B.0102

BALÓNY KUBÍČEK spol. s r.o.
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

Type: .....

Model: .....

Serial No.: .....

Registration: .....

Date of Issue: .....

Registered copy No.: .....

This manual is EASA approved under Approval Number **EASA.BA.C.01137**

Pages identified by „Appr." are approved by the EASA.

Original date of approval: 04.10.2005

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.

INTENTIONALLY LEFT BLANK

0.1 RECORD OF REVISIONS

Any revision of the present manual, except actual weighing data, must be recorded in the following table and in case of approved Sections endorsed by the responsible airworthiness authority.
The new or amended text in the revised page will be indicated by a black vertical line in the left hand margin, and the Revision No. and the date will be shown on the bottom of the page.

Rev. No.	Affected Section	Affected Pages	Date of Issue	Approval	Date of Approval	Date of Insertion	Signature
1	0 1 2 4 6 7	I, III 2, 4, 5 3, 4, 7 1, 2, 5, 6, 7, 8, 2, 3 2, 3, 4	18.10.01	Shrbený	18.10.01	18.10.01	
2	0 1 2 5 8	I, III 3, 4, 5 3, 7 3 2	19.12.01	Shrbený	15.01.02	15.01.02	
3	0 1 2 5 6 7	I, III 3, 4 1, 2, 3, 4, 5, 7, 8, 9, 10 2, 3 2, 3, 4 2	01.07.02	Shrbený	01.07.02	01.07.02	
4	0 1 2 4 5 6 7	I, III 1, 3, 4, 5 6, 7 all 4 2, 3 4 2, 4, 5	12.02.03	Shrbený	12.02.03	12.02.03	
5	0 1 2 4 7	I, III 5 2, 9 2 5	20.01.04	Shrbený	20.01.04	20.01.04	
6	0 1 2 5 7	II,III 3, 4, 5 2, 4, 6, 8, 9 3 2, 4, 5	25.10.04	Shrbený	25.10.04	25.10.04	

Rev. No.	Affected Section	Affected Pages	Date of Issue	Approval	Date of Approval
7	0 1 2 5	II, III 2, 3, 4, 5 4, 9, 11 3	23.08.2005	EASA.B.102	04.10.2005
8	0 1 2 5	II, III 3 2, 4, 9 3	10.02.2006	EASA.B.101	04.04.2006
9	0 1 2 5	II, III 2, 3 4, 8 3	11.09.2006	EASA.B.121	27.11.2006
10	0 1 2 5 7	II, III 2, 3, 5 2, 4, 7, 8, 9, 10 3 3	09.01.2007	EASA.B.01083	04.04.2007
11	0 1 2 5	II, III 3, 5 4, 8, 9 2, 3	17.07.2007	EASA.B.01103	17.07.2007
12	0 1 2	II, III 4 8, 9	08.02.2008	EASA.BA.C.01137	17.03.2008
13	0 1 2 5	II, III 3 3, 4, 8 2, 3	04.03.2008	EASA.BA.C.01143	07.04.2008
14	0 1 2 3 5 7	II, III 2, 3, 4, 5 2, 3, 4, 7, 8 3 2, 3 6	12.05.2008	EASA.BA.C.01141	22.07.2008
15	0 1 2 5	II, III 3 4, 8 3	17.10.2008	EASA.BA.C.01170	18.11.2008
16	0 2 4	II, III 7, 8 6, 7, 8	11.05.2009	EASA.BA.C.01184	15.06.2009
17	0 1 2 7	II, III 4 7, 8 3	20.06.2009	EASA.BA.C.01185	31.08.2009
18	0 1 2	II, III 5 8	01.09.2009	EASA.BA.C.01196	25.08.2009

Rev. No.	Affected Section	Affected Pages	Date of Issue	Approval	Date of Approval
19	0 1 2	III, V 5 1, 7, 8, 9	10. 05. 2010	0010004491-001	10. 05. 2010
20	0 1	III, V 6, 7	29. 04. 2011	DOA approved	29. 04. 2011
21	0 4	III, V 3	21. 10. 2011	DOA approved	21. 10. 2011
22	0 1 2 10	III, V, VI 4 7 1, 2, 3	24. 11. 2011	DOA approved	24. 11. 2011
23	0 2 4	III, V 6 1, 3 - 9	02. 04. 2013	10044278	02. 04. 2013
24	0 4 10	III, V 2 1, 4	19. 06. 2013	10045366	19. 06. 2013
25	0 1	III, V 6	26. 02. 2015	DOA approved	26. 02. 2015
26	0 1 2 10	III, V 4, 5, 6 7 2,3	05. 04. 2016	10057624	05. 04. 2016
27	0 2 1 4	III, V 1, 11 6 1, 2, 3	09. 12. 2016	10060415	09. 12. 2016

INTENTIONALLY LEFT BLANK

0.2 LIST OF EFFECTIVE PAGES

Section	Page	Date of Issue	Section	Page	Date of Issue
0	I	20.01.2004	5	5 - 1	11.12.2000
	II	01.09.2009		Appr. 5 - 2	12.05.2008
	III	09.12.2016		5 - 3	17.10.2008
	IV	25.10.2004			
	V	09. 12. 2016	6	6 - 1	11.12.2000
				6 - 2	01.07.2002
1	1 - 1	11.12.2000		6 - 3	01.07.2002
	1 - 2	12.05.2008		6 - 4	12.02.2003
	1 - 3	17.10.2008			
	1 - 4	05.04.2016	7	7 - 1	11.12.2000
	1 - 5	05.04.2016		7 - 2	25.10.2004
	1 - 6	09.12.2016		7 - 3	20.06.2009
	1 - 7	29.04.2011		7 - 4	25.10.2004
				7 - 5	20.01.2004
2	2 - 1	09.12.2016		7 - 6	12.05.2008
	Appr. 2 - 2	12.05.2008			
	Appr. 2 - 3	12.05.2008	8	8 - 1	11.12.2000
	Appr. 2 - 4	17.10.2008		8 - 2	19.12.2001
	Appr. 2 - 5	12.02.2003		8 - 3	11.12.2000
	Appr. 2 - 6	02.04.2013		8 - 4	11.12.2000
	Appr. 2 - 7	05.04.2016			
	Appr. 2 - 8	10.05.2010	9	9 - 1	11.12.2000
	Appr. 2 - 9	10.05.2010		9 - 2	11.12.2000
	Appr. 2 - 10	09.01.2007			
	Appr. 2 - 11	09.12.2016	10	10-1	19.06.2013
				10-2	05.04.2016
3	3 - 1	11.12.2000		10-3	05.04.2016
	Appr. 3 - 2	11.12.2000		10-4	19.06.2013
	Appr. 3 - 3	11.12.2000			
	Appr. 3 - 4	11.12.2000			
	Appr. 3 - 5	11.12.2000			
4	4 - 1	09.12.2016			
	Appr. 4 - 2	09.12.2016			
	Appr. 4 - 3	09.12.2016			
	Appr. 4 - 4	02.04.2013			
	Appr. 4 - 5	02.04.2013			
	Appr. 4 - 6	02.04.2013			
	Appr. 4 - 7	02.04.2013			
	Appr. 4 - 8	02.04.2013			
	Appr. 4 - 9	02.04.2013			

NOTE:
The pages, approved by the EASA and involved on the list above, are identified as "Appr..

0.3 TABLE OF CONTENTS

SECTION 1

1. General

1. GENERAL

1.1 Introduction

The Flight Manual (the manual only hereafter) has been prepared to provide pilots and instructors with information for the safe and efficient operation of the manned BB, AB 2, AB 2a, AB 8 and AEROTECHNIK AB, BB-S hot air balloon. This manual includes the material required to be furnished to the pilot. It also contains supplemental data supplied by the balloon manufacturer.
All changes and appendices of the Maintenance Manual elaborated before the date of the issue stated on the title page are incorporated to this manual by the manufacturer. Every alternative parameters and progress relating hot air balloon BB-S is definition of addition by this manual.

1.2 Certification Basis

BB balloon has been approved by the EASA in accordance with FAR Part 31, Amendment 31- 7 except models approved by previous amendments or different certification rule:

FAR Part 31, Amdt. 31- 4: envelopes BB12, BB16, BB20, BB22N, BB26N, BB30N, BB37N, BB60N, baskets K7, K10, K12, K12A, K15, K16, K18, burners HB2, H4, KOMET DUO to s/n 104 including

FAR Part 31, Amdt 31-5: envelope BB45N

CS-31HB (NPA 07-2006): baskets K50 and K60

and the Type Certificate No. EASA.BA.003

BB-S balloon has been approved by the EASA in accordance with FAR Part 31, Amendment 31- 7 and the Type Certificate No. EASA.BA.017

Category of Airworthiness Normal.
AB 2, AB 2a balloon has been approved by the EASA in accordance with FAR Part 31 including Amendment 31- 4 and the Type Certificate No. EASA.BA.001 has been issued on 8.2.2005.
Category of Airworthiness Normal.
AB 8 balloon has been approved by the EASA in accordance with FAR Part 31 including Amendment 31- 4 and the Type Certificate No. EASA.BA.002 has been issued on 8.2.2005.
Category of Airworthiness Normal.
AEROTECHNIK AB balloon has been approved by the EASA in accordance with FAR Part 31 including Amendment 31- 4 and the Type Certificate No. EASA.BA.004 has been issued on 8.2.2005.
Category of Airworthiness Normal.

1.3 Warnings, Cautions and Notes

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

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

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

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

1.4 Descriptive Data

1.4.1 Envelopes

Envelope model table - technical data:

Envelope Model	Volume [m^3]	Height [m]	Equator Diameter [m]	No. Gores [pc]	Mouth Diameter [m]	Vent Aperture Diameter		Weight [kg]
						Parachute [m]	Smart Vent [m]	
BB12	1200	12,5	13,4	8	3,0	3,0	-	55
BB16	1600	13,6	14,0	8	3,5	3,9	-	65
BB17GP	1700	16,8	14,5	16	3,5	4,0	4,0	75
BB20	2000	15,4	15,4	12	3,5	3,9	-	85
BB20E	2000	15,9	16,2	12	4,0	5,0	-	85
BB20GP	2000	17,9	15,4	24	3,8	5,0	-	90
BB20XR	2000	20,3	14,4	20	3,6	4,8	-	85
BB22	2200	16,2	17,5	12	4,0	5,0	-	90
BB22E	2200	16,5	16,7	12	4,0	5,0	-	90
BB22N	2200	16,2	16,2	24	4,0	5,0	5,0	95
BB22Z	2200	16,2	16,2	24	4,0	5,0	5,0	95
BB26	2600	17,4	17,5	12	4,0	5,0	-	100
BB26E	2600	17,5	17,6	12	4,0	5,0	-	100
BB26N	2600	17,4	17,2	24	4,0	5,0	5,0	110
BB26Z	2600	17,4	17,2	24	4,0	5,0	5,0	110
BB30N	3000	18,8	18,4	24	4,0	5,0	6,0	120
BB30Z	3000	18,4	18,0	24	4,0	5,0	6,0	120
BB34Z	3400	19,3	18,9	24	4,0	6,0	6,0	140
BB37N	3700	20,0	19,7	24	4,0	6,0*	6,0	145
BB37Z	3700	20,0	19,7	24	4,0	6,0	6,0	145
BB42Z	4200	20,7	20,3	24	4,5	6,0	6,4	155
BB45N	4500	21,1	20,7	24	4,5	6,0	6,4	160
BB45Z	4500	21,1	20,7	24	4,5	6,0	6,4	160
BB51Z	5100	22,1	21,6	24	4,5	6,0	6,4	180
BB60N	6000	23,6	22,9	32	4,5	-	6,4	205
BB60Z	5950	23,4	22,7	24	4,5	6,0	6,4	190
BB70Z	7000	24,6	24,76	24	5,0	-	7,0	220
BB85Z	8500	26,5	25,62	28	5,0	-	7,0	250
AB2	2190	19,0	17,0	28	4,0	5,0	-	90
AB2a	2190	19,0	17,0	28	4,0	5,0	-	90
O22	2190	16,2	18,4	12	4,0	4,9	-	77
N22	2190	16,0	17,4	20	4,0	5,2	-	85
N30	3000	18,2	18,5	24	4,0	5,5	-	106
AB8	3000	22,0	18,5	24	4,0	5,0	-	110

* On early envelopes the vent hole diameter is 5 m

NOTE:

The tabulated weights are indicative figures only. The actual weight is indicated by index plate on each envelope.

