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Maintenance manual

for use with the hot air balloon

Type: BB (Type Certificate No. B04CE)

Model:

Serial No.:

Registration:

Date of Issue:

Registered copy No.:



Pages identified by „Appr.“ are approved by the FAA

Original date of approval: March 20, 2008

This balloon is to be preserved in an airworthy condition in compliance with instructions and information contained herein.

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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 approved 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 6	I, II 15, 16	05 August 2016	Not required	N/A		

0.2 LIST OF EFFECTIVE PAGES

Section	Page	Date of Issue	Section	Page	Date of Issue
0	I	05 Aug 2016	6	6 – 1	10 Jan 2008
	II	05 Aug 2016		6 – 2	10 Jan 2008
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	IV	10 Jan 2008		6 – 4	10 Jan 2008
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The pages, approved by the FAA and involved on the list above, are identified as „Appr.“.

0.3 TABLE OF TRANSFER TO US UNITS

Section	Page	Units	Section	Page	Units
2	2 - 5 2 - 7	1 kg = 2.2 lb	6	6 - 5	1 cm = 0.4 in
		6 bar = 87 psi			2 cm = 0.8 in
		3.7 MW = 4962 hp			10 cm = 4 in
		600 mm = 24 in			22 cm = 8.7 in
		720 mm = 28 in			80 cm = 31.5 in
		835 mm = 33 in			15.5 cm = 6.1 in
		990 mm = 39 in			15 cm = 6 in
		1035 mm = 41 in			0.5 cm = 0.2 in
		1155 mm = 45 in			44 cm = 17.3 in
		1250 mm = 49 in			20,5 cm = 8 in
3	3 - 3	1550 mm = 61 in	6 - 6	20 cm = 7.9 in	
		200 N/5 cm = 45 lbs/2 in		54 cm = 21.3 in	
		300 N/5 cm = 67 lbs/2 in		3 cm = 1.2 in	
		7500 N = 1684 lbs		46 cm = 18.1 in	
		12500 N = 2807 lbs		15 cm = 6 in	
		5100 N = 1145 lbs		87 cm = 34.3 in	
		2 m = 7 ft		25 cm = 9.8 in	
		6 - 7.5 m = 20 - 24 ft		71 cm = 28 in	
		124°C = 255 F		15.5 - 0.5 cm = 6.1 - 0.2 in	
		1 m = 3.3 ft		40 cm = 16 in	
4	4 - 2	1600 m3 = 57,000 cu ft	6 - 7	2 cm = 0.8 in	
		1 mm = 0.04 in		15 cm = 6 in	
		1 kg = 2.2 lb		71 cm = 28 in	
		2 - 5 mm = 0.08 - 0.2 in		81 cm = 32 in	
		124°C = 255 F		20 cm = 7.9 in	
		2 m = 7 ft		20,5 cm = 8 in	
		20 mm = 0.8 in		0.5 cm = 0.2 in	
		10 cm = 4 in		15 cm = 6 in	
		3 cm = 1.2 in		81 cm = 32 in	
		5 cm = 2 in		15,5 cm = 6.1 in	
6	6 - 2	2 cm = 0.8 in	6 - 8	0.5 cm = 0.2 in	
		8.4 cm = 3.3 in		40 cm = 16 in	
		2.1 cm = 0.8 in		6 cm = 2.4 in	
		1.4 cm = 0.6 in		1 cm = 0.4 in	
		5 cm = 2 in		5 cm = 2 in	
		2.1 cm = 0.8 in		50°C = 122 F	
		4 mm = 0.16 in		60°C = 140 F	
		7 mm = 0.28 in		5 mm = 0.2 in	
		5 mm = 0.2 in		70 mm = 2.8 in	
		3 cm = 1.2 in		3 mm = 0.12 in	
	6 - 3	20.5 - 0.5 cm = 8 - 0.2 in	6 - 10	1 mm = 0.04 in	
		40 cm = 16 in		50 cm = 20 in	
				20 cm = 7.9 in	
				12 mm = 0.5 in	
				0.1 mm = 0.004 in	

Section	Page	Units
6	6 - 15	25 Nm = 18.4 lbs ft 20 Nm = 14.8 lbs ft 15 Nm = 11 lbs ft 2,5 Nm = 1.8 lbs ft
	6 - 18	0.2 mm = 0.008 in 0.3 mm = 0.012 in 4 mm = 0.16 in 180°C = 356 F
7	6 - 19	2 mm = 0.08 in
	7 - 1	80 mm = 3.2 in 120 mm = 4.7 in 10 kg = 22 lb 13 kg = 28.7 lb 15 kg = 33 lb 18 kg = 39.7 lb
	7 - 2	12 bar = 174 psi 3 MPa = 435 psi 1.2 MPa = 174 psi
	7 - 4	100 m = 328 ft 0 m/s = 0 knots 1 m/s = 2 knots 2 m/s = 4 knots

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1. GENERAL

1.1 Introduction

The Maintenance Manual (the manual only hereafter) has been prepared to provide information and instructions for safe operation of a BALÓNY KUBÍČEK spol. s r.o. hot-air balloon. This manual contains basic technical and descriptive data of hot-air balloons, scope of work during a flight day, instructions for common care and maintenance of the balloon including annual inspections.

1.2 Applicability

The information contained within this Maintenance Manual applies to all BB and BB-S type from BALÓNY KUBÍČEK spol. s r.o.

1.3 Warnings, Cautions and Notes

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

n nnnmnn

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

nnnnmnn

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

nnmn

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

1.4 Revisions

This manual is kept up to date by manufacturer revisions consisting of a bulletin - optionally with loose-leaf pages and inclusive of the new list of effective pages, requiring the registered manual holder to amend existing information or add new information.

The continued worthiness of your manual should be observed as follows

:

1. Accomplish the change according to bulletin instructions or replace original pages with new/amended ones.
2. Insert up-to-date „List of Effective Pages“.
3. Record the change of issue number in the table of „Record of Revisions“, section 0.1, page (i).

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All changes and appendices of the Maintenance Manual elaborated before the date of the issue stated on the title page are incorporated in this manual by the manufacturer.

1.5 Definitions and Abbreviations of Terms

Natural shaped envelope

The envelope shape is designed so that vertical load tapes will carry the whole basket weight and loading. The textile carries only horizontal acting forces of overpressure.

Special shaped envelope

The envelope shape that does not correspond to any of mentioned standard types. The envelope is produced individually (on request) in form of various eye-catching creatures and imitations.

Operator

The person responsible for the technical condition, proper implementation of all prescribed periodic inspections and repairs (in accordance with procedures approved) carried out by persons with appropriate qualification mandated by the local aviation authority; and for carrying out all tasks assigned by bulletins issued by either the manufacturer or Airworthiness Directives released by the local aviation authority (in compliance with the manufacturer's/operator's country) concerning all balloons he/she operates.

Approved organisation

The producer or organisation commissioned by the relevant national aviation authority to carry out prescribed periodical inspections.

Periodical inspections

The mandatory preventative inspection in a range assigned by the manufacturer and operator's national aviation authority.

Parts/Components

Any instrument, mechanism, equipment, accessory or assembly appointed or used during balloon operating or handling contained herein.

Approved type

The part supplied by the manufacturer or authorised by the local aviation authority.

/-(slash)

The sign used as expression of various text explanations, e.g. : and, or, and/or.

1.6 Index Plates

Index plates for each balloon type, their photos and placement are inserted in the Flight Manual.

2. TECHNICAL DESCRIPTION

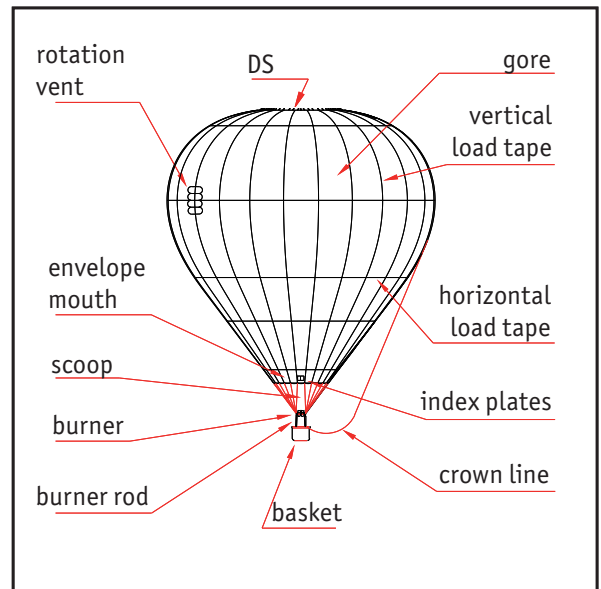
2.1 Envelope

An envelope is the major balloon part. The aircraft component is identified by a serial number and a registration. Each envelope should be only accompanied by parts/components meeting requirements specified and approved by the Flight Manual for the pertinent balloon type. All envelopes, except special shaped ones, are of natural shape in the upper part and conical shape in the lower part. The envelope form is designed so that good flight characteristics, high factors of safety and textile life is provided.

Basic dimensions and data on envelopes are mentioned in the Flight Manual.

The envelope consists of the main components:

1. Envelope body
2. Deflation System (DS)
3. Envelope equipment



▲ Balloon nomenclature

2.1.1 Envelope body

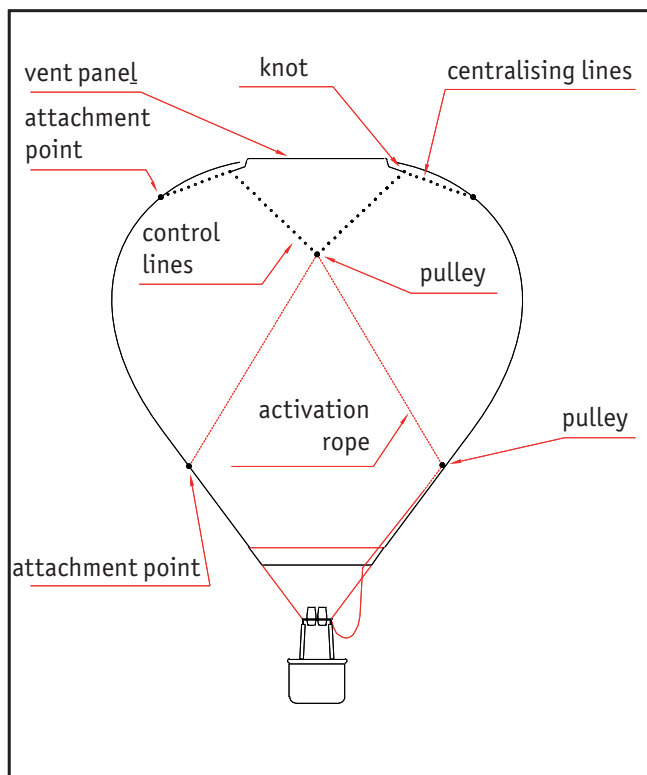
The envelope body is sewed from high tenacity polyester or polyamide base textile which is coated to make it airtight. The natural envelope shape is designed so that the whole basket weight and loading is carried by vertical load tapes (the fabric provides only a horizontal load-carrying element) after envelope hot inflation. A gore is the section of fabric located between two adjacent vertical load tapes. Each gore is composed of individual panels, i.e. textile parts. The first panel above the mouth of the balloon - the lower part of the envelope body - is made from heat-resistant fabric. Natural shaped envelopes of vertical „N“ type and horizontal „O“, „Z“ type are used as type approved balloons. The „N“ type has narrow and moderately gibbous gores to give a near-smooth surface with vertical load tapes sewed in their centres. The „O“ type is characteristic of wider bulbous gores with noticeable curvature and vertical load tapes situated along their edges. A network of vertical and horizontal webbing called load tapes encapsulates the envelope body. The vertical load tapes are attached to a crown ring at the top of the balloon. They extend down to the mouth of the envelope where they are attached to the stainless steel flying wires by a loop. The wires are fixed to the burner frame by means of locking carabiners. Horizontal load tapes appear mostly on every horizontal seam of panel edges to strengthen them and are provided to increase resistance to great rips or tears by large surface dividing. The special shaped envelope body is created from panels in order to reach the required form. Vertical load tapes carry the basket weight and loading. The tapes are sewed towards the envelope body surface or attached to the envelope by shaped load ribs according to the envelope shape and tape placement on it.

2.1.2 Deflation System (DS)

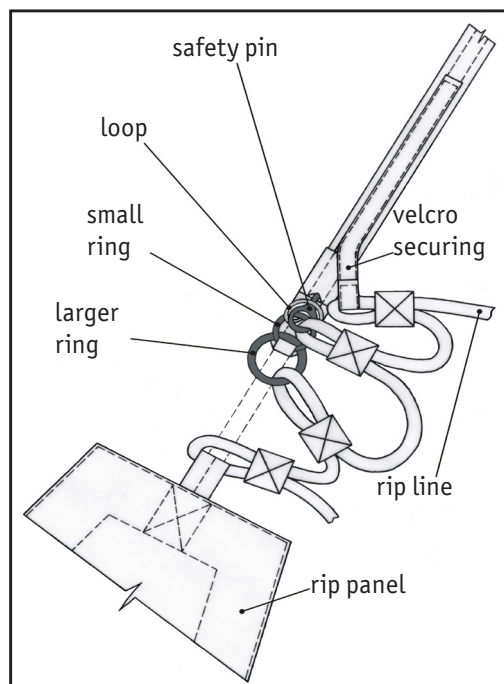
In flight venting of hot air and final envelope deflation is normally achieved using a parachute vent or rip panel, prospectively in combination. The Smart Vent is a rapid deflation system, where one of its functions serves for central venting during landing and final venting.

Parachute

The parachute takes form of a parachute-style disc panel inside the top of the balloon sealing a circular opening in the top of the envelope. The lateral position of the parachute is controlled by centralising lines, which join its edge to the inside surface of the balloon. 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 the right place by the internal overpressure and closes tightly the envelope. The parachute is operated by pulling on a red activation rope in the basket transferring the vertical downwards force to a pulley, which is at the confluence point of a number of control lines attached to the edge of the parachute panel. The parachute resets itself to the former closing position after activation rope releasing.



▲ Parachute control



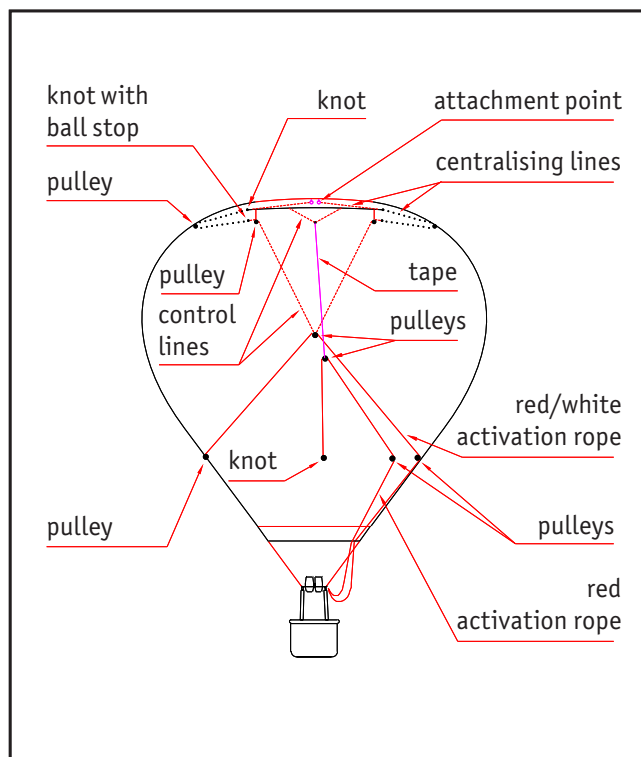
▲ Securing of the rip panel

Rip panel

The velcro rip panel is a partially removing panel of vent opening to permit faster deflation, held in place around part of its edge by velcro. One or more riplocks with velcro securing, in accordance with the envelope type, are fitted around the panel edge to prevent the panel from inadvertently opening the velcro tapes. The rip panel shape matches up with the vent opening. Pulling the rip line first causes a number of riplocks to break, which warns the pilot of the nature of this panel, then causes the panel velcro joint to separate. The rip panel will not reseal itself once the rip line has been pulled, thus revealing a large opening for the escape of hot air.

