Flight Manual
Ballons Chaize

Ref: HABFM-1401001

Version 07_7

Ballons Chaize SARL
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Type Certificate	EASA . BA.015
Registration	
Model	
Serial no.	

Sections II - III & IV approved by: DIRECTION GENERALE DE L'AVIATION CIVILE [CIVIL AVIATION AUTHORITY]
Version No.7 7 Jan 2019
The balloon must be operated within its "operating limits" as set out in this flight manual.
This manual includes information that must be provided to the pilot as part of certification.

THIS DOCUMENT SHALL BE KEPT IN THE BASKET AT ALL TIMES

Version History

List of Versions

Version	Date	Reason	Approval No.	Pages affected	Written by
7_7	*18 January 2019*	*Moedl CS4000 F24 and JZ30 F24 added*	EASA Approval 10068475 on 24 Jan 2019	0-1 08/09/2010 15-16	BCM
7_6	*21 March 2018*	*Model CS5500 F24 added*	EASA approval 10065635 on 25 May 2018	0-1 08/09/2010 15-16 20-21	BCM
7_5	11 July 2016	JZ34F16 added JZ34F24 CS3700 F24 CS4500 F24	EASA approval 10060620 on 03/01/2017	0-1 08/09/2010 15-16 20-21	BCM
7_4	03/04/2016	CS3000 F24 added	EASA approval 10058042 // 0010043184	ALL	BCM
7_3	14/04/2015	CS5000 F24 and fast deflation system added	EASA Approval 10052969 EASA Approval 10052968	ALL	BCM
7_2	23 December 2014	Compatibility applicable to all serial numbers.	10051874 12 January 2015	ALL	BCM
7_1	14 May 2014	Revision increment after change Models DC 2200 DC2000 et DC1800 added MMOD-1308002	EASA Approval 10026017	ALL	BCM
7_0	30 January 2014	New edition after request for change MMOD-1308001 Compatibility List Review	EASA Approval 10048527	ALL	BCM
6_0	01/07/2013	Ballons Chaize colours applied		ALL	BCM
5		Added: Use of double burner SCHROEDER FB6		1-4; 1.5 and 1-9 4.4	
4		Added: Use of double burner		1-4; 1.5 and 1-7	

		CAMERON SIROCCO		
3		Added models: JZ/JZX 20 F12 JZ/JZX 20 F24	2.1	
2		Added compartimentalised basket models	1-3 and 1-7	
1	June 99	Added models: JZ/JZX F24 JZ/JZX F32	1-6 and 2-1	

Revision

			Status	Authorised Signatory
Initial version:			approved	BCM
Revision	Date	Object		
7_0	31/01/2014	New edition	OK	BCM
7_1	14/05/2014	Added DC Dawn Chaser DC2200 DC2000 DC1800 model	OK	BCM
7_2	23/12/2014	Compatibility extended to all serial numbers.	OK	BCM
7_3	14/04/2015	CS5000 F24 and fast deflation system added	OK	BCM
7_4	03/04/2016	Model CS3000 F24 added	OK	BCM
7_5	11/07/2016	JZ34F16 added JZ34F24 CS3700 F24 CS4500 F24	OK	BCM
7_6	21/03/2018	Model CS5500 F24 added	OK	BCM
7_7	18/01/19	Model CS4000 F24 and JZ30 F24	OK	BCM

List of effective pages

Section	Page	Revision date
ALL	ALL	

Constructor:

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Table of Contents

SECTION I. OVERVIEW

I.1 Introduction

This manual includes information that must be provided to the pilot for certification. Revisions of this manual are published on the Ballons Chaize website at: www.le-ballons-chaize.fr In addition, all revisions that introduce major changes are also sent out via service bulletins.

I.2 General Description

I.2.1 Models Concerned

This manual applies to all Ballons Chaize balloon models of series DC, CS, JZ and JZX

EASA denomination	Volume and characteristics	EASA denomination	Volume and characteristics
JZX 18F12	1800 m3 12-gore	JZ 18F12	1800 m3 12-gore
JZX 18F24	1800 m3 24-gore	JZ 18F24	1800 m3 24-gore
JZX 20F12	2000 m3 12-gore	JZ 20F12	2000 m3 12-gore
JZX 20F24	2000 m3 24-gore	JZ 20F24	2000 m3 24-gore
JZX 22F12	2200 m3 12-gore	JZ 22F12	2200 m3 12-gore
JZX 22F24	2200 m3 24-gore	JZ 22F24	2200 m3 24-gore
JZX 25F24	2500 m3 24-gore	JZ 25F24	2500 m3 24-gore
JZX 25F12	2500 m3 12-gore	JZ 25F12	2500 m3 12-gore
JZX 25F32	2500 m3 32-gore	JZ 25F32	2500 m3 32-gore
JZX 30F16	3000 m3 16-gore	JZ 30F16	3000 m3 16-gore
		JZ30F24	3000m3 24 gore
JZX 30F32	3000 m3 32-gore	JZ 30F32	3000 m3 32-gore
		JZ 34F16	3399m3 16-gore
		JZ 34F24	3399m3 24-gore
JZX 35F32	3500 m3 32-gore	JZ 35F32	3500 m3 32-gore
JZX 35F16	3500 m3 16-gore	JZ 35F16	3500 m3 16-gore
JZX 40F16	4000 m3 16-gore	JZ 40F16	4000 m3 16-gore
JZX 40F32	4000 m3 32-gore	JZ 40F32	4000 m3 32-gore

EASA denomination	Volume and characteristics	EASA denomination	Volume and characteristics
CS 1600 F12	1600 m3 16-gore	CS 2000 F24	2000 m3 24-gore

CS 1600 F24	1600 m3 24-gore	CS 22 00 F12	2200 m3 12-gore
CS 1800 F12	1800 m3 12-gore	CS 2200 F16	2200 m3 16-gore
CS 1800 F24	1800 m3 24-gore	CS 2200 F24	2200 m3 24-gore
CS 2000 F12	2000 m3 12-gore	CS 2200 F32	2200 m3 32-gore
CS 4000 F16	4000 m3 16-gore	CS 3000 F16	3000 m3 16-gore
CS 4000 F24	4000m3 24 gore	CS 3000 F32	3000 m3 32-gore
CS 4000 F32	4000 m3 32-gore	CS 3700 F24	3700m3 24-gore
CS4500 F24	4500 m3 24-gore	CS 3000 F24	3000m3 24-gore
CS5000 F24	5000m3 24-gore		
CS5500 F24	5500m3 24-gore		

EASA denomination	Volume and characteristics	Other Commercial Denomination
DC 1800 F16	1800 m3 16-gore	DC67
DC 2000 F16	2000 m3 16-gore	DC70
DC 2200 F16	2200 m3 16-gore	DC77

I.2.2 Certification Bases

Chaize hot air balloons, series JZ, JZX and CS up to 4000m3 have been certified in accordance with CTG 015 A - Edition no. 2 of March 1980 and with CTC 015 which uses the same requirements brought in by amendment no. 4 of FAR 31 and hot air balloons. The other series have been certified in accordance with the specifications of CS 31.HB amendment 1 of 5 December 2011.

The Chaize CS, JZ, JZX and DC series are approved under the EASA type certificate no. EASA.BA.015.