1.4.2 Baskets

The data in the below table apply to baskets of s/n 400 and higher. The appropriate data for baskets up to s/n 399 are stated in the Appendix 1 of this Manual.

Basket model table - technical data:

Basket	Width [cm]	Length [cm]	Height [cm]	Weight [kg]	Load Capacity [kg]	Max. No. Occupants
K7	85	85	110	50	450	2
K10	86	116	110	60	600	3
K11	98	116	110	70	650	3
K12	116	116	110	80	700	4
K12A	116	116	110	80	700	4
K13	116	125	110	80	700	4
K13S	100	120	100	40	550	3
K15	116	135	110	85	800	5
K16	116	145	110	90	900	5
K17	116	145	110	90	900	5
K18	116	155	110	100	950	6
K19	116	155	110	90	950	6
K19L	116	162	110	110	950	6
K22	125	180	110	120	980	8
K23	125	180	110	120	980	6
K25P	125	210	110	140	1000	8
K28H	160	235	110	170	1100	8
K30PP	125	260	110	230	1100	10
K32T	160	240	110	210	1100	10
K40Y	160	270	110	230	1200	12
K50	160	300	110	270	1400	14*
K50TT8	160	300	110	310	1400	14**
K55X	160	345	110	335	1400	16***
K58HH	160	380	110	375	1400	14****
K60	160	380	110	350	1800	18*****
K60X	160	390	110	378	1800	18******

The basket dimensions refer to nominal outside dimensions; heights are measured from a basket floor to the basket edge.

* Occupancy of K50 basket: Pilot may place one person into the pilot compartment if there is no more than four fuel cylinders. Otherwise no more than six persons may be placed in one compartment.

** Occupancy of K50TT8 basket: Pilot may place one person into the pilot compartment if there is no more than five fuel cylinders. Otherwise no more than three persons may be placed in one compartment.

*** Occupancy of K55X basket: Pilot may place one person into the pilot compartment if there is no more than five fuel cylinders. Otherwise no more than three persons may be placed in outer compartments and no more than four persons in middle compartment.

**** Occupancy of K58HH basket: Pilot may place one person into the pilot compartment if there is no more than five fuel cylinders. Otherwise no more than two persons may be placed in one compartment.

*****Occupancy of K60 basket: Pilot may place one person into the pilot compartment if there is no more than five fuel cylinders. Otherwise no more than four persons may be placed in one compartment.

******Occupancy of K60X basket: Pilot may place one person into the pilot compartment if there is no more than five fuel cylinders. Otherwise no more than four persons may be placed in one compartment.

NOTE:
The tabulated weights are an indicative figure only. The actual weight is indicated by index plate on each basket. The actual weight indicates the total weight including minimum equipment and burner rods.

1.4.3 Burners

Burner type table:

Type	Burner weight including frame and hoses [kg]	Largest usable envelope volume [m^3]
H3	16	2000
H3 - D	20	2200
HB2	24	5100
IGNIS 2 units (K10-K18)	23	6000
IGNIS 2 units (K22)	24	
IGNIS 2 units (K23)	26	
IGNIS 2 units (K25P)	26	
IGNIS 2 units (K30PP)	36	
KOMET DUO (K10-K18)	21	3700 (5100*)
KOMET DUO (K22)	22	
KOMET DUO (K25P)	24	
KOMET TRIO (K25P-K32T)	38	8500
IGNIS 3 units (K25P)	41	
IGNIS 3 units (K32T)	42	
IGNIS 3 units (K30PP)	45	
KOMET TRIO (K40Y)	42	
IGNIS 3 units (K40Y)	45	
IGNIS 3 units (K50)	53	
IGNIS 3 units (K60)	56	
IGNIS 3 units (K60X)	60	
IGNIS 4 units (K50)	60	10000
IGNIS 4 units (K60)	63	
IGNIS 4 units (K60X)	68	
H4	42	6000

* Burners from serial number 105 and higher

NOTE:
On the KOMET DUO burners up to S/N 104 the actual weight is indicated by index plate, on the burners from S/N 105 the actual weight is pressed into the middle suspension between the burner units.

1.4.4 Fuel cylinders

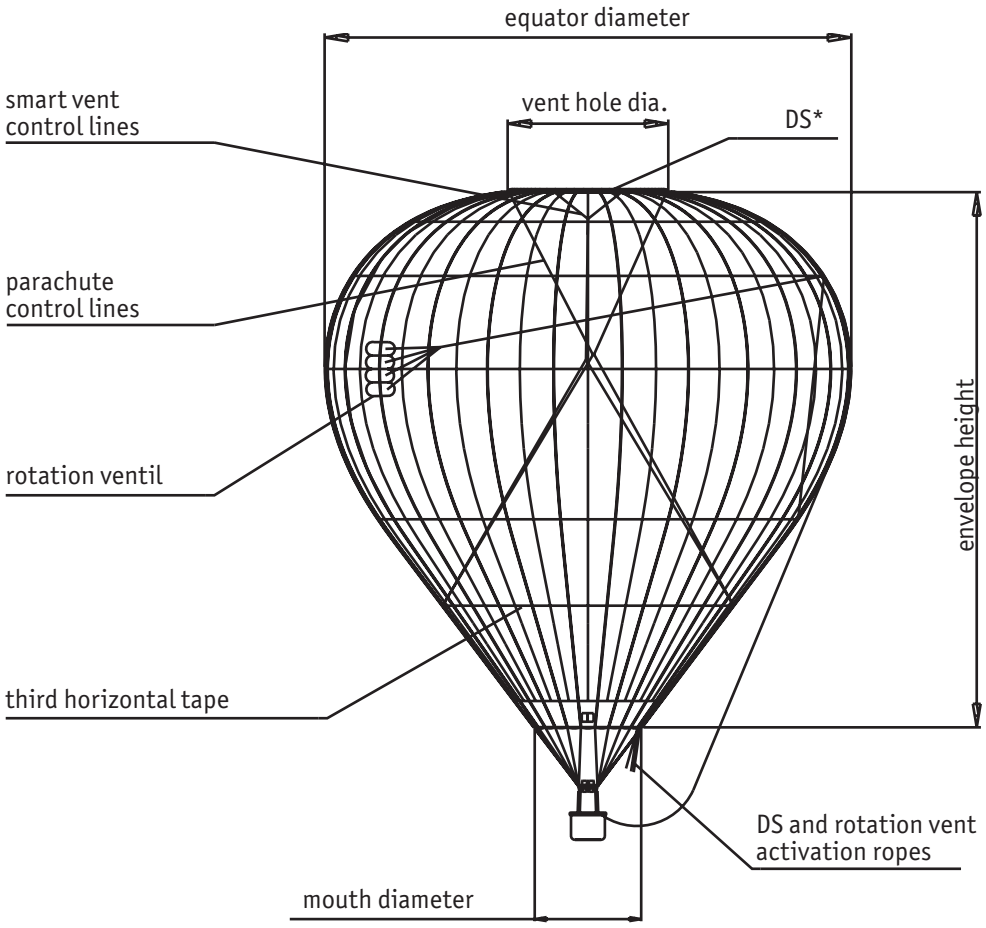
For the balloons mentioned in this manual, the fuel cylinders tabulated below can be used with.

Cylinder type table:

Manufacturer	Material	Type	Volume [l]		Configuration	Weight [kg]	
			Total	Usable		Empty	Full
Balóny Kubíček	Stainless steel	KB72L	72	61,2	Master	19,7	53,5
					Standard	19,3	53,1
		KB97L	97	82,5	Master	24,4	70,1
					Standard	24,0	69,7
Schroeder Fire Balloons	Stainless steel	VA 50	52,0	41,6	Master	14,9	36,1
					Standard	14,5	35,7
		VA 70	70,0	56,0	Master	18,3	48,3
					Standard	18,0	48,0
Worthington	Aluminium	CB250-001 (D0T4E240)	47,0	38,0	Master	14,0	34,0
					Standard	13,0	33,0
Cameron Balloons	Stainless steel	CB497	46,8	37,4	Master	15,8	34,4
					Standard	15,3	33,9
		CB599 (V20)	51,0	41,0	Master	19,6	41,0
					Standard	18,8	40,0
		CB20088 (V30 Tall)	65,0	52,0	Master	22,0	50,0
					Standard	21,2	49,0
		CB426 (30)	69,0	55,0	Master	21,7	51,0
					Standard	20,9	50,0
		CB959 (V40)	88,0	70,0	Master	25,1	62,0
					Standard	24,3	61,0
	Titanium	CB2385	51,0	41,0	Master	14,0	34,0
					Standard	13,6	33,0
		CB2387	65,0	52,0	Master	19,6	41,0
					Standard	18,8	40,0
		CB2380	69,0	55,0	Master	13,4	43,0
					Standard	12,6	42,0
		CB2383	88,0	70,0	Master	15,2	52,0
					Standard	14,4	51,0
	Aluminium	CB2990	50,0	40,0	Standard	13,0	34,0
Lindstrand Balloons	Stainless steel	CY-030-A-100	61,0	53,0	Master	19,0	49,0
					Standard	18,0	48,0
Ultramagic Balloons	Stainless steel	M 20, M-20D	47	38	Master	15	35
					Standard	14	34
		M30, M-30D	70	56	Master	20	50
					Standard	19	49
		M40, M-40D	95	76	Master	24	64
					Standard	22	63

NOTE:
The tabulated weights are an indicative figures only. The actual weight is indicated by index plate on each cylinder.

1.5 Envelope Nomenclature



* Deflation System

INTENTIONALLY LEFT BLANK

SECTION 2

2. Operational Limitations

2. OPERATIONAL LIMITATIONS

2.1 Introduction

Section 2 includes operational limitations, instrument markings, and basic index plates, necessary for safe operation of the balloon, its standard systems and standard equipment.
The limitations included in this section and Section 9 have been approved by the EASA.

2.2 Meteorological Conditions

The maximum surface wind speed for free balloon take-off: **14 knots = 7.5 m/s.**

The maximum surface wind speed for BB60, BB60Z balloon take-off using quick release with two attachments points on the burner frame (Y Type) : **11 knots = 6 m/s.**

The maximum surface wind speed for BB70Z balloon take-off using quick release with two attachments points on the burner frame (Y Type) : **10 knots = 5.5 m/s**

The maximum surface wind speed for free balloon take-off BB20XR with reduced fabric strenght: **10 knots = 5 m/s** (Reduced fabric strenght means the grab test carried out according to para 7.2 of the Maintenance Manual has proven the fabric strenght in range **10 - 13 kg**.)

