



Balloon Flight Manual Supplement

FireFly Baskets and Burners

This Balloon Flight Manual Supplement is initially approved by EASA under major change approval number 10070614, dated 26 July 2019.

Subsequent revisions are approved either by EASA or by authority of DOA, no. EASA.21J.277 as detailed on page 2.

This Balloon Flight Manual Supplement is approved in accordance with 14 CFR Section 21.29 for U.S. registered aircraft and is approved by the Federal Aviation Administration.

Initial date of approval: 31 July 2019

**This balloon is to be operated in compliance with information and limitations contained herein.
The Balloon Flight Manual (and all applicable Balloon Flight Manual Supplements) has to be placed in the basket during flight.**

0.1 Record of Revisions

Any revision of this Balloon Flight Manual Supplement, must be recorded in the following table. The new or amended text in the revised page will be indicated by a black vertical line in the outer margin, and the Revision No. and the date will be shown on the bottom of the page.

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

Revision Number	Affected Section	Affected Pages	Date of Issue	Approval	Date of Approval

0.2 List of Effective Pages

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SECTION 1 - GENERAL

1.1 Introduction

This Balloon Flight Manual Supplement describes installation of FireFly baskets and burners defined under FAA Type Certificate #A14S0 (held by JR Aerosports) to a Kubicek Balloons envelope. The arrangement and numbering of sections in this Balloon Flight Manual Supplement is the same as in the balloon Flight Manual. If any section is influenced, only the different or additional information is stated in this Balloon Flight Manual Supplement, all other remain without any change.

1.4 Definitions and Abbreviations

Abbreviations

FF - FireFly Balloons
 BFM – balloon Flight Manual
 BFMS – Balloon Flight Manual Supplement
 MTOW –Maximum Takeoff Weight
 RMTOW – Reduced Maximum Takeoff Weight
 AMSL – Above Mean Sea Level
 VFR / IFR – Visual Flight Rules / Instrument Flight Rules

SECTION 2 - OPERATIONAL LIMITATIONS

Before EACH flight in which the FireFly basket, burner and fuel tanks are flown, check that the logbook shows the installation of the basket, burner and fuel tanks by part number and serial number. If the balloon is flown regularly with the same basket, burner and fuel tanks, the entry needs to be made only before the first flight with such combination, and each subsequent change from Kubicek to FireFly equipment, using the same set of equipment need say only “equipped as per entry on (DATE)” referring back to date entered for the first installation.

2.3 Fuel

The minimum quantity of fuel required at take-off is 1 full fuel tank per each burner unit, however it is recommended that at least 3 fuel tanks are connected into the fuel system. For detailed information see Note 3 in chapter 2.11 of this Balloon Flight Manual Supplement.

Flight with less than full tanks is not recommended.

The fuel pressure must never exceed the system safe working pressure **12 bar (175 psi)**.

The minimum fuel pressure is **4.5 bar (65 psi)**.

Lower pressures decrease burner performance. Higher pressures make controlled heat application difficult. If necessary, pre-heat or pre-cool tanks so pressures will be correct during flight.

CAUTION	<i>Use propane (LPG) only. Burner design is for propane. Excessive amounts of additives (butane, methanol, etc.) may decrease burner performance and increase radiant heat. At 100 F, butane produces vapor pressures of less than 40 psi.</i>
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CAUTION	<i>Using of Whisper Burner is less efficient for fuel burn, so it will cause increase in fuel consumption (comparing to using of main burner).</i>
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2.9 Weight Range

RMTOW

For certain combinations of KB envelope and FF bottom-end a reduced MTOW is applicable. For list of these combinations refer to Section 5-Weight of this Balloon Flight Manual Supplement.

2.10. Basket Occupancy

Basket Limitations:

Basket	Minimum floor area		MTOW for combination with the largest applicable envelope		Max. Number of Occupants (including pilot)
	[m2]	[sq.ft]	[kg]	[lbs]	
3.9	1.44	15.50	945	2083	3
4.0	1.12	12.06	945	2083	2
4.5	1.26	13.56	945	2083	3
4.9	1.72	18.51	945	2083	4
4.9 DB	1.72	18.51	1308	2885	4
S5.0	1.70	18.30	945	2083	3
5.0	2.22	23.90	945	2083	5
S5.0 DB	1.70	18.30	1308	2885	3
5.0 DB	2.22	23.90	1787	3940	5
5.9	2.95	31.75	1787	3940	8
6.0	3.20	34.44	1787	3940	8
4860 DB	1.84	19.81	945	2083	5
5468	2.35	25.30	1039	2291	4
6072	2.77	29.82	1787	3940	8
6072 T	2.77	29.82	1787	3940	8
6096	3.70	39.83	1787	3940	10
60120	4.64	49.94	1787	3940	14

Occupancy of Compartmentalized Baskets:

Basket	Max.Occupancy of Each Passenger Compartment	Max. Occupancy of Pilot Compartment	Pilot Compartment Floor Area	
			[m2]	[sq.ft]
5468	2	pilot + 1	1.2	12.8
6072	6	pilot + 1	1.2	12.8
6072 T	3	pilot + 1	0.7	7.5
6096	2	pilot + 1	0.7	7.5
60120	3	pilot + 1	1.3	13.7

2.11 Fitment Interchangeability

FF equipment can be used in following configurations only.

