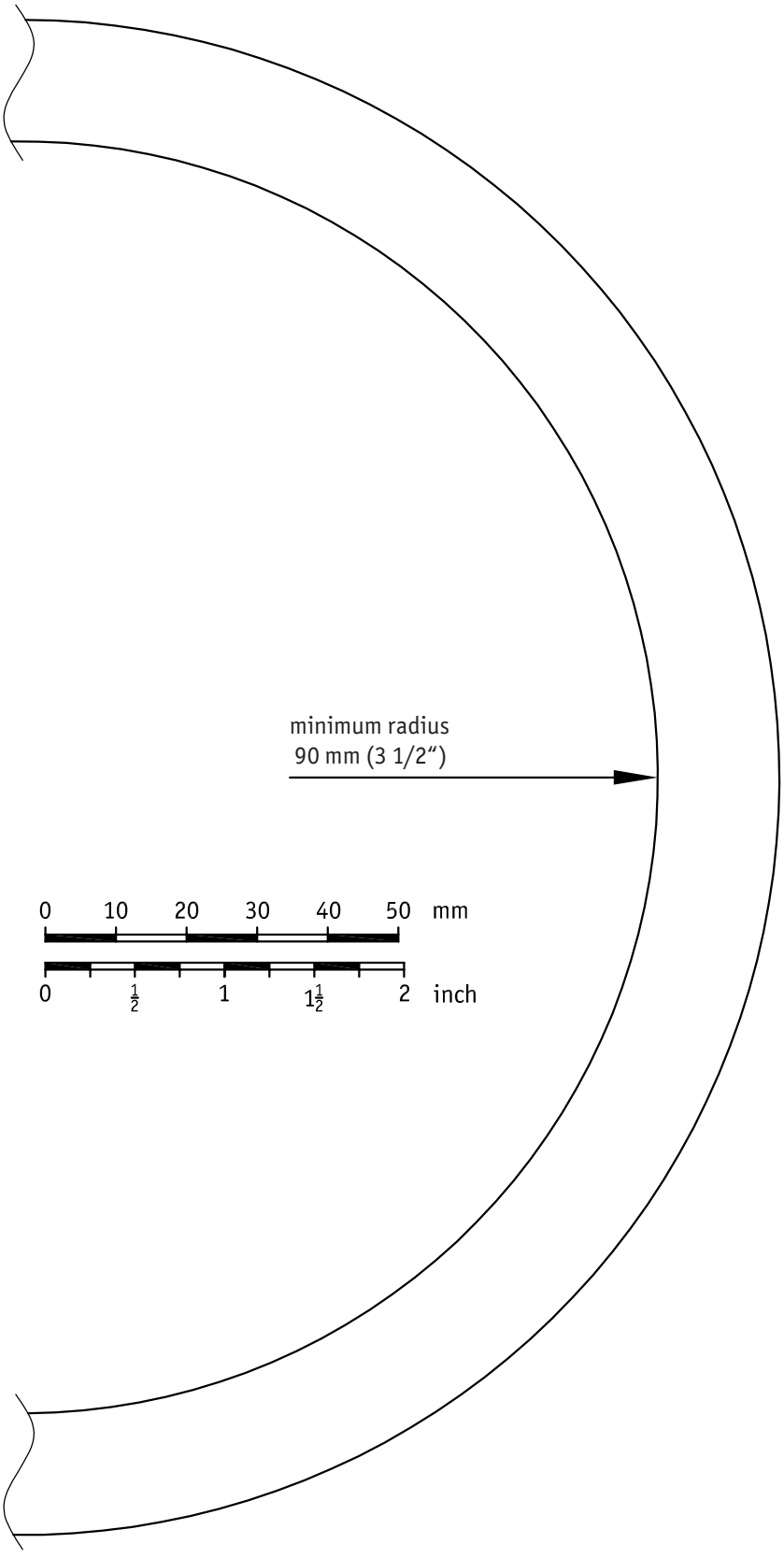
Basket Model	Basket Description	Typical Basket Weight*		Applicable Burners Frames
		[kg]	[lb]	
K7	85 x 85 Open	50	110	Fixed or Vario Frame - basic
K10	85 x 100 Open	60	132	
K11	98 x 116 Open	70	154	
K12, K12A	116 x 116 Open	80	176	
K13	116 x 125 Open	80	176	
K13S	95 x 126 Open	45	99	
K15	116 x 125 Open	85	187	
K16	116 x 140 Open	90	198	
K17	116 x 145 Open	90	198	
K18	116 x 155 Open	100	220	
K22	125 x 179 Open	105	241	
K25P	125 x 208, two partitions	135	297	Fixed Frame - K25P type
K28	160 x 220, T or Y three partitions	150	330	Fixed Frame - K32T type
K32T	125 x 241, T three partitions	160	352	Fixed Frame - K32T type
K32Y	160 x 240, Y three partitions	170	352	Fixed Frame - K32T type
K32TT	160 x 250, double T five partitions	170	352	Fixed Frame - K32TT or K50TT type
K40Y	163 x 250, Y three partitions	220	485	Fixed Frame - K50 type
K50	160 x 300, T or Y three partitions	270	594	Fixed Frame - K50 type
K50TT	160 x 300, double T five partitions	300	661	Fixed Frame - K32TT or K50TT type
K60	170 x 350, double T five partitions	320	705	Fixed Frame - K60 type or K60 STRONG type
K70	170 x 400, double T five partitions	400	881	
K80	170 x 450, double T five partitions	450	991	
K100	160 x 610, nine partitions, double double T	550	1 211	Fixed Frame - K100 type
K110	160 x 660, nine partitions, double double T	600	1 322	Fixed Frame - K100 type

* Typical basket weight includes the minimum equipment specified in para 2.5

INTENTIONALLY LEFT BLANK

Appendix 5: Minimum Fuel Hose Radius

Minimum fuel hose radius template:



INTENTIONALLY LEFT BLANK

SECTION 9 - SUPPLEMENTS

Introduction

This Section lists supplements containing essential information for the safe and reliable operating of a balloon that differs because of technical and/or operational reasons. Each supplement is writen in the same manner as this Manual and provides information and limitation that are peculiar to each specific equipment and/or operation. Where the information in a supplement differs from the main section of the Flight Manual the supplement is to be complied with.

LIST OF SUPPLEMENTS

Number	Description	Revision	Approval Date

LET US HELP YOU!

In case that you have any suggestion, difficulty, problem or comment, please contact our technical department at:

technical@kubicekballoons.cz

+420 545 422 642

DO Approval EASA.21J.277

BALÓNY KUBÍČEK spol. s r. o.
e-mail: sales@kubicekballoons.cz • www.kubicekballoons.cz
Seat: Brno 602 00 • Francouzská 81 • Czech Republic
Office: Brno 61400 • Jarní 2a • Czech Republic
tel.: +420 545 422 620, • fax: +420 545 422 621