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# BLIZZARD Owner's Manual

DGAC certified paraglider for use with paramotor or trike

## Welcome to Bruce Goldsmith Design

BGD is a world leader in the design and production of paragliders. For many years Bruce Goldsmith and his team have been developing products with world-beating performance for pilots who want the best. We apply our competitive knowledge to design top quality products that combine the highest performance with the safe handling our customers value and respect. BGD pilots appreciate our quality and reliability. BGD's world-class status is based on the skills and expertise we have developed in combining aerodynamic design with cloth and materials technology. All BGD products are developed and made with the same skill and attention to good design that are synonymous with the ultimate performance and precision required by paragliders.

### **Congratulations on your purchase of the BGD BLIZZARD**

The BLIZZARD is a progression wing for paramotoring. It is ideal for pilots who have completed their in-school flight training, and who are ready to take their flying to the next level. It is easy to launch and fly and has excellent stability, and its performance and speed will be appreciated by pilots who are ready for longer, further cross-country flights.

The Blizzard flies equally well with a trike or with foot launch. In fact all the DGAC flight tests for the size 29 were done at the maximum weight, with a trike.

Your wing has been designed to a high standard of safety and stability, but it will only retain these characteristics if it is properly looked after. This manual has been prepared to give you information and advice about your paraglider. Please read it carefully to ensure you get the best out of your new wing.

If you need replacement parts or further information, please contact your nearest BGD dealer.

# Precautions

This glider is not intended to be used for aerobatic manoeuvres.

This paraglider must not:

1. Be flown outside the certified weight range
2. Have its trim speed adjusted by changing the length of risers or lines
3. Be flown in rain or snow\*
4. Be towed with a tow-line tension in excess of 200 kg

\*A wet canopy is much more likely to enter a parachutal or full stall (see chapter 5). If you fly into a rain shower, you should immediately go and land somewhere safe, steering the canopy gently and avoiding manoeuvres such as Big Ears which can make it more likely to stall.

## Modifications

Any modification, e.g. change of line lengths or changes to the speed system, can cause a loss of airworthiness and certification. We recommend that you contact your dealer or BGD directly before performing any kind of change. However, the **length of the brake lines** should be adjusted according to whether it is being flown with high or low hangpoints, or trikes..

## Warranty

In order to benefit from the BGD warranty, you are required to complete the warranty form on the website. It is your dealer's responsibility to test fly a new paraglider before you receive it. Failure to test-fly a new paraglider may invalidate the warranty.

# Preparation

## Riser set-up

The **risers** on the Blizzard can be adapted to the height of the hangpoints of your paramotor frame/harness.

For a paramotor with **low hangpoints** the standard positions can be used for the brake attachment and the TST line as shown in the riser image on the following page.

For a paramotor with **high hangpoints** you will need to do the following:

1. Take the brake lines and TST lines off the two handles they are knotted to.
2. Remove the brake leg which is attached to the upper webbing loop on the D riser and move it to the lower position on the D riser. ●
3. Put the brake handle back on, and make sure that you lengthen the brake lines by the distance between the loops (20cm).
4. Thread the TST line through the lower friction ring instead of the upper one. ●
5. Tie the TST handle back on also extended the TST line by the correct amount.
6. The brake and TST lines should be long enough to allow the extension of the lines. If they are not you will either need to get longer lines, or the line can be extended at the top where it does not run through any rings or pulleys.

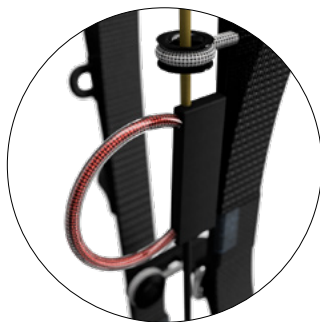


## Blizzard risers

**Trimmer**



**Tip steering TST system**



## Brake Line lengths

There should be enough slack in the brake lines so that in flight with 'hands up' the glider's trailing edge is not deflected either at trim speed or accelerated. The brakes have a knot at the handle so the pilot can check the brakes are long enough and adjust them if necessary.

For free-flight gliders 5-10cm slack is usual; for paramotor wings it can be as much as 15cm. When your dealer test-flies a brand new wing, it is one of the things they check. New gliders will be delivered with the correct brake length which is also the certified length.

However, as a glider ages the brake lines can shrink; even the presence of multiple twists in the brake lines can effectively shorten them. You should make it a habit to check for this and untwist the brake lines on launch or lengthen them at the knot. Avoid over-shortening the brake lines.

When your glider is serviced, brake line shrinkage will be spotted but it is also a good idea as a pilot to check from time to time that when you fly hands up, you can see a slight 'bow' or 'slack' in the brake lines and there is no deflection of the trailing edge.

## On Launch

1. Select a suitable take-off area determined by wind and terrain, clear of any obstacles that may catch in the lines or damage the canopy.
2. Open out your paraglider so that the bottom surface is facing upwards, with the openings at the downwind end of the take-off area and the power unit / harness at the trailing edge at the upwind side.
3. Unfold the canopy to each side so that the leading edge openings form a semicircular shape, with the trailing edge drawn together as the centre of the arc. The power unit / harness should be distanced from the canopy

so that the suspension lines are just tight.

4. Prepare and check your power unit according to the manufacturer's instructions.
5. Connect the wing to the paramotor or trike, ensuring the risers are connected the right way round and that the maillons or karabiners are correctly closed.

## Pre-flight inspection

Your paraglider is designed to be as simple as possible to inspect and maintain but a thorough pre-flight procedure is mandatory on all aircraft. The following pre-flight inspection procedure should be carried out before each flight.

1. Whilst opening out the paraglider check the canopy for any tears.
2. Check that the lines are not twisted or knotted. Divide the suspension lines into groups, each group coming from one riser. By starting from the harness and running towards the canopy remove any tangles or twists in the lines. Partially inflating the canopy in the wind will help to sort out the lines.
3. It is particularly important that the brakes are untwisted and are clear and free to move. Check the knot which attaches the brake handles to the brake lines. Avoid having too many knots, as they could become stuck in the brake pulleys. Both brakes should be the same length and this can be checked by asking an assistant to hold the upper end of the brake lines together while you hold the brake handles. The brake lines should be slack with the wing inflated when the brakes are not applied. After checking the brake lines lay them on the ground.
4. Always check the riser maillons and the attachment points to the paramotor frame or trike. The use of a safety strap is strongly recommended. Before getting into the harness you should be wearing a suitable helmet. Put on the harness ensuring all the buckles are secure and properly adjusted for comfort.