Model	Date of approval
CS1600F12	Nov. 1975
CS1600F24	March 2006
CS1800F12	June 1979
CS1800F24	March 2006
CS2000F12	November 1975
CS2000F24	March 2006
CS2200F12	Mai 1979
CS2200F16	March 2006
CS2200F24	March 2006
CS2200F32	Mai 1979
CS3000F16	July 1981
CS3000F32	March 2006
CS4000F16	Mai 1979
CS4000F32	March 2006
JZ 18 F12	March 1993
JZ 18 F24	June 1999
JZ 20 F12	June 1999
JZ 20 F24	June 1999
JZ 22 F12	July 1994
JZ 22 F24	June 1999

Model	Date of approval
JZ 25 F12	July 2009
JZ 25 F32	March 1993
JZ 25 F24	June 1999
JZ 25 F32	June 1999
JZ 30 F32	Dec. 1992
JZ 30 F32	June 1999
JZ 35 F16	July 1994
JZ 35 F32	June 1999
JZ 40 F16	Dec. 1992
JZ 40 F32	June 1999
JZX 18 F12	March 1993
JZX 18 F24	June 1999
JZX 20 F12	June 1999
JZX 20 F24	June 1999
JZX 22 F12	July 1994
JZX 22 F24	June 1999
JZX 25 F12	July 2009
JZX 25 F16	March 1993
JZX 25 F24	June 1999
JZX 25 F32	June 1999

Model	Date of approval
JZX 30 F16	Dec. 1992
JZX 30 F32	June 1999
JZX 35 F16	July 1994
JZX 35 F32	June 1999
JZX 40 F16	Dec. 1992
JZ 40 F32	June 1999
DC2200F16	July 2014
DC2000F16	July 2014
DC1800F16	July 2014
CS5000F24	April 2015
CS3000F24	April 2016
JZ34F24	Nov 2016
JZ34F16	Nov 2016
CS3700 F24	Nov 2016
CS4500 F24	Nov 2016
CS5500 F24	April 2018
JZ30 F24	February 2019
CS4000 F24	February 2019

I.2.3 Working Principal

CHAIZE Balloons are of the free movement type balloons, in which the climbing force is provided by a temperature difference between outside air and the air contained in the envelope heated by burning liquid propane gas in a burner.

I.2.4 The envelope

The envelope comprises:

- 12 gores, references F12
- 16 gores, references F16
- 24 gores, references F24
- 32 gores, references F32

The purpose of the envelope is to retain the hot air generated by the burner. It is sewn by hand and comprises vertical gores in concentric formation made up of horizontal panels high resistance nylon fabric. The gores are held together vertically by straps, carrying all the loads, brought together at their apex by means of a metal ring known as a crown; at their base they are linked to the connecting cable and the basket. The base is made of fireproof fabric. A windbreak in the form of a scoop or alternatively a skirt, surrounding the balloon, is fixed to the base of the envelope in order to provide more efficient control of the airflow when taking off in strong winds, in tethered flight, or in turbulent atmospheric conditions. A cord is attached to the crown to retain the balloon while it is being inflated.

The letter "X" when included in the type designation, indicates that the envelope is made of high resistant polyester fabric, which supports higher working temperatures than classic nylon fabric (e.g.: JZX18 F12).

Systems for maintaining the balloon at ground level, for tethered balloons, or for quick release mechanisms when taking off, shall be attached to the envelope as follows:

For tethered balloons, each cord is independently hooked on to a karabiner (spring hook) attached to the envelope, with the working principle described in the chapter on tethered balloon mode.

When using quick-release: the mooring line is attached to a quick-release by means of a strap or a cord folded into a V-shape, which in turn is hooked onto the carabiners of the envelope using two carabiners.

I.2.5 Valve

For all balloon types, the valve is the "parachute" type. It can be used in both directions, and has two functions:

- It allows partial evacuation of the hot air in the envelope when performing descent manoeuvres;
- It allows partial evacuation of the hot air in the envelope when landing.

It comprises: The horizontal panels of the crown form a circular surface; this is fixed at the centre, but is free at the circumference, and closes an opening smaller in diameter than itself.

The valve can be opened by the balloon pilot using:

- for models CS, JZ and JZX, a red-coloured cord;
- for DC models, a white and red-coloured cord;

It closes automatically thanks to the envelope's internal pressure.

For all volumes, and obligatory from 5000 m² up, the valve can be fitted with a fast deflation system (FDS).

The fast deflation system (FDS) will release the air contained in the balloon by means of a new red-coloured manoeuvring cord. Pulling on the red chord will bring the parachute into the shape of a column in the centre of the balloon, leaving a large opening at the crown.

The fast deflation system reduces dragging when landing, especially for large volume balloons.

The fast deflation system can be countered by pulling the standard parachute cord. (White and Red)

I.2.6 Rotation Vents

Their purpose is to make the balloon rotate around its vertical axis. There are 4 of them, and they work in pairs (this number can be reduced to 2; in this case one of them rotates the balloon to the right, and the other to the left). They are ventilation holes at the level of the equator; they release two hot-air flows in diametrically opposite directions. They are controlled from the basket using a lanyard: a black lanyard for clockwise rotation and a green lanyard for anticlockwise rotation.

I.2.7 Load Frame

This is a quadrangular stainless steel welded tube frame, with straps in the corners; its purpose:

- attaches the basket to the envelope, by means of welded stainless steel attachments;
- it supports the burner or burners;
- It counters the spreading or spacing effect of the envelope cables;
- it counters the spreading or spacing effect from the ground anchoring system in tethered flight.

I.2.8 The basket

Woven entirely from rattan, with a marine plywood floor, reinforced by cables that cross underneath it and up the four sides of the basket; this creates 4 strands which run all the way up to the load frame, to which they are fixed by means of carabiners. For baskets that carry more than six persons, the cables are doubled and the baskets are divided into compartments. The basket is fitted with a vertical rod at each corner so as to keep the load frame at a fixed distance. On the inside, there are handles for the pilot and the passengers. The upper edge of the basket is fitted with foam covered in leather. The bottom of the basket is reinforced with "buffalo skin" leather and fitted with four pinewood planks that act as shock absorbers in the event of a hard landing. The rigid support stiffeners are encased in leather; they also carry the gas supply piping.

Some models possess interior compartments. (Model T)

I.2.9 Air heating system:

This comprises one or several identical burners, each made of:

- a stainless steel coil, through which the liquid propane gas circulates; when this comes into contact with the flame, it builds up pressure for improved vaporisation;
- a load ring fixed to the coil, fitted with four jets or injectors;
- an inlet pressure gauge; each burner is fed from an independent fuel circuit;
- a burner opening valve;
- a pilot flame opening valve.

- The fuel supply flows through reinforced rubber tubes, connected directly to the liquid propane bottles in the basket.
- The pilot flame connected to an independent liquid propane bottle (known as the master bottle) fitted with a pressure regulator. Fuel supply flows through a reinforced rubber tube, controlled by a spigot.

Note:

With some burners, the pilot flame functions in the liquid phase; the fuel is bled off from the distribution block under the burner itself, before the main valve. In this case there is therefore no independent rubber tube and no need for master bottles.

I.3 SIZING

The maximum number of passengers is given by way of information and is based on an assumed mass of 77 kg per person.

In all cases, please refer to the load curves.

