

Fun For Two

Manual

 **APCO Aviation**
Setting Future Standards

CONTENTS:

1	DISCLAIMER OF LIABILITY	5
2	CONSTRUCTION	5
3	MATERIALS	5
4	BUTT HOLES (Velcro closure on trailing edge tip)	6
5	TRIMMING	6
6	HARNESS	6
7	SPREADERS	7
8	RISERS	7
9	TRIMMERS	8
10	EMERGENCY PARACHUTE ATTACHMENT	8
11	INSPECTION	8
11.1	GENERAL	8
11.2	BRAKE SETTING	8
11.3	FIRST CHECK AND PREFLIGHT INSPECTION	9
11.4	REGULAR INSPECTION CHECKS	9
11.5	LINE MAINTENANCE	9
12	LAUNCHING	10
12.1	LAYOUT	10
12.2	ALPINE LAUNCH OR FORWARD LAUNCH	10
12.3	STRONG WIND AND REVERSE LAUNCH	11
12.4	TOW OR WINCH LAUNCHING	11
13	FLIGHT TECHNIQUES	11
13.1	FLYING SPEED	11
13.2	THERMAL FLYING	12
13.3	ASYMMETRIC COLLAPSE	12
13.4	CRAVAT	12
13.5	FRONT STALL OR SYMMETRIC COLLAPSE	12
13.6	B-STALL	12
13.7	BIG EARS	13
13.8	DEEP STALL OR PARACHUTAL STALL	13
13.8.1	Signs of parachutal stall	13
13.8.2	Exit from parachutal stall	13
13.9	SPIRAL DIVES	14
13.10	STRONG TURBULENCE	14
13.11	STEERING NOT FUNCTIONING	14
14	LANDING	15
14.1	TREE LANDING	15
14.2	WATER LANDING	15
14.3	LANDING IN TURBULENCE	15
15	PACKING	16
16	MAINTENANCE & CLEANING	16
17	STORAGE	16
18	DAMAGE	16
19	GENERAL ADVICE	16
20	FUN FOR TWO SKETCHES AND CERTIFICATION	17
20.1	SKETCHES	17
20.2	CERTIFICATION	19





!!! WARNING

This is not a training manual. Attempting to fly this or any other paraglider without proper instruction from a qualified professional instructor is extremely dangerous to yourself and bystanders.

Apco Aviation's gliders are carefully manufactured and inspected at the factory. Please use the glider only as described in this manual. Do not make any changes to the glider. **AS WITH ANY SPORT - WITHOUT TAKING THE APPROPRIATE PRECAUTIONS, PARAGLIDING CAN BE DANGEROUS.**



GLIDER TECHNICAL DATA			
SIZE			42
Cells			48
Area m ²			42
Area (projected) m ²			37.1
Span (incl. Stabilizer) m			15.1
Span (projected) m			12.55
Aspect Ratio			5.4
Aspect Ratio (projected)			4.2
Pilot and Passenger Weight Kg			140-230
Weight of Canopy Kg			9
Root Cord m			3.37
Tip Cord m			0.67
Length of Lines on B m			9.6
Total length of line used m			475
LINES			
	Material	Diameter	Strength
Top Floor	Dyneema	1.0mm	90kg
St Top	Superaramide	1.2mm	120kg
Middle A1,3, B1,3	Superaramide	1.8mm	230kg
Middle A5, B5, C, D, St	Superaramide	1.5mm	150kg
Lower A;B	Superaramide	1.9mm	320kg
Lower C;D	Superaramide	1.8mm	230kg
Brake Cascades:			
Upper	Dyneema	1,1mm	95kg
Lower	Dyneema	2.3mm	230kg
FABRIC			
Sail Cloth		46gr/m ² "Zero Porosity" Ripstop Nylon	
Rib Reinforcement		180gr/m ² Mylar (Trilam)	
Warranty		3 Years / 250 hours	

GLIDER PERFORMANCE DATA	
V-min @ optimum wing load	24 km/h
V-trim @ optimum wing load	38-39 km/h
V-max @ optimum wing load	46 km/h
Min Sink @ optimum wing load	1.1 m/s

GLIDER CERTIFICATION DATA	
FUN FOR TWO (42)	EN. B



1 DISCLAIMER OF LIABILITY

Taking into consideration the inherent risk in paragliding, it must be expressly understood that the manufacturer and seller do not assume any responsibility for accidents, losses and direct or indirect damage following the use or misuse of this product.

APCO Aviation Ltd. is engaged in the manufacture and sale of hang gliding, paragliding, motorized para/hang gliding and emergency parachute equipment.

This equipment should be used under proper conditions and after proper instruction from a qualified instructor. APCO Aviation Ltd. has no control over the use of this equipment and a person using this equipment assumes all risks of damage or injury.

APCO Aviation Ltd. disclaims any liability or responsibility for injuries or damages resulting from the use of this equipment.

The glider is designed to perform in the frame of the required class as certified by EN.

2 CONSTRUCTION

The glider is constructed with a top and bottom surface, connected by ribs. One top and bottom panel, together with the connecting ribs is called a cell. Each cell has an opening on the lower front part. The cells fill with air forcing the panels to take the shape dictated by the airfoil (rib) section. On either side the wing ends in a stabilizer or wing tip, which provides straight-line (Yaw) stability and produces some outward force to keep span-wise tension. The front part of the ribs is made from Trialm Mylar to keep the leading edge shaped at high speeds and in turbulent air. It also improves the launch characteristics of the glider. The line hook-up points are made of Dyneema or Nylon tape.

3 MATERIALS

The glider is made from tear resistant Ripstop Nylon cloth, which is P.U. coated to zero porosity and then siliconized to give the fabric high resistance to the elements. Different cloth is used for the top, bottom and ribs due to their different functions. The lines are made of superaramid covered with a polyester sheath for protection against UV, wear and abrasion. The bottom section of the brake lines is made of polyester because of its better mechanical properties. The carabineers that attach the lines to the risers are made of stainless steel.



4 BUTT HOLES (Velcro closure on trailing edge tip)

In order to empty sand and small stones from the glider simply shake out the debris towards the wing tip and open the **Butt holes (Velcro closure on trailing edge tip)** and pull out the cloth tongue outside to empty. Do not forget to close the **Butt holes** afterwards.



5 TRIMMING

All Apco gliders are trimmed for optimum performance and safety. It is very important not to re-trim or tamper with any of the lines or risers as this may alter the performance and safety of the glider. Trimming of the brake line should be done in accordance with this manual and carefully checked before flying.

6 HARNESS

All of Apco's gliders are developed with the use of ABS (Automatic Bracing System) type harnesses without cross bracing. We recommend the use of an ABS harness with all our gliders. All certified harnesses can be used with our gliders. For best safety and performance we recommend an Apco harness equipped with a Mayday emergency parachute.

CAUTION:

CROSS BRACING THAT HAS BEEN ADJUSTED TOO TIGHTLY CAN AFFECT THE HANDLING OF A GLIDER, AND MAY NOT NECESSARILY LEAD TO GREATER SAFETY. APCO GLIDERS ARE DEVELOPED AND TESTED WITHOUT THE USE OF CROSS BRACING. USING AN ABS HARNESS WITH CHEST STRAP SET AT THE SPECIFIED WIDTH (CHECK THE AFNOR STICKER ON YOUR GLIDER) WILL RESULT IN THE HIGHEST PASSIVE SAFETY ON YOUR GLIDER.