Envelope	BB17GP, BB17XR
Burner	single burner assembly: T3-017, F1 Mirage
Basket	4.0, 4.5, 3.9, 4.9, S5.0, 5.0
Minimum number of fuel tanks	see Note 3

Envelope	BB18E
Burner	single burner assembly: T3-017, F1 Mirage
Basket	4.0, 4.5, 3.9, 4.9, S5.0, 5.0
Minimum number of fuel tanks	see Note 3

Envelope	BB20, BB20ED, BB20E
Burner	single burner assembly: T3-017, F1 Mirage
Basket	4.0, 4.5, 3.9, 4.9, S5.0, 5.0
Minimum number of fuel tanks	see Note 3

Envelope	BB20GP, BB20XR
Burner	single burner assembly: T3-017, F1 Mirage
Basket	4.0, 4.5, 3.9, 4.9, S5.0, 5.0
Minimum number of fuel tanks	see Note 3

Envelope	BB22ED, BB22E
Burner	single burner assembly: T3-017, F1 Mirage
Basket	4.0, 4.5, 3.9, 4.9, S5.0, 5.0
Minimum number of fuel tanks	see Note 3

Envelope	BB22, BB22D, BB22N, BB22Z
Burner	single burner assembly: T3-017, F1 Mirage
Basket	4.0, 4.5, 3.9, 4.9, S5.0, 5.0
Minimum number of fuel tanks	see Note 3

Envelope	BB22XR
Burner	single burner assembly: T3-017, F1 Mirage
Basket	4.0, 4.5, 3.9, 4.9, S5.0, 5.0
Minimum number of fuel tanks	see Note 3

Envelope	BB26E, BB26ED
Burner	single burner assembly: T3-017, F1 Mirage double burner assembly: T3-017 double, F1 Mirage double
Basket	4.0, 4.5, 3.9, 4.9, 4.9DB, S5.0, 5.0, S5.0DB, 5.0DB, 5.9, 6.0, 4860DB, 5468
Minimum number of fuel tanks	see Note 3

Envelope	BB26, BB26D, BB26N, BB26Z, BB26XR
Burner	single burner assembly: T3-017, F1 Mirage double burner assembly: T3-017 double, F1 Mirage double
Basket	4.0, 4.5, 3.9, 4.9, 4.9DB, S5.0, 5.0, S5.0DB, 5.0DB, 5.9, 6.0, 4860DB, 5468
Minimum number of fuel tanks	see Note 3

Envelope	BB30E, BB30ED
Burner	single burner assembly: T3-017, F1 Mirage double burner assembly: T3-017 double, F1 Mirage double
Basket	4.0, 4.5, 3.9, 4.9, 4.9DB, S5.0, 5.0, S5.0DB, 5.0DB, 5.9, 6.0, 4860DB, 5468, 6072, 6072T
Minimum number of fuel tanks	see Note 3

Envelope	BB30D, BB30N, BB30Z, BB30XR
Burner	single burner assembly: T3-017, F1 Mirage double burner assembly: T3-017 double, F1 Mirage double
Basket	4.0, 4.5, 3.9, 4.9, 4.9DB, S5.0, 5.0, S5.0DB, 5.0DB, 5.9, 6.0, 4860DB, 5468, 6072, 6072T
Minimum number of fuel tanks	see Note 3

Envelope	BB34D, BB34ED, BB34E, BB34Z
Burner	double burner assembly: T3-017 double, F1 Mirage double
Basket	4.9DB, S5.0DB, 5.0DB, 5.9, 6.0, 5468, 6072, 6072T
Minimum number of fuel tanks	see Note 3

Envelope	BB37D, BB37N, BB37Z
Burner	double burner assembly: T3-017 double, F1 Mirage double
Basket	4.9DB, S5.0DB, 5.0DB, 5.9, 6.0, 6072, 6072T
Minimum number of fuel tanks	see Note 3

Envelope	BB40D, BB40Z
Burner	double burner assembly: T3-017 double, F1 Mirage double
Basket	4.9DB, S5.0DB, 5.0DB, 5.9, 6.0, 6072, 6072T, 6096
Minimum number of fuel tanks	see Note 3

Envelope	BB42D, BB42Z
Burner	double burner assembly: T3-017 double, F1 Mirage double
Basket	5.0DB, 5.9, 6.0, 6072, 6072T, 6096
Minimum number of fuel tanks	see Note 3

Envelope	BB45D, BB45N, BB45Z
Burner	double burner assembly: T3-017 double, F1 Mirage double
Basket	5.0DB, 5.9, 6.0, 6072, 6072T, 6096
Minimum number of fuel tanks	see Note 3

Envelope	BB51D, BB51Z
Burner	double burner assembly: T3-017 double, F1 Mirage double
Basket	5.0DB, 5.9, 6.0, 6072, 6072T, 6096, 60120
Minimum number of fuel tanks	see Note 3

Envelope	BB60D, BB60N, BB60Z
Burner	double burner assembly: T3-017 double, F1 Mirage double
Basket	5.0DB*, 5.9*, 6.0*, 6072*, 6072T*, 6096*, 60120* * Maximum permitted MTOW is 3940 lbs (1787 kg)
Minimum number of fuel tanks	see Note 3

Envelope	BB64Z
Burner	double burner assembly: T3-017 double, F1 Mirage double
Basket	5.0DB*, 5.9*, 6.0*, 6072*, 6072T*, 6096*, 60120* * Maximum permitted MTOW is 3940 lbs (1787 kg)
Minimum number of fuel tanks	see Note 3

Envelope	BB70D, BB70Z
Burner	double burner assembly: T3-017 double, F1 Mirage double
Basket	5.0DB*, 5.9*, 6.0*, 6072*, 6072T*, 6096*, 60120* * Maximum permitted MTOW is 3940 lbs (1787 kg)
Minimum number of fuel tanks	see Note 3

Envelope	BB78Z
Burner	double burner assembly: T3-017 double, F1 Mirage double
Basket	6096*, 60120* * Maximum permitted MTOW is 3940 lbs (1787 kg)
Minimum number of fuel tanks	see Note 3

Note 1:

Some carriage model numbers contain the suffix "A1". The carriage models 3.9, 4.0, 4.5, 4.9, s5.0, and 5.0 are identical to the carriage models 3.9A1, 4.0A1, 4.5A1, 4.9A1, s5.0A1, and 5.0A1 respectively, and may be used interchangeably. Some carriage model numbers contain the suffix "DB". That carriage models are made for double burner assembly.