I.3.1 Envelopes

The following tables show dimensional characteristics (sizing) for various envelopes:

ENVELOPE	JZ 18	JZ 20	JZ 22	JZ 25	JZ 30	JZ34	JZ 35	JZ 40
Volume (m3)	1777	2014	2270	2547	3010	3399m	3513	4080
Height (m)	15.7	16.4	17.0	17.7	18.7	19.3	19.7	20.7
Diameter (m)	13.6	16.8	17.4	15.4	16.2	19.4	20.2	18.0
Mass (kg)								
F12	75	80	89	95	/	/	/	/
F16	/	/	/	97	100	115	120	130
F24	81	86	95	101	/	122	/	/
F32	/	/	/	105	108	/	128	138

ENVELOPE	JZX 18	JZX 20	JZX 22	JZX 25	JZX 30	JZX 35	JZX 40
Volume (m3)	1777	2014	2270	2547	3010	3513	4080
Height (m)	15.7	16.4	17.0	17.7	18.7	19.7	20.7
Diameter (m)	13.6	16.8	17.4	15.4	16.2	20.2	18.0
Mass (kg)							
F12	75	80	89	95	/	/	/
F16	/	/	/	97	100	120	130
F24	81	86	95	101	/	/	/
F32	/	/	/	105	108	128	138

ENVELOPE	CS1600	CS1800	CS2000	CS2200	CS2200	CS3000	CS3700
Volume m3	1600	1800	2000	2200	2200	3000	3700
Height (m)	17.5	18	19.0	17.3	17.0	17.5	18.14
Diameter (m)	14.0	15	15.3	18.0	18.0	19.4	20.1
Mass (kg)	57	59	64	85	104	110	115

ENVELOPE	CS4000	CS4500	CS5000	CS5500
Volume m3	4000	4500	5000	5500
Height (m)	18.1	19.4	20.97	21.23
Diameter (m)	22.0	22	22.5	23
Mass (kg)	129	132Kg	135Kg	142Kg

ENVELOPE	DC1800 F16	DC2000 F16	DC2200 F16
Volume m3	1800	2000	2200
Height (m)	18.65	19.29	19.98
Diameter (m)	14.0	14.4	15.0
Mass (kg)	77	82	87

I.3.2 Baskets

Designation	Dimensions
Type A100	Length 1,10 m - Width 1,10 m - Height 1,15 m - Mass 70 kg
Type A 101	Length 1,10 m - Width 1,10 m - Height 1,15 m - Mass 70 kg
Type A 200	Length 1,30 m - Width 1,10 m - Height 1,15 m - Mass 76 kg
Type A 201	Length 1,30 m - Width 1,10 m - Height 1,15 m - Mass 76 kg
Type A 300	Length 1,50 m - Width 1,10 m - Height 1,15 m - Mass 80 kg
Type A 301	Length 1,50 m - Width 1,10 m - Height 1,15 m - Mass 80 kg
Type A 302	Length 1,50 m - Width 1,10 m - Height 1,15 m - Mass 85 kg
Type A 303T	Length 1,50 m - Width 1,10 m - Height 1,15 m - Mass 88 kg
Type A 401	Length 1,70 m - Width 1,30 m - Height 1,20 m - Mass 92 kg
Type A 403	Length 1,70 m - Width 1,30 m - Height 1,20 m - Mass 110 kg
Type A 403 T	Length 1,70 m - Width 1,30 m - Height 1,20 m - Mass 110 kg
Type A 501	Length 2,00 m - Width 1,50 m - Height 1,20 m - Mass 125 kg
Type A 503	Length 2,00 m - Width 1,50 m - Height 1,20 m - Mass 145 kg
Type A 503 T	Length 2,00 m - Width 1,50 m - Height 1,20 m - Mass 145 kg

The maximum number of passengers is given in section II, operating limits.

I.3.3 Chaize Burners

Chaize burners are double stainless steel burners, for the 303, and single burners for the 304; both are fitted with the Mix-D pressure gauge, graduated up to 25 bars, equipped with Legris ball valve spigots, and the same number of pilot lights (single or double).

I.3.4 Worthington Bottles

Worthington bottles have a capacity of 20 kg. When empty, they each weigh 13 kg.

In the liquid phase they are fitted with spigots, using a Parker type connection; in the gas phase they have a spigot option.

I.4 ON-BOARD INSTRUMENTATION

- **Fuel circuit:**

Each bottle is fitted with a gauge showing the level of liquid gas.

- **Air temperature inside the envelope:**

The temperature limits are set by the melting of a fuse rated at 120°C, for the CS, JZ and DC series; in 127°C for the JZ X series. When melting, the fuse causes a red-coloured fabric strip to fall.

- **Climb and descent rates:**

Vertical speed indicator type 100 Badin-Crouzet (0-10 m/s); or type II - Series 2214 Badin-Crouzet (2500 ft/mn) or similar.

- **Altitude:**

Altimeter type 50 (0-5000m) Badin-Crouzet; or type AN 5760 Kollsman, 5000 ft or similar.

The vertical airspeed indicator and altimeter mentioned above can be replaced with electronic instruments, with or without temperature indicator, of the following type or equivalent:

Ball 655: Comprising a digital altimeter, air speed indicator and digital temperature sensor. It is fitted with a double power supply using 9 V batteries; the user may select circuit 1 or 2. It has an outside temperature sensor and an envelope temperature sensor.

FLYTEC: Comprising a digital altimeter, digital air speed indicator and digital temperature sensor. It is fitted with a selectable double power supply, and can be recharged via internal battery. It has an outside temperature sensor and an envelope temperature sensor with wireless transmission.

SECTION II. OPERATING LIMITS

II.1 Introduction

This section sets out operating limits approved by the EASA.

II.2 Weather Conditions

- The CS series may not take off in winds greater than 7 m/s (25 km/h).
- The JZX series may not take off in winds greater than 7.5 m/s (27 km/h).
- The DC series may not take off in winds greater than 7.7 m/s (28 km/h).
- No flights should be started when there is strong thermal activity or storm conditions.
- No balloons should take off for a free flight in weather conditions that include wind gusts over 10 kn (5.1 m/s or 18.5 km/h) average.
- For tethered flight wind speed at ground level must not be greater than 5 m/s (18.5, kilometres per hour); maximum height is 30 m.

II.3 Load

Load is the unladen mass comprising the envelope, the basket and the load frame assembly fitted with its burner or burners.

The total maximum mass must be calculated using the load curve in Section V and shall under no circumstances exceed the given value (max Mass) in the table in Section I.

ENVELOPE	JZ 18	JZ 20	JZ 22	JZ 25	JZ 30	JZ34	JZ 35	JZ 40
Maximum Authorised Mass (kg)	570	650	725	815	963	1080	1120	1300

ENVELOPE	JZX 18	JZX 20	JZX 22	JZX 25	JZX 30	JZX 35	JZX 40
Maximum Authorised Mass (kg)	641	731	815	917	1084	1260	1463

ENVELOPE	CS1600 F12/F24	CS1800 F12/F24	CS2000 F12/F24	CS2200 F12/F24	CS2200 F16/F32	CS3000 F16/24/32	CS4000 F16/F24/ F32
Maximum Authorised Mass (kg)	500	500	500	750	750	999	1100

ENVELOPE	CS3700 F24	CS4500 F24	CS5000 F24	CS5500 F24
Maximum Authorised Mass (kg)	1260Kg	1460Kg	1700Kg	1850Kg
Minimum Authorised Mass (kg)	540Kg	700Kg	700Kg	700Kg

ENVELOPPE	DC1800 F16	DC2000 F16	DC2200 F16
Maximum Authorised Mass (kg)	600	630	680
Minimum Authorised Mass (kg)	260	290	340

The minimum mass is the mass when landing. Note: It is easier to operate the balloon when it is closer to the maximum mass than the minimum mass.

II.4 Acceptable damage levels

The balloon should not take off:

- Where there is damage to the load-bearing elements (worn tapes, degraded cables, defective carabiners;
- Where a burner is not working;
- Where there are rips longer than 5 mm in the balloon's ripstop fabric in the upper section, above the equator;
- Where there are rips longer than 2 cm in the section below the equator.