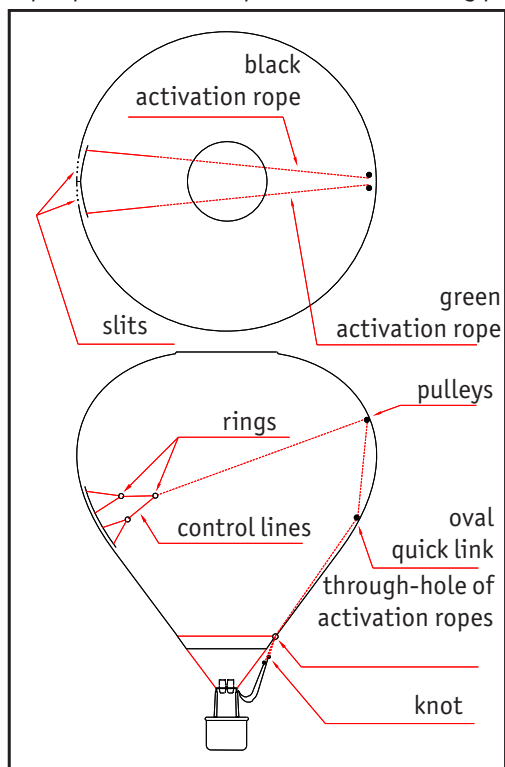
Smart Vent

The Smart Vent is a vent hole closing of two different modes of hot air escaping. The Smart Vent deflation system is similar in appearance and use to a parachute vent followed up by further control lines and an activation rope so that the centre of the panel can be pulled down into the balloon and reset again. The rigging of the parachute vent consists of centralising lines to keep the panel in place horizontally and going to and through pulleys on the inside surface of the balloon, then back to the vent panel. A stop ball is fitted there on the centralising lines, behalf which the lines have free way through pulleys and become parachute control lines. When the red/white activation rope is pulled, the stop ball comes up against the pulley on the underside of the vent, and stops all horizontal forces and so the vent panel can be opened routinely. This in effect changes the rigging into a standard parachute style and in flight venting is the same as a normal parachute.



▲ Smart Vent control

Pulling on the red activation rope, connected by means of a tape to the centre of the vent panel underside, gathers the vent panel down into a column in the centre of the opening for a rapid deflation. The centralising lines are rigged so that the length between the vent edges and attachment envelope point is variable - the edges of the vent move towards the crown ring and centralising lines lengthen to allow this to happen. Then pulling the red/white activation rope spreads the vent panel to the resetting position.



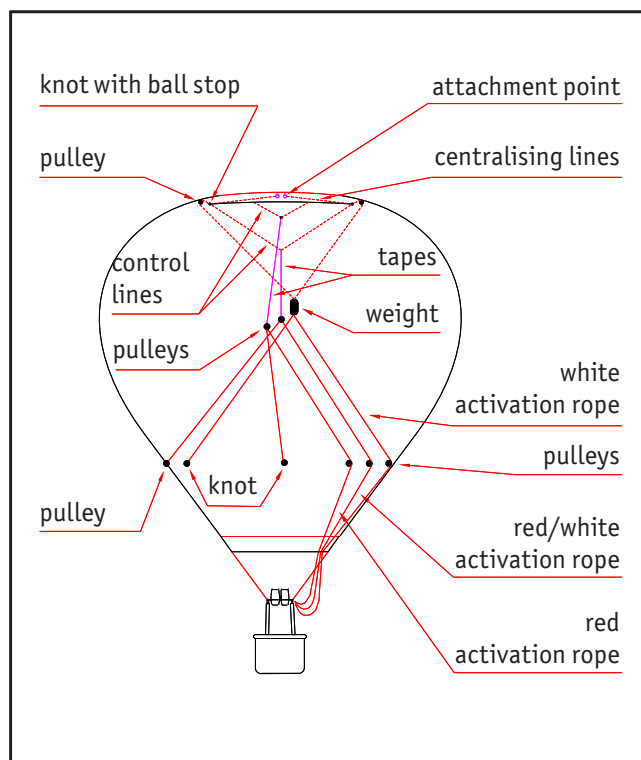
▲ Control of rotation vent

Rotation vent

The rotation vent is located around the envelope equator and consists of a strengthened break in the fabric and a tightly sewed overlap panel with ribs. When the arrangement activated, slits open sending out air tangentially and the effect causes the necessary force for required envelope rotation. Operation is by rotation vent activation ropes (once the force is released from the rope, the internal air pressure causes the vents to reseal).

Light Vent

The Light Vent is a vent hole closing similar to a Smart Vent. Light Vent differs from Smart Vent in that it has three activation ropes and that the parachute centralising lines go through pulleys on the inside surface of the envelope and then to a weight suspended under the parachute vent. This weight reduces the force needed on the white rope to close the vent panel. Pulling on the red/white vent rope curls the edge of the vent panel down whilst the centre of the panel remains in place. When this rope is released the vent panel reseals. Pulling the red rip rope gathers the vent panel into a column in the centre of the opening. The ripping action can be reversed by pulling on the white reset rope.



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▲ Lite Vent control

For operating the Smart Vent, the white activation rope instead of 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 rope can be used regarding the BB balloons up to the including serial No. 177.

2.1.3 Envelope equipment

Crown line

The crown line is a rope or tape attached to the crown ring. The crown line secures the envelope position during inflation and landing.

Scoop

The scoop is made of a fabric with very high resistance to heat in the form of a polygon or circle, suspended in hook-up loops at the bottom of the envelope mouth. The scoop protects the burner flame against wind effects and keeps the sufficient pressure in the envelope under windy conditions during inflation.

Envelope bag

The envelope transport bag is sewed in the form of a pouch and serves for the envelope storage and transporting.

2.2 Basket

The basket serves with the aim of crew/load, fuel cylinders and equipment transporting, to protect people during a flight and especially while landing. Flexible rods fit into basket and burner frame sockets to support the overhead burner frame system.

Basic descriptive data of each basket size are tabulated in the Flight Manual.

The basket consists of the main components:

1. Basket body
2. Basket load cables
3. Burner rods
4. Basket equipment

2.2.1 Basket body

Baskets are of a traditional wickerwork construction, built on a marine grade plywood floor. The floor is reinforced underneath by the addition of wooden or tubular lower frame and hardwood runners, to prevent damage on basket cables. The wickerwork is woven between tubular U-frames concerning smaller-sized baskets. These frames provide strength and stability to wickerwork and protection for steel load cables. The structural load is taken by stainless or steel cables forming a continuous sling around the basket. Flexible rods fit into sleeved sockets at the basket rim and burner frame to support the overhead frame system. On the basket walls there are holes providing passages for strapping in fuel cylinders, and footsteps are provided for easy entry into the basket. The top basket rim is strengthened by the upper stainless steel tubes and glass-reinforced plastic poles. The whole top basket rim is covered with dense foam and then trimmed with suede or leather. The bottom edge is covered with rawhide, which protects the basket from damage during landing and transit. Along the basket top rim underneath, there are internal strong rope handles for use by passengers during landing. Within the lower weave of the basket are included also rope carrying handles externally, which facilitate basket manipulation.

2.2.2 Basket load cables

The load cables are highly strong steel cables with a wire core. Their eyelet endings are squeezed by means of a ferrule and thimble or spliced.

2.2.3 Burner rods

Support rods are either provided as separate flexible rods made of alkaline polyamide or as tilt-mounted frames, both inserted into steel basket sockets. The rods, basket load cables and burner hoses are covered with padded suede covers, to prevent damage or people injury during landing.

2.2.4 Prescribed basket equipment:

1. The dropline, rolled up in a textile casing at an accessible place above the basket floor, is fixed by a carabiner to the basket wall.
2. The (powder) fire extinguisher of min. 1 kg capacity - according to the basket size.
3. Heat-resistant cloth
4. First aid kit.



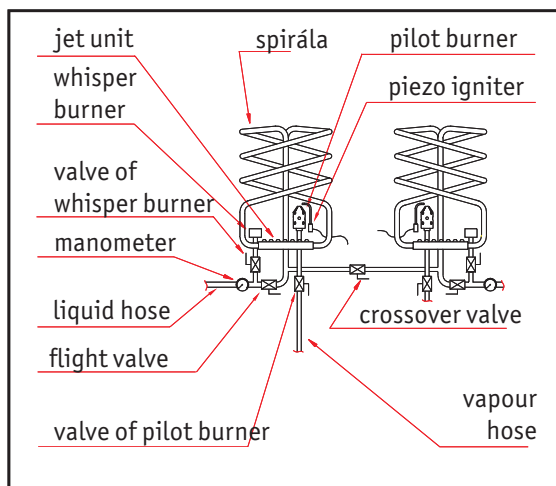
▲ Basket equipment

2.3 Burner

The high-pressure atmospheric diffusion burner provides heating and directing air into a hot air balloon envelope, which is from the safety point of view backed up by the separately controlled whisper burner. These both in company with the pilot burner comprise the burner unit. The burner is assembled from one or multiple burner units and the burner frame.

The burner consists of the major parts:

1. Main flight burner
2. Pilot burner
3. Whisper burner/Liquid fire
4. Burner frame



▲ Nomenclature of burner control

2.3.1 Main flight burner

The main flight burner operates with the liquid phase of fuel gas supplied by a main high-pressure armoured liquid hose through a ball valve commonly referred to as the flight (blast) valve (FV) towards a vaporising coil, where the liquid propane is vaporised prior to combustion. In case of transfer crossover valve (CV) opening, the liquid fuel is fed from fuel cylinders into the second flight burner coil as well. Then already in the gas form it flows across jets to the combustion room to be diffusely mixed with the ambient air and burned. The main flight burner ignition is achieved via the pilot burner. The protection against flame and condensate effects is kept by means of cans forming also the burner body.

2.3.2. Pilot burner (PB)

The pilot burner is a low-pressure burner that uses gas vapour. The vapour is either taken from a fuel cylinder by a vapour hose, passing through a closeable valve/ball cock to the pilot light jet or it is taken from the liquid supply in the burner block, through the pressure reducer (pressure unit) to the pilot light jet. On burners which have vapour hoses the pressure, and therefore the height of the pilot light flame, may be adjusted by using the regulator on the fuel cylinder. The pilot light burner is lit by means of a piezo igniter, match or other means of ignition.

2.3.3 Whisper burner (WB)

The whisper burner feeds liquid fuel through a shutoff valve/cock directly to a multi-hole jet bypassing the coil, via the same supply liquid hose utilised for the main burner. It produces a stream of liquid propane injected into the combustion room. The combustion efficiency and burner power output are lower, but on the other hand, thus producing less noise approximately by one-half than the main burner. The sound spectrum is in the range of low frequencies better accepted by people or animals than high ones. In case of the main flight burner malfunction, the whisper burner serves as a backup burner at the same time.

2.3.4 Burner frame

The burner frame is a solid stainless tube construction carrying horizontal forces of load flying wires. The burner units are swivel-mounted in the inner burner frame or joints, which in its turn is swivel-mounted in the outer frame. This provides a 2-axis gimballed system allowing circular turns of the burner. At each corner the burner frame has sleeved sockets to accept the support rods or upper tilt-mounted basket frames.

2.3.5 Burner descriptive data

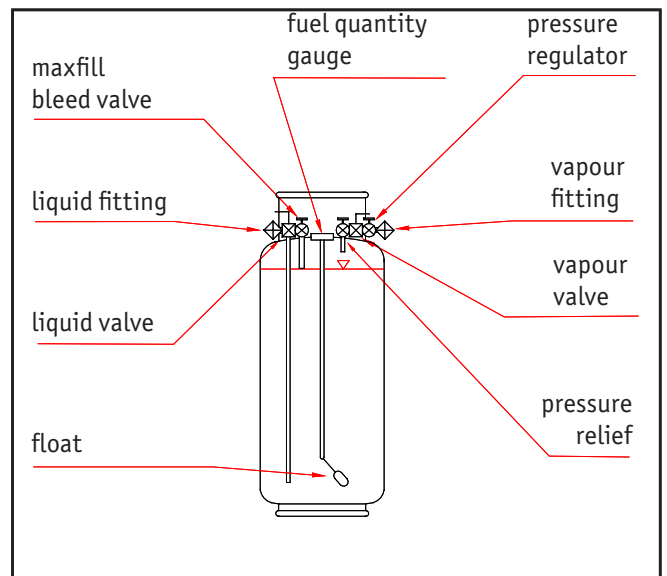
Type	Power output under 6 bar [MW]	Distance between the burner frame attachment points for the envelope [mm]	Connecting couplings of the liquid fuel phase	Connecting couplings of the vapour fuel phase	Fuel
IGNIS 2 units (K10-K22)	2 x 3,7	720 x 600	REGO 7141F, TEMA 3800, ČSN	DYNAQUIP D3, TEMA 1300 LORCH, ČSN with pressure regulator	Liquefied propane or commercial mixture of propane and butane
IGNIS 2 units (K25P)	2 x 3,7	1250 x 835			
IGNIS 3 units (K25P-K32T)	3 x 3,7	1155 x 1035			
IGNIS 3 units (K40Y)		1550 x 990			

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Concerning the fuel hoses, Rego 7141F and Dynaquip D3 couplings are fitted as standard.

2.4 Fuel Cylinders

The liquefied gas - propane fuel, supplied for the burner operation is stored and transported within pressurised fuel cylinders for in-flight use, which all have a liquid supply via a major liquid valve/cock (standard type), and some also a vapour supply by a vapour valve/cock (master type). A pressure relief /safety blow-off valve and a maxfill bleed valve serve for the purpose of checking by volume. All cylinders have a float fuel quantity gauge. The master cylinders are equipped with a pressure regulator. All control elements are positioned in a way to be protected by a cylinder collar.



▲ Nomenclature of (master) fuel cylinder

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The pressure regulator is a component of the connecting vapour coupling as far as relating to the S23 cylinders.

2.4.1 Cylinder descriptive data

Descriptive data for fuel cylinders is included in the Flight Manual.

2.5 Balloon equipment

2.5.1 Prescribed balloon equipment:

1. Altimeter
2. Variometer
3. Fuel quantity gauge on one major cylinder at least
4. Melting link
5. Fire-extinguisher
6. Fireproof fabrics (heat-resistant cloth)

All balloon equipment should be of the approved type.

Operating, Maintenance, repairs and preventative inspections are to be carried out in accordance with the relevant sections in this manual.

3. AIRWORTHINESS LIMITATIONS

The Airworthiness Limitations section is FAA approved and specifies maintenance required under §§43.16 and 91.403 of the Federal Aviation Regulations.”

3.1 Airworthiness

The balloon airworthiness (hereinafter airworthiness) contained herein means the reliability, i.e. the ability of all components of the particular balloon to operate under the conditions defined by the covering technical documentation during the defined period.

3.2 Airworthiness Conditions

The continued airworthiness condition of the balloon/balloon part is conditioned by:

- a) Carrying out the appropriate maintenance
- b) Carrying out the appropriate inspections (as specified in Section 4)
- c) Compliance with instructions for handling and operational limitations designated by the manufacturer
- d) Fulfilment of instructions stipulated by the mandatory standards defined in para 3.3

3.3 Standards for Continued Airworthiness

Mandatory standards for continued airworthiness:

- a) Airworthiness Directives (AD) issued by the NAA of registry. Non-compliance with an AD will make the product non-airworthy.

Recommended standards for continued airworthiness:

- b) Service Bulletin of the TC. holder The service Bulletin is a strong recommendation and non-compliance with a Service Bulletin may render the product non-airworthy.

In order to assist with continued airworthiness Kubicek Balloons maintains a list of all known owners/operators of its balloons. When ownership of a Kubicek Balloons or a part of a balloon changes it is obligatory for the new owner/operator to inform Kubicek Balloons by filling in and returning the enclosed „Balloon Operator Questionnaire“. It is essential that contact details on this form are completed correctly so that Bulletins can be distributed properly.

3.4 Airworthiness Control

The operator is responsible for the continuous airworthiness of a particular balloon.

The TC holder together with the NAA of the state of design is responsible for the continuous airworthiness of the balloon type as defined by the TC.

3.4.1 Information Collection for Airworthiness Control

Kubicek Balloons has established a system of collection and assessment of information on operation and development of potential corrective measures for maintenance or renewal of airworthiness for the respective type.

For a correct function of this system it is necessary that every operator or Maintenance Organisation submits reports at least of following failures defined under to the TC holder.

- a) Fire caused by a failure.
- b) Burner defect which caused damage to the envelope.
- c) Leaks or accumulation of gas the crew space or balloon envelope
- d) Significant primary failure of load-tapes, flying wires or attachments.
- e) Burner failure in flight
- f) Failure of either the burner or the balloon control system (DS) in flight that make the balloon difficult to control or make the flight qualities worse.

Please use the "Failure Report" form in this handbook when reporting.

3.5 Periodical inspections

Type of Inspection	Operating Period	Concerning
Annual inspection	100 flight hours or 12 calendar months, whichever is the sooner (1), (2)	envelope, basket, burner, fuel cylinders, equipment

- (1) In case the 100-hour time limit apply it be exceeded up to max 5 hours, under condition that the extra time is used to complete a flight started before the 100-hour limit reaching. The operating period, exceeding the 100-hour interval, must be included as hours flown relating to the next 100-hour inspection.
- (2) In case the 12 months limit apply the revision has to be carried out not later than on the last day of the month in which the last inspection was carried out.