It is recommended to use a certified rescue parachute when flying. Attaching the rescue parachute should be done in accordance with the recommendation of the



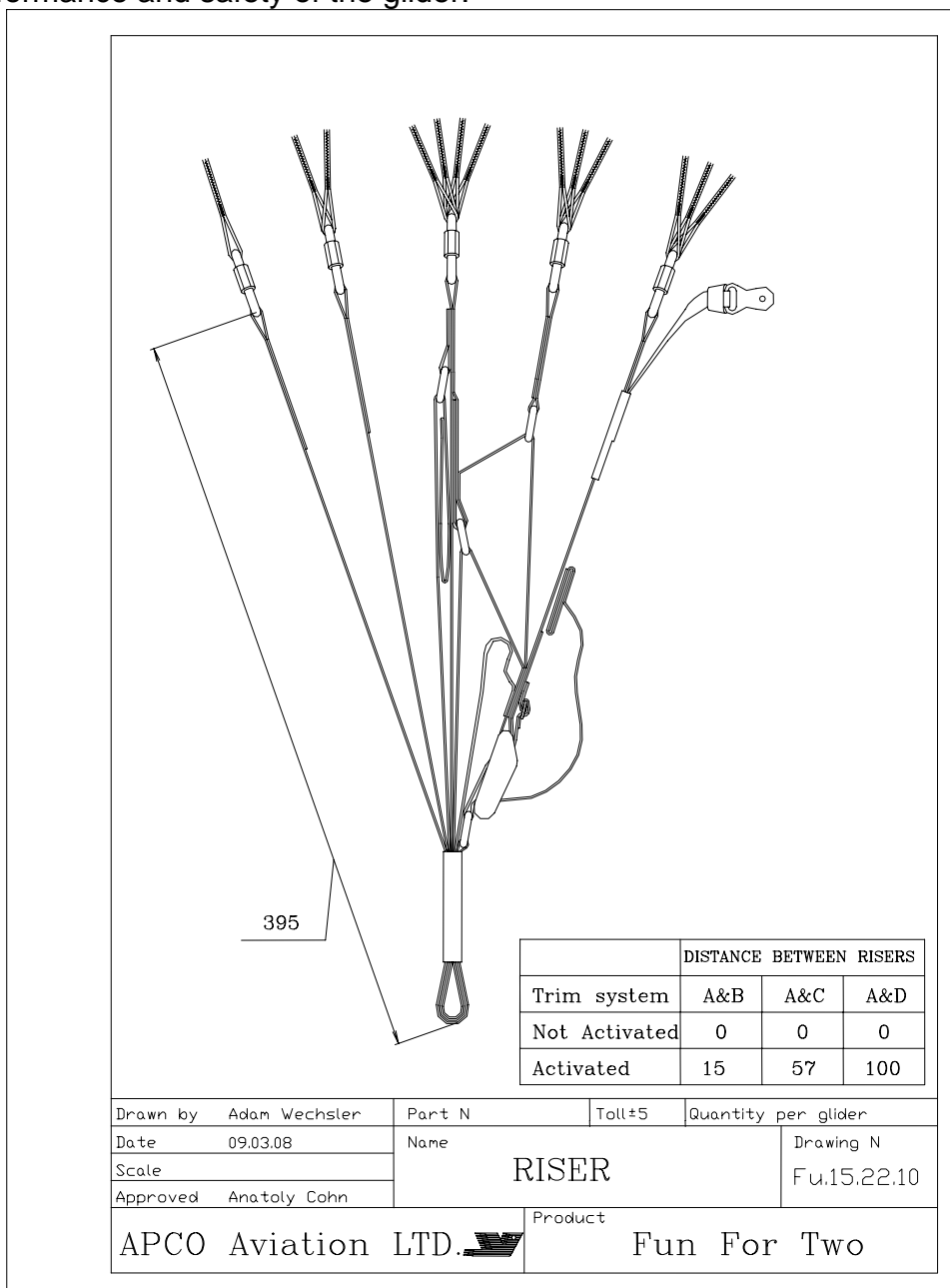
harness and reserve parachute manufacturer. The attachment should be performed and inspected by a qualified person.

7 SPREADERS

Tandem flying requires the use of spreaders. The two most commonly used types are soft spreaders and spreader bars. The choice of which spreader to use is up to the personal preference of the pilot.

8 RISERS

The Fun For Two is supplied with a split A riser. The first A-riser is attached to the outermost A line (A5). The second A-riser is attached to the central two A lines (A1 & A3). This is to facilitate *big ears* or *tip tucks*. At no time should the pilot change the risers or use risers not intended for this specific glider as this will affect the performance and safety of the glider.



9 TRIMMERS

The Fun For Two risers are equipped with replaceable trim tabs for accelerated flight. The neutral setting is when the A/B/C/D risers equal in length. We recommend the neutral position for take off and landing. To accelerate the glider, open the trimmers.

If your trim tabs are worn out simply fray the safety stitch, take out the trimmer webbing and replace it with new APCO trimmer webbing. After re-installing the trimmer webbing make sure to sew a safety stitch at same distance as the original in order to have the full trimmer range.



10 EMERGENCY PARACHUTE ATTACHMENT

It is recommended to use a certified rescue parachute when flying. Attaching the rescue parachute should be done in accordance with the recommendation of the harness and reserve parachute manufacturer.

11 INSPECTION

11.1 GENERAL

Pilots, please insure that your glider has been test flown and checked by your dealer before taking it into your possession.

11.2 BRAKE SETTING

Before the first flight the pilot/dealer has to inflate the glider, check and adjust the brake lines length to his or her preference. It is important that the brakes are not set too short. If the glider is above your head the brakes should not be pulling the trailing edge down as this means that the brakes are too short. A good setting is to have about 10 cm of slack in the brake from the brake guide on the riser to the activation



point of the brakes (See Diagram 11-1 below). If the pilot changes the type of spreader bar, please check the brakes again to ensure that the brakes are not too short.

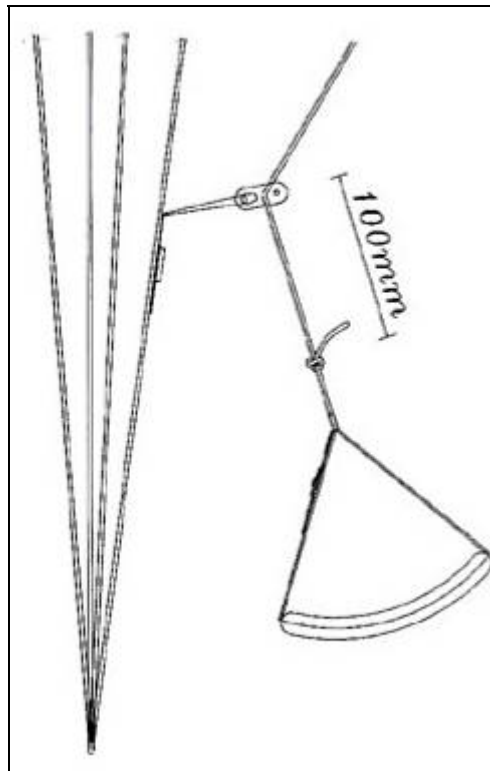


Figure 11-1 Brake Line Adjustment

11.3 FIRST CHECK AND PREFLIGHT INSPECTION

With every new glider, check the following:

- ☐ Connection points between the glider and the harness.
- ☐ No lines twisted, tangled or knotted.
- ☐ The risers and speed-system are hooked up to the harness correctly.