Such damage can be repaired, within the limits shown in the maintenance manual.

II.5 Rate of Climb

For JZ, CS and JZX series, rate of climb is limited to 3 m/s (590 ft/min) when climbing and 4 m/s when descending, unless the internal temperature of the envelope is being monitored using a real-time thermometer display.

For the DC series, rate of climb, both for climb and descent, is limited to 7 m/s (1400 ft/mn).

For JZ, CS and DC series, maximum continuous temperature is 100°C. The absolute maximum temperature is 120°C. For JZX series, maximum continuous temperature is 115°C. Never exceed 130°C.

II.6 Free flight or tethered flight

Flights should be performed, depending on flight conditions, under day VFR, and night VFR for night flight equipped balloons.

II.7 Fast deflation system: operating limits

The fast deflation system must not be used at an altitude greater than 4 m from the ground.

II.8 Minimum equipment

The following minimum equipment must be on board, and must be in working order:

- An altimeter with an operating range sufficient to cover the balloon's operating range;
- One fuel gauge per bottle;

An envelope temperature indicator equipped with real-time monitoring or a warning fuse. For night flights, the following additional equipment must be carried:

- Lights in compliance with operating conditions.
- A VHF transceiver;
- A vertical speed indicator;
- A pocket torch.

Operating regulations may require additional obligatory equipment.

II.9 Safety equipment

The pilot must possess flame resistant gloves, and must keep matches or any other means for igniting the burner or burners, in addition to their normal ignition system.

A powder fire extinguisher with a minimum capacity of 1 kg for CS series up to 4000m3, JZ and JZX; a 2 kg fire extinguisher for series DC and for the CS5000. The fire extinguisher must comply with the EN3 standard or equivalent, and must be on board.

Operating conditions may require additional safety equipment.

II.10 Minimum number of bottles on board

2 fuel bottles made of aluminium alloy or stainless steel are the required on-board minimum for all flights. Each fuel bottle must be attached to the basket by means of at least two bottle straps, approved for this use.

II.11 Maximum number of persons on board

Among the occupants there must be at least one duly qualified pilot, in possession of a valid balloon pilot's licence.

There must be at least one free hand strap per passenger.

Designation	Maximum number of passengers
Type A100	3
Type A 101	3
Type A 200	4
Type A 201	4
Type A 300	5
Type A 301	5
Type A 302	5
Type A 303T	5
Type A 400	7
Type A 401	7
Type A 403	7
Type A 403 T	7
Type A 501	8
Type A 503	8
Type A 503 T	8

(*) Operating conditions limit the number of passengers per compartment to 5. (Example: a flight in the context of CTA or air transport certificate). Please refer to applicable operating conditions regarding the number of passengers allowed per compartment.

II.12 Component interchangeability

Please consult the tables in Section VII

II.13 Markings and identification

The identification plate laid down in the decree of 17 May 1971, modified by the decree of 23 June 1977, is combined with the crown ring, or may be a plate stitched to the base of the balloon near the Nomex fabric.

The plate must be fire resistant.

II.14 Use of other equipment from other manufacturers

If a Chaize envelope is used with a balloon base from another manufacturer, please consult Section VII on compatibility, as well as the additions in Section VIII to ensure that the equipment is approved and is compatible. If in doubt, please contact the manufacturer.

SECTION III. EMERGENCY PROCEDURES

III.1 Introduction

This section provides a list of detailed actions and procedures in the event of an emergency. With rigourous care and preparation, the probability of an emergency is low.

This section has been approved by the EASA.

III.2 Melted fuse

Immediately stop heating, and perform a normal descent. If necessary, maintain heat with short blasts from the burner. Land as soon as possible.

Once on the ground, read off the maximum temperature reached by the envelope. If overheating is confirmed, perform the required maintenance inspection; Otherwise, replace the fuse.

III.3 Operating failure of one or both gas systems.

Immediately switch over to the second circuit, which must be connected to one of the bottles at all times.

III.4 Fire

➢ **On the ground:**

- Shut off the fuel supply.
- Evacuate passengers.
- Use a fire extinguisher to put out the fire.
- Do not take off again.
- If you do not succeed in the above-mentioned measures, move away rapidly to avoid the risk of exploding fuel tanks.

➢ **During flight:**

- Shut off the fuel supply.
- Use a fire extinguisher to put out the fire.

- If the fire is on the fuel supply circuit, keep it closed and use the second circuit; if necessary interconnect the burners.
- If a fire occurs on a burner, do not reuse that burner.
- Land as soon as possible.
- If you do not succeed in putting out the fire, try using a fire resistant blanket; if this is not within reach, use the envelope bag to put out the fire.
- Prepare for a fast landing.

III.5 Gas leaks.

➢ **On the ground:**

- Shut off the fuel supply.
- Shut off the pilot lights.
- Do not take off.

➢ **During flight:**

- Shut off the fuel supply.
- If the leak is on the fuel supply circuit, keep it closed and use the second circuit; if necessary interconnect the burners.
- If the leak occurs in one of the burners, keep the fuel supply circuit closed. Do not reuse this burner.
- In all cases, land as soon as possible.

III.6 Breakdown of a burner

III.6.1 Malfunction of one of the control valves

Switch over to the second circuit and use the other valve, taking care to close the first valve properly.

Land as soon as possible.

III.6.2 If one of the pilot lights are extinguished

Re-ignite it using matches or a lighter; these objects should always be kept on hand.

➢ **In the event of an irrecoverable breakdown:**

- shut down the faulty pilot light's power supply.
- If the burner is fitted with a silencer, open it slightly and use it as a pilot light.

➢ **If the burner is not fitted with a silencer:**

- Close the fuel bottle
- Open the burner valve wide
- Allow a small amount of gas to escape by opening the valve 1/4 and then ignite it.
- Open the valve 1/4 turn or all the way to use the burner.
- Partially close the valve 1/4 of a turn to stop the heating.
- Fly close to the ground and land as soon as possible.

III.6.3 Valve stuck (blocked) in open position.

Try moving the lever to the closed position. If the valve remains open, close the spigot of the bottle that supplies the faulty burner. Switch over to the second circuit and land as soon as possible.

III.7 Parachute line malfunction:

If the parachute line is stuck in a partially open position, immediately compensate the loss of hot air by operating the heating system non-stop as required. Land as soon as possible.

III.8 Fast deflation system malfunction

If the fast deflation system opens accidentally, close it immediately by pulling the red and white coloured valve cord.

III.9 Malfunctioning fuel indicator

Switch to a different fuel tank; the supply pipes are long enough to reach any tank. If in doubt, land as soon as possible.

III.10 When performing a fast landing :

- At maximum speed within authorised use limits (SECTION II Operating Limits), but with slant path due to the wind: pilot and passengers must face the direction of travel, with legs slightly bent at the knee, gripping the inside handles provided for that purpose. Close the bottle spigots (1/4 turn) and the pilot lights before contact with the ground.

- If the speed exceeds the operating limits, and only in open countryside, jettison a certain number of bottles, as required, as well as any equipment inside the basket (guideline, extinguisher) and proceed as in the previous case.

If rotating vents are available, turn the widest side of the basket to the front.

III.11 If the balloon comes into contact with electrical power lines:

If there are electrical power lines close by, the pilot must decide upon the best procedure so as to move away as quickly as possible.

If it is impossible to avoid contact with the electric power lines, ask the passengers to assume the fast landing position on the side of the basket that is furtherest from contact with the power lines. Open the valve and lose altitude so that the envelope and not the basket touches the electric power lines. Close the pilot lights, the bottle spigots and bleed the gas from the supply pipes.