The balloon should not be flown in meteorological conditions that give rise to erratic and gusty winds or in thermic conditions.

WARNING:
Flights near to ascending currents of thunderstorm clouds should be rigorously avoided. There is a risk of carrying up towards altitudes with oxygen insufficiency, very low temperature and dangerous turbulence.

The maximum surface wind speed for tethered balloon take-off and operating: **7.5 knots = 4 m/s.**

The maximum surface wind speed for tethered balloon BB20XR take-off and operating: **14 knots = 7.5 m/s.**

2.3 Temperatures

The maximum allowable envelope temperature depends on the fabric used above the third horizontal load tape (first one above the Nomex), and is defined as follows:

- Nylon, Polyurethane Coated Hot Air Balloons Fabric ..... max. 110 °C
- Polyester, Polyurethane or Acrylic Coated Hot Air Balloons Fabric ..... max. 124 °C

All these fabrics and temperatures are listed on the Envelope index plate – fabrics and maximum alowable temperatures (see 2.15). Fabrics used, above the third horizontal load tape, in a particular envelope is indicated by YES being marked against the fabric. The maximum envelope temperature is the lowest of all the fabrics used and this is indicated by YES marked against appropriate temperature.

☑ YES – this fabric is used / YES – this temperature is the max. allowable envelope temperature

☒ NO – this fabric is not used / NO – this temperature is not the max. allowable envelope temperature

CAUTION:
BB balloons up to the ser. number 211 including, balloons with special shaped envelope are not equipped with this plate, however they were all built from Kubíček fabric and the maximum allowable envelope temperature is 124°C.
For AB2 and AB2a balloons built from polyamide fabric, the maximum allowable envelope temperature is 110°C.
For AB8 and AEROTECHNIK AB balloons built from polyester fabric, the maximum allowable envelope temperature is 120°C.

CAUTION:
If there is a suspicion of exceeding the 124°C temperature (signalled by dropping of the melting link), it is necessary to do strength tests of envelope fabric (see the Maintenance Manual).

2.4 Rate of Climb and Descent

The maximum rate of climb (except BB17GP, BB20 GP and BB20 XR): **4.0 m/s**

The maximum rate of climb BB17GP and BB20 GP: **6.0 m/s**

The maximum rate of descent: **6.5 m/s**

The maximum rate of climb and rate of descend BB20XR: **9.0 m/s**

2.5 Instrument Markings

Instrument markings and color code meaning are tabulated below.

Table of manometer indicated overpressure:

Instrument	**Red Radial Line**	**Yellow Arc**	**Green Arc**	**Yellow Arc**	**Red Radial Line**
	Minimum Limit [bar]	Caution Range [bar]	Normal Operating [bar]	Caution Range [bar]	Maximum Limit [bar]
Fuel Pressure Manometer	2,8 bar	2,8 - 4 bar	4 -11 bar	11 -12 bar	12 bar

2.6 Weight

The maximum take-off and minimum landing weights are tabulated below:

Envelope Size	Max Take - Off Weight [kg]	Min. Landing Weight [kg]
BB12	385	180
BB16	470	230
BB17GP	495	250
BB20	630	280
BB20E	630	280
BB20 GP, BB20 XR	730	280
BB22	730	300
BB22E	680	300
BB22N	730	300
BB22Z	730	300
BB26	840	340
BB26E	730	340
BB26N	840	340
BB26Z	840	340
BB30N	945	410
BB30Z	945	410
BB34Z	1040	455
BB37N	1150	500
BB37Z	1150	500
BB42Z	1410	630
BB45N	1520	670
BB45Z	1520	670
BB51Z	1690	780
BB60N	1940	930
BB60Z	1940	930
BB70Z	2300	1060
BB85Z	2820	1350
AB2	550	300
AB2a	600	300
O22	600	300
N22	600	300
N30	900	410
AB8	900	410

The take-off weight in dependence on the ambient air temperature must never be higher than specified in Section 6, item 6.2.
The maximum take-off weight does not have to be calculated if the balloon is to be flown below 2000 m MSL provided, with the balloon buoyant on the ground prior to take off, the envelope temperature does not exceed + 90 °C over a period of three minutes.

CAUTION:
The balloon must not be flown if there is a danger of breaking the admissible take-off weight at any planned flight level.

2.7 Fuel

Approved fuel sort: G31 propane, G35 propane-butane

Max Admissible Fuel Pressure: 12 bar
In consideration of the pressure increasing into fuel cylinders, there is a possibility of NITROGEN technical gas use and its pressurization by means of the nitrogen pressurizing set, but the total pressure in a cylinder must not be higher than 12 bar.

Min. Admissible Fuel Pressure: 2.8 bar
The min. fuel quantity required for take-off is two full cylinders, for envelopes of 4500 m^3 volume and higher, three full cylinders.

The gas weight in cylinders must be found out by weighing or by means of the max. fill bleed valve.

WARNING:
The fuel cylinders should not be directly exposed to sunshine or heater effect. In case of the cylinder filling above the max level and consecutive cylinder warming-up, the dangerous pressure increase and ensuing the pressure relief valve opening can occur.

NOTE:
During flights at about the upper limit of allowable fuel pressure, there is a long burner flame. It is necessary to avoid long uninterrupted heating so as not to damage parachute lines.

2.8 Operation of Deflation System (DS)

Parachute

The parachute must be closed:

- during descent with the cold balloon
- during heating
- during flying with the first indication of mouth deformation

Smart Vent, Lite Vent

Opening of the Smart Vent or Lite Vent by means of the red activation rope if the basket is higher than 2 metres above ground, is prohibited.

2.9 Admissible Damage

The flight is permitted if there is any fabric damage below the third horizontal load tape.
The flight is permitted if there are any unrepaired tears or damages of min. size of 5 mm.

2.10 Crew and Load

The minimum crew:	one pilot
The minimum load:	see table 2.6
The maximum crew:	a pilot and other occupants, whose number does not exceed the permitted one according to the basket type
The maximum load:	the total sum of weights of all things and people in the basket, including full weights of cylinders, must not exceed the load capacity of the basket.

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.

2.11 Operational Categories

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

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

2.12 Minimum Equipment

A range of prescribed balloon equipment must comprise for every flight:
- Altimeter
- Variometer
- Melting link for the envelope overheating check
- Fuel quantity gauge
- Two sources of ignition
- Drop line
- Fire extinguisher
- Heat-resistant cloth

The altimeter, variometer and thermometer can be replaced by a combined electronic instrument with reading facility of measured temperatures in the basket and supplied with Type Approval for use in civil aviation in the manned balloon category.

CAUTION:
The melting link provides security against envelope over-heating above the permitted limit. There is the A124 melting link, which is cut-off at temperature of 124°C.

2.13 Fitment Interchangeability

Approved combinations of envelopes and baskets:

	Basket model																
Envelope model	**K7**	**K10**	**K11**	**K12, K12A**	**K13, K13S**	**K15, K16**	**K17**	**K18**	**K19, K19L**	**K22**	**K23**	**K25P**	**K28H, K30PP**	**K32T**	**K40Y**	**K50, K50TT8, K55X, K58HH**	**K60, K60X**
BB12		124															
BB16		124															
BB17GP		124															
BB20, BB20E, BB20GP		124															
BB20XR		124															
BB22, BB22E, BB22N, BB22Z		124															
BB26, BB26E, BB26N, BB26Z																	
BB30N, BB30Z																	
BB34Z																	
BB37N, BB37Z												RV	RV	RV			
BB42Z												RV	RV	RV			
BB45N, BB45Z												RV	RV	RV	RV	RV	
BB51Z												RV	RV	RV	RV	RV	
BB60N, BB60Z												RV	RV	RV	RV	RV	RV
BB70Z												RV		RV	RV	RV	RV
BB85Z															#RV	#RV	RV
AB2		124															
AB2a		124															
022		124															
N22		124															
N30		124															
AB8		124															

Approved combinations of envelopes and burners:

	Burner									
Envelope model	**H3**	**H3-D**	**HB2**	**KOMET DUO up to 104**	**KOMET DUO 105+**	**H4**	**KOMET TRIO**	**IGNIS 2 units**	**IGNIS 3 units**	**IGNIS 4 units**
BB12	■	■		■						
BB16	■	■		■						
BB17GP	■	■	■	■	■			■		
BB20, BB20E, BB20GP	■	■	■	■	■			■		
BB20XR		■	■	■	■			■		
BB22, BB22E, BB22N, BB22Z	■	■	■	■	■			■		
BB26, BB26E, BB26N, BB26Z		■	■	■	■			■		
BB30N, BB30Z		■	■	■	■			■		
BB34Z		■	■	■	■			■		
BB37N, BB37Z		■	■	■	■			■		
BB42Z		■	■	■	■	■	■	■	■	
BB45N, BB45Z			■		■	■	■	■	■	■
BB51Z			■		■	■	■	■	■	■
BB60N, BB60Z						■	■	■	■	■
BB70Z						■	■		■	■
BB85Z									■	■
AB2		■	■	■	■			■		
AB2a		■	■	■	■			■		
O22		■	■	■	■			■		
N22		■	■	■	■			■		
N30			■	■	■			■		
AB8			■	■	■			■		

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

Approved combination of AEROTECHNIK equipment:

Balloon type	*Basket*	*Burner*
AB2, AB2a	1.1x1.1, height 1.0 m	HB1
AB8	J1, J2	HB2
AEROTECHNIK AB (022, N22, N30)	J1, J2	HB2a

NOTE:
Conditions for combination with envelopes, baskets and burners of other manufacturers are specified in the optional bulletin No. BB/22b-1

2.14 Other Limitations

Burner
The operation of type approved balloons is permitted with burner backup only. The backup means a functional independent whisper burner as well.

Flight Level
The balloon without oxygen apparatuses and masks must not be flown at levels with ambient air pressure lower than 700 hPa.

Smoking
Smoking in the balloon and within 30 m is prohibited.

2.15 Index Plates

2.15.1 BB Balloons

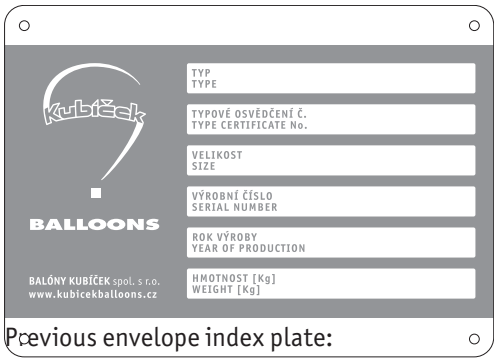
There are following kinds of index plates used on BB balloons.

Balloon index plate
Two kinds of these plates are used (previous and new). The previous one is fixed to the first horizontal tape of the envelope mouth, the new one is fixed to the outside lower part of the envelope mouth.
Envelope index plate
Two kinds of plates are used. The previous one is fixed to the first horizontal tape of the envelope mouth, the new one is fixed to the outside lower part of the envelope mouth.

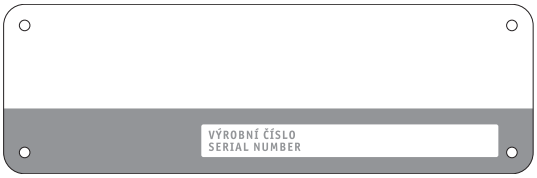
Basket index plate
Two kinds of these plates are used. They are fixed inside to the basket near the top rim The new basket plate is identical to the envelope index plate.
Burner index plate (KOMET type only)
Each KOMET burner is identified by two index plates, one on the underside of each burner body. The serial No. and the year of manufacture are pressed into the middle suspension between the burners (KOMET type) or into the coils (other burners).