11.4 REGULAR INSPECTION CHECKS

- ☐ Damage to lines, webbing and thread on the stitching of the harness and risers.
- ☐ All stainless steel connection links on the risers are not damaged and are fully closed.
- ☐ The condition of the brake lines, stainless steel swivels and knot attaching the brake handle to the brake line.
- ☐ The sewing, condition of the lines and connection of the lines.
- ☐ Damage to hook up points on the glider.
- ☐ Internal damage to the ribs and diagonal ribs.
- ☐ Damage to the top and bottom panels and seams between panels.

11.5 LINE MAINTENANCE

Four groups of suspension lines and one brake line are attached to each riser. The four groups are called A, B, C, D and brake lines. The stabilizer lines are connected along with the B-lines. Superaramide lines are known to be sensitive to the influence of the elements. They must be carefully inspected periodically. In his/her own



interest, the pilot must observe the following points to ensure maximum performance and safety from the glider.

- ☐ Avoid sharp bending and squeezing of lines.
- ☐ Take care that people do not step on the lines.
- ☐ Do not pull on the lines if they are caught on rocks or vegetation.
- ☐ Avoid getting the lines wet. If they do get wet, dry them as soon as possible at room temperature and never store them wet.

IT IS MANDATORY TO CHANGE THE BOTTOM LINES ON EVERY PARAGLIDER ONCE A YEAR OR EVERY 100 HOURS, WHICHEVER COMES FIRST. THE REST OF THE LINES MUST BE CHECKED YEARLY AND REPLACED IF NECESSARY. NEVER REPLACE THE LINES WITH DIFFERENT DIAMETER OR TYPE OF LINES AS ALL GLIDERS WERE LOAD TESTED FOR SAFETY IN THEIR ORIGINAL CONFIGURATION. CHANGING LINE DIAMETER/ STRENGTHS MAY HAVE FATAL CONSEQUENCES.

Every six months one lower A, B, C and D line must be tested for minimum 50 % of the rated strength. If the line fails under the load test or does not return to its specified length all the corresponding lines must be replaced.

Professional use of gliders: towing, tandem, schooling and competition flying requires more frequent line inspection and replacement of A, B, C, D and brake lines.

12 LAUNCHING

As this is not a training manual we will not attempt to teach you proper launch techniques. We briefly cover the different launch techniques to help you get the most out of your glider.

12.1 LAYOUT

Pre-flight check should be done before every flight. Spread the glider on the ground. Spread the lines, dividing them into groups A, B, C, D and brake lines left and right. Make sure the lines are free and not twisted or knotted. Make sure all the lines are on top of the glider and that there are none caught on vegetation or rocks under the glider. Lay out the glider in a horseshoe shape. This method insures that all the lines are equally tensioned on launch, and results in an even inflation. The Mylar rib section and the Flexon™ rib reinforcements will keep the leading edge open for easy inflation. **The most common reason for a bad launch is a bad layout!**

12.2 ALPINE LAUNCH OR FORWARD LAUNCH

The Fun For Two has very good launch behaviour in no wind conditions. For best results we recommend the following techniques: Lay out the glider and position yourself at the centre of the wing with the lines almost tight. With a positive and constant force inflate the wing holding only the A-risers, and smoothly increase your running speed. The wing will quickly inflate and settle overhead. The pilot might have to apply some brake to stop the wing from overshooting the pilot on an aggressive run. After releasing the A-risers, apply about 15% brakes and the Fun For Two will gently lift you off the ground.



12.3 STRONG WIND AND REVERSE LAUNCH

The Fun For Two has ample lifting power and care should be taken in strong wind. It is advisable to have an assistant anchor the pilot when attempting a strong wind launch. It also helps to release the A-riser just before the glider gets above your head. Then pull a bit of brake to stop the wing from overshooting, but not too much as the glider might pull you off your feet too early. The assistant should let the pilot walk under the wing to reduce the wing load during inflation rather than resist its pull; this reduces the tendency of the glider to lift the pilot prematurely.

12.4 TOW OR WINCH LAUNCHING

All Apco gliders are well suited for winching and have no bad tendencies on tow. With towing it is important to have the wing above your head on launch and not to try and force a stalled wing into the air. This is especially important if the winch operator is using high tension on the winch. Very little brake if any need be applied on launch and during the tow. Directional changes should be made with weight shift rather than brakes. While on tow, the brake pressure will be higher and more input may be needed to make corrections than in normal flight.

13 FLIGHT TECHNIQUES

13.1 FLYING SPEED

Indicated trim speed is dependant on the amount of brake the pilot is using, wing loading, altitude above sea level and the accuracy and make of speed probe. The speeds recorded were taken at optimum wing loading at sea level using a Flytec; Slight variations in speed range values are expected.

NOTE:

The speeds indicated in the technical data sheet are the correct speeds measured at sea level using a calibrated instrument flying at optimum wing loading. Speed readings in the flight reports could differ as this was measured during testing using various instruments and is an indication of the difference between trim, stall and top speed. The speed range will be the same but the actual numbers may differ.

- ☐ With 0% brake the Fun For Two will fly at 38-39 km/h with a sink rate of 1.2 m/s.
- ☐ At 25% brake the glider will fly at 34km/h with minimum sink rate 1.1 m/s.
- ☐ The best glide angle is achieved with 0% brakes.
- ☐ With 80% brake the glider will fly at about 26km/h and will be close to the stall POINT 24KM/H.

CAUTION:

APART FROM FLARING FOR LANDING, THERE SHOULD BE NO REASON TO FLY WITH 70% TO 100% BRAKE. THE SINK RATE WILL BE EXCESSIVE AND YOU RISK ENTERING DEEP STALL OR FULL STALL. THERE'S ALSO A RISK OF ENTERING A SPIN (NEGATIVE) WHEN ATTEMPTING TO TURN THE GLIDER NEAR THE STALL SPEED.

WARNING:

USE THE TRIMMERS IN TURBULENT CONDITIONS OR CLOSE TO THE GROUND WITH CAUTION. WHILE FLYING WITH THE TRIMMER RELEASED, THE GLIDER HAS A REDUCED ANGLE OF ATTACK AND IS THEREFORE MORE SUSCEPTIBLE TO TURBULENCE AND MAY COLLAPSE OR PARTIALLY



DEFLATE. GLIDERS REACT FASTER WHEN ACCELERATED AND MAY TURN MORE. FUN FOR TWO IS EQUIPPED WITH HIT VALVE SYSTEM IMPROVING L/E DEFINITION AT HIGH SPEEDS.

13.2 THERMAL FLYING

The Fun For Two has excellent thermaling capacity and will be a pleasure to fly even when you are in a big gaggle or just having fun on a long XC flight. The glider has high internal pressure and needs very little pilot input even in very turbulent conditions. In light lift it is advised to make flat turns to keep the glider from banking too much and avoid increasing the sink rate. In strong lift conditions it is most effective to have small turns in the core with relatively high bank. For the best climb rate in ridge lift we recommend using about 15% to 20% brake.