If the basket touches the ground, evacuate the passengers without touching any metal parts; passengers should make a small jump, to avoid touching the ground and the balloon at the same time. When the passengers evacuate the balloon, it will be lighter: ensure that it does not take off again.

If the balloon is hanging from the electric power line or electrical pylon, do not attempt to evacuate; ensure that nobody (in the basket or on the ground) touches the metal parts of the balloon. Wait for qualified rescue services to confirm that electrical power has been switched off.

III.12 Degradation of the envelope in flight:

Perform heating to replace hot air lost because of the damage; maintain a controlled descent rate. Descend to low altitude and land as soon as possible.

If you are not able to control the descent rate, consider throwing overboard all items that can be jettisoned, including non-essential fuel bottles; take care that there are no people directly below. Ask the passengers to assume the fast landing position.

SECTION IV. NORMAL PROCEDURES

IV.1 Introduction

This section provides a list of detailed actions and procedures for normal use.

This section is EASA approved.

IV.2 Site of inflation

This should be a flat surface, without any roughness or protrusions that could tear the envelope. Should the site be covered in vegetation, ensure that it is not of a type that spreads fire.

- There should be no dangerous obstacles nearby.
- If possible, the site should be sheltered from the wind.
- The site should be sufficiently large to accommodate the entire balloon stretched out on the ground, with the basket, as well as the crown line.

IV.3 Weather Conditions

In compliance with operating limits (SECTION II Operating Limits)

IV.4 Operating rules

Before placing the balloon on the take-off site:

- replenish the liquid propane bottles, taking care to observe relevant safety rules;
- Place the filled liquid propane bottles on board the basket;
- Connect the burner and pilot light fuel supply pipes;
- Open the spigot of the bottle that supplies the pilot light (master bottle) and ignite it using a piezoelectric device, cigarette lighter or any other flame source.
- Verify proper working of:
    - The master bottle and each burner's supply circuit;
    - The second bottle and the main fuel supply circuits to the burners;
- If there are additional bottles, check them by successively connecting the primary circuits to each one, and successively opening the valves controlling both circuits, then igniting the corresponding burner.

➢ **For each burner:**

- Close the spigot of the second bottle, of the master bottle, and any additional bottles.
- Bleed the pipes by actuating both control valves;
- Kill the pilot light by closing its supply spigot on the master bottle.

IV.4.1 Placing the balloons on the take-off site

With the mouth to the wind, and the base of the basket near the edge of the site:

- verify proper closing of the flight control valve in accordance with the guide numbers on components marked with stickers;
- ensure proper placing of:
- the envelope and basket hangers on the load frame;
- the parachute line;
- the FDS (fast deflation system) control cord if it is present;
- the vent cord if vents are present;
- the connecting wires to the thermometer sensors if the balloon is fitted with them;
- safety fuses at the balloon's inner apex.

IV.4.2 Calculating the Loads

Check the total flight mass in accordance with the diagram in Section V, and within the operating limits (SECTION II.3) taking into account outside temperature and the altitude to be reached. Exceeding the authorised load may lead to the deterioration of the envelope to overheating of the internal air. Variations in temperature during the flight, and gas consumption may cause the pilot to modify his or her flight conditions, especially the altitude.

IV.4.3 Crew: distribution of tasks:

Explain clearly his or her role to each member of the inflation crew.

IV.5 Inflation

- First inflate the envelope with cold air using a stand-alone fan or a fan with boom, in successive openings and closings of the mouth of the envelope, if possible up to 2/3 of the volume.
- The ground crew will:
    - hold the mouth open;
    - hold the crown of the balloon on the ground.
- Then, open the pilot light gas supply spigots on the master bottles.
- Ignite the pilot lights on the burners.
- Open the bottle spigots.

NOTE: The entire inflation operation must be performed while the pilot is in the basket. The pilot must be wearing gloves.

When the balloon has been raised to the vertical position, check the following:

- Proper function of the parachute line;
- Proper function of the FDS (fast deflation system) if there is one;
- Proper function of the vents if there are any.
- Presence of the handling line, on-board equipment, temperature displays.
- Embark the passengers.

IV.5.1 For all burner types:

- Ignite the burner by opening the relevant control valve;
- Heat the air contained in the envelope with short blasts from the burner.
- The ground crew will now progressively release the crown of the balloon until the entire assembly is vertical; the basket is held down by the ground crew.