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Inspections must be carried out by an organisation which is approved by the relevant national airworthiness authority. Inspectors dealing with inspections/repairs must be trained

3.6 Service Life

Some components within a balloon system have a maximum life after which they must be replaced. These items are listed within this section.

Other components are to be replaced when worn or damaged as defined within section 6 of this manual.

3.6.1 Life limit of textile envelope parts

The service life of textile materials is based on their residual strength. Textile materials lose its strength gradually, after some period of time a strenght may become insufficient and a particular part has to be replaced.

Textile materials may degrade more rapidly in the following circumstances:

1. Frequent overheating of the envelope during violent manoeuvring in flight.
2. Flying the balloon overloaded.
3. Leaving the envelope spread out in sunlight for long time.
4. Incorrect sealing of the DS
5. Frequent packing up of the hot envelope.
6. Storing the envelope in moist/wet conditions or near direct heat.

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The rate of degradation depends on the temperature at which it is operated, the way that it is stored and the care with which it is operated and maintained..

Minimum fabric trengths

Material	Type	Minimum Strength	
Envelope fabric	PES 50/60	200 N / 5 cm	45 lbs / 2 in
Envelope fabric	100% NYLON	200 N / 5 cm	45 lbs / 2 in
Load tape	PES, width of 25 mm tl.1,7 mm*	7500 N	1684 lbs
Load tape	PES, width of 25 mm tl.2,7 mm**	12 500 N	2807 lbs
Load tape	PES, width of 20 mm	5100 N	1145 lbs

* Identified by a single longitudinal thread in a contrasting colour.

** Identified by two longitudinal threads in a contrasting colour.

3.6.2 Life limit of other parts

The service life termination of other parts is based on periodical evaluation of their condition (see Section 4). The parts mentioned in the following table must be replaced in any case with new ones if they are aged as tabulated below.

Material	Time Limit
Rubber highpressure fuel hose of type EN 853 1SN	10 calendar years
Rubber highpressure by-passing hose of type EN 853 1SN	10 calendar years

Failure Report			
Event date:			
Component type and serial No.:			
Total No. of hours worked on the damaged product:			
Date of the last inspection:			
Description of the failure or dangerous event occurrence: (If it is important, please draw a sketch or enclose a photograph.)			
Classification of failure location (Section 6.4)			
According to the operator:	<input type="checkbox"/> - main group	<input type="checkbox"/> - sub-group	
According to the manufacturer:	<input type="checkbox"/> - main group	<input type="checkbox"/> - sub-group	
Operator's classing of fault			
According to potential effects:	<input type="checkbox"/> - critical	<input type="checkbox"/> - breakdown	<input type="checkbox"/> - minor
According to the time course:	<input type="checkbox"/> - sudden	<input type="checkbox"/> - gradual	<input type="checkbox"/> - irregular
According to the fault reason:	<input type="checkbox"/> - inadequate dimensioning	<input type="checkbox"/> - ageing	<input type="checkbox"/> - wear out
	<input type="checkbox"/> - mishandling	<input type="checkbox"/> - constructional	<input type="checkbox"/> - manufacturing
Report elaborated			
Address:		Name:	Signature:
			Date:

Faults	finish abilities to perform the required function.
Critical fault:	- has caused unacceptable effects
Minor fault:	- has affected particularly important properties
Breakdown fault:	- has not affected particularly important properties
Degradation fault:	- has occurred suddenly and completely
Damage:	- has occurred gradually and partially
Defect:	- unit/part has not complied with the technical specification since damaging
	- state of deterioration is minor with respect to the unit/part operating
<p>n nnnmnnnn</p> <p>If the failure has an effect mentioned in section 3.4.1 maintenance manual the operator is obliged to follow the instructions in section 3.4.1 Maintenance manual.</p>	

Please fill in the white fields and fax to BALÓNY KUBÍČEK spol. s r.o.

Questionnaire to a balloon operator

- Notes:
- 1) In case of change of the operator or owner of the envelope, burner or basket, send this form to the new operator (owner)
 - 2) If you operate more balloons, please make a copy of this blank form
 - 3) Required data you can find on the index labels located on: envelope – mouth tape or above this tape, basket – inner wall under the top rim, burner – coil or central connection between coils

Envelope type	Serial No.	Registration		Operator of the balloon	Owner of the balloon
BB			Name		
BB			Street, No.		
BB			Post Code, City		
BB			State		
BB			Tel + Fax		
			E-mail:		
(*) Do not fill in if identical to the operator					

Burner		Basket	
Type	Serial No.	Type	Serial No.

4. INSPECTIONS PROCEDURES

4.1 Annual Inspection

4.1.1 Documentation preliminaries

1. Check completeness of the service-technical documentation. Verify validity of each certification, as well as the documentation on maintenance and insurance. Inspect the Flight Manual and Maintenance Manual for conformity with the particular balloon, their comprehensiveness and complete records of revisions.
2. Check serial numbers of all the balloon components listed in the logbook against those to be inspected in accordance with index plates and pertinent certificates.
3. Inspect the logbook management - the number of flying hours, flights and modifications performed since the last inspection should be correct and up to date. Check the logbook for repairs, inspections or/and maintenance entries; implementation of issued bulletins and Airworthiness Directives (AD).

4.1.2 Envelope check

1. Supervise the fabric, on the spread or cold inflated envelope, for damage and performed modifications and repairs being in compliance with the information contained herein. Concentrate on the DS and equator fabric during checking.

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Attached banners or patches deforming the envelope shape are inadmissible.

2. Check envelope fabric strength by a grab test, or alternatively the section of the fabric may be removed from the envelope and submitted to a textile-testing laboratory by a tearing test in the horizontal direction (i.e. perpendicularly to the vertical load tapes). The requirement of the min. strength is mentioned in Section 3.5.1 contained in the manual. Description of the test carrying out is inserted in Section 7.2. The test should be conducted for each fabric colour on the panels at about 2-meter distance above the rim of the DS vent hole, min. at three positions and one time over a seam at least. Perform the test concerning all fabric types used at the load-bearing envelope part if there are more envelope fabric patterns. In addition to the tests listed above BB20 GP envelopes are to be tested at a minimum of three positions in the 4th and 5th panels (6-7.5 m above the envelope mouth). Check the fabric for porosity by your mouth trying to blow through it. If the porosity of the fabric is high, a flight test should be considered by the inspector, to assess the fuel consumption and balloon controllability (see Section 7.5), or the section of the fabric should be sent to the envelope manufacturer for reviewing. The fabric of the rotation vent needs to be grab tested as well.

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In case of not observing the requirement, the in flight tearing or ripping of the envelope can occur.

3. Check all load vertical load tapes for security of stitching along the whole length. Pay particular attention to the load tape edges for their potential wear or fraying, and especially around the envelope crown where load tape loops of turnbacks could be abraded or damaged by the crown line. The horizontal load tapes should be free of damage along the whole length.
4. Check the figure-8 crown ring for damage, especially for cracks, splits or extensive corrosion. The crown line should be free of damage.
5. The melting link attached to the temperature warning streamer in position, must be of prescribed type and undamaged. In case of the tempilabel fitting, inspect its condition and when the solder link has been melted during exceeding the max admissible temperature (124 °C), always record the fact and maximum temperature reached in the log book.

6. Inspect the DS textile for no damage. Pay particular attention to the textile edgings. Check the condition of velcro tabs and their proper function. If there is a rip panel, aim your observation to its velcro tapes, riplocks and securing. Ensure the DS is functional. Test the system function, sealing and necessary activation force.
7. Supervise completeness and condition of the whole centralising lines of the DS. Inspect them for wear, fraying, stiffness or further damage indicating overheating. Check the centralising lines for security of attachment at both ends (correct loop stitching of the lines and safety knots), and improper stretching, shrinking or tangling. Concerning the SV system, inspect ball stop attachment on the centralising lines and sufficient slack of the lines at pulleys.

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Frayed, ruptured or missing the centralising lines, or riplocks and rip panel velcro malfunction could cause uncontrolled air leakage out of the envelope while airborne.

8. Check the DS control lines for completeness and no damage, their position and attachment towards pulleys of activation ropes. Damaged parts have to be replaced with the new ones. The knots serve for repairs or minor damage of the control lines can be tolerated if it is ensured that the pulleys/loops are free and running smoothly. Concerning the Lite Vent system inspect the condition and attachment of the weight.
9. Supervise the DS activation ropes for completeness and no damage along the whole length. Pay special attention to the length measuring, the activation ropes should not be worn or frayed from pulley running or heating - check that by the palpation. Inspect the ropes for correctness of colours (according to the DS type) and kinks. Concentrate on the rope connection to the burner frame.
10. Inspect the whole pulleys of the Deflation System to ensure that they are free and running and not worn (no loosened screw joints or seized bearings). Check non-metallic components of pulleys for wear by activation ropes. Pay particular attention to potential damage by flames/ropes and the proper security and attachment to the envelope. Supervise that the loops providing the pulleys fixing are in a good condition and also for security of their stitching to the envelope.
11. Check textile of the rotation vent and ambient localities. Inspect control lines and activation ropes of the rotation vent along the whole length for completeness and no fraying, wear or burn damage. Supervise pulleys and their attachment to the envelope. Test the rotation vent function, especially its sealing.
12. Supervise the load tapes near by the envelope mouth for no burn damage or fraying. Concentrate on the load tape loops that connect the flying wires to the envelope, whether they are not worn or heat damaged. Ensure that the load tapes with stitching are not stiffened by overheating in the first three-meter distance from the envelope mouth, their threads have no burn damage at the connections and the load tapes themselves have no edge damage due to repair of the lower panels, which are often replaced. Inspect the horizontal load tape around the envelope mouth for no damage. Mildly burned places can be tolerated.
13. Inspect the flying wires and envelope carabiners. These should be checked for distortion or damage and that thimbles and ferrules are intact (a slack thimble ordinarily signals a loose wire at a ferrule). Check wires for corrosion and mechanical damage stages (cracking or breaking partially). In case of the number of broken wires not higher than 8 per 1-meter length of a flying wire, this matter can be tolerated under the condition that any strand is not totally separated and there is no doubt about the flying wire strength. Supervise flying wires for any signs of the heat damage reducing their elasticity. Carabiners should be free of fraying and distortion and the screw gate should operate freely. Concerning the balloons up to the 1600 m³ volume, dural carabiners of Walter-M type can be used. Inspect the carabiners for no scratches deeper than 1 mm. In the event that any damage, as described above, is detected, then the carabiners must be replaced promptly.

4.1.3 Basket check

1. Steel basket load cables should be inspected for damage along the whole free length. Concentrate on the locations of the basket cable leaving the dural/stainless frame in the bottom and on the basket rim. Check cable wires for corrosion and mechanical damage (cracking or breaking partially) from the cable banding during the basket assembly and disassembly. In case of the number of broken wires not higher than 8 per 1-meter length of a basket cable, the matter can be tolerated under the condition that any strand is not totally separated and there is no doubt of the cable strength. Furthermore, review the condition and operation of load-bearing carabiners.

2. For situations of basket cable squeezing, check that there is no damage to thimbles or ferrules (a slack thimble ordinarily signals a loose basket cable at a ferrule). Applying to baskets with cable splicing, remove leather covers and inspect the splices.
3. Check strapping for cylinder attachment and locations of their openings providing passages on the basket walls. The passages should be safe enough for strapping in fuel cylinders, especially during landing.
4. Inspect the condition and firmness of the plywood floor, runners / rawhide covers protecting steel basket cables underneath the basket. Pay particularly attention to any cracks present on the underside of the floor, at the connection of the floor with the basket body and to any worn, cracked or slotted locations of protective runners. Ensure that no steel basket cable is uncovered.
5. Supervise the basket body, especially for no unsafe sharp edges with imperfectly covering or dangerous holes in the wickerwork which would cause danger to occupants and through which any object carried by the basket could drop out. Inspect the basket that the internal rope handles are strong and safe enough to be used by passengers during landing.
6. Check the condition of the drop line, its accessibility, compactness and attachment to the basket.
7. Check the type of the pertinent fire extinguisher (filling capacity should be min. of 1 kg, according to the basket size). Inspect the fire extinguisher by weighing, or in accordance with the instructions for pressure gauge for full filling. Ensure that the last revision of the fire extinguisher has been valid so far. The date of the revision should not be older than prescribed by the producer.

4.1.4 Burner check

1. Check the burner for completeness thoroughly.
2. Inspect (without overpressure) the manometers/pressure gauges, their general condition, protective glass lens fixing, and condition and legibility of the dial with pointer, which must indicate/ read zero under the standstill condition/with no fuel pressure applied.
3. Supervise fuel hoses are of the correct age from data mentioned on hose squeezed endings (see Section 3.5.2). Use only the original hoses approved by the burner manufacturer in case of replacing. Inspect the physical condition of hoses thoroughly. Pay special attention to the liquid ones. Observe outer covers of hoses along their entire length to check for no mechanical damage or worn places. Concentrate on bent locations and hose end fittings, if they are not cracked/slack at the squeezed endings. If there are any doubts about the hose perfect condition, replace it with a new one (use only the original hoses produced by the burner manufacturer). During deciding this, please keep special attention and severity. Minor surface damage to fuel vapour hoses (the hoses supplied the pilot burner) is not critical and can be permitted.
4. Check connecting couplings of both the liquid and vapour phases. Inspect the strength and tightness of the hose to couplings connection. Inspect the condition of contact surfaces and also entering tapered cones for no mechanical damage. Regarding the Rego couplings / connectors equipped with a self-closing valve, review its function. Check colour marking of the couplings (if used).
5. Check welds and surface of the vapouriser and burner frame, especially at position of bends on the upper tube edge of the coil and at position of a tube contact with steel connecting band. If you find any damage of the coil tube edge, ask the producer or authorised service for carrying out strength test of the vaporizer (a pressure test). The test procedure see section 7.4.
Check welds and surface of the frame, central gimbal suspension block and the rod inserting sockets on both the burner and basket frame.

6. Check all threaded joints and the condition of retaining safety rings. Reject any safety ring showing a loosening / slack or strain, and replace it with a new one. Check pins and safety rings of the frame flexible ending. Check condition and wear of the corner rubber blocks (if the frame is fitted with them). Damage of a rubber block does not affect working order of the frame, but we recommend to replace it with a new one, you will reduce wear and damage risk of all corner flexible pivot system.
7. Check the FV function and controllability. Inspect correct working of the vent by several opening and closing the FV lever. While the valve is completely closed, free movement of the control lever must be 2-5mm (measured on the lever end in vertical direction). Connect the burner to the fuel cylinder and ignite several times. Check capacity and shape of the flame. Check tightness of the supplying tube inlet to the couplings and tightness around the tubes. Check that there is no burning under the jet array because of fuel leakage under jets or around connecting of the supplying tube. Leaky and slack jets should be tightened and sealed by a professional service. Check that the FV completely closes the fuel inlet and there is no abnormally long afterburning or incomplete shutting off the flame. (The FV can be shut improperly because of worn sealing on the vent seat or the age of the spring).
Check the WB function in the same way.
8. Supervise the function of the piezo igniter and also the distance setting of ignition electrode contact. Conduct the test for ignition and stability of PB heating (ignite and shut off PB at least three times). Inspect that the flame is not easy to shut off.

4.1.5 Fuel cylinder check

1. Verification of the validity of the periodical inspection prescribed by the cylinder producer should be carried out after comparison with data imprinted on the cylinder index label. Cylinders are not permitted to be used without the current periodical inspection.
2. Carry out the external inspection of the cylinder free of its padded cover. Draw particular attention to any damage to the locations of longitudinal welds of the lateral area of the cylinder body, deeper scratches or abrasions, prospective dents, denoting a heavy impact/misuse accident.
3. Check the valves and fittings for correct operation and no leakage. The leakage test should be conducted in accordance with Section 7.3. When working on cylinders, it is possible that they are completely empty or with only residual pressure. Use the compressed nitrogen to achieve the required overpressure. Check the fuel quantity gauge for correct operation and signs of leakage. On the cylinders equipped with the (vapour) pressure regulator within the vapour phase inspect its proper function.

Validity of inspections of the fuel cylinders prescribed by the manufacturer:

Manufacturer	Type	Validity since date of production	Validity of next tests
Schroeder Fire Balloons	VA 50	10 years	10 years
	VA 70		
Cameron Balloons	CB497	10 years	5 years
	CB599		
	CB2088		
	CB426		
	CB959		
	CB2385		
	CB2387		
	CB2380		
	CB2383		

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The leakage test conducted by means of the open flame is a fire hazard and is not permitted.