Note 2:

The 60 x 72 inch T – partition (basket number 6072T) has 2 passenger compartments each holding 3 passengers. The 60 x 96 (basket number 6096) and 60 x 120 (basket number 60120) baskets have 4 passenger compartments, each holding 2 or 3 passengers. Each basket has a separate pilot compartment with a pilot platform, 2 burners (double burner assembly) directly overhead, a cross-over dash panel for ease of fuel management and up to 6 fuel tanks.

Note 3:

Carriage Models 3.9 and 4.9: One, two, three or four 10-gallon FAA approved propane cylinders. One FireFly Balloons P/N 3229, 3229-1 or 3229-2 must be installed in corner one. The remaining cylinders must be FireFly Balloons P/N 3035, 3035-1, 3035-2 or 3258. Models 3.9 and 4.9 may alternately contain one or two 15-gallon FAA approved propane cylinders, FireFly Balloons P/N 3661-2 installed in corners 2 or 3 only.

Carriage Models 4.0 and 4.5: One, two or three 10-gallon FAA approved propane cylinders. One FireFly Balloons P/N 3229, 3229-1 or 3229-2 must be installed in corner one. The remaining cylinders must be FireFly Balloons P/N 3035, 3035-1, 3035-2 or 3258. Models 4.0 and 4.5 may alternately contain one, two or three 15-gallon FAA approved propane cylinders, FireFly Balloons P/N 3661-1 in corner one and FireFly Balloons P/N 3661-2 in the other corners.

Carriage Models 5.0 and S5.0: One, two, three, four, five, or six 10-gallon FAA approved propane cylinders Two FireFly Balloons P/N 3229, 3229-1 or 3229-2 must be installed in corner one. The remaining cylinders must be FireFly Balloons P/N 3035, 3035-1, 3035-2 or 3258.

Carriage Model 4.9DB (two burners installed): Two, three or four 10-gallon FAA approved propane cylinders. Two FireFly Balloons P/N 3229, 3229-1 or 3229-2 must be installed in corner one. The remaining cylinders must be FireFly Balloons P/N 3035, 3035-1 or 3035-2. The size 4.9DB basket may alternately contain one or two 15-gallon FAA approved propane cylinders, FireFly Balloons P/N 3661-2 installed in corners 2 or 3 only.

Carriage Models 5.0DB and S5.0DB (two burners installed): Six 10-gallon FAA approved propane cylinders. Two FireFly Balloons P/N 3229, 3229-1 or 3229-2 must be installed in corner one. The remaining tanks must be FireFly Balloons P/N 3035, 3035-1 or 3035-2.

Carriage Model 5.9: Six or seven 10-gallon FAA approved propane cylinders. Two FireFly Balloons P/N 3229, 3229-1 or 3229-2 must be installed in corner one. The remaining cylinders must be FireFly Balloons P/N 3035, 3035-1 or 3035-2.

Carriage Model 6.0: Seven, eight or nine 10-gallon FAA approved propane cylinders. Two FireFly Balloons P/N 3229, 3229-1 or 3229-2 must be installed in corner one. The remaining cylinders must be FireFly Balloons P/N 3035, 3035-1 or 3035-2. The size 6.0 basket may alternately contain one or two 15gallon FAA approved propane cylinders, FireFly Balloons P/N 3661-2 installed in corners 2 or 3 only.

Carriage Model 4860DB: Four, five or six 10-gallon FAA approved propane cylinders. A FireFly Balloons 3229, 3229-1 or 3229-2 must be installed in corners one and three. The remaining cylinders may be FireFly Balloons P/N C6G001 or FireFly Balloons P/N 3035, 3035-1 or 3035-2. The 4860DB Basket may alternatively contain four, five or six 15-gallon FAA approved propane cylinders, a FireFly Balloons P/N B3G661-1 or FireFly Balloons 3661-1 in corner one and three and FireFly Balloons P/N B3G661-2 or FireFly Balloons P/N 3661-2 in the other corners.

Carriage Models 6072 or 6072T Basket: Six, seven or eight 10-gallon FAA approved propane cylinders. Two FireFly Balloons P/N 3229, 3229-1, or 3229-2 must be installed in corner one or two. The remaining cylinders must be FireFly Balloons P/N C6G001 or FireFly Balloons P/N 3035, 3035-1 or 3035-2. The 6072 and 6072T Baskets may alternatively contain six, seven or eight 15-gallon FAA approved propane cylinders, two FireFly Balloons P/N B3G661-1 or FireFly Balloons P/N 3661-1 in corner one or two and FireFly Balloons P/N B3G661-2 or FireFly Balloons P/N 3661-2 in the other corners.

Carriage Models 6096 or 60120: Six, seven, or eight 10 gallon FAA approved propane cylinders. Two Firefly Balloons P/N 3229, 3229-1 or 3229-2 must be installed in corner one or two. The remaining cylinders must be Firefly Balloons P/N C6G001 or Firefly Balloons P/N 3035, 3035-1, 3035-2. The 6096 or 60120 Basket may alternatively contain six, seven or eight 15 gallon FAA approved propane cylinders. Two Firefly Balloons P/N B3G661-1 or Firefly Balloons P/N 36611 in corner one or two and Firefly Balloons P/N B3G661-2 or Firefly Balloons P/N 3661-2 in the other corners.

Carriage Model 5468: Three, four, five, or six 10 gallon FAA approved propane cylinders. Two Firefly Balloons P/N 3229, 3229-1 or 3229-2 must be installed between corners two and three. The remaining cylinders must be Firefly Balloons P/N C6G001 or Firefly Balloons P/N 3035, 3035-1, or 3035-2.

Additional tanks may be installed (see Appendix 7 of this BFMS).

Additional Limitations

Rotation Vent must be fitter when:

- any FireFly partitioned basket is used.