Envelope fabric index plate
The plate is sewed to the first horizontal tape of the envelope mouth.

New envelope and basket index plate:



New balloon index plate:



Pœevious envelope index plate:

PRODUCER: KUBÍČEK
TYPE: xx x PART NO.: xx
YEAR: xxxx
L.CAPACITY: WEIGHT:
xxxx m³ xxx kg

Previous balloon index plate:

PRODUCER: KUBÍČEK
TYPE: xx x SER. NO.: xx
YEAR: xxxx REG. NO.:
XX - XXXX

Previous basket index plate:

PRODUCER: KUBÍČEK
TYPE: xx x PART NO.: xx
YEAR: xxxx
L.CAPACITY: WEIGHT:
xxx kg xxx kg

Index plates of the KOMET DUO burner

Index plate of KOMET burner from S/N 105

Index plate of the envelope fabric – fabric and maximum allowable temperature

Polyester, Polyurethane or Acrylic Coated Hot Air Balloons Fabric		max. 124 °C	
Nylon, Polyurethane Coated Hot Air Balloons Fabric		max. 110 °C	

2.15.2 AB2, AB2a, AB8 and AEROTECHNIK AB Balloons

Index plates of these balloons are uniform for all types and parts. Their locations are identical to BB balloons.

Index plate of the AEROTECHNIK AB balloon with N30 envelope:

J2 basket index plate:

NOTE:
Other index plates and labels are specified in the Maintenance Manual, related to the particular component.

2.16 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!

INTENTIONALLY LEFT BLANK

SECTION 3

3. Emergency Procedures

3. EMERGENCY PROCEDURES

3.1 Introduction

Section 3 provides checklist and amplified procedures for coping with emergencies that may occur. The emergency situations are extremely rare with proper pre-flight planning and properly inspected and maintained balloon. Should an emergency arise, the following guidelines are presented in this Section to be applied, in order to eliminate the collisions and resulting damage or injury.
If an emergency does occur, the pilot must ensure wind speed; his or her reaction should be quicker under stronger wind and deliberate under mild one. Fire and jumping or pitching out of a balloon are the greatest danger, and should be avoided.

3.2 Avoidance of Dangerous Obstacles

3.2.1 Contact with electric power lines

passengers ..... brief people to adopt the correct position: transferred to the basket side remote from power lines, hold the internal rope handles and do not touch the cylinders or any metal parts, back to the direction to travel with head level lower than basket rim and bend knees
venting ..... venting so that any contact is with the envelope and not the flying wires or basket assembly, i.e. the balloon is not able to fly out
cylinders .... turn off cylinder fuel valves
basket leaving ..... instruct the passengers when it is safe to exit the basket

3.2.2 Dangerous distance to obstacles

decision .... ensure whether the obstacles can be over-flown
passengers .... instruct people, transferred to the basket side remote from obstacles, face away from the direction to travel, hold the basket internal rope handles
venting ..... venting so as the balloon is not able to fly out after contact
basket ..... stabilise the basket position (e.g. attaching to the obstacle by means of the drop line)
basket leaving ..... instruct the passengers when it is safe to exit the basket

3.3 Emergency Landing

3.3.1 Fast landing

The wind speed is higher than 14 knots = 7.5 m/s.
passengers .... back to the direction to travel, hold the internal rope handles, fix objects
basket ..... by means of the rotation vent (if fitted), turn the balloon so that the longer basket side is perpendicular to the flight direction
field .... a large sort of landing field or area protected behind a slope
descent .... gently
venting ..... open the parachute close to the ground
passengers .... keep passengers not to leave the basket till it comes to the absolute stop

3.3.2. Heavy landing

The descent speed is higher than 4 m/s.
passengers .... stand with their knees together and slightly bent, hold by both hands to one internal rope handle, fix objects
basket ..... by means of the rotation vent (if fitted), turn the balloon so that the longer basket side is perpendicular to the flight direction
fuel ..... turn off cylinder fuel valves, vent fuel hoses
information ..... let the retrieve crew know about landing
passengers ..... fix or jettison free objects near by the ground, keep passengers not to leave the basket till it comes to the absolute stop

3.3.3 DS malfunction under strong windy conditions

passengers ..... instruct people, fix objects field a large sort of landing area protected behind a slope, no electric power lines, higher trees or forest to the direction to fly
basket ..... by means of the rotation vent (if fitted), turn the balloon so the longer basket side is perpendicular to the flight direction
descent .... gently
passengers .... keep passengers not to leave the basket till it comes to the absolute stop (the envelope leant on trees)

3.4 Over–Heating of Envelope – melting link dropping

heating fall ..... interrupt immediately heating into the envelope
descent ..... keep gentle descent during a number of short burns, to avoid any sudden intense manoeuvres
approach ..... descend immediately to altitude for a safe emergency landing to be made
landing ..... land on a suitable landing field

CAUTION:
It is necessary to do strength tests of envelope fabric after over-heating.

3.5 Failure of Flight Blast Valve

3.5.1 Impossibility to turn off flight blast valve

valve lever ..... press the lever from the lower level and at the same time turn it on right and left
cylinder ..... turn off the main valve
heating ..... heat by means of the second burner or cylinder valve
landing ..... land as soon as possible

3.5.2 Fuel supply freezing

cylinder ..... connect another cylinder and try the burner
flight valve ..... heat the flight valve by means of lighter
landing ..... heavy landing preparations

3.6 Flight Burner Failure

cylinder ..... check of fuel, quantity/pressure, hose connection and the cylinder valve
heating ..... heat by means of the second burner or the liquid fire/whisper burner valve
landing ..... land as soon as possible

3.7 Pilot Burner Failure

burner ..... ignite the flight burner for a short time
match-box ..... re-light the pilot light using matches after turning off the blast valve of the flight burner
flame ..... keep a small flame on the liquid fire/whisper burner valve or on jets of the flight burner
repairs ..... repair defects and their reason

NOTE:
Main causes of the light failure are low gas pressure at the regulator, air turbulence, fuel shortage in cylinders, jet block and dropping off of pilot hose endings on the cylinder.

3.8 Fire

3.8.1 Propane in-flight fire

cylinders ..... turn off source of propane at cylinders
hoses .... blow off gas from burner hoses
stop burning ..... put out the fire by means of the nomex heat-resistant cloth or operate the fire extinguisher
landing land as soon as possible
passengers ..... prevent anybody from abandoning the basket till the moment of making sure that the
balloon will not become airborne

CAUTION:
The fire extinguisher operates only for several seconds.
The fire extinguisher must be used in the vertical position.

3.8.2 Propane ground fire

cylinders ..... turn off the source of propane with the cylinder valve
hoses ..... blow off gas from burner hoses
stop burning ..... put out the fire by means of the nomex cloth or operate the fire extinguisher
escape ..... abandon the basket in order to achieve the safe distance – more than 30 m

WARNING:
If extinguishing is not successful and gas temperature increases dangerously in cylinders, then evacuate all people to a safe area, as there is a strong risk of cylinder explosion.

3.9 Envelope Damage

heating ..... supply overpressure in the envelope with a number of short burns
descent ..... keep gentle descent
approach ..... descend immediately to the altitude of safe landing

3.10 Other Emergency Procedures

Not applicable

INTENTIONALLY LEFT BLANK

SECTION 4

4. Normal Procedures

4. NORMAL PROCEDURES

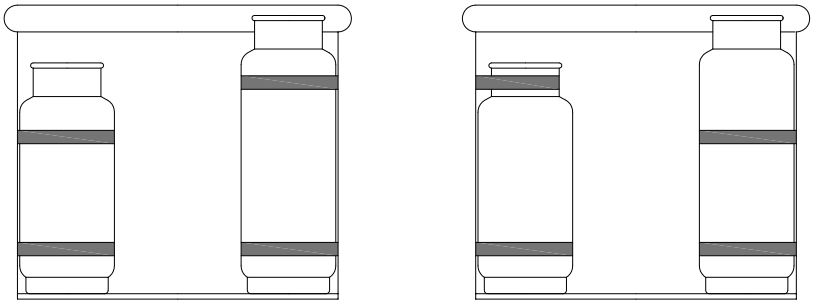
4.1 Introduction

Section 4 provides checklist and amplified procedures for the conduct of normal operation. Normal procedures associated with optional systems can be found in Section 9.

4.2 Assembly of Balloon and Pre Take-Off Checks

4.2.1 Balloon preparation:

Pull the envelope from carrying bag, roll up and spread it on a grassy field or launching canvas with the mouth against the wind. Fully deploy the crown line downwind and close the used deflation system (DS).
Place the basket about 3 meters in front of the envelope mouth. Place the fuel cylinders into the basket, attach them 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.
On the swivel-mounted frame or by means of flexible changeable rods, lift and set the burner to the basket. Attach the load-bearing basket cables by carabiners to the burner frame. Connect supply hoses to cylinders; the burner hoses should be fastened so that the vapour phase supply cylinders will be spent as the last ones. Rod covers are fitted over the basket cables and the flexible rods or swivel- mounted frame, to provide protection. Enclose burner hoses inside the covers, equipped with zips and velcro tapes, and ensure that the hoses have sufficient slack at the top to allow the burner gimbal and all fuel cylinders will be available and within reach in the basket for case of changing fuel supply during flight.



Arrangement of Fuel Cylinder Straps

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

Light the burner and check its correct assembly and operating. Instruments and accessories are fixed to the rod covers or inner basket side. Equipment and ballast should be attached to the inner basket side. Lay the basket over on to its side with burners pointing downwind, i.e. towards the envelope mouth, and manometers and the crossover valve control facing upwards. Lock the flying wire carabiners to the basket ones correctly orientated and screw their gates. Tether the basket to a strong anchoring point through envelope carabiners (see Section 4.3.5).
Spread out the mouth, taut en the downside. Fix the envelope scoop, control ropes and tapes to the lower burner frame side. Draw the temperature wire (if used) out of the envelope and connect it to the thermometer.
Position the fan near by the basket and secure it. You can begin to cold inflate the envelope after the fan starting up.

WARNING:
All cylinders and heavier objects should be fixed by means of prescribed straps or tapes and fastened in order not to be slackened during landing and cause any injury.
Attaching of objects (except textile banners, a transmitting aerial or envelope bag) on the outer basket side is prohibited.

NOTE:
If the balloon is fitted with a variable height burner frame then, before hot inflation, the burner unit must be locked in the down position. Once the balloon is inflated the burner unit may be moved to the most suitable height. When in the upper position the lateral movement of the burners is slightly restricted.

4.2.2 Passenger briefing

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.