4.1.6 Equipment check

1. Review that the last inspection, in compliance with the Technical description (present submitted documentation), of the relevant ancillary instrument/equipment is valid. You should also check the result of the inspection and supervise their extra standard operating periods.
2. Ensure that the condition, function, conspicuous data legibility and exactness concerning each instrument comply with the rules contained in the Technical description/service and maintenance manual.
3. Check all the supply and by-passing hoses applied in compliance with Section 4.4.4 , item 3..

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Applying different than approved hoses could lead to the hose loosening out from the coupling by corrosion and a fire hazard.

If there is any noticeable damage to the hose external surface or couplings applied, this fact could cause a fuel leakage and fire risk.

4.2 Irregular Inspection

4.2.1 Inspection after envelope overheating

The balloons are fitted with a temperature-warning streamer, which will descend or be damaged when the melting link melts after exceeding the maximum allowable temperature in the envelope. If this occurs, the inspection must be carried out.

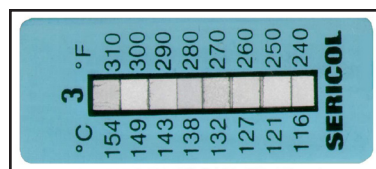
Tempi-label: If the maximum temperature indicated on the tempilabel is greater than 124 °C, sew on a new one, do not remove the original label, it must stay in its cover.

Envelope fabric: Fabric strength test should be conducted by means of a Grab test at various positions of about 2-meter distance from the envelope top DS edge. The envelope fabric should be grab tested perpendicularly to the vertical load tapes. In case of the fabric tearing, submit the envelope to the manufacturer for further inspection.

Lines: Ensure that the lines are in good condition with no burn damage, stiffness or length reduction. Replace the stiff lines with new ones.

Envelope mouth: Supervise the load tapes at the envelope mouth and the locations that connect the load tapes to the flying wires for any signs of heat damage. If there are any doubts concerning the condition of any parts, a new component must be applied.

Logbook: Record the maximum temperature reached, result of the tests and ensuing repairs in the logbook.



▲ Tempilabel

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Excessive heat on fabric tends to cause cracking due to stiffness.

4.2.2 Inspection after contact with electric power lines

If the envelope or basket touches electric power lines, the inspection should be carried out in scope of the annual inspection with concentration on the checks described below.

Envelope textile: Review all envelope textiles, especially for signs of any damage to the load tapes by the electric discharge. The damaged parts must be repaired.

Crown ring: When supervising the crown ring, draw attention to any noticeable damage. In case of this matter, a new crown ring should be installed.

Flying wires: Perform the inspection of the flying wires along their whole length including thimbles and ferrules. In the event that any damage from the electric current is detected, then the flying wire must be replaced.

Basket cables: These should be checked for electric damage along the whole length and that the thimble and ferrule are in good condition as well. After removing the basket protective runners/rawhide, pull out the cables. Replacement of damaged basket cables should be carried out. In the event that any problem of the whole length checking of the cable occurs, a new basket cable must be installed.

Fuel cylinders: Remove the padded jackets/covers and inspect the cylinders bodies for external damage from the electric discharge. After detecting any damaging effect the pressure test of the cylinder should be performed. If the cylinder has been deemed unsuitable for further service in accordance with the test results, put the cylinder out of operation. The failed cylinder must be marked and secured against accidental filling.

Logbook: The accident concerning the contact with power lines and the following tests/repairs should be entered in the balloon's log book.

4.2.3 Inspection after hard landing

The inspection after hard landing should be carried out on the basket, burner and fuel cylinders in scope of the annual inspection with concentration on the checks described below:

Logbook: The hard landing and the following tests/repairs should be entered in the balloon's log book.

Balloon Type	Serial No.	Registration	Date of Inspection

Annual Inspection - Preliminaries				
4.1.1	Check	Minimum scope	Conducted	Inspected
1.	Documentation Completeness	Log book. Certificate of Airworthiness (C of A). Certificate of Registration. Certificate of Insurance. Maintenance Statement and Certificate of Release to Service. Aircraft Station Licence. Flight Manual. Maintenance Manual. Basket/burner book of records		
2.	Index Plates and Part/Component No.	Balloon, envelope, basket, burner, fuel cylinders, equipment.		
3.	Service - technical documentation	Log book. Accomplishment of Bulletins and Airworthiness Directives (AD)		

Envelope Type (Size)	Serial No.	Registration	Date of Inspection

Annual Inspection - Envelope				
4.1.2	Check	Minimum scope	Conducted	Inspected
1.	Envelope Fabric	Fabric damage and performing of previous repairs.		
2.	Fabric Strength and Porosity	Tensile strength and porosity.		
3.	Load Tapes	Intact vertical and horizontal load tapes along the whole length and tape endings at the crown ring.		
4.	Crown Ring	Crown ring, crown line.		
5.	Melting Link and Tempilabel	Attachment location, condition.		
6.	DS	Textile and velcro (panel) condition, function and sealing, state and operation of riplocks with velcro securing of the rip panel and the control force.		
7.	Centralising Lines of DS	Completeness, condition, attachment and length of the lines, state of SV ball stops and the slack in pulleys.		
8.	Control Lines of DS	Damage, slack in pulleys, attachment into the envelope, position and fixing up to pulleys and free pulley passage, condition and attachment of SV + weight.		
9.	Activation Ropes of DS	Damage, slack in pulleys, attachment into the envelope, sufficient lengths and colour correctness.		
10.	Pulleys of DS	Fixed attachment of pulleys, bearing condition, screw tightening, heat or mechanical damages and sewing up loops for pulley towards the envelope body.		
11.	Rotation Vent	Textile state, function, sealing, condition of pulleys, control lines and activation ropes, and fixing to the envelope.		
12.	Envelope Mouth	Connections of load tapes and flying wires, load tapes over-stitching, esp. at endings, and the horizontal load tape sewn around the envelope mouth edge.		
13.	Load Flying Wires	Condition and slack in thimbles, corrosion stage, burn or mechanical damage, wire elasticity and types, state and function of the load-bearing carabiners applied.		

Basket Type (Size)	Serial No.	Date of Inspection

Annual Inspection - Basket				
4.1.3	Check	Minimum scope	Conducted	Inspected
1.	Load Cables	Broken wires, corrosion, condition and function of load-bearing carabiners.		
2.	Cable Squeeze	Condition and slack in thimbles.		
3.	Cylinder Straps	Strength, attachment to the basket and no damage to clasps.		
4.	Basket Floor	Cracks in the basket floor, condition and wear of protective runners.		
5.	Basket Body	Dangerous sharp edges, holes in the basket body and condition of rope handles.		
6.	Dropline	Completeness, position and fastening.		
7.	Fire Extinguisher	Filling and current revision.		

Burner Type	Serial No.	Date of Inspection

Annual Inspection - Burner				
4.1.4	Check	Minimum scope	Conducted	Inspected
1.	Burner Units	Thorough check of completeness.		
2.	Manometers	General state and function of manometers, glass lens fixing, condition and legibility of the dial with pointer.		
3.	Fuel Hoses	Age and condition, damage, pressing in at the couplings, colour marking and function of couplings.		
4.	Connecting Couplings	Function of endings and the self-closing valve if applied, condition of contact surfaces and seals.		
5.	Vapouriser and welds	Weld, vapouriser and burner frame check		
6.	Thread and flexible joints	All thread joint, safety ring and cotter pin check. Flexible joint ending of the frame check.		
7.	FV and WB check	FV and WB function and controllability check. FV and WB burning and tightness check.		
8.	PB check	Check function and controllability, safety of PB igniting.		

Fuel Cylinder Type	Serial No.	Date of Inspection

Annual Inspection - Fuel Cylinder				
4.1.5	Check	Minimum scope	Conducted	Inspected
1.	Pressure test	Check validity of the last inspection.		
2.	External Inspection	Dents, scratches and longitudinal welds of the cylinder body.		
3.	Function and tightness of Fittings	Sealing of threaded joints, function and tightness of fittings during closing, operation of the fuel quantity gauge and the pressure regulator, stage and function of connecting fittings.		

Equipment Type	Serial No.	Date of Inspection

Annual Inspection - Equipment				
4.1.6	Check	Minimum scope	Conducted	Inspected
1.	Instruments with Separate Maintenance System	Validity and result of the last inspection.		
2.	All Instruments	State, function, conspicuous data legibility and exactness, verification of requirements specified in the technical description.		
3.	By - passing Hoses	Type, state and age.		

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5. BALLOON HANDLING AND CARE

Balloons are very simple aircraft. Therefore, the balloon parts not mentioned in this chapter do not necessitate any detailed comments on operation than it is described in the Flight Manual.

5.1 Envelope

Besides common cleaning and keeping the below mentioned storage instructions (Section 5.2.4), the envelope does not necessitate additional maintenance.

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

5.2 Basket

The basket necessitates periodical cleaning. The cane and floor should be cleaned with flowing water and 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. Care about the basket not being exposed to moist storage. Under moist conditions acting for a long time, there is a danger of mould and rot inception. Rawhide on the basket bottom and leather/suede on the top rim is recommended be attended to common products for oxbide/leather/suede care (for example Elaskon). If there is a suede cover on the upper rim, simply restore it by brushing with a special suede shoe-brush.

5.3 Burner and fuel system

During the operation of the burner, there is inevitably an accumulation of carbon deposits, i.e. soot and condensates, within the coil and can of the burner. These deposits may be regularly removed by using a dry soft cloth - flannel (the best after each flight day). This has been keeping your burner appearance in good condition for a long time. While more accumulating, you can clean the carbon deposits by using a weak detergent with hot water soaked cloth. In some instances, when cleaning of burners does not be accomplished efficiently and periodically as specified above, the next continued burner operating may result in the mess burning-in and sticking. These can be removed only with difficulties.

Cleaning and the lubrication of valves, the adjustment of the pilot burner electrodes and further maintenance are specified in Section 6.5.

5.4 Balloon storage and road transport

The rolled up balloon envelope is best stored in a transport bag and at a dry airy place. Pack the envelope in absolute dry condition and minimise the exposure to the sunshine or heater effect (recommended is storage onto a pallet so that airing from the bottom could be ensued. In case of the wet envelope after the flight completing, ensure its complete drying without fail and as soon as possible. Spread the envelope on a dry shady field and keep airing. The wet envelope should be gently dried by cold and then hot inflation until the whole moisture has evaporated). During packing the basket pay attention so that it is not exposed to the moist of the floor. Under moist conditions acting for a long time, there is a danger of mould and rot inception.

Besides common keeping of the mentioned storage instructions, the burner does not necessitate additional maintenance. It is recommended to remove accumulation of carbon deposits (soot and condensates) after each flight day. Ensure that no fouling to couplings of fuel hoses can occur during transport/storage (a connector cover is recommended). Draw close attention to fuel hose storage that any collision with heavy objects, fall or hard object squeeze should not cause damage to them. The burner should be always stored and transported with empty fuel hoses. Residual fuel in hoses shortens their operating life. Moreover, concerning the burner transport, a padded burner bag is recommended, and is available at your balloon dealer or the manufacturer. Ideally the burner should always be restrained from movement during transportation.

Follow the procedures recommended by your national regulations valid for transport and storage of liquefied oil gas tanks.

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6. REPAIRS

6.1 General

Repairs of modern hot air balloons are relatively simple compared with other types of aircraft. However it is important that the people carrying out the repairs are familiar with repairing methods of manufacturer BALÓNY KUBÍČEK spol.s.r.o. and get a certification from THE AVIATION AUTHORITY so the work to be carried out safely.

Basic repairing procedures are given in this Section. For work of a greater complexity than described, please consult BALÓNY KUBÍČEK spol. s r.o. Balloon components made by another manufacturer – different from BALÓNY KUBÍČEK spol.s.r.o. – must follow the repair procedures given by that producer.

BALÓNY KUBÍČEK spol. s r.o. run courses which cover the maintenance and repair of their balloons.

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If it is not possible to discover the reason for the failure of a component then contact BALÓNY KUBÍČEK spol. s r.o. and have the repair made by them.

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All replacement items must be approved by the manufacturer of the balloon.

Unless otherwise specified the parts to be replaced are identified by a part number in italic. In case there is a risk of confusion of similar critical parts (e.g. load tapes) contact BALÓNY KUBÍČEK spol. s r.o. for advice.

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Common repairs do not include for instance slack lines, unfastened screws or loose cane – these examples are taken as a part of daily service and maintenance.

6.2 Prohibited repairs

The following repairs are prohibited except by the manufacturer BALÓNY KUBÍČEK spol. s r.o.

Envelope:

Replacement of more than 50% of the fabric panels within one repair, counted by the total number of panels, irrespective of area.

Basket:

Replacement of more than 20% of the total basket surface area.

Burner and Fuel System:

The repair of any burner components or fuel hoses with squeezed couplings, differently than by their replacement of the whole parts with new ones.

Fuel Cylinders:

Steel body or damaged thread repairs.

Load bearing wires:

The repair of swaged wire flying cable assemblies or basket wires.

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BALÓNY KUBÍČEK spol. s r.o. accepts no liability for the consequences of carrying out prohibited repairs.

6.3 Envelope Repairs

6.3.1 Repairing the fabric of the envelope

If the coat of the envelope, panels of the DS, rip panel or rotation vent are torn, take appropriate procedures according to the size of the damage.

6.3.1.1 Small tears – damage smaller than 10 cm covering less than 10% of panel area

Small tears (maximum 3 cm) can be mended by means of sticky-backed patches that are standard for repairing boat sails. Other tears to the maximum of 10 cm are possible to cover and seamed by a simple „hot cut and overlay“ patch from any material of either polyester or polyamide origin. Also the sticky-backed patches can be used provided their edges must be sewn together with the envelope body using two rows of parallel independent stitching. This kind of repair must be finished before the start of the next flight day. The distance between the patches must be more than 10 cm.

When mending small tears the fabric of the envelope in the place of the patch does not have to be cut away.

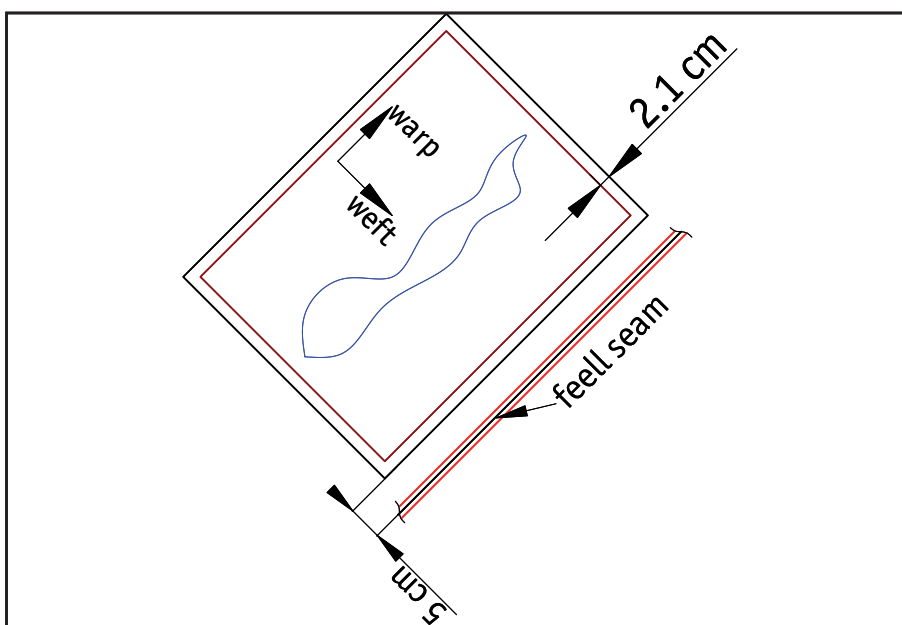
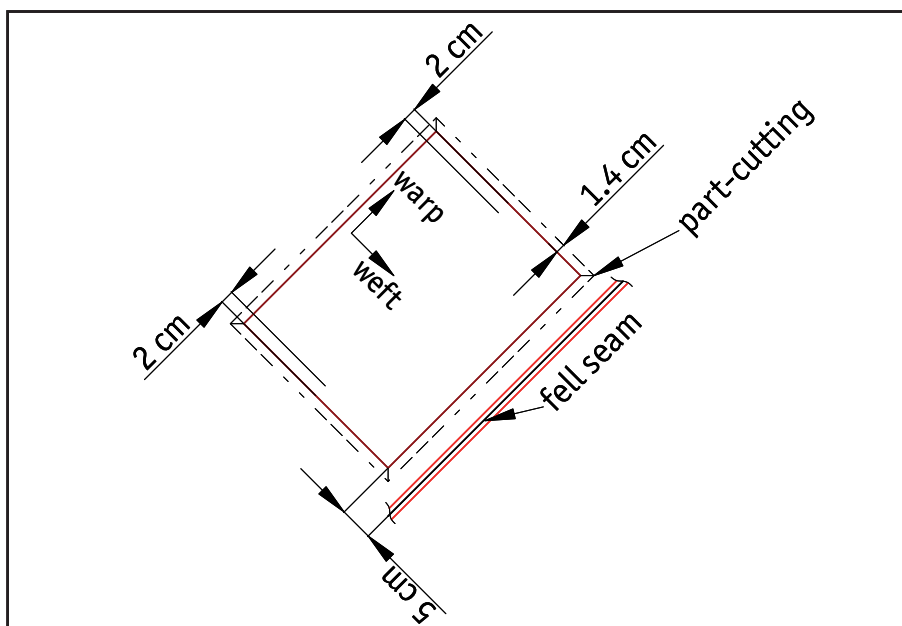
If the tear is less than 5 cm from the fell seam, the seam must be unraveled and the patch sewed in the fell seam.