13.3 ASYMMETRIC COLLAPSE

If one side of the glider partially folds or collapses it is important to keep your flying direction by applying some brake on the opposite side. The wing should re-inflate on its own without any input from the pilot. To assist re-inflation it is possible to pull some brake on the collapsed side and release immediately. In the event of a big deflation, i.e. 70%, it is important to give brake in the opposite direction but **care must be taken not to pull too much as you could stall the flying side**. The glider is very solid and has a very strong tendency to re-inflate after any collapse. It is important to remember that the glider will behave a bit more aggressively if the collapse happens with the trimmers released (open). Do not fly with the trimmer completely released in very turbulent conditions.

13.4 CRAVAT

In case a cravat occurs from an asymmetric collapse or other manoeuvres, it is important to maintain your flying direction by applying some brake on the opposite side. The cravat can usually be opened by pulling down on the stabilo line of the affected side while countering the turn with opposite brake and weight shift. It also helps sometimes to pull Big Ears to release the tension on the affected lines, or a combination of the above techniques, i.e. pulling on the stabilo after pulling Big Ears.

13.5 FRONT STALL OR SYMMETRIC COLLAPSE

In the event of a front stall the glider will normally re-inflate on its own immediately without any change of direction. To speed up re-inflation briefly apply 30-40% brake (to pump open the leading edge). Do not hold the brakes down permanently to avoid an unwanted stall. With the trimmers completely released the pilot must pull about 30% brake to speed up the inflation process.

13.6 B-STALL

The Fun For Two has a very clean and stable B stall. To enter the B stall the pilot has to pull on B-riser slowly until the glider loses forward speed and starts to descend vertically. Then the pilot can pull more on the B until he/she attains a stable 7 to 9 m/s descent rate. The glider has no tendency to front rosette or become pitch unstable. To exit the B stall the pilot releases the B slowly until the glider has regained its shape and then the last 15 cm fast to prevent the glider from entering deep stall. The Fun For Two can be controlled directionally in the B stall by pulling more on one B riser than on the other to create a turn in any direction. The B-stall is a safe controlled way of losing altitude fast without any forward speed.



Due to the high load on the B-lines, sometimes it is very difficult to do B-stall a tandem. This is why you may also try to perform B-stall by grabbing the handles on the B-riser and pulling them down. The handles activate a special reduction mechanism to lessen the force necessary to make a B-stall. To exit a B-stall, release the riser fast, to prevent any chance of entering deep stall, especially with light wing loading.

13.7 BIG EARS

Height can be lost in a controlled way by collapsing both tips. To do this, grab the outer-most A-line (attached on its own riser) on both side and pull down until the tips collapse. Pulling one side at a time may be more comfortable and easier, especially for lighter pilots. This should fold about 30% of the wing in total. It is possible to steer with weight shift.

Big ears yield around 7 m/s sink-rate with about 45-km/h forward speed. To exit, release the outer A-lines.

Sometimes, it may be necessary to apply a little brake to open the tips. If using the brakes to open the tips, it is best to open one tip at a time to avoid reducing your air-speed.

CAUTION

DO NOT ATTEMPT ANY EXTREME MANEUVERS WITH THE TIPS COLLAPSED AS THIS DOUBLES THE LOAD ON THE CENTER LINES AND ATTACHMENT POINTS AND COULD LEAD TO FAILURE.

13.8 DEEP STALL OR PARACHUTAL STALL

Under normal flying conditions the Fun For Two has no tendency to enter deep stall. All gliders can however, under certain conditions, enter and stay in deep stall configuration (as a result of ageing of materials, improper maintenance or pilot induced).

13.8.1 Signs of parachutal stall

- ☐ The pilot has very little or no forward speed and no wind in his/her face.
- ☐ The glider is fully open yet the cells are bulging in and not out on the bottom surface.
- ☐ The glider might have a very slow turning sensation.
- ☐ You will have an increased vertical descent.

13.8.2 Exit from parachutal stall

It is important to recognize this situation. Most accidents involving parachutal stall occur because pilots fail to realize a deep stall situation.

The best way to exit a parachutal stall is to pull all the A risers down to get the wing flying again. The pilot can pull the A riser down until the wing starts to fly again. The moment the wing starts to fly the pilot should release the A riser or the wing might suffer a frontal collapse.

Alternatively the pilot can release the trimmers to lower the angle of attack and get the wing flying again.



By pulling one or both brakes while in deep stall the pilot can accidentally enter a full stall or spin.

13.9 SPIRAL DIVES

The Fun For Two has very good behaviour in spiral and has no tendency to stick in a spiral. By progressively applying brake on one side the glider can enter a spiral dive. Safe high sink rates can be achieved. The spiral has to be exited slowly by releasing the brake over one complete turn or the glider may pitch forward (surge) and possibly suffer a collapse.

Care must be taken that the pilot has enough height to exit the spiral safely.

Sink rates in excess of 22m/s can be obtained.

CAUTION:

SOME GLIDERS CAN BE NEUTRAL IN SPIRAL AND MAY NOT EXIT WITHOUT PILOT INPUT. TO EXIT A NEUTRAL SPIRAL THE PILOT HAS TO LEAN HIS/HER WEIGHT TO THE OUTSIDE OF THE TURN OR APPLY BRAKE ON THE OUTSIDE WING. AS SOON AS THE GLIDER STARTS TO SLOW DOWN IN THE SPIRAL THE OUTSIDE BRAKE MUST BE RELEASED.

PILOTS MAY SUFFER A BLACK OUT IN A SPIRAL. THE PILOT HAS TO EXIT THE SPIRAL AS SOON AS HE/SHE FEELS ANY ABNORMAL SYMPTOMS (BLACK DOTS IN FIELD OF VISION OR LIGHT-HEADEDNESS).

13.10 STRONG TURBULENCE

NEVER FLY IN STRONG TURBULENCE!

If you unexpectedly encounter strong turbulence, fly with about 20% brake applied to increase the internal pressure and the angle of attack of the canopy and land as soon as possible. If the air is turbulent on landing approach, land with Big Ears.

Learn to fly actively and to anticipate collapses and prevent them by applying brake when needed before you have unwanted collapses.

13.11 STEERING NOT FUNCTIONING

If the pilot cannot reach the brake or steering lines for any reason or if they are not functioning properly, (for example: snapped on a damage point) he or she can control the glider by pulling down on the rear risers.

Care must be taken when steering like this, as much less input is needed to turn the wing and the response of the wing is also much slower than when using the brakes.

IF YOU PULL TOO MUCH ON ONE OR BOTH RISERS THE GLIDER WILL SPIN OR STALL.

On the landing flare the pilot should be especially careful not to stall the glider too high.



14 LANDING

Before landing the pilot should determine the wind direction by checking a windsock, flag, smoke drift or your drift over the ground while performing one or more 360 degree turns.