➢ AIR HEATING SYSTEM OPERATING DIAGRAM

Figure 1 For all burner types, with pilot light in gas phase

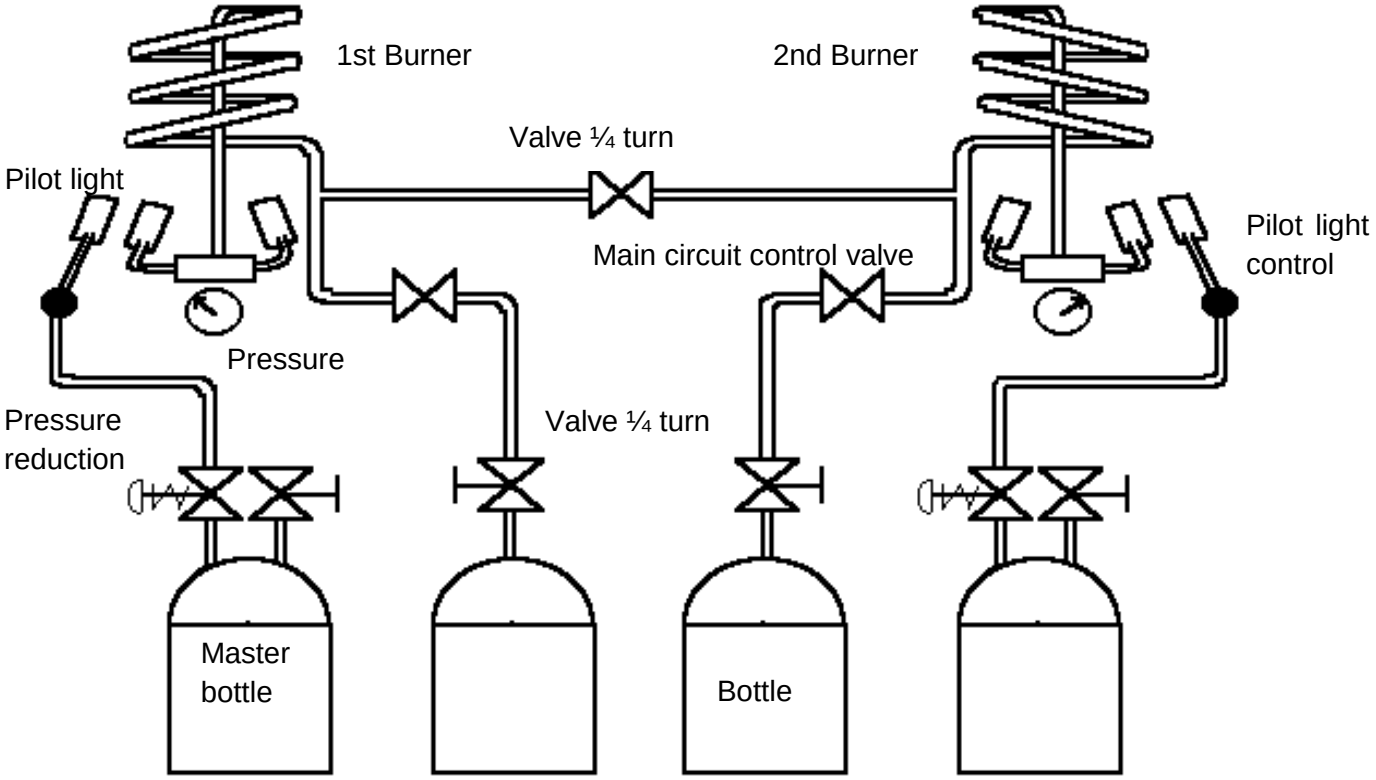
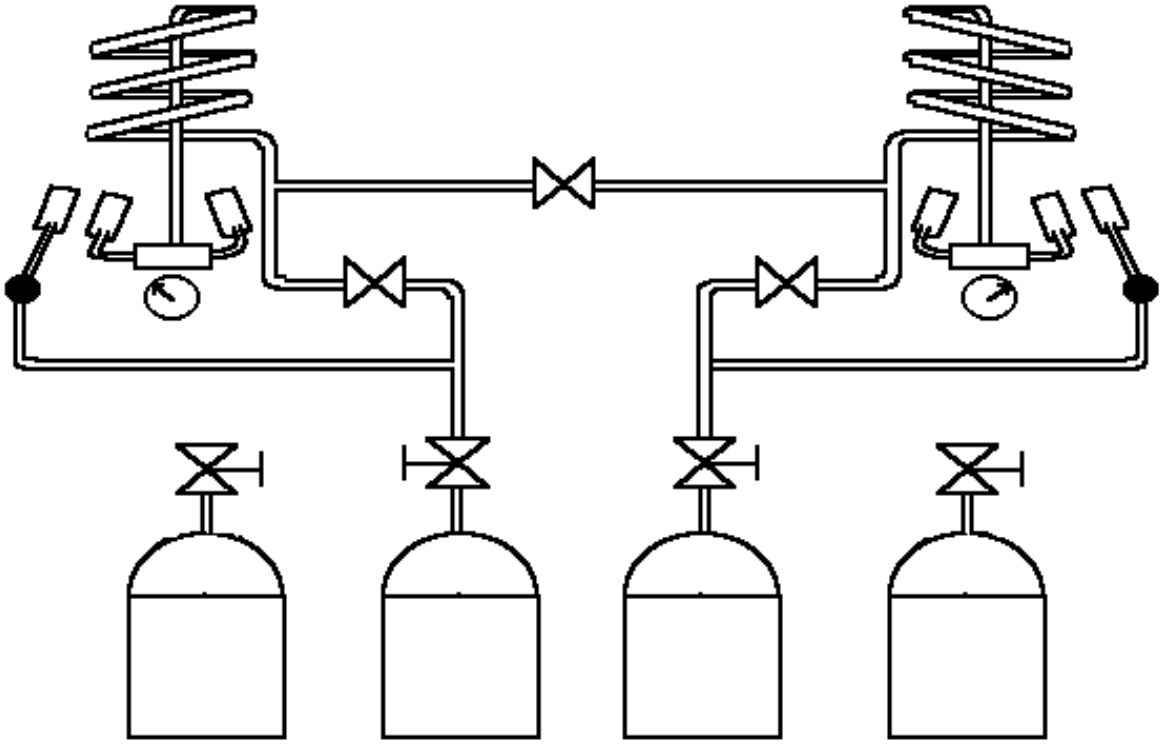


Figure 2 For all burner types, with pilot light in liquid phase



- The SIROCCO double burner does not possess an interconnecting valve with quarter turn.

IV.6 Take-off

- If possible, use a quick release attached to the chase vehicle;
- Place the balloon in aerostatic equilibrium; the pilot must be near the quick release;
- Heat the air in the balloon sufficiently to obtain proper take-off; The ground crew will test the balloon's readiness to take off by quickly releasing and gripping the basket;
- When releasing the balloon, check that none of the ground crew are snagged on the basket;
- If there is a quick release; detach it. If there is a high wind, be careful of false lift caused by the quick release.
- Note the time of take-off so as to monitor gas consumption;
- Maintain the temperature inside the balloon with short blasts to achieve a steady climb rate until the desired altitude.

NOTE: When outside temperature is low, pilots are advised to take off with a lower payload than shown in the graph. This is because pressure in the bottle is reduced when ambient temperature is reduced; as a result, less heat is generated and the balloon will react more slowly, especially when landing.

IV.7 Changes over time

IV.7.1 Monitoring during flight

The flight must be performed within authorised operating limits (Section II page 2.1).

You should often check the following:

- gas level and time elapsed;
- temperature monitoring fuse presence (unless the balloon is fitted with a thermometer sensor).

➢ **Climbing:**

- Heat the air in the envelope with successive blasts using the burner gas valve; stay within operating limits (Section II page 2.1).

➢ **Level flight:**

- Maintain the temperature inside the envelope as steady as possible. To do this, the pilot gives small successive blasts; this technique is learnt through proper training.

IV.7.2 Switching fuel tanks

Switch over to each of the bottles as follows:

- Shut the spigot of the empty bottle;
- bleed off the supply pipe;
- disconnect the spigot of the empty bottle;
- reconnect the supply pipe to a full bottle;
- immediately check that it is working properly by short blasts from the burner;
- when all additional bottles are finished, switch to the master bottle circuit by turning the valve three times.

IV.7.3 Wind gusts

During a flight, you may encounter wind gust or wind shear. This has the effect of flattening the balloon and therefore reducing its volume. The resulting descent caused by loss of hot air volume will be partly compensated by the balloon's descent. However you will also need to compensate the loss of volume with the burner by reintroducing warmed air.

If there are wind gusts, land as soon as possible.

Should there be wind shear, limit the descent rate so as to reduce the effect of the wind shear.

IV.7.4 Ascending air currents or "thermals"

Should you be caught in one of these air movements:

- Allow yourself to climb while maintaining the balloon at the right temperature, in order to avoid a situation in which, as you come out of the thermal, the air contained in the envelope will have cooled, creating the risk of a too-rapid descent.

IV.8 Landing

➢ **Procedure:**

Find a suitable terrain, preferably close to a navigable road (for the chase crew); the terrain must be sufficiently large, must not present dangerous obstacles (high or low tension power lines, telephone lines, trees) and should have no elements that can be damaged (crops, vines, hops etc) or objects disagreeable to touch (rocks, swamps, thickets); take care to avoid animals (animals panic easily).

- Open the flight control valve partially so as to begin the descent.
- As the ground comes closer, slow the rate of descent by means of successive blasts so that it is close to zero when you touch ground.
- Release the drop line, taking care that it cannot catch onto an obstacle.
- Kill the pilot light before touching the ground.
- Should the balloon not be equipped with an FDS, as soon as the basket touches the ground, immediately the parachute line all the way so as to perform total deflation of the envelope.
- If the envelope is fitted with a fast deflation system, actuate it by pulling the red cord just before ground contact, and below 3 m AGL. Once the balloon has been stabilised, and if you desire to leave the balloon standing, shut the FDS by pulling on the parachute line.
- Shut any bottle spigots that are open.
- Bleed the burners' gas supply lines.

IV.9 Folding the balloon envelope

- Stretch the envelope out fully.
- Fold over the panels on either side several times until you reach the envelope axis.
- Unhook the envelope from the load frame.
- Place in the bag, loosely, in order to avoid repeated folding in the same places, starting from the crown. When you get to the suspension cables and carabiners hooked onto the load frame, place them in their special bag and place everything in the large envelope bag.
- Close this back up.

- Unhook the basket suspension cables from the load frame.
- Remove on-board equipment and accessories not fixed to the basket (to avoid loss, theft or confrontation damage).