6.3.1.2 Large tears / burnt holes – damage larger than 10 cm

Mending larger tears you must cut away the damaged fabric close to the tear or cut the panel between the adjacent seams and replace it with new one. If the damage covers more than one panel replace the fabric of all damaged panels. Cut the fabric around the damaged area at least 2 cm from the edge of damaged area. When replacing it the orientating of the tread direction (warp / weft threads) of the new inserted fabric must follow the orientating of the original fabric.

Guidelines to the envelope fabric repairs:

- Mark out the damaged place on the envelope in the parallel direction that follows the anti-rip grid along the whole width / length of the panel between the adjacent vertical / horizontal seams or around the damage.
- Mark out the position of the fabric in the envelope on the part to be cut away to ensure the correct orientating of the thread direction concerning the envelope after cutting it away.
- Unpick the fabric and cut away the remaining partly seam in the parallel direction that follows the anti-rip grid or cut the damaged place around. Cut the corners.
- The damaged fabric from the envelope shall be used as a pattern to create a new part for replacement. Cut the replacement part of the panel of new fabric (1441) that is 8.4 cm larger than the marked edges (2.1cm – additional allowance for one fell seam) and mark out orientation of its location within the envelope. If the fabric is seriously damaged, take the measures from the adjacent panel).
- Sew up the panel / patch into position of the envelope using the technique of the double structural fell seam.



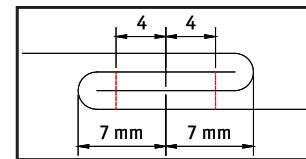
▲ repair of patch

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For repairs use only the original fabric from BALÓNY KUBÍČEK s.p. s.r.o.

6.3.1.3 Carrying out the fell seam

For carrying out the fell seam it is necessary to take into accounts additional allowance 2.1 cm on each side of the fabric. Carry out the seam according to the picture. The length of the stitch should be from 4 to 7 mm. Recommended length is 5 mm.



▲ Double structural fell seam

6.3.1.4 Nomex mouth repairs

To repair nomex mouth use patching by nomex fabric. When repairing the vertical load tapes must be always protected against flames of the burner by nomex fabric.

6.3.1.5. Restrictions

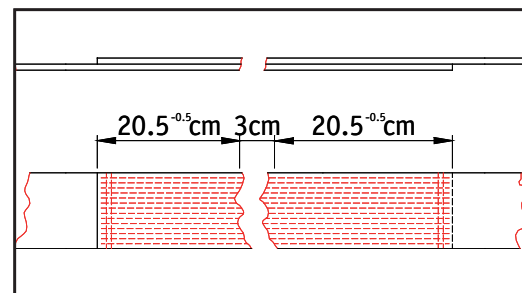
Repairs defined in section 6.3.1.1. must be provided only on the lower part of the envelope coat not higher than the first horizontal load tape. On the rest of the coat only repairs of damages with maximum size of 3 cm are allowed

Repairs defined in section 6.3.1.2 must be provided only by BALÓNY KUBÍČEK spol. s r.o. or an organization with written certification for providing these repairs from BALÓNY KUBÍČEK spol. s r.o.

6.3.2 Load tapes and wires repairs

6.3.2.1 Vertical and horizontal load tapes

Damaged or cut load tapes shall be changed or covered with a new one in that way there is the minimum overlap of 50 cm in both directions from the damaged area. (*Contact BALÓNY KUBÍČEK spol. s r.o. to specify which type to use*) Fixate the place of cut by melting with hot air. The sewing shall be secured using 15 rows of twice parallel stitching along the tape length according to the picture. Sewing of the load tapes altogether must be finished before their fixing to the fabric of the envelope.



▲ Sewing of the load tapes

6.3.2.2 Connection of the flying wire or crown ring with the to load tape

Unpick the damaged load tape in the connection. Cut the damaged part and cover the load tape with a new one according to the procedure in 6.3.2.1. Thread the load tape through the thimble of the flying wire or crown ring, sew the load tapes altogether and back to the envelope. Sew the load tapes according to the picture retaining the original overlap. If you damage ends of the load tapes during unpicking, cut the damaged part and replace with a new load tape according to the procedure in 6.3.2.1.

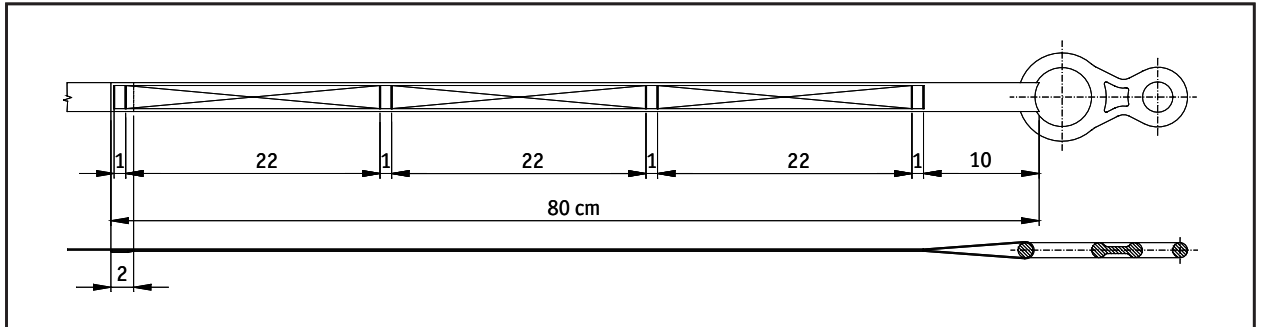
When sewing up the load tape in the envelope mouth there must be a space at least 40 cm between each stitch (in the case of damaging the load tape by the flame of the burner, you reduce the risk of burning all the seam.)

6.3.2.3 Crown ring

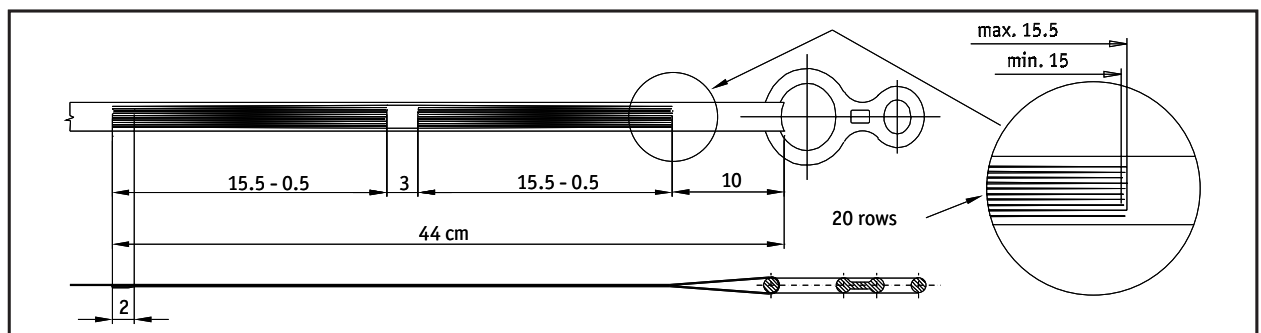
Unpick the damaged crown ring and replace with a new one (80), according to para 6.3.2.2.

6.3.2.4 Replacing the flying wire

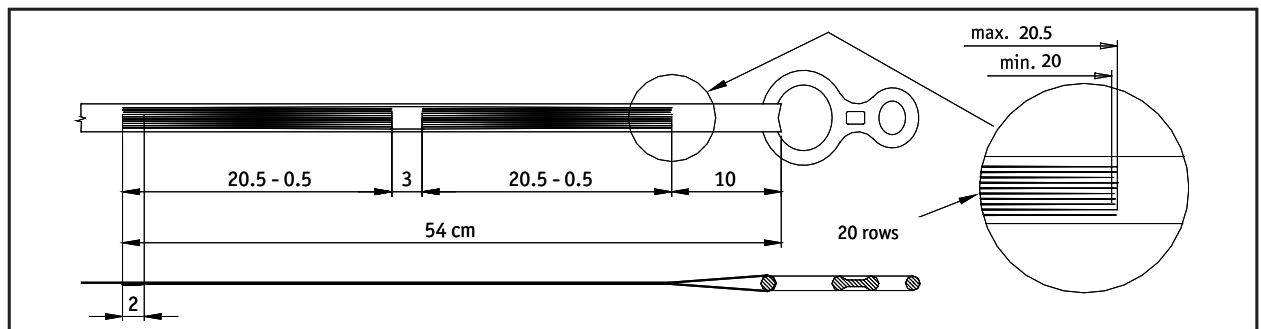
Replace the damaged flying wire with a new one (see 6.3.2.2).



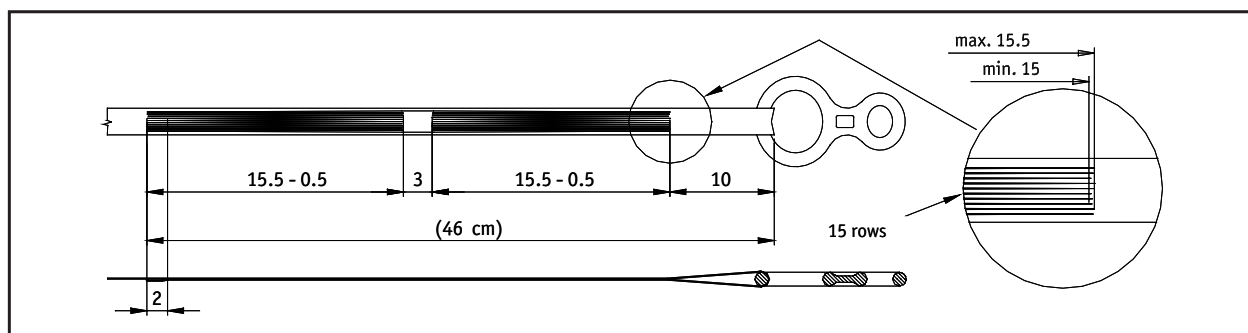
▲ Load tape sewing to the crown ring



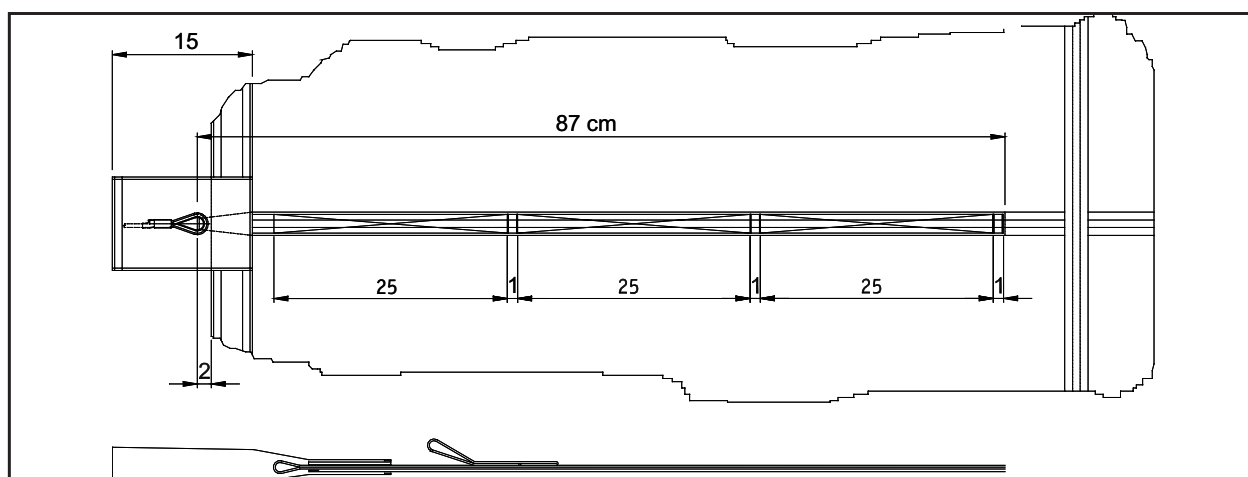
▲ New load tape sewing to the crown ring for envelopes BB12 – BB60 (32 gores) except of BB17XR



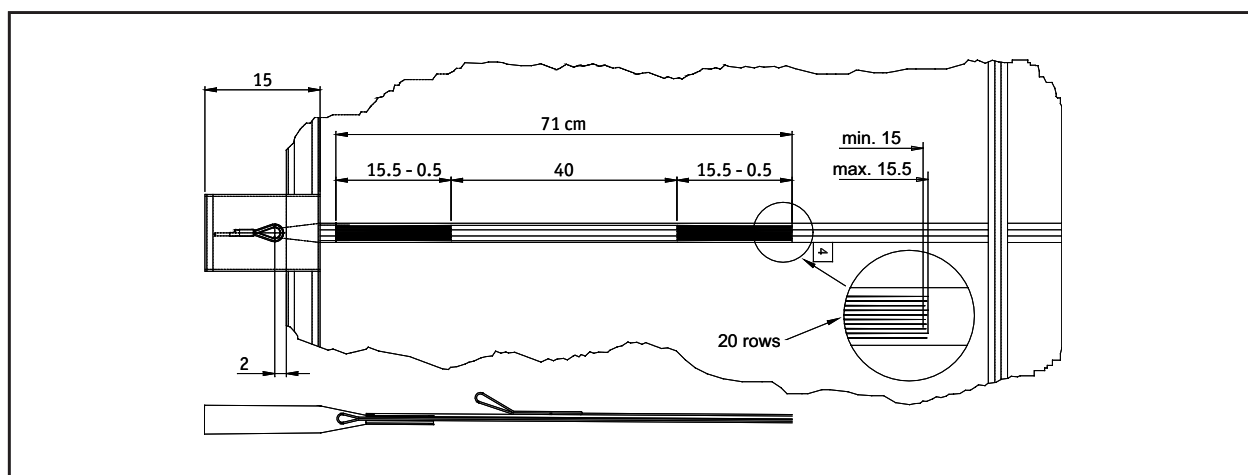
▲ New load tape sewing to the crown ring for BB602 (24 gores), BB702 and BB85Z



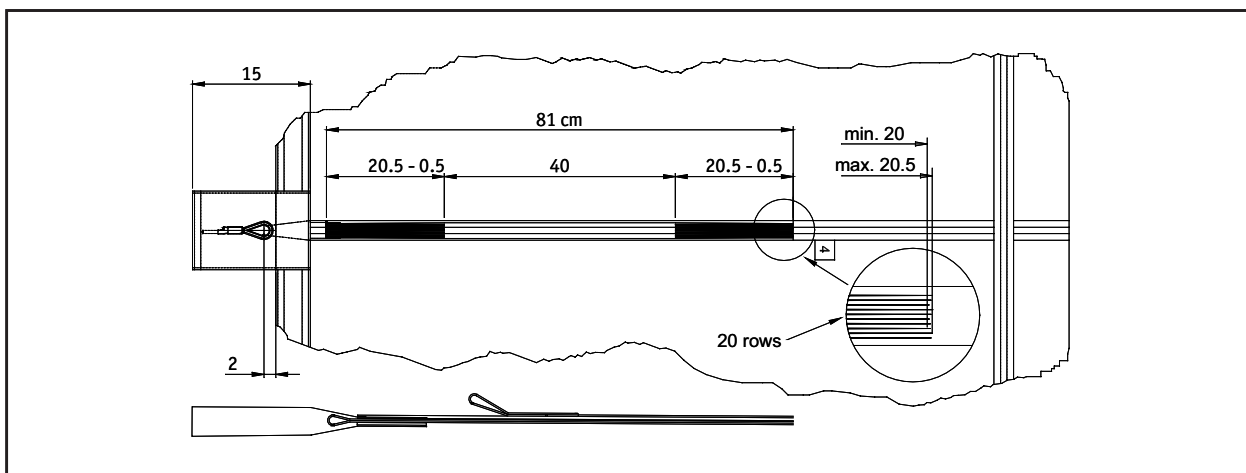
▲ Load tape sewing to the crown ring for BB17XR



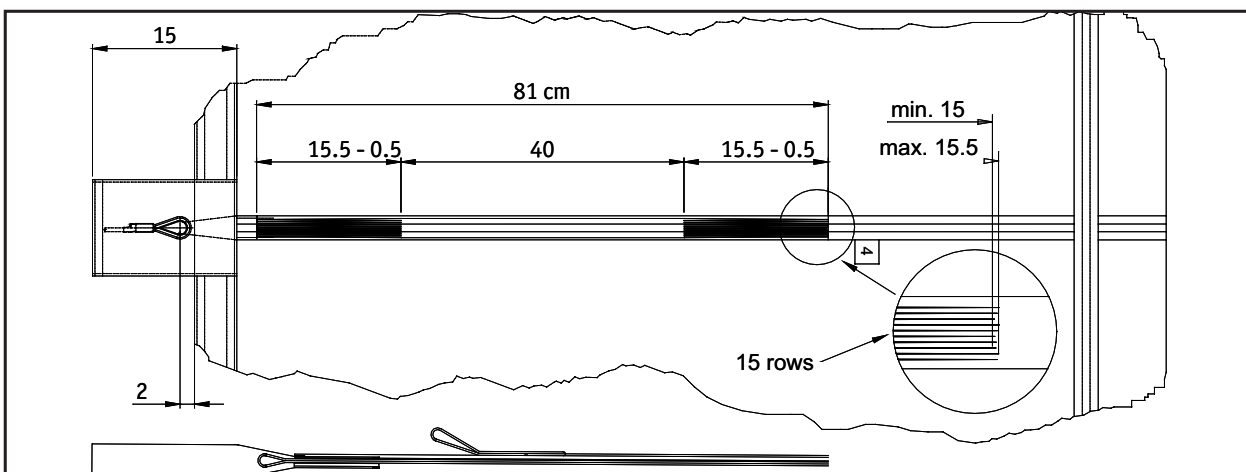
▲ Connection of the flying wire and the envelope load tape



▲ New connection of the flying wire and the envelope load tape for BB12 – BB60 (32 gores) except of BB17XR



▲ New connection of the flying wire and the envelope load tape for BB60Z (24 gores), BB70Z and BB85Z



▲ Connection of the flying wire and the envelope load tape for BB17XR

6.3.2.5 Restrictions

All connection repairs, component and load tape replacing must be provided by BALÓNY KUBÍČEK spol. s r.o. or by an organization which has a written certification for providing these repairs from BALÓNY KUBÍČEK spol. s r.o.