- ☐ Always land into the wind.
- ☐ At a height of about 50 meters above the ground begin your landing approach. The most commonly used one is to head into the wind and depending on the wind strength the pilot should reach his/her landing point by making s-turns.
- ☐ At a height of about 15 meters make your final approach in trim speed into the wind
- ☐ At a height of 0.5 to 1.0 meter you can gently flare the glider by pulling gradually down on the brakes to the stall point. When top-landing it is sometimes not necessary to flare or a much gentler flare is necessary, especially in strong ridge conditions.

14.1 TREE LANDING

If it is not possible to land in an open area, steer into the wind towards an unobstructed tree and do a normal landing approach as if the tree is your landing spot. Flare as you would for a normal landing. On impact keep your legs together and protect your face with your arms.

After any tree landing it is very important to check all the lines, line measurements, and the canopy for damage.

14.2 WATER LANDING

As you approach landing, release all harness buckles (and cross-bracing if present) except for one leg. Just before landing, release the remaining buckle. It is advisable to enter the water downwind. Let the canopy swing forward completely until it meets the water with the leading edge openings; the air inside will be trapped forming a big air mattress and giving the pilot more time to escape. Less water will enter the canopy this way making the recovery much easier. Get away from the glider and lines as soon as possible to avoid entanglement. Remember that a ballast bag can be emptied and then inflated with air to aid flotation.

The canopy should be carefully inspected after a water landing, since it is very easy to cause internal damage to the ribs if the canopy is lifted while containing water. **Always lift the canopy by the trailing edge, not by the lines or top or bottom surface fabric.**

14.3 LANDING IN TURBULENCE

One of the safest ways to land a glider in turbulent conditions is to use Big Ears. This reduces the chances of getting a collapse during final approach. Use weight shift to control your approach. It is possible to keep the ears in until you are ready to flare the glider. Simply release the A-risers and flare the glider starting a little higher than usual. Practice this in normal conditions before you need it in an emergency.



15 PACKING

Spread the canopy completely on the ground. Separate the lines to the left and the right side of the glider. If the risers are removed from the harness, join the two risers together by passing one riser end loop through the other. This keeps them neatly together and helps prevent line entanglement.

Fold the canopy alternately from the right and left sides, working towards the center, press out the air, working from the rear towards the front. Place the risers at the trailing edge of the folded canopy and use them to initiate the final roll up of the canopy.

16 MAINTENANCE & CLEANING

Cleaning should be carried out with water and if necessary, mild soap. If the glider comes in contact with salt water, clean thoroughly with fresh water. Do not use solvents of any kind, as this may remove the protective coatings and destroy the fabric.

17 STORAGE

When the glider is not in use, store it in a cool, dry place. A wet glider should first be dried out (not in direct sunlight). Protect the glider against sunlight (UV radiation). When on the hill keep the glider covered or in the bag. Never store or transport the glider near paint, petrol or any other chemicals.

18 DAMAGE

Using rip-stop sail repair tape (for non-siliconized cloth) to repair tears in the canopy (up to 5cm). A professional repairer should repair greater damage.

19 GENERAL ADVICE

A qualified person or APCO agent should check the glider every year.

The glider is carefully manufactured and checked at the factory. Never make changes to the canopy or the lines. Changes can introduce dangerous flying characteristics and will not improve flying performance.

Do not expose the glider to direct sunlight when not necessary. In order to protect the glider during transportation or para-waiting we recommend one of our lightweight storage bags.

If you have any doubts about flying conditions - do not begin.

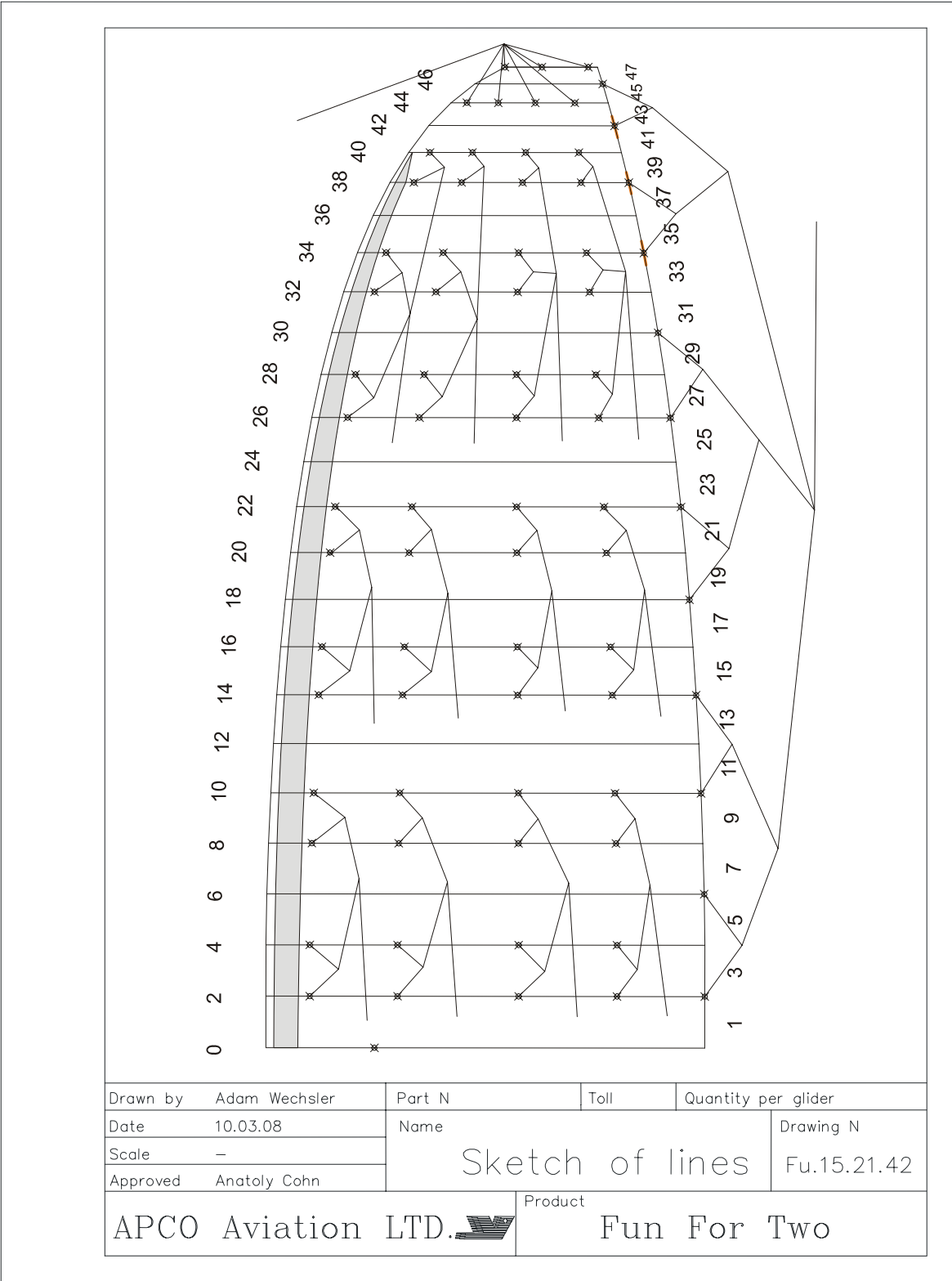
If you have any questions, please contact your dealer or us.