5. Ensure the trimmers set to position 1, as pictured.

Your paraglider is now ready for flight.

Take care to protect yourself and other people from the propeller. Always start your motor up at a safe distance away from other people. The blades can pick up and fire out debris which could injure people several metres away. Remember there are inherent risks with petrol, oil and volatile or flammable materials.



# Flight Characteristics

This manual is not intended as an instruction book on how to fly your paraglider. You should be a qualified pilot or under suitable supervision, but the following comments will help you to get the best from your wing.

## Weight range

Each size is certified for a certain weight range. The weight refers to the 'overall take-off weight'. This means the weight of the pilot, the glider, the harness, the paramotor or trike and all other equipment carried with you in flight.

We recommend your paraglider is flown in the middle of the weight range.

If you fly in the lower half of the weight range the turning agility will be lower and the glider will be more damped, but it will have a slightly increased tendency to collapse in strong turbulence. If you mainly fly in weak conditions you might choose to fly towards the lower end of the weight range.

If you fly in the upper half of the weight range you will have greater agility and speed, and greater stability in turbulence, but your wing will be less damped in turns and after collapses. If you prefer a dynamic flight characteristic you should choose to fly higher in the weight range.

You should never fly a paramotor in strong turbulence or violent winds.

## Take-off

Your paraglider is easy to inflate in light or stronger winds and will quickly rise overhead to the flying position. The best inflation technique is to hold one A-riser in each hand. Take the brakes in your hands, and lay the risers over your arms. Hold the A and Baby A risers together at the maillons as shown in the picture.



We recommend launching with the trimmers set to position 1, as pictured on page 8.

Never try to launch if the wing is not perfectly inflated above your head and you do not have full control of pitch and roll.

## Initial Climb

Once in the air you should continue to fly into wind while gaining altitude. Leave the trimmers in the take-off position to get the best climb rate.

Do not attempt to increase your climb rate by braking, as using the brakes combined with the engine's thrust can increase the

angle of attack to the point where the wing can stall. In addition, this high angle of attack can result in a big dive if the motor suddenly dies, which could be dangerous if you are near the ground.

Do not initiate a turn until you have enough height and speed to do so.

## Trimmers and Speed bar

The trimmers allow easy fast cruising. After take-off, once you have gained a safe altitude, you can open up the trimmers progressively to increase your speed. The speed bar can be used at the same time for a significant increase in speed.

### Important note on using the trimmers

Trimmers should be pulled backwards or down when applied. The trimmer should not be pulled to the side or in towards the pilot, as this will cause the webbing to rub on the trimmer buckle causing premature wear on the trimmer. Take care to avoid this issue especially when flying with a trike.

The trimmers and speed bar both increase the speed of the paraglider and activate the reflex system. Even with the trimmers open and the speed bar fully applied, the brakes can be used without causing a front collapse. However, whenever the trimmers are open to more than about half, or half-speedbar is applied, it is better to use tip steering instead of brakes as it retains the reflex profile and allows you to turn without losing speed.

In turbulent air it can be useful to have the trimmers open to better absorb turbulence, but it is safer not to apply full speedbar at the same time, to avoid a frontal collapse. To reduce fuel consumption or to fly in thermals, the trimmers should be closed, pulled down to their maximum.

Maximum speed is with the trimmers released and the speedbar pushed out fully so that the pulleys touch. Do not push the speedbar beyond this limit in an attempt to attain a higher speed. To fly at full-bar the speed stirrup should be applied gradually until the two pulleys on each A-riser touch. Do not go beyond this point by using excessive force to attempt to make the glider go faster as this may result in the glider collapsing.

The Blizzard has roller-cam trimmers, which are smooth to operate and reduce wear on the webbing. Nonetheless, it is important to regularly check the wear on the trimmers and that the system is functioning cleanly with no sticking points. If they are showing signs of wear, the trimmers should be replaced. This can be done by the pilot.

## Turning

Your first turns should be gradual and progressive. The initial action to change direction should be the movement of your weight in the harness towards the side of the intended turn. Then gently relax the pressure on the outer brake, and gently apply pressure to the inner brake until you attain the desired bank angle.

To adjust your speed and turning-circle size, coordinate your weightshift with pressure on the outer brake. How your glider reacts to weightshift will depend on the type of paramotor setup you use, for instance with a trike no weightshift at all is possible.

Remember that to violently apply high force on the brakes is dangerous and should be avoided. Never initiate a turn if you are flying slowly, as you risk the glider entering a spin.

## Tip Steering System (TST)

The tip steering system can be used to turn without slowing the glider. This is the usual way to turn when you have the trimmers released. It can also be used in conjunction with the brakes to adjust the characteristics of the turn

## Unintended Oscillations

In certain circumstances, a pilot can induce unintended oscillations. This can be due to a combination of the engine/propeller and pilot's weightshift and / or action on the brakes. To stop unintended oscillations you should reduce the power, ensure that you are seated centrally and not accidentally applying weightshift, and that you are not acting on the brakes. Once the oscillations have stabilised you can gently reapply power.

## Landing

Set the trimmers to the closed position and set up your approach downwind of the landing field. When your height above the field is around 40m and you are in a good position to land in your intended landing spot, switch the engine off\* and make your final approach, keeping your hands up to keep plenty of energy in the wing until you are about a metre above the ground. Flare, braking slowly and gradually to slow down the wing until you are close to the stall point and able to land on your feet.

\*If you land with the engine running there is a considerable risk of rotational propeller damage (eg lines passing through the propeller, or even injury).

## Active Piloting

Active piloting means flying in empathy with your paraglider. This means guiding the glider through the air and controlling the movements of the wing, especially in thermals and turbulence. If the air is smooth the wing does not need much input from the pilot, but in turbulent air a continual action of the pilot on the brakes and in the harness is necessary. These reactions are instinctive in experienced pilots. It is essential to maintain contact with the paraglider by a light pressure on the brakes. This allows you to feel the decreases in the wing's internal pressure which often precede collapses. Remember, you should not fly a paramotor in windy or turbulent conditions.