Different frame dimensions:

- before changing a combination of envelope and basket to another approved combination, care needs to be taken of the suitability of the flying wires. If the new frame has different dimensions than the original one, the flying wires need to be replaced following the instructions provided in Maintenance Manual Supplement (B.3205-MMS_USBEF). If in doubt, ask KB for further assistance and technical support.

Single burner assemblies:

- are permitted only when fitted with Fire 2 (auxiliary burner).

Maximum altitude

The maximum allowable flight altitude according to VFR in the U.S.A. is 18,000 ft AMSL.

Fuel tanks

A minimum of one fuel tank per burner unit is to be carried for flight. These tanks must be full for take off. Gas for refuelling must be completely clean and the use of fuel filters is strongly recommended.

SECTION 3 - EMERGENCY PROCEDURES

3.7. Burner Failures

3.7.1 Pilot Light Failure

Additional information and procedures apply for burners fitted with Fire2 auxiliary burner. For burner assemblies without Fire2, follow the instructions in KB balloon Flight Manual (B.3105).

If the failure remains:

6. Open Fire2 valve slightly.
7. Light vapor with an igniter inserted through the hole in the burner can nearest to the Fire2 nozzle.
8. Adjust the flame to a level that will serve as a pilot light.
9. Land as soon as practicable.

CAUTION	<i>A Fire2 valve left open at the same adjustment for a long period of time may freeze in position. To avoid this, rock the valve handle back and forth a minimum of 1/8 turn at least once per minute.</i>
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3.9 Gas Leak

All fuel leaks pose a fire hazard and require landing as soon as possible.

WARNING	<i>NEVER in any case operate any ignition source if fuel is still leaking or if the basket contains or is surrounded by leaked fuel. A hard landing (without using any burner at all) is a better choice.</i>
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For burners without Fire2 auxiliary burner follow the instructions given by the KB balloon Flight Manual (B.3105).

For burners fitted with Fire2 auxiliary burner follow these steps:

1. Close Pilot Light Safety ShutOff.
2. Close tank valve on tank in use (other tank valves should be already closed).
3. Lock Trigger Valve open.
4. ONLY WHEN ALL PROPAN VAPOR DISSAPEARED, relight pilot lights and land on Fire2.

CAUTION	<i>Allow for much slower balloon response when using Fire2 instead of the main burner system. Low fuel pressure and/or heavy loads further slow the responsiveness. Exercise special care in keeping descent rates under control when using Fire2 alone.</i>
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SECTION 4 - NORMAL PROCEDURES

The following procedures are additional to those already contained in the balloon Flight Manual.

Logbook

Record all inflated time in the balloon system logbook.

The record should show total time the balloon was buoyant, regardless of whether it was held on the ground, tethered, or in free flight.

It is also the balloon owner's responsibility to make sure that all repairs are correctly entered in the logbook.

4.7 Refueling

Refueling inevitably releases small amounts of propane, and this propane must be allowed to disperse safely.

When handling propane, always remember that propane vapor is heavier than air and tends to flow downward.

WARNING

Never refuel inside an enclosure and especially not inside a small enclosure. Confinement can concentrate propane vapor to dangerous levels.

Any nearby ignition source is a potential danger. Among possible ignition sources are:

1. Vehicle exhaust, hot exhaust systems of recently operated vehicles, and sparks generated by a short circuit or by an operating part of a vehicle's (or other) electrical system.
2. Static electricity discharge, especially at low temperature and low humidity, Nylon garments and seat covers can generate static sparking.
3. Striker and/or other pilot light igniter, unless disengaged or stowed where accidental sparking is impossible.
4. Burner pilot lights inadvertently left alight.
5. Smoking. Cigarette lighters. Careless bystanders.

Refueling procedure:

1. Wear gloves. Liquid propane causes severe frostbite.
2. Check tanks for loose fittings, dents, gouges or other obvious damage. Do not fill a damaged tank, remove damaged tanks from the carriage before refueling.
3. Assure that all valves - including Fire 2, pilot light, tank and bleeder valves - on all tanks are securely closed. Close the Pilot Light Safety Shutoff on the burner.
4. Make sure all unused fuel hoses are capped and secured.
5. Disconnect the main fuel line at the burner and hang it outside the carriage.
6. Stand outside the carriage within easy reach of the tank being refueled. Do not reach across in front of one tank to reach another.
7. Using the brass adapter, connect the incoming fuel line to the main fuel line. Keep the connection outside the carriage.
8. Turn on incoming fuel.
9. First: Open the bleeder valve on the tank to be filled. (Vapor bleed-out will start immediately.)
Second: Open the tank valve on this tank only.

Fill only one tank at a time. Never allow more than one bleeder valve and one tank valve (on the same tank) to be open at any one time. If a fire starts with more valves open, it will be almost impossible to extinguish without personal injury before the fire is out of control

CAUTION

A portable fire extinguisher rated not less than 10-B,C in accordance with NFPA No. 10 is recommended.

10. When the bleeder valve bleeds white droplets (liquid propane):

First: Close the tank valve.

Second: Close the bleeder valve. If the tank was overfilled, re-open the bleeder valve to bleed off excess liquid propane, then reclose securely.

Proceed to the next tank to be filled using the procedure in (6), (9) and (10) above.

11. When all tanks are filled, turn off incoming fuel. Disconnect the incoming fuel line slowly to allow trapped liquid propane to vaporize.
12. Reconnect the burner or cap the main fuel hose to exclude dirt and insects.
13. Check to be sure that all tank and bleeder valves are securely closed.
14. Re-open the Pilot Light Safety Shutoff. Leave all other fuel system valves closed.

If tanks are removed from the carriage for outside filling, reinstall with hoses and fittings returned to correct position so they do not rub against tanks or any object that might produce damage. To assure against crossed threads or other interference, hand-tighten POL fittings until they bottom in tank valves. Then use a wrench for final tightening with hoses and fittings in correct position.

4.8 Tank heating

Cold weather can make pre-flight tank heating necessary to raise fuel pressure into the operating range specified in LIMITATIONS, 2.5.2.