Replacing load tapes by squeezing must be provided by BALÓNY KUBÍČEK spol. s r.o. or by an organization which has adequate equipment and written certification for providing this repair from BALÓNY KUBÍČEK spol. s r.o. and has adequate technological equipment for their squeezing. Squeezing load tape ends must be provided in compliance with requirements of standard EN 13411-3 or equivalent.

6.3.3 Vent hole sealed with the velcro panel

6.3.3.2 Riplock

The repair of the riplock must be provided by the complete re-change. The seam length and types of the knots must be kept. Changing the velcro you must use the type supplied by the envelope producer and the velcro tab must be sewn all along its edges. Load tapes protective covering must remain.

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The load protective covering minimises damage to the velcro tabs during the envelope packing. Using other than certified velcro can cause a disconnection by moisture or change of temperature.

6.3.3.3 Restrictions

The repairs of the riplock must be provided by BALÓNY KUBÍČEK spol. s r.o. or by an organization which has a written certification for providing these repairs from BALÓNY KUBÍČEK spol. s r.o.

6.3.4 Ropes and lines

6.3.4.1 Control lines of the rotation vent

Damaged control lines must be replaced with new ones.

6.3.4.2 Activation ropes of DS

Provide the repair by replacing all the damaged rope. The activation rope can be also extended by tying in the damaged end for activating with the same rope type. Make the lengthening by means of safety turnback knots to keep the free movement of the rope.



▲ Safety turnback knot

6.3.4.3 Control lines of DS

Mending is provided by elongation of the damaged control lines in that way the length between the pulley and the loop on the edge of the vent panel remains the same. Lengthening is to be done with using of safety turnback knots. If more than three control lines are damaged it is necessary to replace them for the new ones. *(Contact BALÓNY KUBÍČEK spol. s r.o. to specify which type to use)*

6.3.4.4 Centralising lines of DS

Centralising lines for both the parachute vent and the Smart Vent fix the right position of the vent panel and that affects its sealing.

Short line pulls the vent panel inside the envelope, it causes dangerous stress or strain to its edge and afterwards the vent panel possible leakage. The short line is responsible for the characteristic tense flat edge of the vent.

Long line allows pulling the vent panel inside the load tapes, it increases the force and time necessary to open and can cause leakage. The long line is typical for the drooping edge of parachute vent.

Adjusting the length of the parachute lines:

1. Join up the velcro panel of parachute vent and the relevant matted gore on which you provide the adjustment.
2. Untie the centralising line from the envelope body. Then stretch out the load tape between the loop of the vent panel on the envelope and the edge of the deflation / vent hole.
3. Tight up the line using the safety turnback knot in that way the distance between the loop on the envelope body and the velcro panel of the parachute becomes longer by 6 ± 1 than the distance between the loop and velcro panel on the envelope body.

Replace the damaged or broken cords with new ones (93). When replacing cut off damaged cord close to the edge of the parachute vent so there remains the overlap end of 5 cm as minimum and melt this end. Place and fasten the new line into the loop on the vent panel edge, after adjusting its length it can be fixed into the loop on the envelope body.

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Using other knots than turnback safety knots can cause problem owing to the high force to the lines, and their loosening and undoing leads to the faulty sealing of the parachute vent.

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Add the 5 cm surplus as minimum, which is the lost while replacing cords with a knot. Conduct the final check of the length after fixing.

Adjusting the length of the Smart Vent line:

There is no need to adjust it. There are special heat-resistant vectran lines for the Smart Vent and no shortening occurs.

Damaged and broken vectran cords must be replaced with new ones (1011). Use a double fisherman's knot to knot in vectran and control lines and a bowline knot to fix the vectran cord to the edge of the vent panel.



▲ Bowline knot



▲ Double fisherman's knot

6.3.5 Smart vent + weight

Mend any damage to the tapes by sewing them together. Do not repair a damaged weight, replace it with a new one.

6.3.6 Pulleys of the envelope

Replace the damaged pulleys with new ones. (*Contact BALÓNY KUBÍČEK spol. s r.o. to specify which type to use*)

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Be careful and do not replace one type of fixed pulleys with another type of pulley that allows its rotation around the vertical axis and vice versa. You risk tangling up of lines.

6.3.7 Carabiners

Replace the damaged carabiners with new ones. Use only steel Stubai carabiners of the same or higher loading capacity (30 kN carabiner 217.00, 40 kN carabiner 2784).

6.3.8 The test by means of inflating after provided repairs

If controlling system components (DS, rotation vent, rip panel) are replaced or repaired, realise the test inflation up of the envelope and check a proper function of the systems.

If the extent of the repair and technical condition of the balloon need to carry out the test flight, follow the instructions in 7.4 Test flight.

6.4 Basket repairs

6.4.1 Upholstery and padded suede / leatherwork repairs

6.4.1.1. To mend soft parts of suede / leatherwork use common upholstery aids.

To mend soft parts of suede / leatherwork use common upholstery aids. Repair the damaged leather by sewing it together or patching with proper material. Replenish damaged or rubbed off parts of soft upholstery padding with softened polyurethane or other proper upholstery padding. Fix the inserted parts with an appropriate glue.

6.4.1.2 Basket types K7 to K18

After treatment of thick cowhide (leather work of basket bottom and entries) use an appropriate leather-impregnating agent. Before impregnating firstly clean up the leather with brush and wash it with hot water and detergent and then let it dry.

When repairing damaged leather upholstery parts it is necessary to replace it all. Unpick all damaged part and use it as a pattern to create the new one. Cut the leather with sheet metal shears. For sewing punch holes (5mm diameter) alongside the edge. Impregnate the leather properly with and sew it back with cord PES with 5mm diameter and to the bottom fix the leather with upholstery tacks (if you do not have a tack, fix it with nails of proper size).

6.4.1.3 Basket types K22 and bigger

To maintain the white rawhide (leatherwork at the basket bottom and entries) clean it dry with a brush and possibly apply common shoe treatment for white leather.

Damaged protective cables and bottom basket rims covered with hard white rawhide shall be repaired by replacing all the damaged leather strip or its part. Before other processing it is necessary to soak the leather in water for 10

hours as minimum (recommended length is 24 hours). Cut the new strip in the way that there is the minimum overlap of 70 mm on both sides of the connection with the original leather. Punch in holes with 3mm diameter along the edge for sewing. Sew with PES cord with 3mm diameter and to the basket bottom fix with upholstery tacks. If you replaced the leather parts that cover basket load cables, check that the cables are not damaged.

6.4.2 Basket wickerwork repairs

6.4.2.1 Exserting ends or broken canes

Inweave the exserting ends, or broken canes of the basket and fix them by means of cord, string or plastic strap. If the broken end is not long enough to be inweaved, cut the exserting part off. Scratched or split canes must be cut out and replaced with new ones.

6.4.2.2 Ratan - canes

Repair damaged vertical ratan-canes by partial replacement of them. Cut out the damaged part. Use mitre cutting of the end in the length of 50 mm as minimum. Put on the new cane with the same scarfing of the end. Fix the prominent part (in the length of scarfing) with plastic straps.

Vertical canes which are damaged under the roots must be repaired by a basket producer.

6.4.3 Basket floor, load-bearing wooden frame or other wooden component repairs

6.4.3.1 Small damage of the floor

Repairing small damage of the floor use common techniques of woodwork (bonding,...). Small holes cracked through the floor (if the floor is not entirely broken) shall be repaired by lapping with 1-milimetre thick incorrodible sheet metal and screwing with the floor. If the floor is hardly damaged or the floor cracked right through, it must be replaced with a new one (*Contact BALÓNY KUBÍČEK spol. s r.o. to specify which type to use*)

6.4.3.2 Cover strip

If there is so serious damage or breakthrough of wooden cover strip protecting cables and tubes that they do not carry out their protective function, they must be replaced with new ones. After installation cover the repaired parts with transparent synthetic protective varnish for wood. While applying the varnish firstly note that any protective varnish must be completely removed from the damaged area by using the wire brush and then the sandpaper and only afterwards put on the synthetic re-varnish coat for wood in two layers as a minimum. Before you start to varnish up the coloured part of wickerwork, it is good to use a stain of suitable colour to dye in first.

6.4.3.3 Exserting sharp objects

Fit sharp objects (parts of screws, floor splinters etc.) to prevent injuries to the crew (cut off, abrade).

6.4.3.4 Cracked skid covers

glue up cracked skid covers (K25P baskets and bigger) with dispersive adhesive for wood, sand the repaired place and put on synthetic varnish for wood. Replace broken runners with new ones (*Contact BALÓNY KUBÍČEK spol. s r.o. to specify which type to use*).

6.4.3.5 Damaged sliding shims

unscrew the damaged sliding shims (K7 to K22 baskets) and replace them with new ones (*Contact BALÓNY KUBÍČEK spol. s r.o. to specify which type to use*). In position of bulge put a round piece of thick cowhide or hard rubber under the sliding shims. You will prevent pressing in the concaved part of the washer sliding shims while operating the basket along the hard flat ground.

6.4.4 Pipe frame / fibreglass support repairs**6.4.4.1 The broken pipe frame**

(a pipe from stainless steel repair the broken pipe frame) by weld. Before welding clean up the broken place properly. If the broken part of the pipe is damaged in another way (squeezed, torn,...) cut it and replace it with a new pipe with the same diameter from DIN 1.4301 material. Weld by TIG method. If there is wickedwork in the repairing place, it is necessary to put everything away around the weld and moisten the wicker to prevent its ignition.

6.4.4.2 Broken fibreglass support

Do not repair the broken fibreglass support, replace it with a new one (*50169 or 52153 according to basket size*).

6.4.5 Handle repairs

Cut the damaged rope at least 50 cm from the handle on both sides and pull the rope out. Unweave a new part of the rope. Cut out the core from the ends of the rope and put on the 20 cm of the original rope as minimum. Fix the ropes together with straps.

6.4.6 Load cable repairs

Do not repair a damaged load cable, replace all of it with a new one (*Contact BALÓNY KUBÍČEK spol. s r.o. to specify which type to use*).

6.4.7 Equipment and accessories repairs**6.4.7.1 Load - bearing carabiners**

Any repairs or adjustments of load-bearing carabiners are prohibited, it is always necessary to replace the damaged carabiner with a new one (*30 kN carabiner 217.00, 40 kN carabiner 2784*).

6.4.7.2 Strapping for cylinder attachment

Replace the damaged strapping (a buckle which is deformed or does not work, torn abraded strapping) with new one. Because of a high load capacity of new strapping it is possible to tolerate rip or wearing through the strapping up to 15 % of its width.

6.4.7.3. Fabric and leather equipment

Repair the fabric and leather equipment in a common way of sewing or patching.

6.4.7.4 Damaged drop line

Replace a damaged drop line with a new one (*50091*).

6.4.7.5 Broken or cracked frame of the burner

Do not put bond or repair a broken or cracked frame of the burner. It is necessary to replace it with a new one.

6.4.7.6 A damaged or expired first aid kit box and fire extinguisher

Must be replaced with new ones. The first-aid kit is not necessary to be replaced all, only damaged or expired medical supplies must be substituted.

6.4.8 Restrictions

Wickerwork repairs which extend more than 5 rows of horizontal or 2 rows of vertical canes in one place of wickerwork must be provided by BALÓNY KUBÍČEK spol. s r.o. or by an organisation with a written certification for providing these repairs from BALÓNY KUBÍČEK spol. s r.o.

Wickerwork repairs which extend the connection to the bottom or upper basket frame must be provided by BALÓNY KUBÍČEK spol. s r.o. or by an organisation with a written certification for providing these repairs from BALÓNY KUBÍČEK spol. s r.o.

Repairs of a broken steel frame by welding must be provided by BALÓNY KUBÍČEK spol. s r.o. or by an organisation with a written certification for providing these repairs from BALÓNY KUBÍČEK spol. s r.o. and adequate technological equipment and a licenced worker according to EN 287-1.

Handle repairs (see 6.2.5) must be provided by BALÓNY KUBÍČEK spol. s r.o. or by an organisation with a written certification for providing these repairs from BALÓNY KUBÍČEK spol. s r.o.

Load cable repairs by replacing must be provided by BALÓNY KUBÍČEK spol. s r.o. or by an organisation with a written certification for providing these repairs from BALÓNY KUBÍČEK spol. s r.o. and adequate technological equipment for squeezing. Squeezing of the cable ends must be provided in compliance with requirements in standard EN 13411 - 3

6.5 Burner repairs**6.5.1 General notes**

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Before starting any maintenance or repair work disconnect the burner from all fuel supplies and vent all the fuel from the burner.

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It is essential that all fuel system and burner repairs are carried out in a clean environment.

The presence of dirt or chemicals may damage movable parts, rubber seals or bonded joints and could blockage the burner jets.

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When maintaining or repairing fuel system and burners all replacement items must be approved by BALÓNY KUBÍČEK spol. s.r.o. and equiped with the correct documentation. BALÓNY KUBÍČEK spol. s r.o. accept no liability for items not provided by them.

Common commercially available parts (unified items) can be replaced with equivalents, provided in common trade network.

6.5.2 Standard practises

6.5.2.1 'O'-rings and rubber Seals

When movable units sealed with 'O'-rings are disassembled, new 'O'-ring must be used when the components is reassembled. When disassembling other joints, 'O'-rings and seals must be inspected and replaced if damaged or deformed. Lubricate 'O'-rings with a graphite- based lubricant (We recommend Molyduval Attila GR). We recommend carrying out regular replacement of 'O'-rings after 100 hours in operation.

6.5.2.2 Threaded Joints

- a) General – When assembling burner parts and fuel hoses that are not fixed with either a sealant or sealed with PTFE tape lubricate the threads with silicone (Vaseline). If threaded joints made from aluminium clad are not lubricated before assemble then they can jam.
- b) Fixed and tightened by sealing – Threads must be clean and free from grease, dirt and old sealant. Smear the sealant on the second and fourth thread of the outer threaded joint and screw in immediately. To shorten the time necessary for sealant to dry it is possible to use spray activator that is applied on all thread joint under the sealant. Always observe the drying times recommended by the sealant manufacturer..

Used sealants:

- Loctite 243 – for securing threads against unintentional loosening (removable joints)
- Loctite 620 – for securing main burner jets
- Loctite 270 – for sealing and securing thread

- c) Sealed with PTFE tape – Threads are clean and free from grease, dirt and old tape. All burrs on the threads must be removed with emery cloth..