## Rapid Descent Techniques

### Big Ears

The 'baby A-riser' allows the wing tips of the paraglider to be folded in simply and easily to increase its sink rate. Applying big ears allows you to descend quickly without substantially reducing the forward speed of the canopy (in contrast with the B-line stall, which substantially reduces the canopy's forward speed). To engage big ears, lean forward in the harness and grasp the baby A-risers, one in each hand, at the maillons, keeping hold of both brake handles if possible. Pull the risers out and down at least 30cm to collapse the tips of the glider. It is very important that the other A-lines are not affected when you do this, as this could cause the leading edge to collapse. Steering with big ears in is possible by weightshifting. If the big ears do not come out quickly on their own, a gentle pump on the brakes will speed things up.

Before using big ears in earnest, it is essential to practise beforehand with plenty of ground clearance in case a leading edge collapse occurs. Always keep hold of both brakes in order to retain control.

### B-Line Stall

This fast descent method is a useful emergency procedure. Keeping hold of both brake handles, grasp the top of the B-risers, one in each hand, and pull them down by around 10-15cm. This will stall the canopy and forward speed will drop to zero. Make sure you have plenty of ground clearance because the descent rate can be over 10 m/sec.

To increase the descent rate, pull harder on the B-risers. When you release the B-risers the canopy will automatically start flying again, normally within two seconds. Sometimes the canopy will turn gently when it exits from the B-line stall. It is usually better to release the B-risers fairly quickly rather than slowly, as doing so slowly may result in the canopy entering deep stall. Always release the risers symmetrically, as an asymmetric release from a B-line stall may cause the glider to enter a spin.

This manoeuvre is useful if you need to lose a lot of height quickly, perhaps when escaping from a thunderstorm. It should not be performed with less than 100m of ground clearance (see also Recovery Techniques).

## Spiral Dive

A normal turn can be converted into a strong spiral dive by continuing to apply one brake. The bank angle and speed of the turn will increase as the downward spiral is continued. Be careful to enter the spiral gradually as too quick a brake application can cause a spin or an over-the-nose spiral.

BGD gliders are designed and tested to recover automatically from normal spirals with a descent rate inferior to 16 m/s, without pilot input. If the pilot increases the descent rate of the spiral to over 16 m/s or initiates what is known as an over-the-nose spiral, the glider may require pilot input to recover. In this case all the pilot needs to do is to apply some outside brake and steer the glider out of the turn.

The over-the-nose spiral is a spiral dive where the glider points almost directly at the ground. It will enter this if you make a sudden brake application during the spiral entry so that the glider yaws around. The nose of the glider points at the ground, and it picks up speed very quickly. This technique is very similar to SAT entry technique, and like the SAT it is an aerobatic manoeuvre which is outside the normal safe flight envelope. Please do not practise these manoeuvres without proper supervision, as they can be dangerous.

Care should be taken when exiting from any spiral dive. To pull out of a steep spiral dive, release the applied brake gradually or apply opposite brake gradually. A sharp release of the brake can cause the glider to surge and dive as

the wing converts speed to lift. Always be ready to damp out any potential dive with the brakes. Also be ready to encounter turbulence when you exit from a spiral because you may fly through your own wake turbulence, which can cause a collapse.

CAUTION: Spiral dives can cause loss of orientation (black out) and some time is needed to exit this manoeuvre. This manoeuvre must be exited in time and with sufficient height!

# Recovery Techniques

All of the following manoeuvres can be dangerous, and should only be practised in a secure environment, such as an SIV course.

## Stalls

Stalls are caused by flying too slowly. Airspeed is lost as brake pressure increases and as the canopy approaches the stall point it will start to descend vertically and finally begin to collapse. Should this occur it is important that the pilot releases the brakes at the correct moment. The brakes should never be released when the wing has fallen behind the pilot; the brakes should be released fairly slowly, to prevent the forward dive of the canopy from being too strong. A pre-release of the brake and the reconstruction of the full span is recommended to avoid the tips getting cravatted during the recovery.

### Deep Stall (or Parachutal Stall)

Your paraglider has been designed so that it will not easily remain in a deep stall. However, if it is incorrectly rigged or its flying characteristics have been adversely affected by some other cause, it is possible that it could enter this situation. In the interests of safety all pilots should be aware of this problem, and know how to recover from it. The most common way of ending up in deep stall is from flying too slowly, from a B-line stall or even from big ears. When in deep stall the pilot will notice the following:

1. Very low airspeed.
2. Almost-vertical descent (like a round canopy), typically around 5m/s.
3. The paraglider appears quite well inflated but does not have full internal pressure. It looks and feels a bit limp.

Recovery from deep stall is quite simple: The normal method is to simply initiate a mild turn. As the canopy starts to turn it will automatically revert to normal flight, but it is important not to turn too fast as this could induce a spin.

The second method is to pull gently on the A-risers. This helps the airflow to re-attach to the leading edge, but be careful not to pull down too hard as this will induce a front collapse.

If the previous methods do not work then a full stall will solve the problem. To do this apply both brakes again fairly quickly, as if to do a strong stall, then immediately release both brakes and damp out the forward surge in the normal way. The canopy will swing behind you then automatically reinflate and surge forward in front of you before returning to normal flight. It is the surge forward that exits the canopy from deep stall.

## Spins

A spin can occur if the pilot tries to turn too fast. In a spin the pilot, lines and canopy basically stay vertical and rotate around a vertical axis. Your glider will resist spinning, but if a spin is inadvertently induced you should release the brake pressure and be ready to damp out any dive as the glider exits the spin. Failure to damp the dive on exiting the spin may result in an asymmetric deflation.

## Symmetric Front Collapse

It is possible that turbulence can cause the front of the wing to symmetrically collapse, although active piloting can largely prevent this from occurring accidentally. A pilot can reproduce the effect by taking hold of both the A-risers and pulling down sharply on them. The glider will automatically recover on its own from this situation in around three seconds. During this recovery period it is advisable not to apply the brakes as this could stall the wing.