4.2.3 Pre take-off checks

Inspect the following:

certificates ..... validity of the C of A, Maintenance Statement and Certificate of Release to Operation, Form One of the burner and basket and certificate validity of instruments and each cylinder applied in-flight

basket ..... assembly of load-bearing cables and wires to the burner frame and envelope, floor and basket wall condition, assembly correctness of the frame, rod cover fitting, slack allow the burner gimbal

cylinders ..... cylinder strapping in the basket, correctness and tightness of hose connection, accessible valves and fuel quantity, if there any doubts, check the used cylinder qualification in accordance with their certificates or on the index plate

equipment, instruments and accessories ..... function and installation of altimeter, variometer and thermometer, presence of matches (two sources of ignition), drop line, first aid kit, fire extinguisher and heat-resistant cloth

burners ..... assembly and tightness of complete burner unit, burner lighting, fuel pressure during heating, flame shape and dimension, function of flight, whisper and pilot burners, burner mobility

pilot flame (KOMET 105 + only) correct function of the pilot burner - flame only around the upper part, not blowing from the lower holes

envelope securing .. envelope position, ensure that the wires connected to each carabiner are not twisted, crossed or kinked, carabiners closed and gates screwed shut

rope securing ..... strong enough securing of DS and rotation vent activation ropes, their availability from the basket

mouth load tape ..... observe whether connections of load tapes and flying wires at the envelope mouth are not damaged by fire

fabric ..... free from visible damage by heat

crown ring ..... no damage, the crown line is properly fixed and no damage to tape attaching

Observe entering the envelope after the cold inflation:

fabric damage ..... envelope fabric free from visible damage, holes or tears above the third horizontal load tape

vent hole closing .... velcro tabs matted (DS sealed) securing and rip locks secured

DS and rotation vent activation ropes ..... condition and fixing of DS activation ropes, theirs sufficient slack in pulleys, no tangles or twists

equipment ..... no kink or damage to melting link, clear line of the thermometer wire and the temperature indicator is at the right place in the envelope

DS and rotation vent lines ..... vent lines are not interrupted or tangled

CAUTION:
Fuel weight in cylinders must be found out by means of weighing or a max fill bleed valve.
The temperature sensor must be placed in the same distance from the envelope skin as the melting link.

WARNING:
NO FLIGHT IS PERMITTED if there is any fuel leakage out of the fuel system or pilot burner malfunction.

4.3 Normal Procedures

4.3.1 Decision-making about flight

weather ..... do not fly in thermals, turbulence or in the strong wind
launch site ..... protected, without obstacles
weight ..... the admissible take-off weight will not have to be exceeded
fuel ..... minimum is two full cylinders, for envelope above 4500 m^3 – min. three cylinders
landing ..... if you keep the above mentioned rules concerning current conditions of the weather, launch site, weight and fuel, you will be able to land safely

CAUTION:
NO FLIGHT IS PERMITTED if there is a suspicion that the wind speed during the flight exceeds limitations. Never attempt a balloon flight around thunderstorm activity, ahead of approaching frontal systems, or near severe weather of any kind (turbulence, thermic or wave currents etc.).

4.3.2 Inflation procedures

crew ..... briefed
tethering ..... safe balloon tethering
fan ..... cold inflation
heating ..... short bursts of heat to envelope
envelope lifting ..... put the basket in vertical position
heating up..... heat up carefully

CAUTION:
Before hot inflating, the crown line crew should be instructed about their tasks (to prevent envelope from lifting during the cold inflation stage and from moving side to side), protection against line catching (hold the end of the crown line, not to wrap it around themselves, as this can cause severe injury if a gust wind hits the balloon), procedures in case of impossibility to keep the line (RELEASE the line IMMEDIATELY!!) and procedures after envelope standing upright (tied off the line to the basket). The crown line and envelope mouth crews should be equipped with leather gloves.

NOTE:
The aim is to keep the wide mouth opening as near circular as possible by two crew members during inflating. It is recommended to begin heating after full cold inflation in order to prevent the envelope with localized small quantity of heated air from lifting. Keep the flying wires taut to avoid them hanging in the burner flame. The inflation fan is recommended to be turned off after putting the basket in a vertical position, as air flowing from the inflation fan cools effectively down mouth fabric when heating during envelope lifting is intense.

4.3.3 Pre take-off steps

ignition sources ..... within pilot's easy reach
instruments ..... altimeter set, thermometer works
DS - all systems ..... closed, good seal, function test of venting (opening and closing)
Smart Vent check
(if fitted) ..... open partially using red activation rope, close by red/white rope, check the red/white rope is stowed freely in the basket, preferably in vent bag
Lite Vent check
(if fitted) ..... open partially using red activation rope, close by red/white rope and reset by white rope, check the red/white rope and white rope are stowed freely in the basket, preferably in vent bags
carabiners ..... not twisted or crossed
people ..... passengers briefed and in the basket, ground crew has got keys of retrieve vehicle, retrieve number established, non-briefed people are in safe distance - away from the basket

4.3.4 Take-off

balance ..... the basket balanced
take-off ..... ground crews are "hands off ", released everything and are not entangled with the balloon rigging, quick release undone, heating as needed
basket check ..... no person or free object is outside the basket
climbing ..... obstacles will be overflown in a safe distance

CAUTION:
During taking-off or any obstacle overflying, the pilot has to take into consideration especially the wind direction and speed.

NOTE:
The wind shelter behind low objects is not suitable because the upper envelope part would be knocked down with the wind.
- *When conditions are windy special care is necessary on take-off and we must contemplate a tethered flight that means that the balloon must be always tied to a sufficiently firm and stationary anchoring point by means of a restraining device object. Never built up excess lift before leaving the ground only by using crew holding the basket (see Section 4.3.5).*
- *During climbing it is necessary to heat in the way to eliminate the possibility of the pilot light failure due to the wind cut effect after flying up from the wind shelter zone. During climbing the envelope, deformation and partial loss in lifting force must be take into account*

NOTE:
If the wind speed is stronger (more than 6 knots = 3.2 m/s), it is recommended to find a launch place protected from the wind as much as possible.

4.3.5 Take-off by using quick release

Take-off can be performed by means of the ensuring restraining devices:
- Bonnano quick release
- quick release supplied by the balloon manufacturer

Take - off by using the quick release can be only realized under the conditions:
- The Bonnano quick release can be applied in the range of all balloons mentioned in this Flight Manual.
- The quick release supplied by the manufacturer can utilise the envelopes up to max. volume of 2200 m^3.
- The rope/tape of the quick release should be connected to the uppermost envelope carabiners or the separate restraint lugs of the burner frame (if fitted) on the wider basket side by means of the two carabiners with closed gates and locked up.
- The rope length of the quick release should have sufficient slack in attaching point to the burner frame. Simultaneously this has to be of appropriate length for the pilot's easy release of the restrain device without any further rope or line.
- Strength of the restraining rope and the rope of the Bonnano quick release have to be min 29 kN.
- Strength of the restraining rope and the rope of the quick release produced by the manufacturer have to be min. 15 kN.
- The restraining rope must be properly fixed to a sufficiently firm and stationary anchoring point and stretched out along the whole length.
- The restraining rope should not be made of a stretchy material so that the ground crew or any properties will be protect from its or the quick release recoiling, shooting up or falling towards the anchoring point caused to happen any injury or damage.
- The length of the restraining rope should be adequately modified according to the balloon size, weather conditions and launch field nature.
- When take-off is imminent, the final release should be made when the quick release is as loaded as possible and the envelope air has to be sufficiently heated up. For this reason, the balloon should not touch the land right

off after releasing the restraining device. The optimal situation arises out of the condition of the balloon with the restraining rope of approximately 7 m and the balloon hovered about 1 m above ground level.
- During the releasing procedure, the securing pin is withdrawn ready for the final release. After the last visual check of the people near by the basket, the final release of the restraining device should be performed by the pilot.
- The quick release must be unfastened from the burner frame and securely stored in the basket so that any personal injury can not occur while airborne.

WARNING:
The maximum angle between webing arms is 60 degees for preventing overstressing of the burner frame. That is why lenghts of the webbing arms are to be at least the same as the distance between their attachment points - envelope carabiners or attachment lugs.

Take-off by using quick release

tethering ..... restraining rope fasten and stretch properly, carabiners of the quick release with closed gates and secured
envelope ..... inflated and lifted
passengers ..... in the basket
ground crew/people
near by the basket .. protection against the restraining rope or basket catching that can caused severe injury or fatal lifting up from the ground
heating up..... short burst of heat to envelope till the take-off mode
securing pin ..... withdrawn
check..... ground crew in a safe distance from the basket and warned imminently before the balloon release
quick release ..... undone
flight ..... unlock the carabiners of the quick release from the burner frame, the quick release should be stored securely in the basket

4.3.6 Flight

burner ..... run only one cylinder down so that there are two cylinders of min 20 % fuel capacity for landing, flame check
temperature ..... melting link in place, temperature below limitations
envelope ..... mouth opened, DS closed, envelope sufficiently pressurised

4.3.7 Changing fuel cylinders

altitude .... the balloon is forced to climb and manipulation with cylinders begins at sufficient altitude
preparation... ..... start heating by means of the second burner, close the liquid valve on the spent cylinder, open the burner blast valve to vent fuel from the liquid hose (the rest of gas will be burnt up)
screw joint ..... disconnect the connector on the liquid hose and transfer to the full cylinder, open the liquid valve on the new cylinder and read fuel pressure, check the joint tightness
test ..... test the burner and its operation, do remember the time of changing cylinders

4.3.8 Approach

information ..... inform retrieve crews about landing
passengers and objects ..... hold internal rope handles – hands in the basket, objects fixed
basket ..... by means of the rotation vent, turn the balloon with the longer basket side to the flight direction
burners ..... both burners are supplied with sufficient fuel and OK
venting ..... available activation ropes and not tangled or kinked
landing site ..... free of electric power lines, obstructions or people on the ground
stabilization ..... horizontal flight at the min flight level

4.3.9 Landing

descend ..... towards the level of 1 m above the ground
fuel ..... turn off the pilot lights and cylinder valves, if possible
passengers ..... briefed for type of landing
venting ..... just close by the ground (immediately before touchdown)
basket movement ... check on people
pilot burners ..... check that pilot burners is turned off
basket leaving ..... instruction for leaving the basket

NOTE:
If the balloons land in calm, it is suitable to cool down the burner coil by means of not ignited gas so that the envelope fabric will be prevent from burning-up during a fall on a burner.

4.3.10 Post landing steps

cylinders ..... turn off valves on cylinders
burner ..... all flames put out
envelope ..... deflated safely
retrieve crew ..... informed

4.3.11 Tethered flight

Balloon tethering – a balloon should be tethered by means of three ropes:

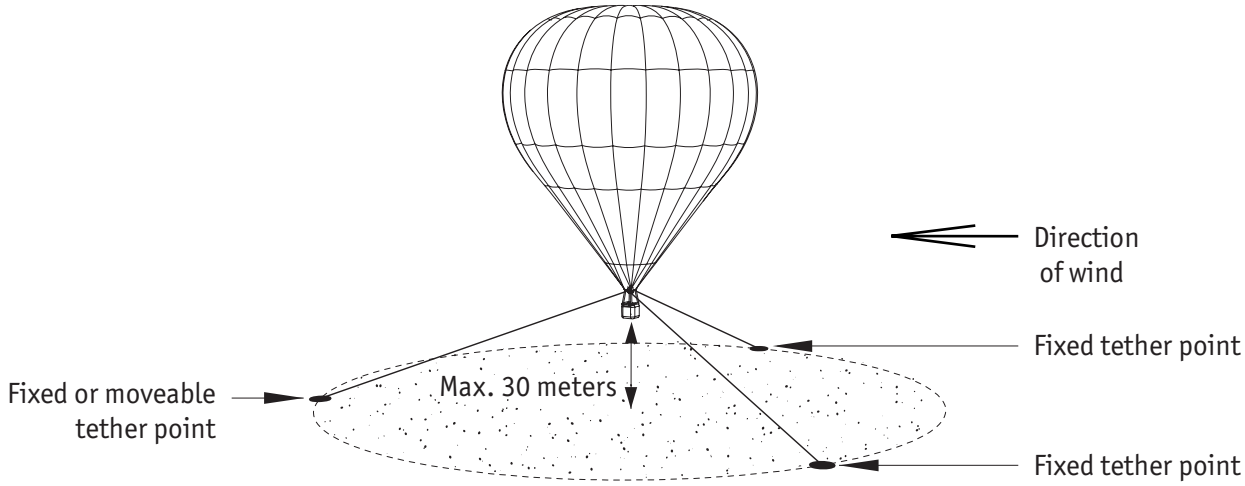
Two main ropes of the same length are anchored on the upwind side to the envelope carabiners or lugs in burner frames placed in the frame corners in smaller frames close to the corner on the longer side af the frame on bigger frames. These ropes provide the main resistance to movement. The upwind ropes must be firmly attached to strong points on the ground and spread so that the angle between them is approximately 120 degrees.