IV.10 Using the rotation vents

In order to orientate the basket to the direction of travel, actuate the vents by pulling the halyard while standing in the basket; the black halyard for a clockwise turn and the yellow halyard for an anticlockwise turn. To compensate the loss of hot air resulting from opening of the vents, heat by means of short blasts during the operation. You can use the opposite vents to slow unwanted or too-rapid rotation.

➢ **Limits:**

The vents should not be used during tethered flight. Opposing vents should not be actuated at the same time.

➢ **Check:**

Before take-off, ensure that the vents are properly flattened against the balloon surface, and that the rotation halyards are free and easy to use.

➢ **Assembly:**

When preparing to inflate, thread the rotation halyards through the load frame and fix them inside the basket.

➢ **Stowage:**

After the flight, stow the halyards into the special pouch in the upper part of the Nomex fabric.

➢ **Neutralising the rotation vents:**

Should the pilot decide, before the flight, not to use the rotation vents, he or she can leave the halyards in their storage pouch. In this case, care should be taken that the vents are properly closed, and that the halyards are flexible before take-off.

IV.11 Using the Fast Deflation System (FDS)

Use the FDS when you need to rapidly decrease lift during landing.

➢ **Limits:**

The FDS must only be used when bringing the envelope to a complete stop, and never more than 3 m AGL. For tethered flight, the FDS must only be used to empty the balloon for the final landing. The FDS must not be used at the same time as the parachute cord.

- **Check:**

Before take-off, check proper operation of the FDS. Actuate the red chord so as to bring the parachute towards the centre. When there is a complete circle of visible sky between the parachute and the balloon opening, close the parachute by pulling on the parachute cord (red and white).

It may be necessary to pull the parachute cord (white and red) a second time to ensure that the parachute is properly placed and properly sealed.

- **Assembly:**

When preparing for inflation, attach the FDS control cord (red) to the load frame, making sure it has no knots, and that it is not tangled in the envelope cables or any other lines.

IV.12 Night flight

It is essential to prepare the flight properly: Weather conditions, flying time and flying range so that the balloon is able to keep flying until sunrise. Do not hesitate to carry more fuel than you think you need.

In addition, the following equipment must be carried:

- The lights required for operating conditions;
- A VHF transceiver;
- A GPS;
- One or even several pocket lamps.

IV.13 Tethered flight

IV.13.1 Equipment

The equipment must be approved by Ballons Chaize, and in all cases:

- The resistance line must have a minimum rating of 3 t;
- The carabiners must have a minimum rating of 5 t.

IV.13.2 Emplacement

The selected terrain must be free of electrical power lines or nearby obstacles; It must measure at least 50 m x 50 m, and in all cases must be at least twice the height of the balloon;

The downwind part of the site must be free of obstacles in case one of the mooring lines breaks;

No member of the public, other than the passengers, must not be in the area between the anchorage points.

IV.13.3 Anchorage

The balloon must be solidly anchored. Two lines must be anchored to the ground upwind and attached to the two corners opposite the windbreak by means of carabiners, to the envelope carabiners. It is critically important that mechanical strain is lengthwise along the carabiners and not sideways; otherwise the carabiner could twist and snap. This can be avoided by the use of tethering rings, with three holes, into which the carabiners can be hooked. On the windward side, a single chord is sufficient. This is fixed to a bridle attached to two carabiners on the load frame on the windbreak side. This single cord can be attached to a fixed or mobile point. Length of the cords will be adjusted depending on available space and wind strength. Ensure that spectators are kept at a distance: cords may be suddenly and violently stretched tight by wind gusts.

The anchorage lines as well as the anchoring points must be rated for 3 t. These cords must be inspected before each tethered flight.

If a vehicle is being used as an anchorage point, ensure that the handbrake and gear lever are both engaged. Provide a clear safety perimeter around the vehicle.

IV.13.4 During tethered flight.

Monitor wind speed on the ground using a wind sock or a wind gauge operated by a crew member.

Before and during each take-off ensure that no crew members are snagged on the basket, and that they quickly move away from the anchoring points.

SECTION V. LOADING DIAGRAM

V.1 Using the loading graph and table

Std = Standard atmosphere = Temperature = 15°C, Pressure = 1013,25 HPa - At sea level

The dotted lines indicate the deviation from standard atmosphere (Std - 10° = 5°C)

The load table gives the maximum authorised mass for a 100° envelope temperature for series JZ, CS and DC; and 115°C for series JZ X. In order to calculate the payload, deduct unladen mass from total mass. True unladen mass is shown in Section VIII of the present flight manual.

Example:

Balloon Type JZ30, volume 3010 m3, ambient temperature 17°C, desired flight altitude 4000 ft (1200 m) above sea level.

- On the load graph, find the temperature along the temperature curve.
- Then move up vertically to where it intersects with the line marked "sea level"
- From there, move to the line marked 4000 feet, parallel to a dotted line.
- From this point trace a horizontal line in order to find the buoyancy per 100 m³ on the vertical axis. This gives us a value between 26 and 27. Use the more restrictive of the two i.e. 26.
- Find this value in the load table; it gives 783 kg.
- Subtract the unladen mass (197 kg); this gives a payload of 586 kg, to be shared between the passengers and the gas bottles.