## Asymmetric Front Collapse

Your paraglider is very resistant to deflations, but if the canopy does collapse on one side due to turbulence, you should first of all control the direction of flight by countering on the opposite brake. Most normal collapses will immediately reinflate on their own and you will hardly have time to react before the wing reinflates automatically. The act of controlling the direction will tend to reinflate the wing. However, with more persistent collapses it may be necessary to pump the brake on the

collapsed wing using a long, strong, smooth and firm action. Normally one or two pumps of around 80cm will be sufficient. Each pump should be applied in about one second and smoothly released. In severe cases it can be more effective to pump both brakes together to get the canopy to reinflate. Be careful not to stall the wing completely if this technique is used.

## Releasing a trapped tip (cravat)

Following a severe deflation it is possible for a wingtip to become trapped in the glider's lines (cravat). If this occurs then first of all use the standard method of recovery from a tip deflation as described in Asymmetric Front Collapse above. If the canopy still does not recover then pull the rear risers to help the canopy to reinflate. Pulling the stabilo line is also a good way to remove cravats, but remember to control your flight direction as your number-one priority. If you are very low then it is much more important to steer the canopy into a safe landing place or even throw your reserve.

NOTE: Test pilots have tested your paraglider well beyond the normal flight envelope, but these tests are carried out in a very precise manner by trained test pilots with a back-up parachute, and over water. Stalls and spins on any paragliders are dangerous manoeuvres and are not recommended.

## Loss of brakes

In the unlikely event of a brake line snapping in flight or a handle becoming detached, the glider can be flown by gently pulling the rear risers for directional control.

# Maintenance

## Storage

Always store the canopy in a dry, warm place. Ideally this should be in the temperature range of 5°C to 25°C. Never let your canopy freeze, particularly if it is damp.

If you have to pack your canopy away wet, do not leave it for more than a few hours in that condition. As soon as possible dry it out, but do not use direct heat sources as it is flammable!

Your paraglider is made from high quality nylon which is treated against weakening from ultraviolet radiation. However, UV exposure will still weaken the fabric and prolonged exposure to harsh sunlight can severely compromise the safety of your canopy. Therefore once you have finished flying, put your wing away. Do not leave it laying in strong sunshine unnecessarily.

Do not treat your canopy with chemical cleaners or solvents. If you must wash the fabric, use warm water and a little soap. If your canopy gets wet in sea water, wash it with warm water and carefully dry it.

## Small Repairs

Small tears in the top or bottom surface (not normally the ribs) of a canopy can be repaired with a patch of self-adhesive ripstop nylon. Tears of up to 100mm can be repaired in this way providing they are not in a high-stress area.

## Lines

### Releasing line loops



*Left: loops on maillons; Right: loops released*

All BGD gliders are rigged from new with loops on the maillons of the C lines (and D lines if any) plus the stabi line. The loops are there so that they can be released to compensate for any shrinkage of the back lines as the glider gets older.

We recommend releasing the loops after 100 hours or one year, whichever comes first, or earlier if the pilot feels the glider does not come up as easily on launch.

Line lengths are checked as part of a glider service. When the first service is carried out, normally at two years, the loops should already have been released, and this should be verified and fine-tuned by the check centre.

### Replacing lines

If you need to replace lines on your glider, we recommended that a professional should mount the new lines. The airworthiness of your glider, and your safety, depends on it being done correctly.

You can identify the line(s) you need to replace from the line layout diagram for your wing. Download the latest version here: <https://flybgd.com/lines>

Replacement lines can be ordered from the Accessories section of the BGD website. Check that the lines you have received correspond with the line layout diagram, and that this matches the line layout of your wing.

The quickest way to remove the old lines is to cut them off. (Don't cut the old lines off if you have not received the new ones or you may end up not being able to fly!). Sometimes only a part line set is needed (eg excluding top lines or brakes) so take care not to cut any lines that need to be retained.

It is important that lines are mounted the correct way up (see diagram on the following page). Microlines have internal reinforcing in one end, marked by yellow thread. This must be put on the line-junction end. The non-reinforced end is marked with white thread and should be attached to the glider tab or the maillon. Sheathed lines have no additional reinforcing and can be mounted either way up.

### **Tab Alignment**

Lines should be symmetrically placed on the tab, except where the tab is inclined. The A tabs are inclined backwards on all BGD gliders, to align with the direction of pull of the line. So when assembling the lines, the A tabs should be angled back, and the B, C and D tabs should be perpendicular to the undersurface.

### **Line Loops**

New lines should be mounted on the maillons without loops on the A and B risers. The Stabi line and the C risers should have a single loop on the maillon.

### **Maillon Inserts**

The maillons have black plastic inserts to stop them coming undone accidentally and the lines falling off. Always ensure these are correctly installed after rigging the glider. If they are lost then use a locktight to secure the maillon closed. New inserts can be ordered at [www.flybgd.com](http://www.flybgd.com).

### **Check before flying**

After rigging, always do a full dimensional line check of the wing, and also inflate the wing to check everything is correct before flying.

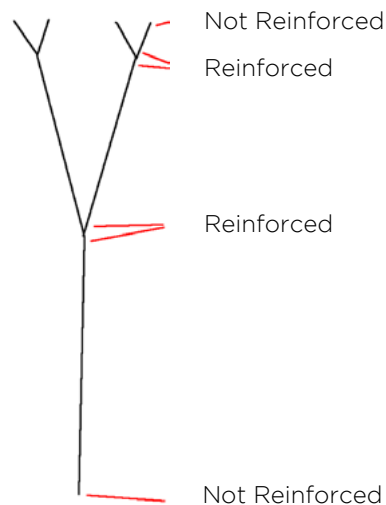
## Correct alignment of microlines



Sheathed lines have no additional reinforcement and can be mounted either way up

Yellow thread marks the reinforced end of a microline

White thread marks the non-reinforced end of a microline



### Lark's Foot junctions

Lines are connected to other lines or to tabs with lark's foot junctions. Make sure these are joined correctly with an interlocked junction and not a looped junction.



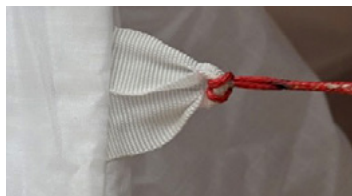
Interlocked junction – correct



Looped junction – incorrect



Interlocked junction – correct



Looped junction – incorrect

## Servicing / Inspection

It is important to have your glider regularly serviced. Your wing should have a thorough check / inspection every 24 months or every 150 flight hours, whichever occurs first. This check must be made by the manufacturer, importer, distributor or other authorised persons.