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 towards the balloon to restrict the height of the tether.

Take-off of tethered balloons

tethering ..... attaching points of ropes and rope conditions checked
ground rope team ... lines cannot snap taut and injure anybody on the ground or carry anybody up
temperature ..... admissible envelope temperature is not exceeded
climbing ..... up to 1 m/s, especially before rope tensioning

WARNING:
When the downwind rope gets taut the pilot must not continue in heating!



Tether Layout

4.3.12 <u>Dropping of parachutists</u>

clean exit ..... ensure clean exit for the parachutists so that neither fuel, crown or control ropes nor balloon equipment (thermometer wire) is snagged as he or she leaves
area check ..... the area under the basket is free
preparation and instruction for dropping ..... tell the parachutist to sit on the basket edge for wards, holding the burner support system, and exit on pilot's instruction

NOTE:
Parachutists leave the basket individually. Another one can exit the basket at the moment when the admissible climbing is secured not to exceed by means of basket unloading.
The instruction for dropping parachutists can be only given by the pilot so that unexpected climbing or a threat to the air traffic area under the balloon can be eliminated.
The take off weight and number of dropped parachutists depend on the envelope size. Furthermore, all the other applicable national aviation regulations must be kept.

INTENTIONALLY LEFT BLANK

SECTION 5

5. Performance

5. PERFORMANCE

5.1 Introduction

Section 5 provides approved data for performance during ascent and descent, take-off and non-approved additional information.
The data in the charts has been computed from realized flight tests with the balloons in good conditions and using average piloting techniques.

5.2 Approved data

5.2.1 Climb and descent

Balloon Type	Max Climb [m/s]	Height after 60-s Climb [m]	Max Descent [m/s]	Distance To Max Descent [m]	Distance To Stop Descent [m]
BB (except BB17GP and BB20GP)	4,0	95*	6,5	450	450
BB17GP, BB20GP	6,0	135	6,5	490	250
BB20 XR	9.0	135	9.0	400	250
AB2	4,0	120	6,5	450	450
AB2a	4,0	160	6,5	450	450
AB8	4,0	120	6,5	450	300
AEROTECHNIK AB	4,0	140	6,5	450	300

* The min attainable height for all sizes of BB balloon envelopes.

WARNING: (for BB20 XR)
In case of the reduced fabric strenght the limitations stated in section 2 must be observed!

5.3 Non-approved data

5.3.1 Consumption, endurance

Fuel consumption depends on the temperature in the envelope, load, ambient temperature, manoeuvring and flight level. Regarding earlier envelopes, there is a higher consumption caused by higher fabric air permeability.

Envelope Size	Consumption under 100 °C [kg/flight hour]	Endurance for 1 cylinder of 30 kg [min.]	Endurance for 1 cylinder of 20 kg [min.]
BB12	22 - 28	64 - 82	43 - 55
BB16	26 - 30	60 - 69	40 - 46
BB17GP	36 - 41	43 - 50	29 - 33
BB20	26 - 32	56 - 69	38 - 46
BB20E	26 - 32	56 - 69	38 - 46
BB20GP	36 - 44	41 - 50	27 - 33
BB20 XR	25 - 40	41 - 50	27 - 33
BB22	32 - 40	45 - 56	30 - 38
BB22E	32 - 40	45 - 56	30 - 38
BB22N	32 - 40	45 - 56	30 - 38
BB22Z	32 - 40	45 - 56	30 - 38
BB26	34 - 42	43 - 53	29 - 35
BB26E	34 - 42	43 - 53	29 - 35
BB26N	34 - 42	43 - 53	29 - 35
BB26Z	34 - 42	43 - 53	29 - 35
BB30N	36 - 45	40 - 50	27 - 33
BB30Z	36 - 45	40 - 50	27 - 33
BB34Z	37 - 47	38 - 49	26 - 32
BB37N	38 - 50	36 - 47	24 - 32
BB37Z	38 - 50	36 - 47	24 - 32
BB42Z	45 - 55	33 - 40	22 - 27
BB45N	45 - 60	30 - 40	20 - 27
BB45Z	45 - 60	30 - 40	20 - 27
BB51Z	50 - 65	28 - 36	18 - 24
BB60N	55 - 70	26 - 33	17 - 22
BB60Z	55 - 70	26 - 33	17 - 22
BB70Z	80 - 100	18 - 22	12 - 15
BB85Z	100 - 120	15 - 18	10 - 12

5.3.2. Ceiling

Balloon ceiling is limited by the envelope temperature and burner function.
- Burner malfunction due to-flight oxygen insufficiency is attested at levels higher than 23 000 ft ALT.

INTENTIONALLY LEFT BLANK

SECTION 6

6. Weight

6. WEIGHT

6.1 Introduction

This Section provides a range of balloon loading under which the balloon should operate with respect to the ambient air temperature.

6.2 Admissible Weight

The gross (all up) lift must be calculated by using the tables below. Find the admissible gross lift per 1000 m^3 and multiply by the relevant factor in accordance with the envelope volume (e.g. the pertinent value x2.2 concerning the BB22N envelope or the value x3 concerning the BB30N envelope, etc.). Furthermore, you should compare the result with the current actual balloon weight (see the sample calculations below).
The 77-kg weight of each occupant can be taken into account.
The ambient air temperature at expected flight altitude could be determined either by taking the air temperature at take-off and converting it according to the ISA conditions (the temperature falls about 0.65 °C per each 100 m) or in compliance with the data obtained from a meteorological station.
No estimate of balloon part weights is permitted.

CAUTION:
For calculating the maximum gross lift, no tables must be used where the internal envelope temperature exceeds the maximum allowable envelope temperature (see 2.3). The recommended standard table is the "100 °C" table. This results in a reduced load, but will allow for a longer lifetime of the envelope.

Sample check calculation of the BB30N balloon loading:

Parameters..... 3050 m - maximum expected flight altitude
100 °C - temperature in the envelope
10 °C - ambient temperature at the height of 3050 m
Table ..... 182 kg - admissible gross lift per 1000 m^3 and for the parameters
Gross Lift ..... 182 x 3 = 546 kg - admissible gross lift at 3050 m and for the conditions
Take Off
Weight..... envelope + basket + burner + cylinders + people + equipment + instruments + advertisements + ballast = 540 kg of the balloon weight
Check ..... 546 > 540; the flight can be realized up to the height of 3050 m

CAUTION:
Regardless of the calculated gross lift of the balloon, the total pre take-off weight of the balloon must not be higher than the max take-off weight (see Section 2.6).

NOTE:
It is also necessary to check load at the warmest flight level if there is a strong inversion condition.

The gross lift per **1000 m³** in kilograms at an internal envelope temperature of **100°C**

Ambient Temp. [°C]	**Height [m], altimeter set at 1013 hPa**								
	600 m	**1200 m**	**1850 m**	**2450 m**	**3050 m**	**3650 m**	**4250 m**	**4900 m**	**5500 m**
-35	457	427	396	370	347	324	304	284	266
-30	429	401	372	348	325	305	285	266	250
-25	402	375	349	326	305	285	268	250	234
-20	377	351	326	305	285	267	250	233	219
-15	352	328	305	285	266	249	234	218	205
-10	328	306	284	265	248	232	218	203	191
-5	305	284	264	247	231	216	203	189	177
0	283	264	245	229	214	200	188	175	164
5	261	244	226	211	198	185	174	162	152
10	240	224	208	198	182	171	160	149	140
15	221	206	191	179	167	156	147	137	128
20	201	188	174	163	153	143	134	125	117
25	183	170	158	148	138	130	121	113	106
30	165	154	143	133	125	117	110	102	96
35	147	137	128	119	112	104	98	91	86

The gross lift per **1000 m³** in kilograms at an internal envelope temperature of **110°C**

Ambient Temp. [°C]	**Height [m], altimeter set at 1013 hPa**								
	600 m	1200 m	1850 m	2450 m	3050 m	3650 m	4250 m	4900 m	5500 m
-35	478	446	415	387	363	339	318	297	279
-30	450	420	390	365	341	320	299	279	262
-25	423	395	367	343	321	300	281	263	246
-20	398	371	344	322	301	282	264	247	231
-15	373	348	323	302	282	264	248	231	217
-10	349	325	302	282	264	247	232	216	203
-5	326	304	282	264	247	231	217	202	190
0	304	283	263	246	230	215	202	188	177
5	282	263	244	228	214	200	188	175	164
10	261	244	227	212	198	185	174	162	152
15	242	225	209	196	183	171	161	150	141
20	222	207	193	180	168	158	148	138	129
25	204	190	176	165	154	145	135	126	119
30	186	173	161	150	141	132	123	115	108
35	168	157	146	136	128	119	112	104	98

The gross lift per **1000 m³** in kilograms at an internal envelope temperature of **120°C**

Ambient Temp. [°C]	**Height [m], altimeter set at 1013 hPa**								
	600 m	**1200 m**	**1850 m**	**2450 m**	**3050 m**	**3650 m**	**4250 m**	**4900 m**	**5500 m**
-35	499	465	432	404	378	354	331	309	290
-30	470	439	408	381	356	334	313	292	274
-25	444	414	384	359	336	315	295	275	258
-20	418	390	362	338	316	296	278	259	243
-15	393	366	340	318	298	279	261	244	229
-10	369	344	320	299	279	262	245	229	215
-5	346	323	300	280	262	245	230	214	201
0	324	302	280	262	245	230	215	201	188
5	302	282	262	245	229	214	201	187	176
10	282	263	244	228	213	200	187	175	164
15	262	244	227	212	198	186	174	162	152
20	242	226	210	196	184	172	161	150	141
25	224	209	194	181	170	159	149	139	130
30	206	192	178	167	156	146	137	128	120
35	188	176	163	153	143	134	125	117	110

The gross lift per **1000 m³** in kilograms at an internal envelope temperature of **124°C**

Ambient Temp. [°C]	**Height [m], altimeter set at 1013 hPa**								
	600 m	1200 m	1850 m	2450 m	3050 m	3650 m	4250 m	4900 m	5500 m
-35	506	472	439	410	384	359	337	314	295
-30	478	446	414	387	362	339	318	297	278
-25	451	421	391	365	342	320	300	280	263
-20	425	397	369	345	322	302	283	264	248
-15	401	374	347	324	303	284	266	248	233
-10	377	351	326	305	285	267	250	234	219
-5	354	330	306	286	268	251	235	219	206
0	331	309	287	268	251	235	220	206	193
5	310	289	269	251	235	220	206	192	180
10	289	270	251	234	219	205	192	179	168
15	269	251	233	218	204	191	179	167	157
20	250	233	217	203	190	177	166	155	146
25	232	216	201	188	175	164	154	144	135
30	214	199	185	173	162	152	142	132	124
35	196	183	170	159	149	139	130	122	114

SECTION 7

7. Balloon and Systems Description

7. DESCRIPTION OF BALLOON & UNITS

7.1 Introduction

This Section provides description and operation of the balloon and its systems. Refer to Section 9, Supplements for details of optional systems and equipment.