1. Never heat tanks by any means inside an enclosure or anywhere near any ignition source. Rising temperature may cause a Tank Safety Valve to release propane.
2. Never heat tanks to pressures above 240 psi. This is the pressure generated by propane at 125°F/ 52°C.

WARNING *Do not concentrate heat upon the bottom or upon any small area of a tank. Spot-heating is dangerous. Flame-heating is even more dangerous.*

3. It is recommended that only full tanks be heated and that heat be applied to tank areas backed by liquid fuel, not vapor. For pre-flight heating and for retaining heat during flight, tank-heater jackets are recommended. These are heat-retaining jackets which contain well-insulated wrap-around electric heating elements located to apply heat over an area backed by liquid fuel.
4. Rising fuel pressure in each tank must be monitored as heating progresses. It is recommended that the heat-jacketed tanks remain installed in the carriage and connected into the fuel system so the Fuel Pressure Gauge can be used for monitoring:
 - (a) Mount and connect the burner(s), cap unused hoses and close all valves on tanks and burner(s).
 - (b) Open one Tank Valve. Fuel Pressure Gauge will show pressure in this tank.
 - (c) Close this Tank Valve and then open the Trigger Valve to bleed trapped fuel pressure back down.
 - (d) Repeat (b) and (c) for each tank.
 - (e) When finished, open both valves on the burner(s) to bleed fuel hoses, then close the Trigger Valve(s). Dismount the burner(s) before transport.

Always be cautious when burning high-pressure fuel and be especially cautious with first burns. The rapid flow of high-pressure fuel through a cold burner may produce an unexpectedly large initial burst of flame.

SECTION 5 - WEIGHT

For the following combinations a reduced MTOW is applicable.

Envelopes	Baskets	RMTOW
BB60D, BB60N, BB60Z	5.0DB, 5.9, 6.0, 6072, 6072T, 6096, 60120	3940 lbs (1787 kg)
BB64Z	5.0DB, 5.9, 6.0, 6072, 6072T, 6096, 60120	3940 lbs (1787 kg)
BB70D, BB70Z	5.0DB, 5.9, 6.0, 6072, 6072T, 6096, 60120	3940 lbs (1787 kg)
BB78Z	6096, 60120	3940 lbs (1787 kg)

For combinations other than those stated in this table, the standard MTOW stated in Envelope Weight Limits chart in KB BFM applies.

5.1 Introduction

As stated in the Section 2, chapter 2.9 Weight Range of the balloon Flight Manual, the actual weight of the balloon must be kept between the upper limit weight (MTOW, lowered MTOW, RMTOW and Maximum Balloon Lifting Capacity – whichever is lesser) and lower limit weight (MLW) during the entire flight.

SECTION 6 - BALLOON AND SYSTEMS DESCRIPTION

6.5 Burners

There are two burner types currently being manufactured and used by FireFly Balloons. These are the T3-017 and the F1 Mirage. Although all T3-017 burners are similar in appearance, the output was increased by an orifice change in August 1986 and by a blast valve change in January 1990.

6.5.2 Whisper Burner - Fire 2 auxiliary burner

Fire 2 is an auxiliary burner that can be fitted on T3-017 or F1 Mirage burners. It consists of a liquid propane nozzle mounted on the base plate of the burner, which directs a jet of liquid propane upward. After it exits the orifice it partially vaporizes and then, mixing with air, it burns. The burner may or may not have a fast-acting toggle valve for the Fire2 system located on the burner. It runs independently from the main burner. In the unlikely event of a main burner or hose failure, the balloon can be still operated only with using the Fire 2 backup system.

CAUTION

Using of Whisper Burner is less efficient for fuel burn, so it will cause increase in fuel consumption (comparing to using of main burner).

6.5.6 Fuel Supplies

For combinations of KB envelopes and FF bottom-ends, single burner assemblies are permitted only when fitted with Fire 2 (auxiliary burner).

For correct number and type of applicable fuel tank see Note 3 in chapter 2.11 as well as Appendix 7 of this BFMS.

Fuel should always be vented from fuel hoses when the burner is not in use. The remaining fuel can cause damage to the fuel hoses due to heat expansion.

6.5.7 Burner Frame

The FF burner frames and supports can be divided into 2 main groups – burner frame and support rods assembly and rattan supporting system.

The first option consist of separate burner frame, which has sockets in each corner for attaching the supporting rods. They fit to the sockets on the upper frame of the baskets. This removable rigid burner support made of either rattan or a steel/fiberglass combination.

The second option is a whole burner support assembly made of thick rattan canes. These are bent to form the shape of frame and connected together at the top. Their bottom parts do fit to the upper frame of the basket.

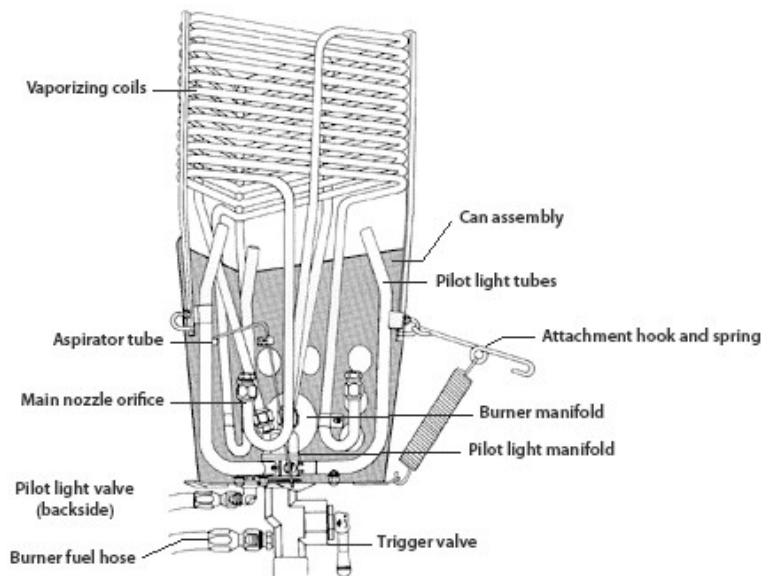
The burner assembly is mounted to the burner support by spring/lever assemblies on its three corners. The springs allow the burner to be gimbaled in order to direct the flame during inflation or in flight.