Please print out the service pages from this manual, fill in the number of flights and hours flown in the Service Record, and send together with your glider when it goes for inspection or servicing. The manufacturer will only accept responsibility for paraglider lines and repairs which we have produced and fitted or repaired ourselves.

If you are concerned about any aspect of the integrity of your paraglider please contact your nearest BGD dealer or talk to BGD directly.

## Environmental protection and recycling

Our sport takes place in the natural environment, and we should do everything to preserve our environment. A glider is basically made of nylon, synthetic fibres and metal. At the end of your paraglider's life span, please remove all metal parts and put the different materials in an appropriate waste/recycling plant.

# Technical data

## Materials

|                    |                                     |
|--------------------|-------------------------------------|
| Sail               |                                     |
| Top surface        | Porcher Skytex 38 g/m <sup>2</sup>  |
| Bottom surface     | Porcher Eazyfly 38 g/m <sup>2</sup> |
| Internal structure | Porcher Skytex 38 hard white        |
| Nose reinforcing   | Ratioparts                          |

## Risers

|          |                        |
|----------|------------------------|
| Webbing  | Rivori                 |
| Maillons | Rapide MRD103.5        |
| Pulleys  | Allen A2020pti3 (20mm) |

## Lines

|                |                                            |
|----------------|--------------------------------------------|
| Upper          | Liros PPSL & DSL                           |
| Middle         | Liros PPSL & DSL                           |
| Lower          | Liros PPSL & DSL                           |
| Brakes         | Liros DSL 70 (upper / middle), 110 (Lower) |
| Brake Line KL1 | Liros DSL350                               |

Spare parts can be obtained directly from BGD or through our network of registered BGD repair shops.

For a full list check [www.flybgd.com](http://www.flybgd.com)

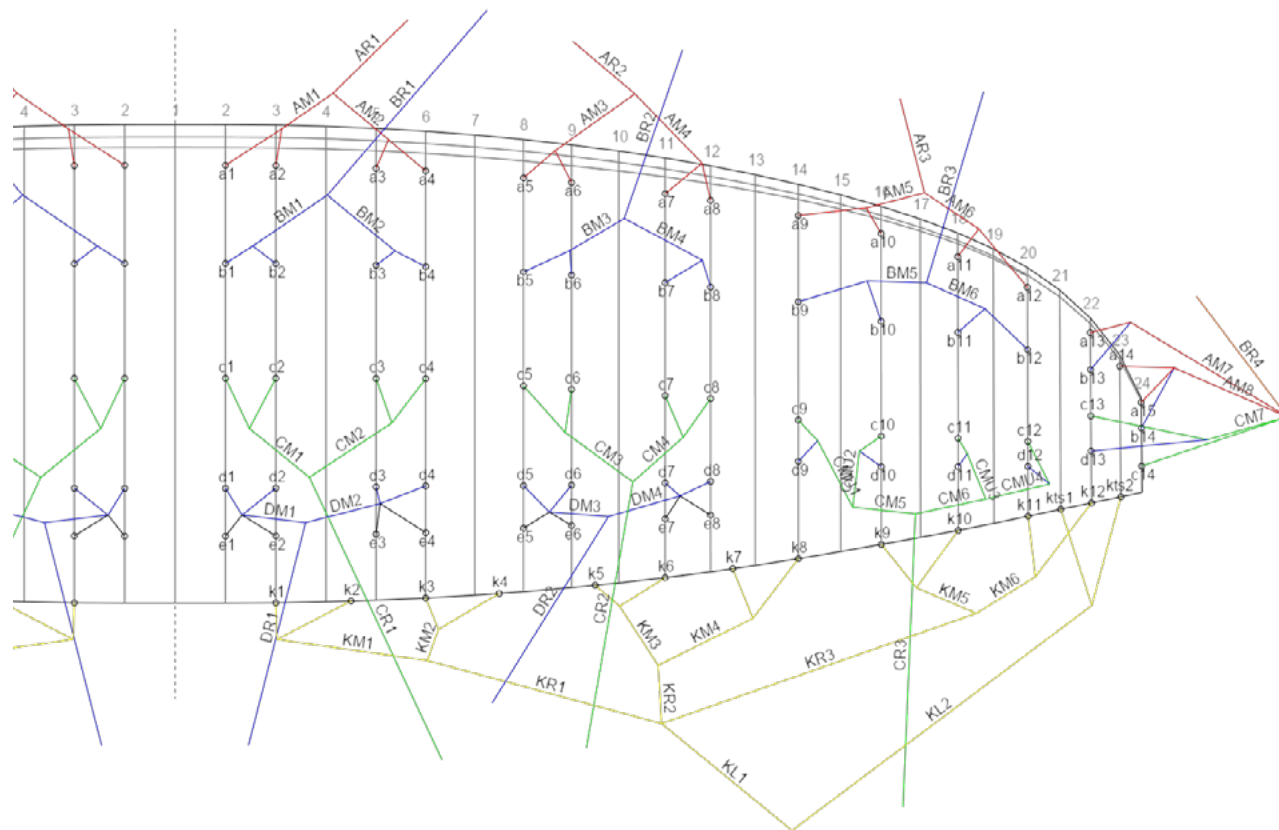
## Specifications

|                                  | 20      | 23      | 26      | 29      |
|----------------------------------|---------|---------|---------|---------|
| Projected area (m <sup>2</sup> ) | 17.2    | 19.7    | 22.3    | 24.9    |
| Flat area (m <sup>2</sup> )      | 20      | 23      | 26      | 29      |
| Glider weight (kg)               | 4.8     | 5.2     | 5.7     | 6.2     |
| Number of main lines             | 3/4/3/2 | 3/4/3/2 | 3/4/3/2 | 3/4/3/2 |
| Cells                            | 46      | 46      | 46      | 46      |
| Flat aspect ratio                | 5.0     | 5.0     | 5.0     | 5.0     |
| Projected aspect ratio           | 3.6     | 3.6     | 3.6     | 3.6     |
| Central chord (m)                | 2.5     | 2.7     | 2.8     | 3.0     |
| Flat span (m)                    | 10.0    | 10.7    | 11.4    | 12.0    |
| Projected span (m)               | 7.7     | 8.2     | 9.0     | 9.3     |
| Weight range PPG (kg)            | 60-120  | 70-130  | 85-160  | 100-200 |
| Minimum speed (km/h)             | 25      | 25      | 25      | 25      |
| Trim speed (km/h)                | 37-47   | 37-47   | 37-47   | 37-47   |
| Top speed (km/h)                 | 54      | 54      | 54      | 54      |
| DGAC registration                | Yes     | Yes     | Yes     | Yes     |

## Overview of glider parts



## Line Plan



## Line length checks

All measures are in mm, with 50N line tension, this tension being slowly and gradually applied before taking the measurement.