7.2 Balloon Description

7.2.1 Envelope

Natural shaped envelopes of vertical N type and horizontal O type or Z type are used as type approved balloons. A gore is the fabric section between two adjacent vertical load tapes and a number of gores are chosen in accordance with the envelope size and shape. Vent hole closing, hot air in-flight venting and final deflation is achieved with a DS (deflation system) of a parachute, Smart Vent or Lite Vent type. An optional envelope feature is double rotation vents located on the envelope equator. The lower part of the envelope is made of nomex fabric, which has a very high resistance to heat. The flying wires link the envelope to the burner frame and are connected to the burner and basket cables by means of locking carabiners. As an option, balloons can be fitted with a scoop suspended in hook-up loops at the bottom of the envelope.

Parachute Vent

The parachute vent is a return system provides controlled air deflation. Companion velcro tabs are sewed both at the edge of vent hole and parachute panels for the purpose of sealing them together during inflating. After envelope inflation, the parachute is held in position by the internal overpressure that pushes it towards the inner load tapes of vent hole and closes tightly the envelope. The parachute is opened by a pull on an activation rope. The parachute resets itself to the former closing position after activation rope releasing.

Smart Vent

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

Lite Vent

Lite Vent is a rapid deflation system, similar to a Smart Vent, which offers a more efficient venting action. It is fitted with three activation ropes. The red/white rope is for in-flight controlled venting only. The red rope has the same function as in a standard Smart Vent. The ripping action can be reversed by pulling on the white reset rope. Further pulling on the white rope holds the vent panel in place so that an inadvertent open caused e.g. by turbulence is avoided. The additional weight suspended under the vent panel makes its closing easier.

Rotation Vent

The rotation vent provides controlled balloon rotation about its vertical axis while airborne. When the arrangement activated, slits open sending out air tangentially and the effect causes the necessary force for envelope rotation. The rotation vent is controlled by means of two activation ropes, one coded black for left, and second green for right hand rotation.

CAUTION:
For operating the Smart Vent, the white activation rope instead of the red/white one can be used regarding the BB balloons up to the including serial No. 177.
For operating the rotation vent, the white and black activation ropes can be used regarding the BB balloons up to the including serial No. 177.
For operating the rotation vent, the yellow and green activation ropes can be used regarding the balloons of the AB2, AB2a, AB8 and AEROTECHNIK AB types.

7.2.2 Basket

The basket serves with the aim of crew/load and fuel cylinders transporting. On the basket walls there are openings providing passages for strapping in fuel cylinders. Flexible rods fit into basket and burner frame sockets to support the overhead burner frame system. The load-bearing basket cables forms a continuous sling around the basket and together with the support rods are coated with padded suede covers. The prescribed basket equipment and instruments are secured to the inner basket side. The instrument box with LUN instruments should be attached to special basket through-holes. Electronic instruments should be strapped by means of velcro tapes to rod coverings. Along the basket top rim underneath, there are internal rope handles for use by passengers during landing.

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

7.2.3 Burner

The burner consists of one or more burner units and burner frame.
The burner units itself is assembled from the main flight valve and vaporizing coil ended with jets. Flight burner ignition is achieved with a pilot burner. Late model burners utilise burner units equipped with a valve and whisper burner jet. In a double or more burner configuration, a transfer crossover valve/cock can be used (according to the burner type) providing a cross-feed capability between the two main flight valves.
The main flight burner / valve operates with the liquid phase of fuel gas supplied by a main liquid hose ending in hand operated couplings. It is operated by a flight valve lever / blast valve. Gas is automatically ignited by the pilot burner. With the view of fuel gas observing, there is a manometer connected to the main flight valve.
The pilot burner works with the vapour phase of fuel gas conducted by means of its private supply hose, or from hose main flight valve (liquid phase over pressure transformer). It stays igniting during the whole flight. The gas pressure is reduced to the operating pressure by a pressure regulator providing with the opportunity of an optimal flame setting. This is not applicable for burner with pressure transformen (without hose vapour phase). The pressure regulator is component of the conduct hose coupling or vapour phase valve on the cylinder valve (with respect to the type). The pilot burner utilises a piezoelectric igniter for easy operation. The piezo ignition system is controlled by repeated depressions or turnings (according to the type), until the pilot burner re-lights.
The whisper burner / liquid fire runs with the liquid phase of fuel gas conducted directly to the jet by a branch from the flight valve. It is controlled by means of a cock valve opening connected with the main flight burner room, or by whisper burner lever pulling (with respect to the type). The whisper burner is automatically ignited by the pilot light.
The burner frame is stainless tube frame. The burner units are swivel-mounted in the inner burner frame or joint, which in its turn is swivel-mounted in the outer frame (this provides a 2 - axis gimballed system). At each corner the burner frame has lugs, where the envelope and basket load-bearing carabiners hook up, and tube swinging or fixed sockets (see the type), to accept the nylon rods.

7.2.4 Fuel cylinders

Fuel cylinders are of stainless steel or light alloy coated with soft padded coverings. On all cylinders there are a liquid supply with proper screw joint and major fuel liquid valve. The float fuel quantity gauge and max fill bleed valve (liquid level gauge) serve for the purpose of checking. Every cylinder is also equipped with a safety blow-off valve. The master cylinder type (also a vapour supply) is fitted with a vapour valve.

7.2.5 Equipment

Altimeter and variometer
Mechanical realisation: The instrument box fitted with a LUN altimeter and variometer. The box should be attached to special basket through-holes with fastening bolts and lock nuts.
Electronic combined instruments: They should be strapped by means of velcro tapes to support rod coverings.
Thermometer
The envelope temperature is read by thermometer fixed by velcro tapes to the support rod coverings. In accordance with the used type, the thermometer is connected to the sensor, which is located at the envelope top, by means of a sensor wire or wirelessly.

7.3 Control Systems

7.3.1 Envelope

Red activation rope of parachute vent
In case of the red rope activating by a pilot, the parachute panel is pulled down by all over area of its circumference at the same time and controlled air venting starts. When the red rope is released, the vent panel resets itself to the former position and closes the envelope vent hole.

Red/white activation rope of Smart Vent
In case of the red/white rope activating by a pilot, the centre of the vent panel is pulled the outer edges of the panel down at the same time and to allow controlled venting. When the red/white rope is released, the vent panel resets itself to the former position and closes the envelope vent hole. The rope should have sufficient slack in order not to stand in the way of the red rope venting.

Red activation rope of Smart Vent
In case of the red rope activating by a pilot, the centre of the vent panel is pulled down into the balloon. This caused the panel to form a vertical plume in the centre of the vent aperture to allow a clear path for air to escape quickly out of the envelope. The Smart Vent can be resealed by the red/white activation rope pulling.

Red/white activation rope of Lite Vent
In a Lite Vent the red/white rope is a vent rope. With the vent panel in place, pulling on the red/white rope curls the edges of the vent panel down whilst the centre of the panel remains in place. When the rope is released the vent panel res eats.

Red activation rope of Lite Vent
In a Lite Vent the red rope has exactly the same function as in Smart Vent. The Lite Vent may be resealed by pulling on the white activation rope.

White activation rope of Lite Vent
Pulling the white reset rope spreads the vent panel to the closed position. In turbulent conditions the vent panel may be held in place by pulling on the white rope.

Black and green activation ropes of rotation vent
In case of activating, left or right slits open sending out air caused controlled balloon rotation to the right or left; the black rope (tape) for left and the other green tape for right hand envelope rotation.

7.3.2 Burner

Main flight valve
It opens the liquid phase inlet to the burner. After activating, the flight light burns.

Whisper burner valve
It opens the liquid phase inlet to the burner. After opening, the whisper light burns.

Transfer crossover valve
The transfer valve provides a cross-feed capability between burner units behind the flight valve. When activating, both burner units burn by any flight valve opening.

Lever of pilot burner valve
The lever provides a gas phase entry to the pilot burner. After opening and igniting by the piezo system, the pilot light burns.

Piezo button
This exposes the piezo igniter to pressure. After (repeated) depressing, an ignition spark is produced and jumps over to the head of pilot burner.

Gas spring lever on adjustable burner frame
The lever makes it possible to adjust the height of the burner on a burner fitted with an adjustable height burner frame. When the lever is depressed the burner height may be varied by moving the burner handle up or down. When the lever is released the burner will stay at the selected height.

7.3.3 Fuel cylinders

Major liquid valve
It turns on/off the cylinder liquid phase outlet of fuel gas.

Vapour valve
It turns on/off the cylinder vapour phase outlet of fuel gas.

Pressure regulator
It is joined to the vapour valve and reduces the gas pressure of the pilot burner.

7.4 Fuel System

The fuel system consists of fuel cylinders and a burner. Supply hoses with connecting couplings are a part of each burner. The fuel system represents two circuits, a liquid phase circuit (primary one) and vapour phase circuit.
The major fuel closing - ball cock or valve, independent for each circuits, is a component of the fuel cylinder. The manometer indicating the fuel pressure is located on the control burner panel. The float gauge with indicator placed on the propane cylinder reads fuel quantity. The max fill bleed valve checks the max liquid fuel level in the cylinder.

7.5 Seats and Safety Harness

No seat is used. Crew should hold internal basket rope handles during taking-off and landing. At least one handle must be available for each crew member. The pilot should control passenger moving in the basket.

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 lenght during approach. The lenght 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.

7.6 Baggage Room

Baggage is transported in the basket area assigned to crew.
Their weight must be taken into account for the max take-off weight.
Baggage should not have any sharp, rough and dangerous edges and must be secured against motion in the basket.

7.7 Other Equipment

7.7.1 Drop line

It provides balloon handling near by the ground. The drop line, rolled up in a textile casing above the basket floor, is fixed to the basket wall. Free ending of the drop line is secured by means of a carabiner at the loop on the basket body. Before activating, the free end with carabiner should be clipped to an envelope flying wire carabiner and the line itself is cast from the basket with the view of handling by ground crews.

7.7.2 Fire extinguisher, heat-resistant cloth and first aid kit

The assessment mentioned above should be operated in case of fire or body injury only. The location is at separate holders or a combined wall-side pocket on the inner basket side.

SECTION 8

8. Balloon Handling, Care and Maintenance

8. BALLOON OPERATION & MAINTENANCE

8.1 Introduction

This Section contains manufactur´s recommended procedures for proper 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.
Balloons are very simple air crafts. Therefore, the balloon parts not mentioned in this capture do not solicit any detailed comments on operation and maintenance.

8.2 Inspection Periods

The qualification on balloon airworthiness seems to be keeping prescribed inspections and further needed inspections not tabulated below but determined by any applicable nation, where the balloon is registered/operated, aviation regulations and instructions.
The scope, licence and procedures concerning the inspection carrying out are mentioned in the Maintenance Manual, related to the particular balloon.
Summary of inspections prescribed by the manufacturer:

Inspection Type	Operating Period	Refer to
annual inspection	100 flight hours or 12 calendar months (1) (2)	balloon envelope, basket, burner, fuel cylinders, instruments, equipment and accessories
two-year inspection	24 calendar months (2)	electronic M1 thermometer, combined instrument of Piccolo Plus type
five year inspection	five years	fuel cylinders (see the Maintenance Manual)
ten-year inspection	ten years (3)	fuel cylinders (see the Maintenance Manual)

(1) At operating period determination by both flight hours and calendar months limitations, the service period is applied that starts first. The 100th time limit can be exceeded up to max 5 hours, under condition that the breach is used for the flight completing started before the 100th limit reaching. The operating period, exceeding the 100th interval, must be included as a hours flown relating to the next 100th inspection.
(2) At operating period determination with calendar month limitations, the revision has to be made on the balloon or its parts till the last day of the month, in which the last inspection was carried out after the defined limit expiration.
(3) Determination of inspection term is based on the date of production or date of inspection if any marked on each cylinder.