It is good to coarsen the crests of the outer threads (passing hacksaw blade over it) across the thread as this

prevents displacement of the tape. For sealing use 12 x 0.1 mm PTFE tape. Wrap the outer thread in the direction of thread. When wrapping the tape must be tense all the time and thereby pulled between the thread. Choose the number of layers according to thread diameter (from 3 to 6 layers). If the wrapping is correct, the tape must completely fill the space between each thread and form a cone (see picture).

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Keep the first thread free from tape, because the tape on the thread edge could be cut off during reassemble. Loose pieces of tape could then get into the fuel system and cause a blockage.

After reassemble of any burner or fuel component carry out leak detection of joints in the way described in 7.3..

6.5.2.3 Replacement of fuel hoses

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Never repair damaged fuel hoses or squeezed hose ends. Always replace the hose with a new one from BALÓNY KUBÍČEK spol. s r.o. and contact BALÓNY KUBÍČEK spol. s r.o. to specify which type to use.

Burner hose connections with 1/4" NPT threads (fuel hose / REGO coupling) should be assembled with PTFE tape.

Burner hoses with 3/8" BSP and M18 x1.5 parallel threads (fuel hose / TEMA 3810 coupling and hose / burner) should be assembled with the appropriate sized Dowty seal (steel washer with bonded rubber insert).

Burner hoses supplied with pre-applied Everseal sealant (stiff blue paste on the connector male thread) use no additional sealing means and are to be installed directly.



▲ correct tape wrapping of thread



▲ incorrect tape wrapping of thread

These maximum recommended torque values should not be exceeded when replacing the following components:

- 1/4 NPT thread max. 20 Nm
- 3/8 BSP thread max. 20 Nm

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It is recommended to lubricate burner hose connections sealed with Dowty seal with graphite powder. No additional lubrication is to be used when PTFE tape or Everseal sealant is used.

6.5.2.4 Main Burner jets

Unscrew damaged or loose main burner jets. Remove old sealant and grease from the jet. Apply a drop of Loctite 620 sealant on the jet thread and immediately screw in. Tighten it up to a torque of 2.5 Nm. After refitting burner jets allow them to dry for at least 8 hours before passing vapour or liquid through the burner.

6.5.2.5 Cleaning of pilot burner pressure reducer.

When using low-quality fuel with a high oil content the pressure reducer may become so soiled that it stops working properly resulting in a reduced pilot flame that can not be regulated (see 6.5.2.6). In extreme cases oil may be seen running out of the jet.

Remove the reducer, dismantle and clean. While disassembling and assembling the reducer piston, take care not to damage the seal around the rim of the piston (wiper seal). Never clean the piston or seals with an alkali solvent. Do not replace damaged seals; if a seal on the piston is damaged then replace the piston and seals as a single item. If the piston is functioning incorrect in that vapour is leaking from the air bleed in the reducer body then this may be solved by lubricating the piston wiper seal. Before assembling the piston in the reducer body smear the wiping seal with a thin layer (just a smear on the periphery of wiping seal with your finger) of PTFE paste (CARBAFLO BBL 50). Assembling and disassembling procedures for specific burners are shown in the chapters with description of individual burner maintenance.

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A simple way to clean a slightly soiled pressure reducer is by connecting the burner to a cylinder filled with pure propane then running the pilot burner for at least 2 hours. Pure propane vapour will push the residual oil and dirt out. After cleaning the pilot light size may require adjustment (see 6.5.2.6).

6.5.2.6 Pilot burner and piezo ignition

If the pilot flame is too big or too small then, on some burners, you can regulate its size by adjusting the air intake. Change the quantity of air by moving a steel strap on the burner support (covering and uncovering the inlet hole). Never cover the entire hole. If the burner does not burn despite there being vapour pressure in inlet hose and the pressure reducer is working then clean the PB jet and check that the filter is not blocked with dirt or carbon. Replace the soiled filter with a new one. Wash the jet in petrol and dry it with pressurised cold air. Assembling and disassembling PB see sections with descriptions of individual burner maintenance. Pilot burners are fitted with a fuel filter. If you do not succeed in removing the defect by any of procedures mentioned above, check the condition of the filters and replace if required. For position and disassembling and assembling see sections with description of individual burner maintenance.

6.5.2.7 Manometer repairs

Replace a nonfunctioning manometer with a new one. Fix loose acrylic lens with quick-setting adhesive. If the pointer does not indicate zero while fuel inlet is disconnected and flight vent is open, remove the lens and lower the

pointer to indicate zero by removing pointer and refitting it. Take care when moving the pointer because it is very easy to damage the manometer. After remounting the pointer test the manometer to make sure that it functions correctly. Pressurising the fuel system and make sure the manometer indicates correctly. For pressuring use pressurised nitrogen and check the pressure with an accurate manometer

6.5.2.8 Condensation removal

If the absorbing tube is not effective it may be adjusted. Loosen the screw on the absorbing tube holder and insert the tube to the bottom of a indentation that catches the condensation. The other end of the tube must be in line with a main burner jet and it should cover half of the jet hole as seen from above.

6.5.2.9 Gimbal mounting of burner unit (cardan joint)

During maintenance of a cardan joint, after disassembling clean the components and lubricate with Molyduval Attila GR. Replace worn friction pads with new ones.

6.5.2.10 Flexible couplings on burner frames

Replace damaged rubber buffers with new ones (burner frames made since 2007).

Replace damaged tube frame couplings with new ones.

6.5.2.11 Adjustable burner frame

If, on burners with height adjusters, the burner units do not stay in a selected height, it is necessary to adjust the pressure in the gas spring. This can only be carried out by an authorized provider of gas struts or by BALÓNY KUBÍČEK spol. s r.o..

If the burner frame / gas strut is damaged and burner units can not be adjusted:

- if burner frame components are damaged or bent, replace them with new ones
- if the gas spring is damaged or bent, replace it with a new one.

6.5.3 Repair a Blast Valve (BV)

6.5.3.1 Identification and removal of a defect

If it is difficult to operate the BV or there is a leak caused by the valve not closing properly then:

1. Check the amount of movement of the lever assembly controlling the valve. Replace damaged parts and lubricate the assembly with Molyduval Attila GR.
2. Check the state and lubrication of stem (53119) that belongs to the vent and the lead nut. If a seal is damaged replace the whole stem and seal assembly. Lubricate friction areas and seals with Molyduval Attila GR.
3. Check the condition of the front face of the stem (53119) and the stem seal. If the front face or the seal is damaged then change the whole stem assembly. Clean the contact surface carefully.
4. Check that there is no permanent deformation of the spring (51132). If, with the valve in the closed position, the lever feels loose then replace the spring.

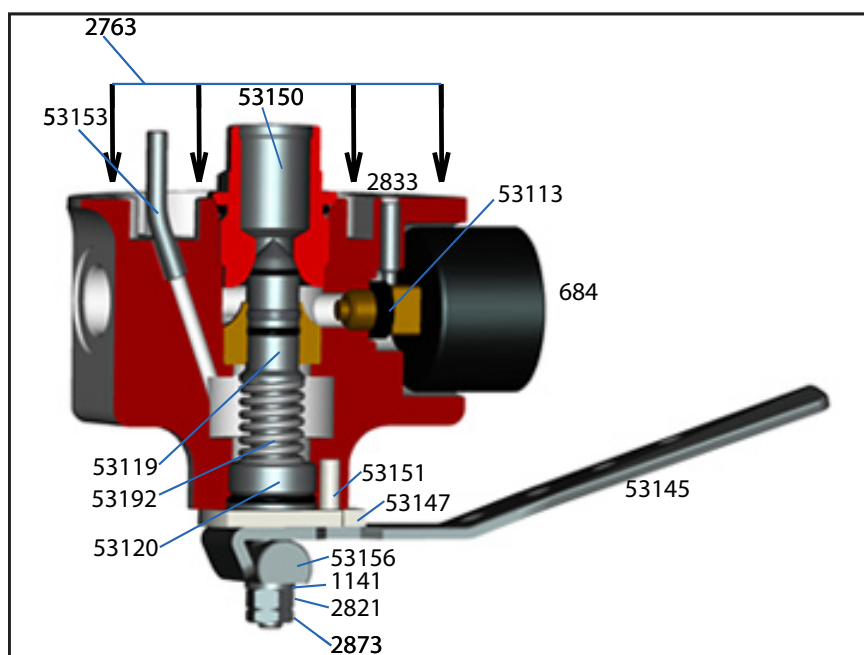
If there is fuel leakage from the blow-off tube, from around the lever assembly, from around the manometer or from the fuel hose connection or fuel filter II cover (53209)

1. Check sealing rings of the stem (53119) and lead nut (53120). If any seal is damaged then replace the whole stem assembly. Lubricate friction areas and rings with Molyduval Attila GR.
2. Check the manometer seal (53113) and that the manometer is fitted securely. Replace the seal if it is damaged, tighten the manometer and fix it in the correct position with screw 2833.
3. Check the sealing shim on the threaded joint of the fuel hose and that the hose is tight. Replace the shim if it is damaged and tighten the hose (see 6.5.2.3).
4. Check sealing of the fuel filter cover and its tightening. Replace the shim if damaged and retighten the cover.

6.5.3.2 Disassembling the Blast Valve (BV) and manometer

1. Remove the screws in the burner handle, remove the handle and the cover of the lever assembly.
(For easier handling you can dismantle the fitting from the burner unit see 6.5.3.4).
2. Unscrew nuts (2873, 2821) and remove the lever assembly including the frictional sliding shim (53147).
3. Using a box spanner unscrew the lead nut (53120) and remove the stem with the spring (53119, 53192).
4. Unscrew retaining screw 2833 at least 5mm, unscrew the manometer by hand.

684 - WIKA Manometer
 1141 - Shim 6.4 stainless
 2763 - Screw M5x16
 2821 - Nut M6 stainless
 2833 - Adjusting screw M5x20
 2873 - Nut M6 stainless low
 53113 - Manometer seal
 53119 - Stem of BV
 53120 - Screw lead of Stem BV
 53145 - Lever of BV
 53147 - Sliding shim
 53150 - Threaded shim of BV
 53151 - BV lever shock absorber
 53153 - Blow - off tube
 53156 - BV pendulum bearing
 53192 - BV spring



▲ Blast Valve on IGNIS burners

6.5.3.3 Assembling the Blast Valve (BV) and manometer.

1. Put the spring (53192) and lead nut (53120) on the clean and lubricated stem (53119).
2. Put the stem into the body of the manifold block. Lubricate the thread of the nut thread. Tighten the nut so that the hexagon is line with the groove in the manifold block so that a sliding shim (53147) can be easily fitted.
3. Put on the lever (53145) and pendulum bearing (53156). Fix with nuts (2821, 2873) through the shim (1141). Tighten the nut so that there is clearance of 0.2 – 0.3mm between the lever and the sliding shim. (When the lever is in the correct position relative to adjusting shim (53151), there will be a clearance of about 4 mm between the two). Secure the joint by tightening the locking-nut (2873).
4. Slide the seal(53113) onto the manometer thread. Screw the manometer in by hand so that it seals and the dial is in the upright position. Secure the gauge against rotation by tightening the screw (2833). If you do not manage to tighten the manometer so that there is no leakage and the dial is in right position at the same time then turn the dial and pointer through 180°. For disassembling see 6.5.2.7.
5. Refit the cover and handle, fix with screws.

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The blow-off tube is only pressed in the fitting and fixed with Loctite 243 sealant.

6.5.3.4 Disassembling the burner manifold.

1. Remove the four M5 screws (2763).(see the picture in 6.5.3.2)
2. Pull out all the fitting from vaporiser dish. Do not dismantle the threaded shim. The central tube with sealing rings is only push fitted into the burner manifold.
3. While reassembling the burner lubricate the M5 screws with a silicone lubricant or Vaseline (see 6.5.2.2), and the sealing rigs with Molyduval Attila GR (see 6.5.2.1).

6.5.4 Repair of the whisper burner (WB)**6.5.4.1 Identification and removal of a defect**

If it is difficult to operate the BV or there is a leak caused by the valve not closing properly then:

1. Check the seals on the stem (53138) and top surface of the unit (53134). If the seals are damaged then replace the whole stem assembly. Lubricate friction areas and rings with Molyduval Attila GR.
2. Check the front face of the stem and contact surface. If a seal is damaged, replace the whole stem assembly. Check that the lever moves correctly to give full control of the valve. Replace damaged parts and lubricate the assembly with Molyduval Attila GR.
3. Check the quantity of motion of the lever assembly regarding valve control. Replace damaged parts and lubricate the assembly with Molyduval Attila GR.

If there is a fuel leakage around the lever assembly or at the upper side of the fitting around the WB support:

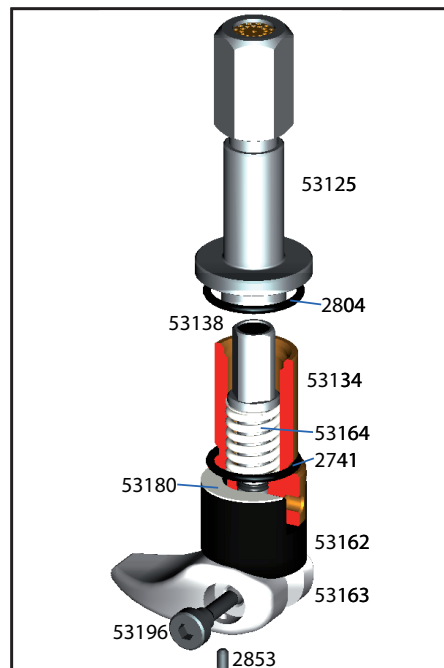
1. Check seals on the stem (53138) and top surface of the unit (53134). If a seal is damaged then replace the whole stem assembly. Lubricate friction areas and rings with Molyduval Attila GR.
2. Check the outer seals (2741, 2804) and surfaces that these seals come in contact with. Replace damaged seals.

6.5.4.2 Disassembling the Whisper Burner

1. Unscrew the WB unit (53125), whilst holding the control valve so that it does not rotate. The assembly is secured against its rotation with M5 screw (set screw), which is bolted from the side of the fitting.
2. After unscrewing of the WB unit unscrew the safety screw M5 and pull out the assembly.
3. Before disassembling the control lever (53163) loosen the lock screw (2853). Unscrew the pin of the lever (53196).

6.5.4.3 Assembling the Whisper Burner

1. Insert the stem (53138) with the spring (53164) into the stem casing. Put the shim and lever base on the stem. Fit the WB lever (53163) and the pin (53196), tighten the pin and secure with the lock screw to prevent it rotating. Lubricate the assembly, stem and lead surface with Molyduval Attila GR.
2. Insert the assembly into the burner manifold and screw up the pressure reducer fix with the lock screw M5 and from the upper side screw up the WB unit (53125) with a seal (2804) and tighten.
3. Check there is a clearance of at least 2mm between the lever (53163) and Teflon shim. If the clearance is too large then insert more shims (53180).



▲ Whisper burner on IGNIS burners

6.5.5 Pilot burner (PB) repairs

6.5.5.1 Identification and removal of a defect

If it is difficult to control the pilot burner (PB) or there is a leak caused by the valve not closing properly then:

If there is a fuel leakage around the control lever:

Because the construction of the PB assembly is the same as the WB assembly follow the advice in para 6.5.4.4.

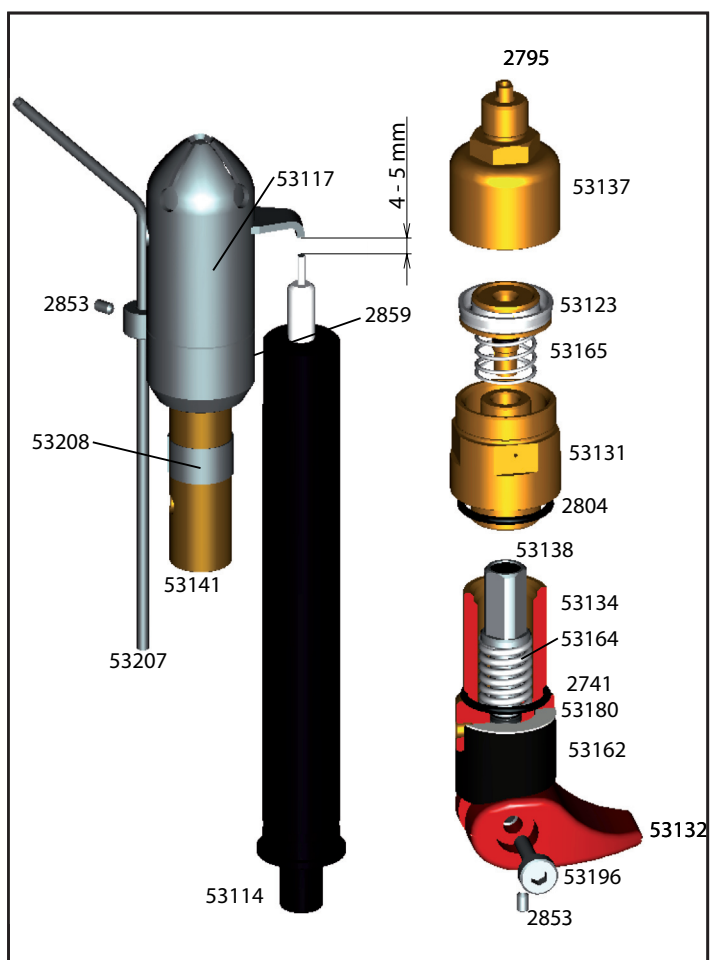
If PB does not burn, burns irregularly or fails to ignite:

1. Check the cleanliness PB and the pressure reducer. Clean the PB / reducer in accordance with 6.5.2.5 and 6.5.2.6.
2. Check the position of the piezo igniter electrode (53114) and PB spark gap (53117). Clean the ceramic part of the electrode. Adjust the spark gap to 4-5mm. If the piezo igniter does not work replace it.