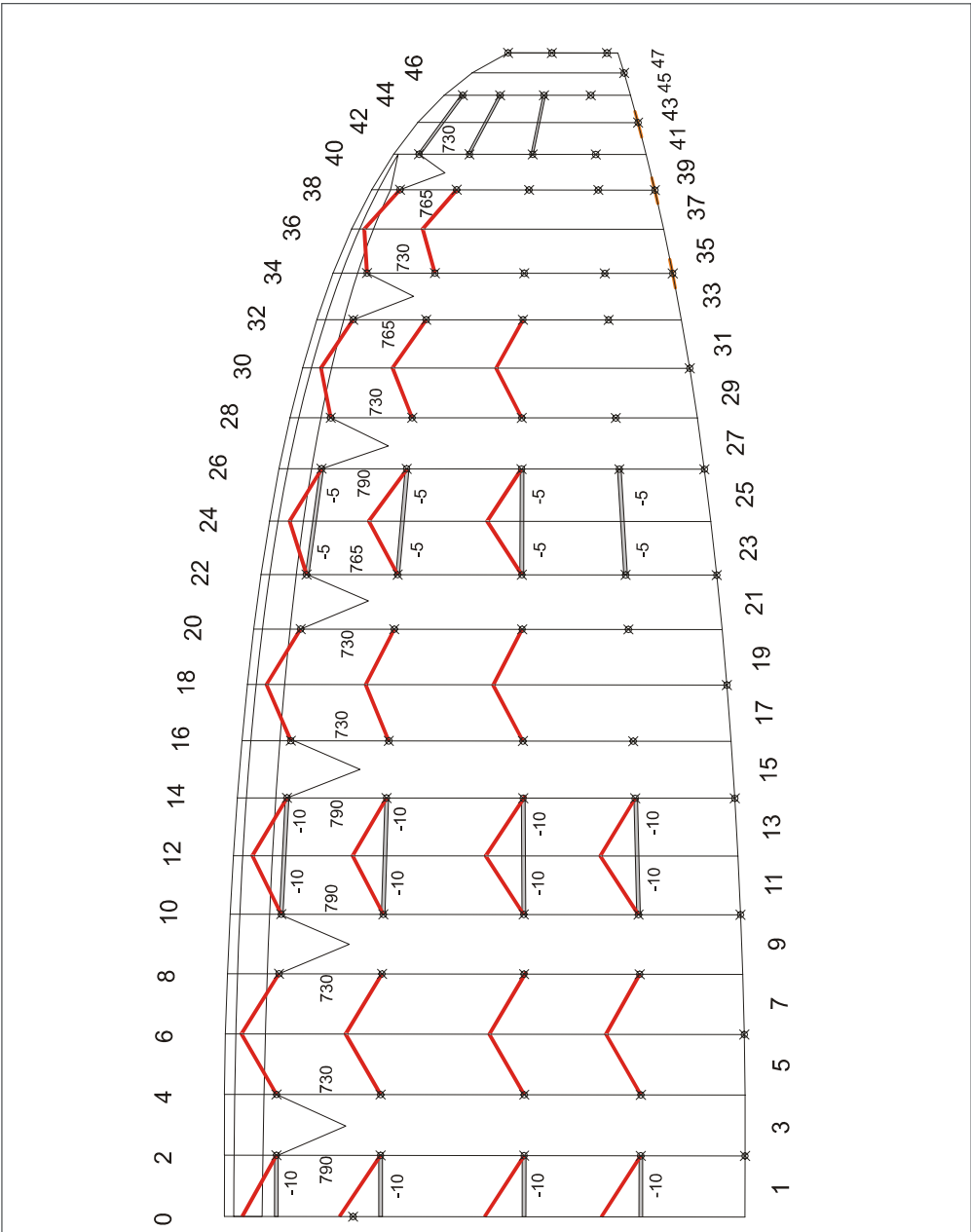
Lastly, carry a certified emergency parachute and helmet on every flight.



20 FUN FOR TWO SKETCHES AND CERTIFICATION

20.1 SKETCHES





Drawn by	Adam Wechsler	Part N	Toll	Quantity per glider
Date	10.03.08	Name	Canopy	
Scale	-			
Approved	Anatoly Cohn	Product		Drawing N
APCO Aviation LTD.		Fun For Two		Fu.15.10.42



20.2 CERTIFICATION

para-test.com



paragliding by air turquoise

Air Turquoise SA
Rte du Pré-au-Comte 8 | CH-1844 Villeneuve
tel. +41 21 965 65 65 | mobile +41 79 202 52 30
info@para-test.com

Apco Aviation Ltd.
Mr Cohn Anatoly
7, Chalamish St., Industrial park
38900 Caesarea
Israel

Certificate

The hereunder sample of paraglider has been tested
in accordance with the following standards:
EN 926-2:2005 & EN 926-1:2006



Certification number	PG_0137.2008
Manufacturer	Apco Aviation Ltd.
Glider model	Fun For Two 42
Category	B
Maximum weight in flight (kg)	230 kg
Minimum weight in flight (kg)	140 kg
Glider's weight (kg)	9 kg

Date of flight test

Flight tests	07. 03. 2008
Serial number	PR 9745
Load test	20. 09. 2008
Serial number	190514

Best Regards,

Alain Zoller

Randi Eriksen

para-test.com



paragliding by air turquoise

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Class: **B**

In accordance with EN standards 926-2:2005 & 926-1:2006:

PG_0137.2008

Date of issue (DMY):

24. 09. 2008

Manufacturer: **Apco Aviation Ltd.**

Model: **Fun For Two 42**

Serial number:

Configuration during flight tests

Paraglider

Maximum weight in flight (kg)	230
Minimum weight in flight (kg)	140
Glider's weight (kg)	9
Number of risers	4
Projected area (m2)	37.1

Accessories

Range of speed system (cm)	0
Speed range using brakes (km/h)	15
Range of trimmers (cm)	10
Total speed range with accessories (km/h)	22

Harness used for testing (max weight)

Harness type	ABS
Harness brand	Advance
Harness model	Bi Pro 2
Harness to risers distance (cm)	50
Distance between risers (cm)	56

Inspections (whichever happens first)

Yearly or every 100 flying hours
Warning! Before use refer to user's manual
Person or company having presented the glider for testing: Wechsler Adam

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
A	A	B	A	0	0	A	A	B	B	A	0	B	B	A	A	A	A	0	A	0	A	A	0



Flight test report



Manufacturer	Apco Aviation Ltd.	Certification number	PG_0137.2008
Address	7, Chalamish St., Industrial park 38900 Caesarea Israel	Date of flight test	07. 03. 2008
Representative	Wechsler Adam	Place of test	Villeneuve
Glider model	Fun For Two 42	Classification	B
Trimmer	yes: closed		