6.5.14 Burner T3-017

The burner consists of 3 main jets fed through a common manifold, with 3 separate pilot lights. Liquid fuel from the main fuel line enters the assembly through a quick-acting toggle valve. The fuel flows through into a hexagon-shaped manifold which feeds the 3 intertwined Inconel vaporizing coils. Vaporized fuel exits through 3 main jets. After leaving the manifold there are three separate flow circuits. Although the coils are intertwined there is no connection between them.

The pilot light uses vapor phase of fuel from the master fuel cylinder. The vapor enters the burner through a flare fitting through the bottom plate and into a manifold that is held in place between the trigger valve and the main fuel manifold. Three orifices are screwed into that manifold and in the inlet side of them, there is a metal filter, which prevents dirt from plugging the tiny orifice. As propane vapor jets out of the orifice, it entrains air. This mixture begins to burn below the top of the pilot light tube and the flame exits the top.

An aspirator tube is installed in the burner with the bottom end aligning in a divot on the bottom plate to aid in removing condensation build-up in the burner.



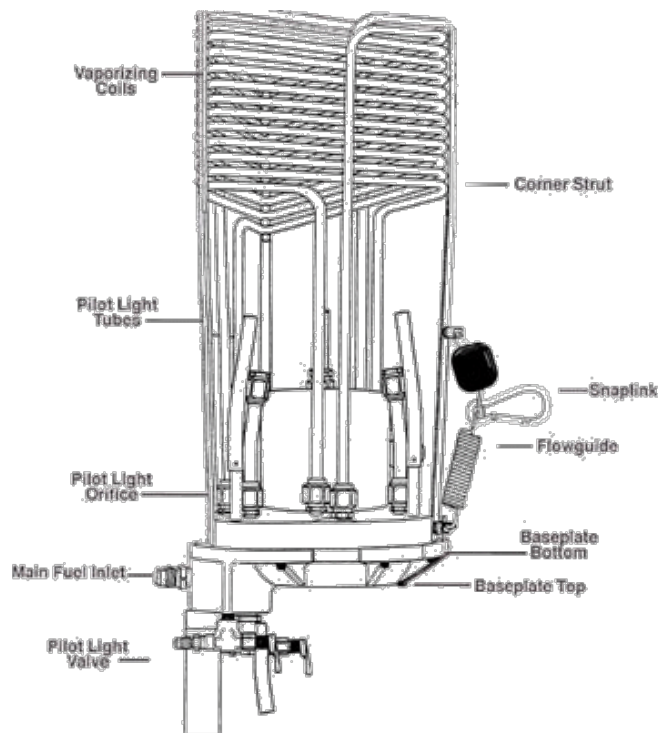
Source: FireFly Balloons 2010, Inc. - Repair and Maintenance Manual, rev. 1.0, issued October 2015, page 2-10
Modified figure

6.5.15 Burner F1 Mirage

The F1 Mirage burner is quite different from the T3-017 burner. All fuel for the pilot lights, Fire2 and main burner is routed to the respective points through 4 separate (not connected) channels machined between two cast alloy plates which form the base of the burner. The main fuel supply enters through the bonnet assembly, then it is directed to the 3 intertwined Inconel vaporizing coils and then flows back into the base for delivery to the flow-guide. The pilot light vapor enters the baseplate through a switch valve, then it is directed through its channel and exits through the top of the plate into the pilot light. Fire2 fuel enters the baseplate through a trigger valve assembly. It is then directed through its channel and out the top of the plate through 3 orifices.

There are heat shields installed around the coils on each side of the burner, older burner assemblies have separate upper and lower heat shields while newer assemblies have one heat shield per side.

An aspirator tube is fitted into the flow-guide opening of this burner. It has 3 to 4 tubes to aid in removing condensation build-up on the base plate.



Source: FireFly Balloons 2010, Inc. - Repair and Maintenance Manual, rev. 1.0, issued October 2015, page 2-10

6.7 Baskets

Firefly baskets have very similar concept of construction to other manufacturer's baskets, but with some important differences. The FF basket is made of solid (9-ply birch laminate) floor with woven wicker walls. However, their wicker is woven vertically, not horizontally. Also the upper and lower basket frames are not of stainless-steel, but they are made of extremely strong glass fiber tubing. A rope suspension system passes from its attachments beneath the floor, up through and vertically, to loops which are toggled to the envelope. In the FireFly baskets, all major loads are carried by the suspension ropes, the floor assembly and the glass fiber tubing/rattan frame. The wicker sidewalls are not primary load carrying members.

Some basket models will come with either one burner or two burners depending on customer preference. These baskets containing the optional second burner are denoted with a "DB" suffix after the model number. These carriages are 4.9DB, S5.0DB, 5.0DB, and 4860DB. Some triangle carriages were equipped with a throttle valve on one of the panels, these models have a "T" suffix on the model number. Some triangle carriages were made with adjustable uprights, these are known as the Barnestormer models and have a "B" suffix on the model number. The 6072 model carriage can be made with or without a T-shaped partition, the partitioned carriage has a "T" suffix on the model number and is called the 6072.

Rattan Frame Baskets

The standard basket frame is constructed of rattan structural members that are fastened together using bolts and nyloc (nylon-insert lock) nuts. Rattan is a natural solid fibrous material with all the fibers running parallel, it is light brown in color and has an irregular surface. The ends of rattan poles are solid and there may be loose fibers around the edges.

The floor assembly in this style of baskets is laced to the frame using steel braided wire that is secured with a nicopress sleeve.