The lengths are measured from the lower surface of the canopy and include the risers and maillons.

Brakes and TST are measured from the knot up to the webbing (reefing not included).

The latest line lengths and diagrams can be downloaded from <https://flybgd.com/lines>.

## Bridle check, size 20

|    | A    | B    | C    | D    | E    | K    | TST  |
|----|------|------|------|------|------|------|------|
| 1  | 6051 | 5958 | 6016 | 6108 | 6199 | 6279 | 5419 |
| 2  | 6018 | 5922 | 5964 | 6051 | 6148 | 6139 | 5190 |
| 3  | 5990 | 5895 | 5936 | 6029 | 6123 | 6041 |      |
| 4  | 6001 | 5908 | 5965 | 6067 | 6155 | 6060 |      |
| 5  | 5986 | 5894 | 5954 | 6056 | 6136 | 5928 |      |
| 6  | 5964 | 5870 | 5920 | 6014 | 6092 | 5818 |      |
| 7  | 5935 | 5857 | 5921 | 6016 | 6084 | 5794 |      |
| 8  | 5949 | 5878 | 5961 | 6054 | 6110 | 5876 |      |
| 9  | 5914 | 5854 | 5941 | 5986 |      | 5810 |      |
| 10 | 5866 | 5814 | 5904 | 5946 |      | 5753 |      |
| 11 | 5806 | 5773 | 5871 | 5908 |      | 5723 |      |
| 12 | 5722 | 5713 | 5821 | 5860 |      | 5772 |      |
| 13 | 5538 | 5527 | 5577 | 5648 |      |      |      |
| 14 | 5423 | 5426 | 5499 |      |      |      |      |
| 15 | 5385 |      |      |      |      |      |      |

## Individual line lengths, size 20

| A   |      | B   |      | C    |      | D   |      | K    |      |
|-----|------|-----|------|------|------|-----|------|------|------|
| a1  | 426  | b1  | 489  | c1   | 354  | d1  | 614  | k1   | 495  |
| a2  | 393  | b2  | 453  | c2   | 302  | d2  | 557  | k2   | 355  |
| a3  | 441  | b3  | 464  | c3   | 314  | d3  | 563  | k3   | 425  |
| a4  | 452  | b4  | 477  | c4   | 343  | d4  | 601  | k4   | 444  |
| a5  | 440  | b5  | 462  | c5   | 319  | d5  | 550  | k5   | 451  |
| a6  | 418  | b6  | 438  | c6   | 285  | d6  | 508  | k6   | 341  |
| a7  | 366  | b7  | 415  | c7   | 263  | d7  | 436  | k7   | 336  |
| a8  | 380  | b8  | 436  | c8   | 303  | d8  | 474  | k8   | 418  |
| a9  | 1536 | b9  | 1358 | c9   | 542  | d9  | 587  | k9   | 442  |
| a10 | 1488 | b10 | 1318 | c10  | 522  | d10 | 564  | kts1 | 598  |
| a11 | 1135 | b11 | 902  | c11  | 441  | d11 | 478  | kts2 | 369  |
| a12 | 1051 | b12 | 842  | c12  | 255  | d12 | 294  | k10  | 385  |
| a13 | 424  | b13 | 411  | c13  | 343  | d13 | 414  | k11  | 306  |
| a14 | 543  | b14 | 544  | c14  | 1196 | DM1 | 1049 | k12  | 355  |
| a15 | 505  | BM1 | 2081 | CM1  | 1573 | DM2 | 1021 | KM1  | 880  |
| AM1 | 2325 | BM2 | 2043 | CM2  | 1533 | DM3 | 999  | KM2  | 712  |
| AM2 | 2249 | BM3 | 1789 | CM3  | 1384 | DM4 | 1073 | KM3  | 742  |
| AM3 | 2127 | BM4 | 1799 | CM4  | 1407 | DR1 | 3924 | KM4  | 723  |
| AM4 | 2150 | BM5 | 1075 | CMU1 | 569  | DR2 | 3986 | KM5  | 577  |
| AM5 | 1313 | BM6 | 1449 | CMU2 | 552  | e1  | 705  | KM6  | 626  |
| AM6 | 1606 | BR1 | 2863 | CMU3 | 469  | e2  | 654  | KL2  | 4814 |
| AM7 | 818  | BR2 | 3116 | CMU4 | 605  | e3  | 657  | KR1  | 2855 |
| AM8 | 584  | BR3 | 2893 | CM7  | 936  | e4  | 689  | KR2  | 2686 |
| AR1 | 2777 | BR4 | 3777 | CR1  | 3570 | e5  | 630  | KR3  | 2742 |
| AR2 | 2896 |     |      | CR2  | 3731 | e6  | 586  | KL1  | 2057 |
| AR3 | 2540 |     |      | CM5  | 1119 | e7  | 504  | KL1  | 2057 |
|     |      |     |      | CM6  | 1250 | e8  | 530  |      |      |
|     |      |     |      | CR3  | 3195 |     |      |      |      |