	Test pilot	Thurnheer Claude	Zoller Alain		
	Harness	Advance - Bi-pro	Advance - Bi Pro 2		
	Total weight in flight (kg)	140	230		
1. Inflation/Take-off		A			
Rising behaviour		Smooth, easy and constant rising	A	Smooth, easy and constant rising	A
Special take off technique required		No	A	No	A
2. Landing		A			
Special landing technique required		No	A	No	A
3. Speed in straight flight		B			
Trim speed more than 30 km/h		Yes	A	Yes	A
Speed range using the controls larger than 10 km/h		Yes	A	Yes	A
Minimum speed		25 km/h to 30 km/h	B	25 km/h to 30 km/h	B
4. Control movement		A			
Max. weight in flight up to 80 kg					
Symmetric control pressure / travel		not available	0	not available	0
Max. weight in flight 80 kg to 100 kg					
Symmetric control pressure / travel		not available	0	not available	0
Max. weight in flight greater than 100 kg					
Symmetric control pressure / travel		Increasing / greater than 65 cm	A	Increasing / greater than 65 cm	A
5. Pitch stability exiting accelerated flight		0			
Dive forward angle on exit		not available	0	not available	0
Collapse occurs		not available	0	not available	0
6. Pitch stability operating controls during accelerated flight		0			
Collapse occurs		not available	0	not available	0
7. Roll stability and damping		A			
Oscillations		Reducing	A	Reducing	A
8. Stability in gentle spirals		A			
Tendency to return to straight flight		Spontaneous exit	A	Spontaneous exit	A
9. Behaviour in a steeply banked turn		B			
Sink rate after two turns		More than 14 m/s	B	More than 14 m/s	B
10. Symmetric front collapse		B			
Entry		Rocking back less than 45°	A	Rocking back less than 45°	A
Recovery		Spontaneous in less than 3 s	A	Spontaneous in less than 3 s	A
Dive forward angle on exit / Change of course		Dive forward 30° to 60° / Keeping course	B	Dive forward 0° to 30° / Keeping course	A
Cascade occurs		No	A	No	A
With accelerator					
Entry		not available	0	not available	0
Recovery		not available	0	not available	0

Dive forward angle on exit / Change of course	not available	0	not available	0
Cascade occurs	not available	0	not available	0
11. Exiting deep stall (parachutal stall)	A			
Deep stall achieved	Yes	A	Yes	A
Recovery	Spontaneous in less than 3 s	A	Spontaneous in less than 3 s	A
Dive forward angle on exit	Dive forward 0° to 30°	A	Dive forward 0° to 30°	A
Change of course	Changing course less than 45°	A	Changing course less than 45°	A
Cascade occurs	No	A	No	A
12. High angle of attack recovery	0			
Recovery	not available	0	not available	0
Cascade occurs	not available	0	not available	0
13. Recovery from a developed full stall	B			
Dive forward angle on exit	Dive forward 0° to 30°	A	Dive forward 30° to 60°	B
Collapse	No collapse	A	No collapse	A
Cascade occurs (other than collapses)	No	A	No	A
Rocking back	Less than 45°	A	Less than 45°	A
Line tension	Most lines tight	A	Most lines tight	A
14. Asymmetric collapse	B			
<i>With 50% collapse</i>				
Change of course until re-inflation / Maximum dive forward or roll angle	Less than 90° / Dive or roll angle 15° to 45°	A	Less than 90° / Dive or roll angle 15° to 45°	A
Re-inflation behaviour	Spontaneous re-inflation	A	Spontaneous re-inflation	A
Total change of course	Less than 360°	A	Less than 360°	A
Collapse on the opposite side occurs	No	A	No	A
Twist occurs	No	A	No	A
Cascade occurs	No	A	No	A
<i>With 75% collapse</i>				
Change of course until re-inflation / Maximum dive forward or roll angle	Less than 90° / Dive or roll angle 15° to 45°	A	90° to 180° / Dive or roll angle 15° to 45°	B
Re-inflation behaviour	Spontaneous re-inflation	A	Spontaneous re-inflation	A
Total change of course	Less than 360°	A	Less than 360°	A
Collapse on the opposite side occurs	No	A	No	A
Twist occurs	No	A	No	A
Cascade occurs	No	A	No	A
<i>With 50% collapse and accelerator</i>				
Change of course until re-inflation / Maximum dive forward or roll angle	not available	0	not available	0
Re-inflation behaviour	not available	0	not available	0
Total change of course	not available	0	not available	0
Collapse on the opposite side occurs	not available	0	not available	0
Twist occurs	not available	0	not available	0
Cascade occurs	not available	0	not available	0
<i>With 75% collapse and accelerator</i>				
Change of course until re-inflation / Maximum dive forward or roll angle	not available	0	not available	0
Re-inflation behaviour	not available	0	not available	0
Total change of course	not available	0	not available	0
Collapse on the opposite side occurs	not available	0	not available	0
Twist occurs	not available	0	not available	0
Cascade occurs	not available	0	not available	0
15. Directional control with a maintained asymmetric collapse	A			
Able to keep course	Yes	A	Yes	A
180° turn away from the collapsed side possible in 10 s	Yes	A	Yes	A
Amount of control range between turn and stall or spin	More than 50 % of the symmetric control travel	A	More than 50 % of the symmetric control travel	A
16. Trim speed spin tendency	A			
Spin occurs	No	A	No	A

17. Low speed spin tendency	A			
Spin occurs	No	A	No	A
18. Recovery from a developed spin	A			
Spin rotation angle after release	Stops spinning in less than 90°	A	Stops spinning in less than 90°	A
Cascade occurs	No	A	No	A
19. B-line stall	0			
Change of course before release	not available	0	not available	0
Behaviour before release	not available	0	not available	0
Recovery	not available	0	not available	0
Dive forward angle on exit	not available	0	not available	0
Cascade occurs	not available	0	not available	0
20. Big ears	A			
Entry procedure	Dedicated controls	A	Dedicated controls	A
Behaviour during big ears	Stable flight	A	Stable flight	A
Recovery	Spontaneous in less than 3 s	A	Spontaneous in less than 3 s	A
Dive forward angle on exit	Dive forward 0° to 30°	A	Dive forward 0° to 30°	A
21. Big ears in accelerated flight	0			
Entry procedure	not available	0	not available	0
Behaviour during big ears	not available	0	not available	0
Recovery	not available	0	not available	0
Dive forward angle on exit	not available	0	not available	0
Behaviour immediately after releasing the accelerator while maintaining big ears	not available	0	not available	0
22. Behaviour exiting a steep spiral	A			
Tendency to return to straight flight	Spontaneous exit	A	Spontaneous exit	A
Turn angle to recover normal flight	Less than 720°, spontaneous recovery	A	Less than 720°, spontaneous recovery	A
Sink rate when evaluating spiral stability [m/s]	19		19	
23. Alternative means of directional control	A			
180° turn achievable in 20 s	Yes	A	Yes	A
Stall or spin occurs	No	A	No	A
24. Any other flight procedure and/or configuration described in the user's manual	0			
Procedure works as described	not available	0	not available	0
Procedure suitable for novice pilots	not available	0	not available	0
Cascade occurs	not available	0	not available	0
25. Comments of test pilot				
Comments	Impossible to manage the B-Stall and front collapse.			