Glass Fiber frame baskets

The FireFly glass fiber baskets are constructed of high tensile glass fiber members with composite joints. Large diameter tubing, which runs around the perimeter of the top and perimeter of the compartments at the top of the carriage, is filament wound and resin coated. The triangulated members that run from the top to the bottom rails and across the floor are made of pultruded glass. The bottom rail, which runs around the perimeter of the carriage, is also made of pultruded glass.

The top rails are joined together by large crosses or elbows. These fittings may be tapered or straight through and the tubing sections, which attach them, will have the mating configuration. At each joint, the tubing is secured by epoxy resin.

All other structural fittings in the carriage are composite and are also secured to the tubing with epoxy. Most of these fittings have two parts, which are bolted together for quick assembly/disassembly.

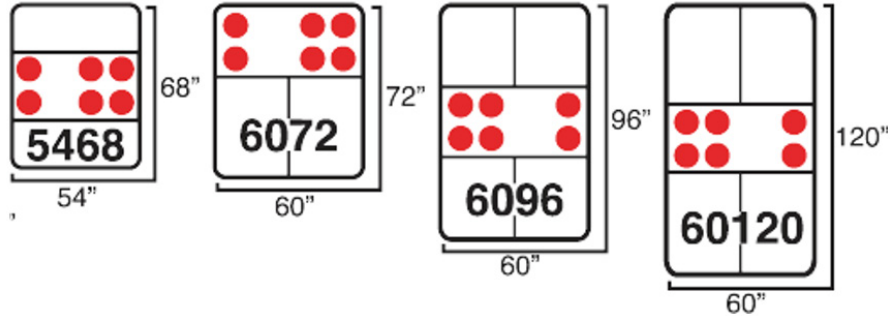
The carriage structure is secured to the floor by metal (rubber cushioned) straps. If compartment dividers are supplied, they are also secured to the structure this way.

6.7.1 Basket types

6.7.1.1 Partitioned Baskets

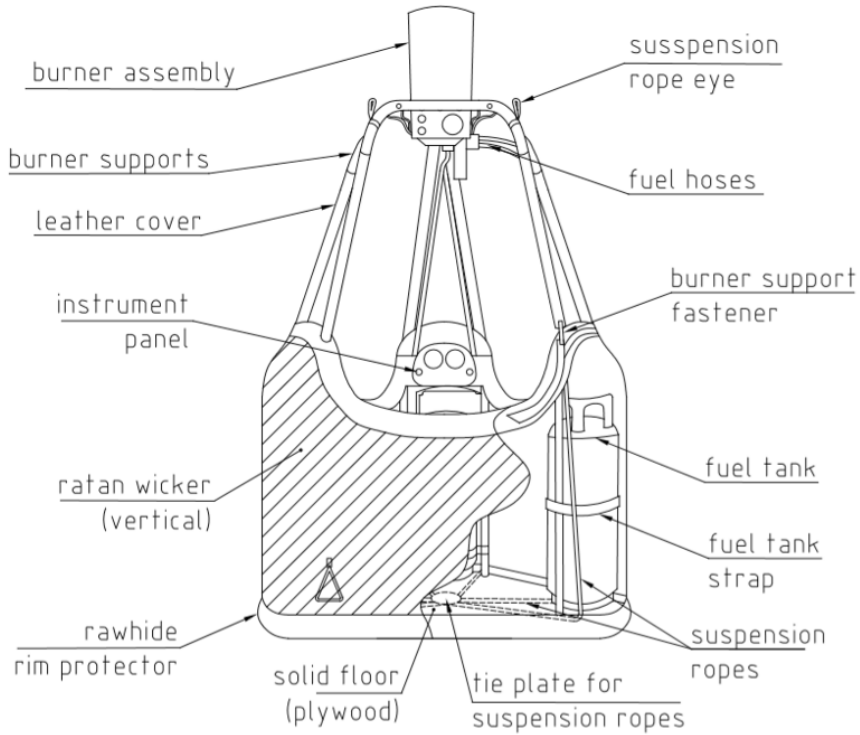
FireFly's partitioned (ride) baskets are of a rectangular shape and they have straight glass fiber frames, wicker walls and plywood floor. They have a partition wall (or more of them) that is made of either plywood or woven wicker.

Applicable baskets: 6-tank models: 5468, 6072T, 6096, 60120



Source: FireFly Balloons 2010, Inc. - Repair and Maintenance Manual, rev. 1.0, issued October 2015, page 2-2

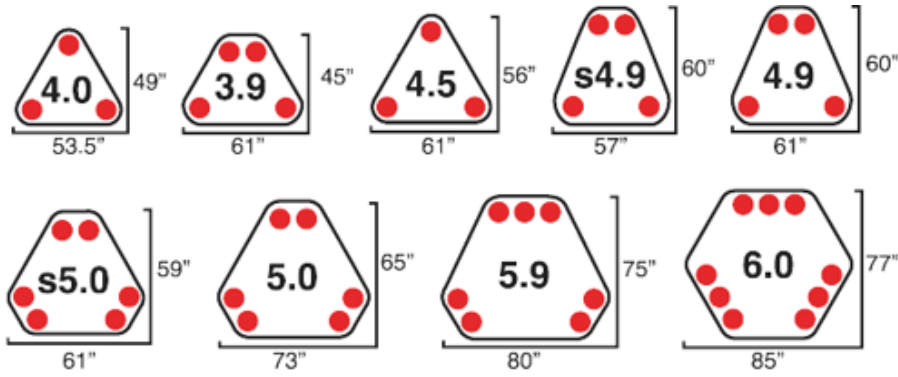
6.7.1.2 Open baskets



B.3105-USBEF - Fig. 1

Triangles, trapezoids and hexagons

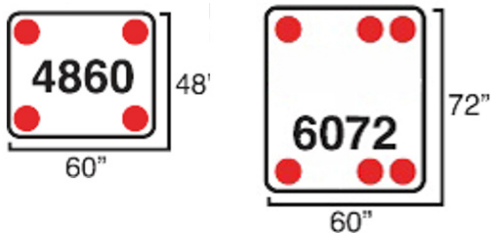
Applicable baskets: 3-tank models: 4.0, 4.5
 4-tank models: 3.9, 4.9, 4.9 DB
 6-tank models: S5.0, 5.0, S5.0 DB, 5.0 DB
 7-tank model: 5.9
 9-tank model: 6.0