**Bridle check, size 23**

|    | A    | B    | C    | D    | E    | K    | TST  |
|----|------|------|------|------|------|------|------|
| 1  | 6487 | 6385 | 6438 | 6547 | 6644 | 6749 | 5804 |
| 2  | 6452 | 6346 | 6384 | 6487 | 6591 | 6600 | 5564 |
| 3  | 6425 | 6319 | 6356 | 6464 | 6567 | 6496 |      |
| 4  | 6438 | 6334 | 6388 | 6506 | 6600 | 6517 |      |
| 5  | 6422 | 6320 | 6376 | 6494 | 6581 | 6376 |      |
| 6  | 6399 | 6295 | 6341 | 6450 | 6534 | 6259 |      |
| 7  | 6378 | 6287 | 6342 | 6452 | 6525 | 6234 |      |
| 8  | 6395 | 6310 | 6386 | 6493 | 6552 | 6324 |      |
| 9  | 6353 | 6288 | 6375 | 6423 |      | 6253 |      |
| 10 | 6301 | 6245 | 6336 | 6381 |      | 6193 |      |
| 11 | 6244 | 6207 | 6300 | 6340 |      | 6163 |      |
| 12 | 6154 | 6142 | 6246 | 6287 |      | 6216 |      |
| 13 | 5967 | 5944 | 5986 | 6062 |      |      |      |
| 14 | 5845 | 5836 | 5902 |      |      |      |      |
| 15 | 5792 |      |      |      |      |      |      |

## Individual line lengths, size 23

| A   |      | B   |      | C    |      | D   |      | K    |      |
|-----|------|-----|------|------|------|-----|------|------|------|
| a1  | 458  | b1  | 526  | c1   | 380  | d1  | 659  | k1   | 531  |
| a2  | 423  | b2  | 487  | c2   | 326  | d2  | 599  | k2   | 382  |
| a3  | 473  | b3  | 498  | c3   | 337  | d3  | 604  | k3   | 456  |
| a4  | 486  | b4  | 513  | c4   | 369  | d4  | 646  | k4   | 477  |
| a5  | 473  | b5  | 496  | c5   | 342  | d5  | 590  | k5   | 484  |
| a6  | 450  | b6  | 471  | c6   | 307  | d6  | 546  | k6   | 367  |
| a7  | 392  | b7  | 445  | c7   | 282  | d7  | 469  | k7   | 360  |
| a8  | 409  | b8  | 468  | c8   | 326  | d8  | 510  | k8   | 450  |
| a9  | 1648 | b9  | 1458 | c9   | 582  | d9  | 630  | k9   | 474  |
| a10 | 1596 | b10 | 1415 | c10  | 561  | d10 | 606  | kts1 | 653  |
| a11 | 1218 | b11 | 969  | c11  | 474  | d11 | 514  | kts2 | 413  |
| a12 | 1128 | b12 | 904  | c12  | 275  | d12 | 316  | k10  | 414  |
| a13 | 467  | b13 | 442  | c13  | 369  | d13 | 445  | k11  | 329  |
| a14 | 595  | b14 | 584  | c14  | 1283 | DM1 | 1124 | k12  | 382  |
| a15 | 542  | BM1 | 2232 | CM1  | 1687 | DM2 | 1096 | KM1  | 943  |
| AM1 | 2488 | BM2 | 2194 | CM2  | 1648 | DM3 | 1071 | KM2  | 765  |
| AM2 | 2411 | BM3 | 1917 | CM3  | 1485 | DM4 | 1150 | KM3  | 794  |
| AM3 | 2278 | BM4 | 1935 | CM4  | 1511 | DR1 | 4243 | KM4  | 776  |
| AM4 | 2315 | BM5 | 1158 | CMU1 | 610  | DR2 | 4312 | KM5  | 617  |
| AM5 | 1417 | BM6 | 1565 | CMU2 | 592  | e1  | 756  | KM6  | 672  |
| AM6 | 1738 | BR1 | 3102 | CMU3 | 503  | e2  | 703  | KL2  | 5144 |
| AM7 | 888  | BR2 | 3380 | CMU4 | 648  | e3  | 707  | KR1  | 3058 |
| AM8 | 638  | BR3 | 3144 | CM7  | 1003 | e4  | 740  | KR2  | 2881 |
| AR1 | 3018 | BR4 | 4093 | CR1  | 3852 | e5  | 677  | KR3  | 2945 |
| AR2 | 3148 | BR3 | 3144 | CR2  | 4029 | e6  | 630  | KL1  | 2225 |
| AR3 | 2763 | BR4 | 4093 | CM5  | 1201 | e7  | 542  |      |      |
|     |      |     |      | CM6  | 1341 | e8  | 569  |      |      |
|     |      |     |      | CR3  | 3466 |     |      |      |      |

**Bridle check, size 26**

|    | A    | B    | C    | D    | E    | K    | TST  |
|----|------|------|------|------|------|------|------|
| 1  | 6904 | 6785 | 6845 | 6953 | 7056 | 7167 | 6176 |
| 2  | 6868 | 6746 | 6788 | 6890 | 7001 | 7010 | 5914 |
| 3  | 6839 | 6719 | 6762 | 6868 | 6977 | 6900 |      |
| 4  | 6855 | 6735 | 6796 | 6914 | 7013 | 6923 |      |
| 5  | 6836 | 6722 | 6785 | 6902 | 6995 | 6775 |      |
| 6  | 6812 | 6696 | 6747 | 6855 | 6944 | 6651 |      |
| 7  | 6793 | 6689 | 6752 | 6859 | 6937 | 6625 |      |
| 8  | 6810 | 6714 | 6798 | 6903 | 6966 | 6720 |      |
| 9  | 6766 | 6689 | 6778 | 6829 |      | 6647 |      |
| 10 | 6711 | 6644 | 6736 | 6784 |      | 6584 |      |
| 11 | 6649 | 6604 | 6697 | 6739 |      | 6553 |      |
| 12 | 6553 | 6535 | 6640 | 6684 |      | 6611 |      |
| 13 | 6349 | 6323 | 6366 | 6447 |      |      |      |
| 14 | 6218 | 6207 | 6277 |      |      |      |      |
| 15 | 6161 |      |      |      |      |      |      |