Flight test report



Manufacturer	Apco Aviation Ltd.	Certification number	PG_0137.2008
Address	7, Chalamish St., Industrial park 38900 Caesarea Israel	Date of flight test	07. 03. 2008
Representative	Wechsler Adam	Place of test	Villeneuve
Glider model	Fun For Two 42	Classification	B
Trimmer	yes: opened		

	Test pilot	Thurnheer Claude		Zoller Alain	
	Harness	Advance - Bi-pro		Advance - Bi Pro 2	
	Total weight in flight (kg)	140		230	
1. Inflation/Take-off		A			
Rising behaviour		Smooth, easy and constant rising	A	Smooth, easy and constant rising	A
Special take off technique required		No	A	No	A
2. Landing		A			
Special landing technique required		No	A	No	A
3. Speed in straight flight		B			
Trim speed more than 30 km/h		Yes	A	Yes	A
Speed range using the controls larger than 10 km/h		Yes	A	Yes	A
Minimum speed		25 km/h to 30 km/h	B	25 km/h to 30 km/h	B
4. Control movement		A			
Max. weight in flight up to 80 kg					
Symmetric control pressure / travel		not available	0	not available	0
Max. weight in flight 80 kg to 100 kg					
Symmetric control pressure / travel		not available	0	not available	0
Max. weight in flight greater than 100 kg					
Symmetric control pressure / travel		Increasing / greater than 65 cm	A	Increasing / greater than 65 cm	A
5. Pitch stability exiting accelerated flight		0			
Dive forward angle on exit		not available	0	not available	0
Collapse occurs		not available	0	not available	0
6. Pitch stability operating controls during accelerated flight		0			
Collapse occurs		not available	0	not available	0
7. Roll stability and damping		A			
Oscillations		not available	0	Reducing	A
8. Stability in gentle spirals		A			
Tendency to return to straight flight		not available	0	Spontaneous exit	A
9. Behaviour in a steeply banked turn		B			
Sink rate after two turns		More than 14 m/s	B	More than 14 m/s	B
10. Symmetric front collapse		A			
Entry		Rocking back less than 45°	A	Rocking back less than 45°	A
Recovery		Spontaneous in less than 3 s	A	Spontaneous in less than 3 s	A
Dive forward angle on exit / Change of course		Dive forward 0° to 30° / Keeping course	A	Dive forward 0° to 30° / Keeping course	A
Cascade occurs		No	A	No	A
With accelerator					
Entry		not available	0	not available	0
Recovery		not available	0	not available	0

Dive forward angle on exit / Change of course	not available	0	not available	0
Cascade occurs	No	A	not available	0
11. Exiting deep stall (parachutal stall)	A			
Deep stall achieved	Yes	A	Yes	A
Recovery	Spontaneous in less than 3 s	A	Spontaneous in less than 3 s	A
Dive forward angle on exit	Dive forward 0° to 30°	A	Dive forward 0° to 30°	A
Change of course	Changing course less than 45°	A	Changing course less than 45°	A
Cascade occurs	No	A	No	A
12. High angle of attack recovery	0			
Recovery	not available	0	not available	0
Cascade occurs	not available	0	not available	0
13. Recovery from a developed full stall	B			
Dive forward angle on exit	Dive forward 0° to 30°	A	Dive forward 30° to 60°	B
Collapse	No collapse	A	No collapse	A
Cascade occurs (other than collapses)	No	A	No	A
Rocking back	Less than 45°	A	Less than 45°	A
Line tension	Most lines tight	A	Most lines tight	A
14. Asymmetric collapse	B			
<i>With 50% collapse</i>				
Change of course until re-inflation / Maximum dive forward or roll angle	Less than 90° / Dive or roll angle 15° to 45°	A	Less than 90° / Dive or roll angle 15° to 45°	A
Re-inflation behaviour	Spontaneous re-inflation	A	Spontaneous re-inflation	A
Total change of course	Less than 360°	A	Less than 360°	A
Collapse on the opposite side occurs	No	A	No	A
Twist occurs	No	A	No	A
Cascade occurs	No	A	No	A
<i>With 75% collapse</i>				
Change of course until re-inflation / Maximum dive forward or roll angle	90° to 180° / Dive or roll angle 15° to 45°	B	90° to 180° / Dive or roll angle 15° to 45°	B
Re-inflation behaviour	Spontaneous re-inflation	A	Spontaneous re-inflation	A
Total change of course	Less than 360°	A	Less than 360°	A
Collapse on the opposite side occurs	No	A	No	A
Twist occurs	No	A	No	A
Cascade occurs	No	A	No	A
<i>With 50% collapse and accelerator</i>				
Change of course until re-inflation / Maximum dive forward or roll angle	not available	0	not available	0
Re-inflation behaviour	not available	0	not available	0
Total change of course	not available	0	not available	0
Collapse on the opposite side occurs	not available	0	not available	0
Twist occurs	not available	0	not available	0
Cascade occurs	not available	0	not available	0
<i>With 75% collapse and accelerator</i>				
Change of course until re-inflation / Maximum dive forward or roll angle	not available	0	not available	0
Re-inflation behaviour	not available	0	not available	0
Total change of course	not available	0	not available	0
Collapse on the opposite side occurs	not available	0	not available	0
Twist occurs	not available	0	not available	0
Cascade occurs	not available	0	not available	0
15. Directional control with a maintained asymmetric collapse	A			
Able to keep course	Yes	A	Yes	A
180° turn away from the collapsed side possible in 10 s	Yes	A	Yes	A
Amount of control range between turn and stall or spin	More than 50 % of the symmetric control travel	A	More than 50 % of the symmetric control travel	A
16. Trim speed spin tendency	A			
Spin occurs	No	A	No	A

17. Low speed spin tendency	A			
Spin occurs	No	A	No	A
18. Recovery from a developed spin	A			
Spin rotation angle after release	Stops spinning in less than 90°	A	Stops spinning in less than 90°	A
Cascade occurs	No	A	No	A
19. B-line stall	0			
Change of course before release	not available	0	not available	0
Behaviour before release	not available	0	not available	0
Recovery	not available	0	not available	0
Dive forward angle on exit	not available	0	not available	0
Cascade occurs	not available	0	not available	0
20. Big ears	A			
Entry procedure	Dedicated controls	A	Dedicated controls	A
Behaviour during big ears	Stable flight	A	Stable flight	A
Recovery	Spontaneous in less than 3 s	A	Spontaneous in less than 3 s	A
Dive forward angle on exit	Dive forward 0° to 30°	A	Dive forward 0° to 30°	A
21. Big ears in accelerated flight	0			
Entry procedure	not available	0	not available	0
Behaviour during big ears	not available	0	not available	0
Recovery	not available	0	not available	0
Dive forward angle on exit	not available	0	not available	0
Behaviour immediately after releasing the accelerator while maintaining big ears	not available	0	not available	0
22. Behaviour exiting a steep spiral	A			
Tendency to return to straight flight	Spontaneous exit	A	Spontaneous exit	A
Turn angle to recover normal flight	Less than 720°, spontaneous recovery	A	Less than 720°, spontaneous recovery	A
Sink rate when evaluating spiral stability [m/s]	20		22	
23. Alternative means of directional control	A			
180° turn achievable in 20 s	Yes	A	Yes	A
Stall or spin occurs	No	A	No	A
24. Any other flight procedure and/or configuration described in the user's manual	0			
Procedure works as described	not available	0	not available	0
Procedure suitable for novice pilots	not available	0	not available	0
Cascade occurs	not available	0	not available	0
25. Comments of test pilot				
Comments	Impossible to make B-Stall line			



APCO wishes you many hours of enjoyable flying.

Take Air!