Source: FireFly Balloons 2010, Inc. - Repair and Maintenance Manual, rev. 1.0, issued October 2015, page 2-2

Rectangular baskets

Applicable baskets: 4-tank model: 4860 DB
 6-tank model: 6072



Source: FireFly Balloons 2010, Inc. - Repair and Maintenance Manual, rev. 1.0, issued October 2015, page 2-2

SECTION 7 - BALLOON HANDLING, CARE AND MAINTENANCE

7.3 Balloon Maintenance, Repairs and Alterations

All balloon maintenance and repairs must be carried out in accordance with the Kubicek Balloons Maintenance Manual Supplement (B.3205-MMS_USBEF). If in doubt, contact KB (see the last page of this Balloon Flight Manual Supplement).

The Maintenance Manual (and all its supplements) is available for downloading on the Kubicek Balloons website: www.kubicekballoons.eu.

7.5 Cleaning and Care

7.5.2 Basket

Refer to the Kubicek Balloons Maintenance Manual Supplement (B.3205-MMS_USBEF).

7.5.4 Burner

Refer to the Kubicek Balloons Maintenance Manual Supplement (B.3205-MMS_USBEF).

SECTION 8 - EQUIPMENT LIST

FF fuel tanks

Manufacturer	Material	Type	Empty Weight		Full Weight	
			[kg]	[lb]	[kg]	[lb]
FireFly Balloons	Aluminium	3229, 3229-1	13	29	29	64
	Stainless steel	3229-2	20	43	35	78
	Aluminium	3035, 3035-1	12	26	28	61
	Stainless steel	3035-2	19	41	34	76
	Aluminium	3258	12	26	28	61
	Aluminium	C6G001	12	26	28	61
	Stainless steel	B3G661-1	23	51.5	47	104.1
		B3G661-2	22	48.5	46	101.1
		3661-1	23	51.5	24	104.1
		3661-2	22	48.5	46	101.1

Notes:

Tank No. 1, TBW Part C3229, is required for pilot lights and Fire 2 system. Double burner installations require one C3229 tank for each burner.

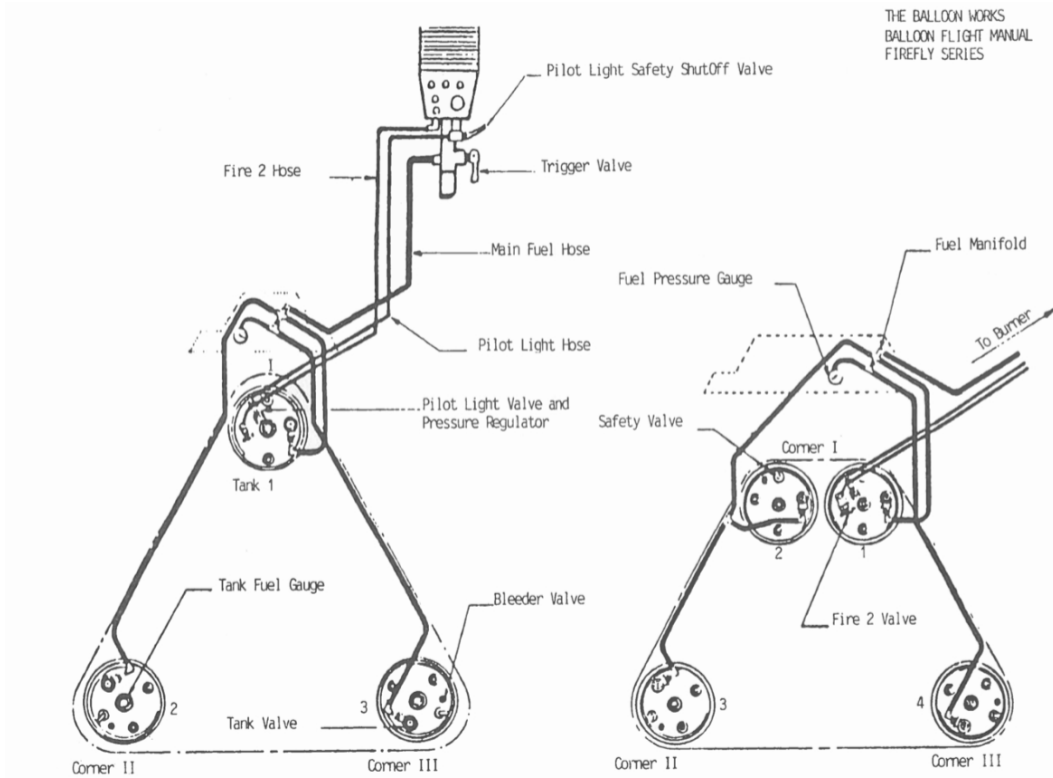
Additional tanks installed below a panel must be TBW Part C3035 (with collar cut-out). Tanks installed in comers without panels must be TBW Part C3258 (without collar cut-out).

SECTION 9 - APPENDICES

Appendix 7: Installation of additional fuel tanks to FireFly baskets

When installing fuel tanks to FF baskets, care needs to be taken to correct type and location of the fuel tanks.

Use the following scheme in combination with limitations stated in chapter 2.11 Fitment Interchangeability, Note 3 of this BFMS.



Source: The Balloon Works Flight Manual (for The FireFly 7 balloon), Appendix C

SECTION 10 - SUPPLEMENTS

No change.

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LET US HELP YOU!

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

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+420 545 422 638

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