CAUTION: Do not forget to count the two obligatory gas bottles

V.2 Load Curve

Figure 3 LOAD CURVE SERIES JZ and CS and DC

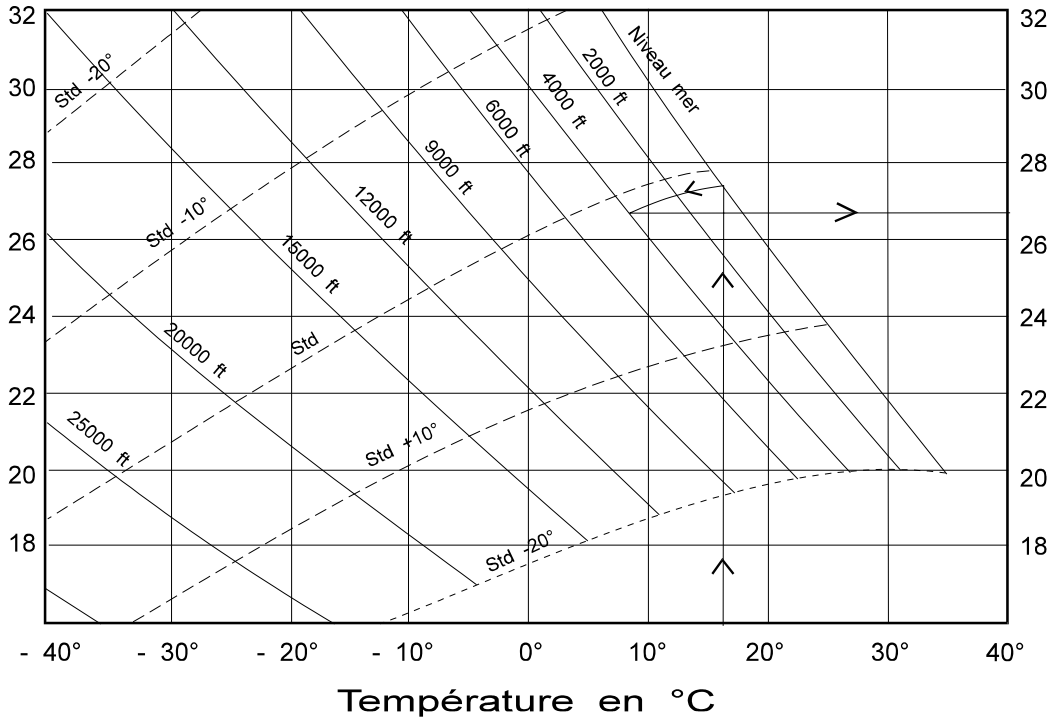
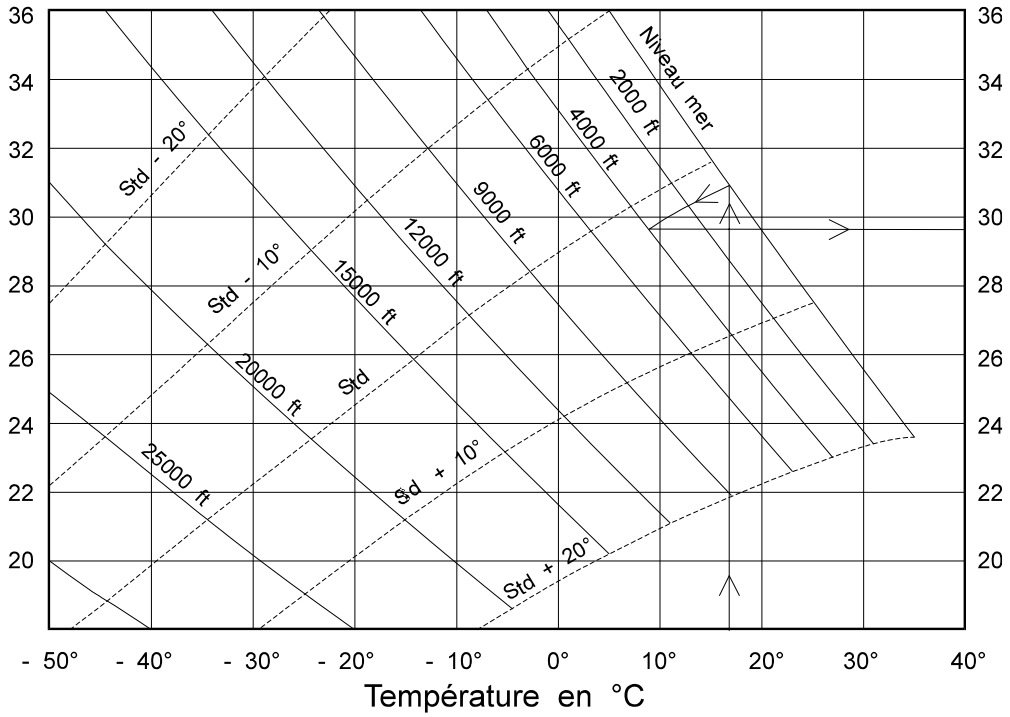


Figure 4 LOAD CURVE SERIES JZ X



V.3 Load table

Kg per 100 m^3	TOTAL AUTHORISED LOAD (Kg) PER BALLOON TYPE Example 35 = 3500 m^3											
	55	50	45	40	35	30	25	22	20	18	16	08
17	952	866	779	691	595	512	433	385	345	303	266	136
18	1007	916	824	732	630	542	458	408	365	320	282	144
19	1064	968	871	772	665	572	484	430	386	338	297	152
20	1119	1018	916	813	700	602	509	453	406	356	313	160
21	1177	1070	963	853	735	632	535	476	426	374	328	168
22	1232	1120	1008	894	770	662	560	498	447	392	344	176
23	1289	1172	1054	935	805	692	586	521	467	409	360	184
24	1344	1222	1099	975	840	722	611	544	487	427	375	192
25	1401	1274	1146	1016	875	753	637	566	508	445	391	200
26	1456	1324	1191	1057	910	783	662	589	528	463	407	208
27	1513	1376	1238	1097	945	813	688	612	548	481	422	216
28	1603	1426	1283	1138	980	843	713	634	568	498	438	224
29	1680	1458	1312	1179	1015	873	729	657	589	516	454	232
30	1738	1528	1375	1219	1050	903	764	680	609	534	469	240
31	1793	1580	1422	1260	1085	933	790	702	629	552	485	248
32	1850	1630	1467	1300	1120	963	815	725	650	570	500	256
33	1905	1682	1516	1341	1155	993	841	747	670	587	516	264
34	1905	1732	1558	1382	1190	1023	866	770	690	605	532	272
35	1960	1782	1603	1422	1225	1054	891	793	711	623	547	280
36	2017	1834	1650	1463	1260	1084	917	815	731	641	563	288

SECTION VI. DAILY INSPECTIONS

VI.1 Envelope

Should you find a rip, ensure that it is within the tolerated damage limit shown in Section II.4. If it exceeds the limit, refer to the maintenance manual.

No maintenance, unless there are rips. Should there be a rip under the first horizontal tape, the user can repair it by stitching, or using adhesive tape. In all other cases, only the manufacturer is qualified to carry out repairs (please see maintenance manual).

The suspension cables must be flexible, and must show no broken strands.

Check condition of the loop and the Velcro hook at the envelope apex.

VI.2 Lifting tapes or halyards

On models with tapes (straps) should any damage be found, please refer to the maintenance manual.

On models fitted with halyards, these are found along 3 cm at the base of the Nomex. Check their condition; in the event of damage, please consult the maintenance manual.

VI.3 Basket

- Check condition of the suspension cables, especially those that pass through the basket wickerwork.
- Check condition of handles for passengers.
- Check condition of the floorboard**:** cracks etc.
- Check the general condition of the wickerwork.

VI.4 Burner and power supply

They must be kept clean and in good condition. The controls must always be free and watertight. Should they malfunction, do not hesitate to replace the defective part.

Bolted joints seal can be improved by using Teflon tape or similar.

VI.5 Bottles

They must not have any leaks.

Should a bottle malfunction, only a properly authorised workshop can perform the required inspection and repairs.

SECTION VII. COMPATIBILITY

VII.1 Compatible equipment

Chaize-compatible equipment is listed below.

Compatibility with other lower balloon parts from other manufacturers are set out in additional specifications in Section VIII.

VII.1.1 Basket

	<= 2000m3	2000m3-2200m3	2200m3-3000m3	3000m3-3600m3	3600 m3 4500m3	5000m3 5500m3
A100	X	X	X			
A101	X	X	X			
A200	X	X	X	X		
A201	X	X	X	X		
A300		X	X	X		
A301			X	X	X	
A302			X	X	X	
A303T			X	X	X	
A400				X	X	X
A401				X	X	X
A403				X	X	X
A403T				X	X	X
A501					X	X
A503					X	X
A503T					X	X

VII.1.2 Burners

- **Load frame compatibility**

Load frames with 4 attachment points, measuring between 55 and 75 cm wide, and between 55 and 75 cm long, are accepted, and are compatible with Chaize envelopes.

For envelopes with a volume greater than 3600 m³, rectangular load frames measuring between 55 and 90 cm wide, and 1 m and 1 m 80 long, are authorised.

For envelopes of 5000 m³, the rectangular load frame must be between 90 and 120 cm wide, and 90 and 200 cm long.

Any other load frame must be approved by the organisation that designed the envelope.

- **Compatibility of burners from other manufacturers**

  For burner compatibility, please refer to the additional paragraphs listed in Section VIII.

VII.1.3 Bottles

Worthington	DOT-4E

SECTION VIII. OPTIONS AND ADD-ONS

VIII.1 LIST OF ADD-ONS OR OPTIONS

No.	Description
1	Addition of removable banners
3	Connection systems between bottles
4	Cameron Base
5	Kubicek Base
6	Lindstrand Base
7	Ultramagic Base
8	Thunder & Colt Base
9	Raven Base
10	Sky Base
11	Schroeder Base