8.3 Balloon Alterations and Repairs

Contact the balloon manufacturer before each adjustment and in case of serious revisions or repairs (affected the airworthiness) also with the EASA in advance.
All balloon adjustments and repairs should be done with respect to the Maintenance Manual, related to the particular balloon. Do not carry out any revision or repair that is not approved in the Maintenance Manual of your balloon and instead contact the manufacturer or approved repair shop.

8.4 Ground Handling / Road Transport

After the flight completing, pack the envelope and transport it in the original envelope bag only. The envelope should be sheltered against the rain during transporting.
Secure each component against any movement at the balloon conveyance in a car or trailer. Carry the fuel cylinders in vertical position and strap them properly. It is recommended to apply a burner bag for burner transport. Arrange the burner from overly swinging in case of taking assembled basket and burner for a short distance.
Always vent the fuel burner hoses, check that the fuel cylinder valves are closed and disconnect the supply hoses.
Follow the procedures recommended by your nation regulations valid for transport of liquefied oil gas tanks.

8.5 Cleaning and Care

8.5.1 Envelope

Besides common cleaning and keeping the below mentioned storage instructions, the envelope does not necessitate additional maintenance.

Cleaning
Use customary cleaning detergents, water diluted. Soiled areas should be cleaned by means of damped swabs. Then, before packing, the envelope should be dried thoroughly.

Storage
The rolled up balloon is best stored in a transport bag and at a dry airy place. Pack the envelope in an absolute dry condition and do not directly expose it to the sunshine or heater effect (recommended storage onto a pallet). In case of the wet envelope after the flight completing, ensure its complete drying as soon as possible and without fail. Spread the envelope on a dry shady field and keep airing. The wet envelope should be gently dried by keeping it cold-inflated with a fan, and then hot inflating it until the whole moisture has evaporated.

8.5.2 Basket

Cleaning
The basket necessitates periodical cleaning. The cane and floor should be clean with flowing water and a brush, or pressure water as far as possible (protect the upper suede rim against overly wetting through). Preserve cane from overly drying, the matter gets down its fragility resistance. Leather on the basket bottom and top rim is recommended to attend with common products for leather and suede care. If there is a suede cover on the upper rim, simply restore it by brushing with a special suede shoe-brush.

Storage
Care about the basket not exposing to floor moisture during storage. Under moisture conditions acting for a long time, there is a danger of mould and rot inception (recommended to storage onto a pallet).

8.5.3 Burner

Cleaning
Clean efficiently the burner from carbon black and condensates after each flight day. Check the moveable frame parts, frame suspension and connecting fittings for dry dust and mud fouling. Clean and lubricate with silicone oil as may be required.

Care
Check periodically quantities of motion of the flight valves control. Lubricate the flight valve with any suspicion of its function failure. Meet instructions, mentioned in the Maintenance Manual, during flight valve servicing.

Storage
There is not any special procedures concerning burner storage. Ensure only no burner damage, by a collision of hard or heavy objects, and no fouling to couplings of fuel hoses can occur during transport/storage. Take close attention to fuel hoses that should not be damaged by a fall or heavy object squeeze.

8.5.4 Fuel cylinders

Care
Check periodically quantities of motion of control valves and the pressure regulator adjustment. Submit cylinders due to a review to an approved repair shop if there is any suspicion of their dysfunction. Lubricate O ring seals and the square sealing at the liquid phase ending with silicone vaseline once a month. Keep surroundings of valves and end connectors clean.

8.5.5 Instruments

Follow the Maintenance Manual, related to the individual instrument, during operating or servicing.

SECTION 9

9. Supplements

9. SUPPLEMENTS

9.1 Introduction

This Section contains necessary supplements with information requisite for safe and reliable operating of the balloon differed in further equipment or other deviations from standard balloons.

9.2 List of Supplements

Date of Insertion	Supplement No.	Name of Supplement

9.3 Supplements

None

SECTION 10

10. Appendices

10. APPENDICES

10.1 Introduction

This Section contains additional information related to specific equipment or conditions.

10.2 Appendix 1 - Basket up to s/n 399

This appendix states operational limitation and technical data for all Kubicek and Aerotechnik balloons of s/n up to 399. Newer baskets have slightly modified dimensions and weights.

Basket model table - technical data:

Basket	Width **[cm]**	Length **[cm]**	Height **[cm]**	Weight **[kg]**	Load Capacity **[kg]**	Max. No. Occupants
K7	85±5	85 - 100	110+5	50	450	2
K10	85±5	100 -116	110+5	60	600	3
K11	98	116	103 - 114	70	650	3
K12	116±5	116 - 126	110+5	80	700	4
K12A	116±5	116 - 126	110+5	80	700	4
K13	98	125	103 - 114	80	700	4
K13S	95	126	110	45	550	3
K15	116±5	125 - 135	110+5	85	800	5
K16	116±5	140 - 150	110+5	90	900	5
K17	116	145	103 - 114	90	900	5
K18	116±5	155 - 180	110+5	100	950	6
K22	125±5	179 - 183	110+5	105	980	8
K25P	125±5	208 - 226	110+5	140	1000	8
K32T	125±5	241 - 245	115±5	160	1100	10
K40Y	163±5	250 - 260	115±5	220	1200	12
K50	160±5	300	115±5	270	1400	13*
K60	170±5	350	115±5	320	1800	18**
J1	123±5	123 - 128	110±5	72	600	4
J2	123±5	135 - 140	110±5	76	900	6

The basket dimensions refer to nominal outside dimensions; heights are measured from a basket floor to the basket edge.

* Occupancy of K50 basket: Pilot may place one person into the middle compartment if there is no more than four fuel cylinders. Otherwise no more than six persons may be placed in one compartment.

**Occupancy of K60 basket: Pilot may place one person into the pilot compartment if there is no more than five fuel cylinders. Otherwise no more than four persons may be placed in one compartment

NOTE:
The tabulated weights are an indicative figure only. The actual weight is indicated by index plate on each basket. The actual weight indicates the total weight including minimum equipment and burner rods.

Approved combinations of envelopes and baskets:

	Basket																	
Envelope model	**K7**	**K10**	**K11**	**K12 K12A**	**K13**	**K13S**	**K15**	**K16**	**K17**	**K18**	**K22**	**K25P**	**K32T**	**K40Y**	**K50**	**K60**	**J1**	**J2**
BB12		124																
BB16		124																
BB17GP		124																
BB20, BB20GP		124																
BB20E		124																
BB20XR		124																
BB22, BB22N, BB22Z		124																
BB22E		124																
BB26, BB26N, BB26Z																		
BB26E																		
BB30N, BB30Z																		
BB34Z																		
BB37N, BB37Z																		
BB42Z																		
BB45N, BB45Z															RV			
BB51Z															RV			
BB60N, BB60Z															RV	RV		
BB70Z															RV	RV		
BB85Z														#RV	#RV	RV		
AB2		124																
AB2a		124																
022		124																
N22		124																
N30		124																
AB8		124																

Explanation:

= approved combination

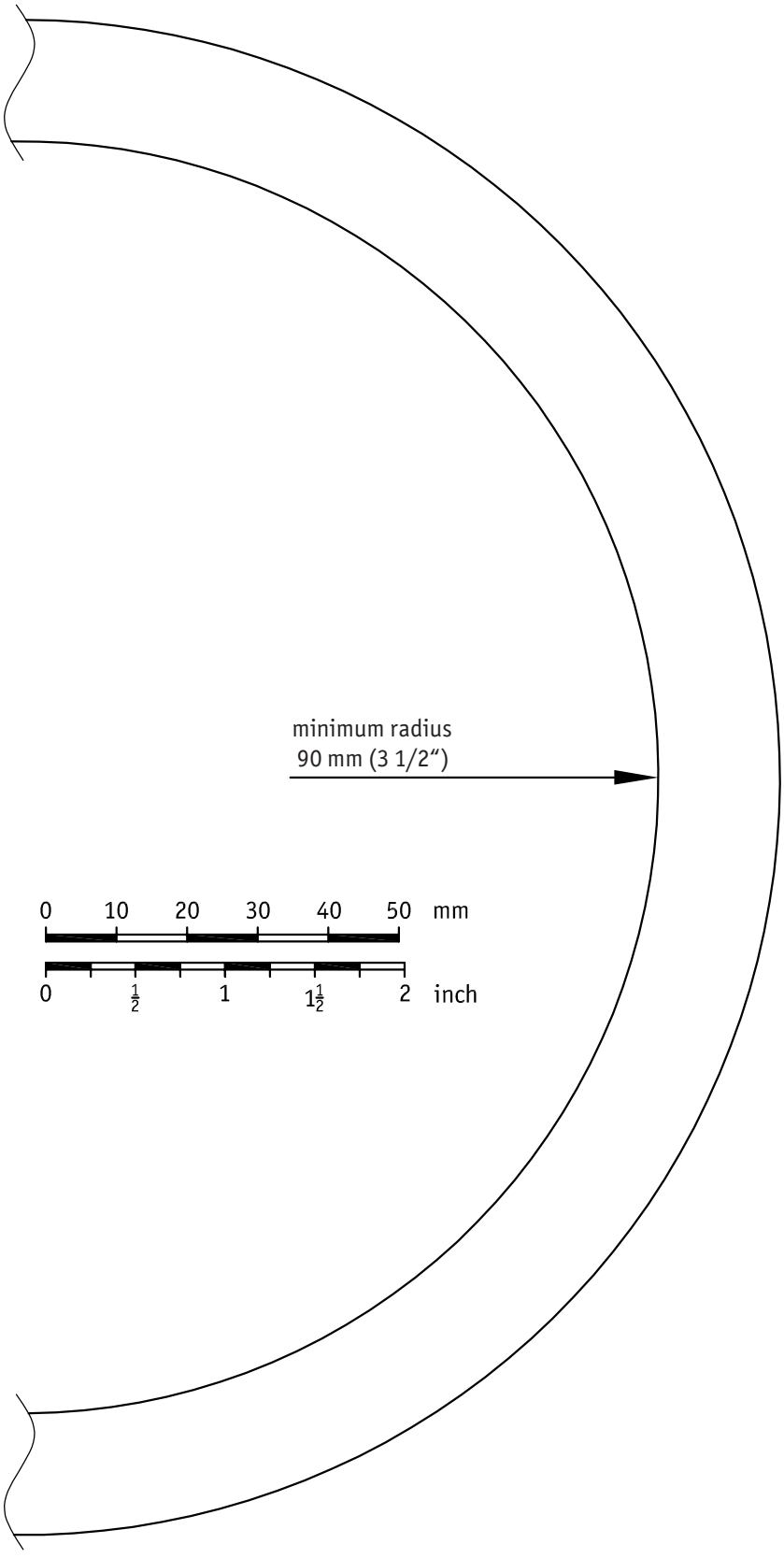
124 = K10 baskets of s/n 124 and higher are to be combined with Komet Duo and Ignis - two units burners

RV = rotation vent must be fitted

= only the burner frame with the symbol **S/N** before its serial number may be used

10.3 Appendix 2 - Minimum Fuel Hose Radius

Minimum fuel hose radius template:



INTENTIONALLY LEFT BLANK

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