6.5.5.2 Disassembling the Pilot Burner and piezo igniter

1. Loosen the lock screw of the piezo igniter and withdraw the piezo (53114).
2. Loosen the lock screw (2859) and remove the PB flame cup (53117).
3. Unscrew the pressure reducer unit by using a spanner on the flat sides of the reducer unit (53131). Prevent it rotating within the burner manifold by holding the control lever. The assembly is secured against rotation by a M5 screw (set screw), which is screwed in from the side of the fitting.
4. After unscrewing the reducer unit, unscrew the M5 safety screw and pull out the controlling assembly.
5. Before disassembling the control lever (53132) loosen the safety screw (2853). Screw out the lever pin (53196).

- 2741 – 'O'-ring, 19x2 NBR
- 2795 – Jet
- 2804 – 'O'-ring, 21x2 NBR
- 2853 – Adjusting screw, M3x5
- 2859 – Adjusting screw, M5x8
- 53114 – Piezo igniter
- 53117 – PB flame cup
- 53123 – Differential piston of PB
- 53131 – Nut of the piston chamber
- 53132 – Lever of PB, left, right
- 53134 – Stem casing of WB / PB
- 53137 – Piston chamber
- 53138 – Stem of WB / PB
- 53141 – Support of PB
- 53162 – Lever base of WB / PB, left, right
- 53164 – Spring of WB / PB
- 53165 – Piston spring
- 53180 – Shim
- 53196 – Lever pin of WB / PB
- 53207 – Tube of extractor
- 53208 – Inlet restrictor of PB



▲ IGNIS pilot burner

6.5.5.3 Assembling the Pilot Burner and piezo igniter

1. The assembling procedure is the same as for the WB, proceed in accordance with 6.5.4.3, but replace the WB unit with the pressure reducer. Be careful while tightening the reducer, use a spanner on the flat sides of the piston chamber (53131).
2. Screw the PB support (53141) onto the reducer, put the PB flame cup (53117) on the PB support. Refit the piezo igniter (53114). Position the PB flame cup so that there is the correct spark gap between it and the piezo, as shown in the picture. Secure the piezo and the PB flame cup with their lock screws.
3. Adjust the position of extractor tube (53207) and secure it with the screw (2853) against rotation. Check that the piezo functions correctly.

6.5.5.4 Disassembling and reassembling the Pressure Reducer

1. Unscrew the upper and lower parts of the reducer unit (piston chambers 53137 and 53131). The thread is secured with Loctite 243 sealant. Carefully remove the piston (53123).
2. When reassembling lubricate the PTFE wiping seal with CARBAFLO BBL 50 and then carefully slide the piston (53123) into the piston chamber (53137).
3. Put on the spring (53165) onto the shaft of the piston and then, having coated the thread with Loctite 243, screw the upper and bottom part of the piston chamber together. Do not allow any Loctite to enter the pressure reducer as this will prevent the unit working.

IGNIS Burner type without a Pressure Reducer

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Construction of the PB without the pressure reducer (connected to the vapour phase of the fuel) is in principle the same as the one with the reducer. Except that there is no differential piston in the reducer and no hole for pressure equalization in the reducer unit.

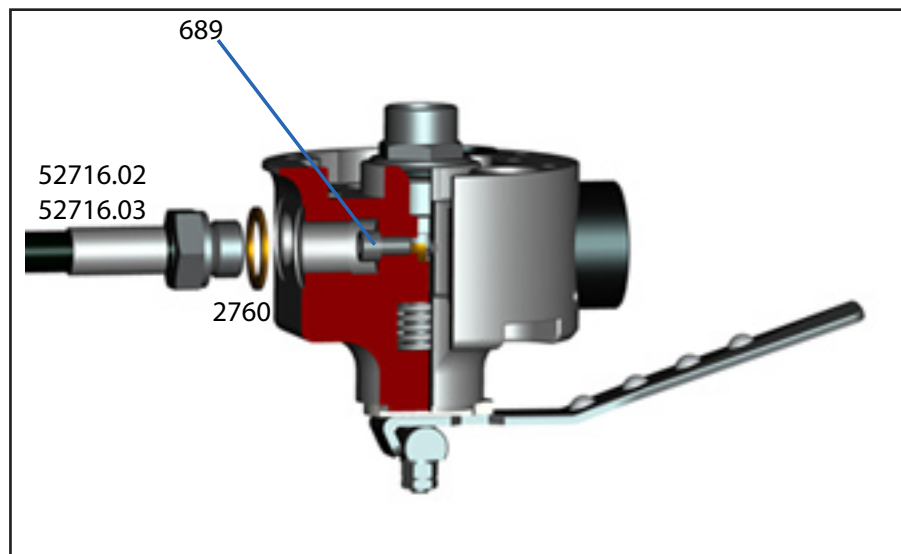
While identifying and removing a defect proceed as in 6.5.5.1 to 6.5.5.3.

6.5.6 Replacement of the fuel filter in a PB

- Filter I
The fuel filter is sealed to the piston chamber (53137). This filter and item (53137) forms one unremovable component. Disassembling and assembling the piston chamber see 6.5.5.9.
- Filter II (53205) – only fitted when the burner has a pressure reducer (when there is no vapour hose)
Unscrew the plug (53209) then unscrew the filter (53205).
Before reassembling lubricate the filter thread with Molyduval Attila GR.

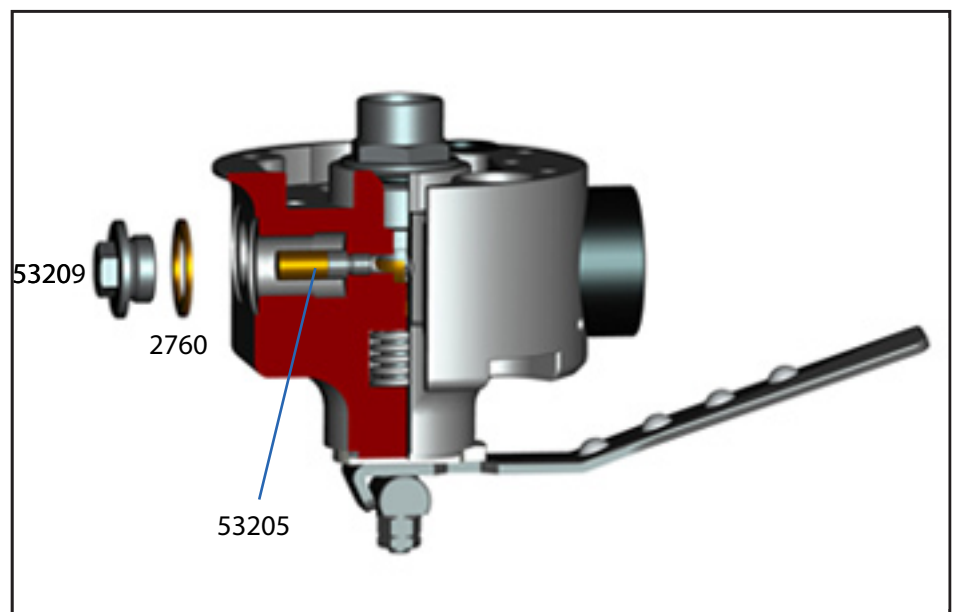
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When the burner has a vapour hose (the burner has no pressure reducer) then a blanking screw (369) must be fitted in place of the fuel filter. Without this blanking screw liquid fuel would come into the vapour circuit.



689 – Screw, M6x10
 2760 – Sealing shim
 52716.02 – Fuel hose
 52716.03 – Fuel hose

▲ Fuel supply of PB in a IGNIS without a pressure reducer (with a vapour hose)



2760 – Sealing shim
 53205 – Fuel filter II
 53209 – Plug of filter II

▲ Fuel supply of PB in a IGNIS with a pressure reducer (without a vapour hose)

6.5.7 Repairing a loose connection of the burner coil/ fitting

If the fitting becomes loose then replace the 'O'-rings. Do not loosen the stainless nut where the descent tube is put. Unscrew the lock screws and pull the fitting out. Lubricate the new 'O'-rings with lubricant (see 6.5.2.1).

6.5.8 Repairing mechanical deformation of burner coils and burner cans or burner vanes

A hardwood rod may be used to straighten small deformations (by prizing or knocking) in the burner cans and deformation of the burner coils. After every repair the the coil the coil must be pressure tested. See 7.4.

6.5.9 Restrictions

Repairs which involve opening the fuel system, including replacement of 'O'-rings and rubber seals, must be carried out by BALÓNY KUBÍČEK spol. s r.o. or an organisation with approved in writing by BALÓNY KUBÍČEK spol. s r.o. to make these repairs. These repairs include

- Replacement of fuel hoses and connecting quick couplers
- Repairs to a vaporiser including replacement of individual jets
- Repairs to a manometer
- Repairs to blast valves, whisper burners and pilot burners
- Repairs to the pressure reducer of a whisper burner
- Repairs to a crossover valve
- Repairs to threaded joints sealed with PTFE tape or sealing lubricant

Repairs covered by para 6.5.7, including the pressure testing burner coil must be carried out by BALÓNY KUBÍČEK spol. s r.o. spol.s.r.o. or an organisation with approved in writing by BALÓNY KUBÍČEK spol. s r.o. to make these repairs.

6.6 Equipment repairs**6.6.1 Tempilabel and melting link**

Do not repair / remove a damaged tempilabel, sew a new one next to it. Replace a melted link with a new one.

6.7 Facility repairs

While repairing and servicing individual devices follow the instructions in the maintenance manual for a particular device.

6.7.1 Device repairs

While repairing individual devices follow the instructions in maintenance manual for the specific device.

7. INSTRUCTIONS

7.1 General

The instructions regarding special procedures during inspections and repairs are contained in this section. Concerning the instructions involving measurement records in the written form, the particular certificates are drawn up and enclosed herein. While any certificate varying, its technical content must be retained.

7.2 Fabric Strength Test

The fabric test should be carried out to find out, whether the tested fabric is convenient (airworthy) for the following airborne service. This may be conducted directly on the envelope by using grab testers (the proprietary clamps are available from the manufacturer).

7.2.1 Test conduct

1. The fabric must be gripped with the jaw edges carefully aligned so that the same fibres are being pulled from each end. The minimum jaw distance of 80 mm must be kept at the same time (the min textile width of 120 mm). The clamp edges must be parallel so that the fibres are loaded evenly and tightened properly.
2. The envelope fabric should be grab tested to 13 kg. The level of loading could be observed on a spring tensile dynamometer suspended in the hook of the grab tester.

7.2.2. Test evaluation

7.2.2.1 for envelopes

1. If the fabric withstands the specified pull and is not damaged, it is fully airworthy.
2. If the fabric fails between 10 and 13 kg fabric may be passed as airworthy with the following limitations:
 - The max admissible loading will be reduced by 20 % concerning all types.
 - The balloon can only fly under favourable weather conditions.
 - The strength test must be periodically repeated either every 50 flight hours or 6 calendar months. The limitation of the service period is applied that starts first.
3. If the fabric fails below 10 kg then all the weak fabric must be replaced.

7.3 Leakage Test with Lather Solution

7.3.1 Preparation of lather solution

Mix 3 units of unpolluted water with one unit of whichever (ecological) detergent.

7.3.2 Application of lather solution

The leak detection should be carried out using a wide paintbrush (coating no pouring) or a sprayer on the tested part at the place of supposed leakage. The tested part must be exposed to the testing overpressure of 12 bar as minimum. Any leaks will be shown by the presence of bubbles. The min. observing period of the bubble initiation is 5 minutes..

7.4 Strength test of burner coils (compression test)

7.4.1 Preparation

1. Remove the coil from the burner unit so that the coil and jet ring can be tested in isolation.
2. Replace all the jets with blanking plugs (jets without holes).
3. Clean the coil.
4. Connect the vaporiser to the testing device.

7.4.2 Conducting the test

1. Fill the testing device and coil. Remove air from the system by loosening a blanking plug and retightening it when all air is removed.
2. Increase the pressure in the coil to 3 MPa with pressurised nitrogen.
3. After 3 minutes at this pressure knock the vaporiser surface with a hard object (for example with a spanner) and watch to see that there are no visible tears, deformations or cracks.
4. Lower the pressure and let the water out of the coil by loosening of the blanking plugs. When the water is out, tighten the plug.

7.4.3 Evaluation of the result

1. Pressurise the coil with nitrogen to a pressure of at least 1.2 Mpa. Dip the vaporiser to a container with water.
2. Watch to see if there is any leakage / emergence of bubbles, that would indicate looseness or cracks in the coil.
3. The coil is considered to be sound if these tests show no defects or damage.

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*Authorised repair stations can order connecting parts and necessary to conduct these tests from
BALÓNY KUBÍČEK spol. s r.o.*

7.5 Test/Trial Flight

The approved organisation considers and required possibly the test/trial flight carrying out. This decision is based on the technical balloon condition in accordance with current requirements and rules of the operator's local CAA. The range and authorisation of trial flights performing follow the valid regulations of the operator's national CAA. The manufacturer carries out ordinarily test flights according to the Certificate on Serial Flight Test/Renewal of Certificate of Airworthiness enclosed bellow.

CERTIFICATE

ON SERIAL FLIGHT TEST / RENEWAL OF CERTIFICATE OF AIRWORTHINESS (according to CAA-TI-008-k/98)*

Owner / Operator: _____

Registration:	Type:	Manufacturer:	Serial No.:	Year of production:
Certificate of Airworthiness No.:			Last valid till:	Renewed till:

Balloon technical data:	Date:	In total since production:			since last annual inspection:		
		h	min	starts	h	min	starts

Technical inspection of the balloon:

Envelope	Type:	Serial No.:		
Heating unit	Type:	Serial No.:		
Basket	Type:	Serial No.:		
Equipment				
Fuel consumption				

The Balloon is from view of completeness and correctness of certificates and documents and keeping maintenance system and technical condition:

☐ airworthy concerning a test flight / airborne operation

☐ not airworthy concerning a test flight / airborne operation

Confirmation by approved organisation
(stamp and signature)

Date of inspection
(C of A renewal)

Confirmation by CAA
(stamp and signature)

* inapplicable facts should be crossed out

FLIGHT TEST

Date	Launch field	MLS altitude	Air temperature	QNH	Wind direction/speed

Time of climbing towards 100m		Empty weight (without fuel cylinders)	
Envelope air temperature (climb of 0 m/s)		Full weight of cylinders	
Temperature after 30s		Load weight	
Descent after 30s		Take - off weight	
Fuel pressure			
Altitude AGL with the balloon descending at the 2 m/sec vertical velocity while heating was starting		Altitude loss	
Altitude AGL with the balloon climbing at the 1 m/sec vertical velocity while heating was completed		Time of heating:	
Operation of the parachute/ Smart Vent:	Operation of the rotation vent:	Operation of the rip panel:	

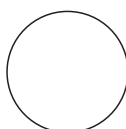
Further observations, notices or found out failures:		
Take - off time:	Landing field and time:	Flight time:

Conclusion

The flight test of the balloon has been conducted in compliance with the approved scheme. Considering the balloon performances and also the functioning of all components, the balloon has.

☐ a/ met

☐ b/ met since the found failures elimination

☐ c/ failed
the requirements of airworthiness.


Pilot in command

technical inspector

Certificate received on behalf of:

Date:

Signature

8. SUPPLEMENTS

8.1 Introduction

This Section contains necessary supplementets with information requisite for continued airworthiness of the balloon differed in further equipment or other deviations from standard balloon realisation.

8.2 List of Supplement

Date of Insertion	Supplement No.	Name of Supplement

8.3 Supplements

None

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