## Individual line lengths, size 26

| A   |      | B   |      | C    |      | D   |      | K    |      |
|-----|------|-----|------|------|------|-----|------|------|------|
| a1  | 487  | b1  | 559  | c1   | 405  | d1  | 701  | k1   | 565  |
| a2  | 451  | b2  | 520  | c2   | 348  | d2  | 638  | k2   | 408  |
| a3  | 503  | b3  | 530  | c3   | 359  | d3  | 643  | k3   | 485  |
| a4  | 519  | b4  | 546  | c4   | 393  | d4  | 689  | k4   | 508  |
| a5  | 503  | b5  | 528  | c5   | 365  | d5  | 628  | k5   | 516  |
| a6  | 479  | b6  | 502  | c6   | 327  | d6  | 581  | k6   | 392  |
| a7  | 418  | b7  | 474  | c7   | 301  | d7  | 499  | k7   | 384  |
| a8  | 435  | b8  | 499  | c8   | 347  | d8  | 543  | k8   | 479  |
| a9  | 1754 | b9  | 1550 | c9   | 620  | d9  | 671  | k9   | 505  |
| a10 | 1699 | b10 | 1505 | c10  | 597  | d10 | 645  | kts1 | 684  |
| a11 | 1296 | b11 | 1031 | c11  | 505  | d11 | 547  | kts2 | 422  |
| a12 | 1200 | b12 | 962  | c12  | 293  | d12 | 337  | k10  | 442  |
| a13 | 498  | b13 | 470  | c13  | 393  | d13 | 474  | k11  | 350  |
| a14 | 634  | b14 | 621  | c14  | 1364 | DM1 | 1193 | k12  | 408  |
| a15 | 577  | BM1 | 2370 | CM1  | 1789 | DM2 | 1166 | KM1  | 1001 |
| AM1 | 2648 | BM2 | 2333 | CM2  | 1752 | DM3 | 1137 | KM2  | 814  |
| AM2 | 2567 | BM3 | 2037 | CM3  | 1575 | DM4 | 1223 | KM3  | 843  |
| AM3 | 2423 | BM4 | 2058 | CM4  | 1606 | DR1 | 4538 | KM4  | 825  |
| AM4 | 2465 | BM5 | 1231 | CMU1 | 648  | DR2 | 4616 | KM5  | 655  |
| AM5 | 1509 | BM6 | 1664 | CMU2 | 629  | DR2 | 804  | KM6  | 716  |
| AM6 | 1850 | BR1 | 3331 | CMU3 | 534  | e1  | 749  | KL2  | 5485 |
| AM7 | 945  | BR2 | 3630 | CMU4 | 689  | e2  | 752  | KR1  | 3249 |
| AM8 | 678  | BR3 | 3380 | CM7  | 1065 | e3  | 788  | KR2  | 3064 |
| AR1 | 3246 | BR4 | 4387 | CR1  | 4132 | e4  | 721  | KR3  | 3135 |
| AR2 | 3387 | BR3 | 3380 | CR2  | 4325 | e5  | 670  | KL1  | 2360 |
| AR3 | 2978 | BR4 | 4387 | CM5  | 1276 | e6  | 577  | KL1  | 2360 |
|     |      |     |      | CM6  | 1424 | e7  | 606  |      |      |
|     |      |     |      | CR3  | 3718 | e8  | 577  |      |      |

## Bridle check, size 29

|    | A    | B    | C    | D    | E    | K    | TST  |
|----|------|------|------|------|------|------|------|
| 1  | 7275 | 7157 | 7227 | 7343 | 7453 | 7693 | 6531 |
| 2  | 7237 | 7117 | 7168 | 7278 | 7395 | 7527 | 6260 |
| 3  | 7209 | 7090 | 7140 | 7256 | 7371 | 7410 |      |
| 4  | 7225 | 7109 | 7178 | 7304 | 7409 | 7436 |      |
| 5  | 7211 | 7095 | 7168 | 7295 | 7393 | 7279 |      |
| 6  | 7186 | 7068 | 7129 | 7245 | 7341 | 7149 |      |
| 7  | 7157 | 7056 | 7134 | 7249 | 7332 | 7122 |      |
| 8  | 7175 | 7083 | 7184 | 7297 | 7363 | 7224 |      |
| 9  | 7134 | 7058 | 7162 | 7216 |      | 7148 |      |
| 10 | 7076 | 7010 | 7119 | 7169 |      | 7082 |      |
| 11 | 7007 | 6965 | 7079 | 7123 |      | 7050 |      |
| 12 | 6907 | 6893 | 7018 | 7065 |      | 7111 |      |
| 13 | 6688 | 6670 | 6726 | 6812 |      |      |      |
| 14 | 6550 | 6548 | 6631 |      |      |      |      |
| 15 | 6499 |      |      |      |      |      |      |

## Individual line lengths, size 29

| A   |      | B   |      | C    |      | D   |      | K    |      |
|-----|------|-----|------|------|------|-----|------|------|------|
| a1  | 515  | b1  | 590  | c1   | 428  | d1  | 740  | k1   | 598  |
| a2  | 477  | b2  | 550  | c2   | 369  | d2  | 675  | k2   | 432  |
| a3  | 532  | b3  | 559  | c3   | 379  | d3  | 680  | k3   | 512  |
| a4  | 548  | b4  | 578  | c4   | 417  | d4  | 728  | k4   | 538  |
| a5  | 532  | b5  | 559  | c5   | 386  | d5  | 664  | k5   | 545  |
| a6  | 507  | b6  | 532  | c6   | 347  | d6  | 614  | k6   | 415  |
| a7  | 442  | b7  | 501  | c7   | 318  | d7  | 527  | k7   | 405  |
| a8  | 460  | b8  | 528  | c8   | 368  | d8  | 575  | k8   | 507  |
| a9  | 1852 | b9  | 1638 | c9   | 655  | d9  | 709  | k9   | 534  |
| a10 | 1794 | b10 | 1590 | c10  | 632  | d10 | 682  | kts1 | 736  |
| a11 | 1369 | b11 | 1089 | c11  | 534  | d11 | 578  | kts2 | 465  |
| a12 | 1269 | b12 | 1017 | c12  | 310  | d12 | 357  | k10  | 468  |
| a13 | 517  | b13 | 497  | c13  | 416  | d13 | 502  | k11  | 370  |
| a14 | 661  | b14 | 657  | c14  | 1441 | DM1 | 1259 | k12  | 431  |
| a15 | 610  | BM1 | 2499 | CM1  | 1887 | DM2 | 1232 | KM1  | 1057 |
| AM1 | 2793 | BM2 | 2463 | CM2  | 1849 | DM3 | 1201 | KM2  | 860  |
| AM2 | 2710 | BM3 | 2148 | CM3  | 1661 | DM4 | 1292 | KM3  | 889  |
| AM3 | 2556 | BM4 | 2167 | CM4  | 1695 | DR1 | 4823 | KM4  | 872  |
| AM4 | 2592 | BM5 | 1293 | CMU1 | 684  | DR2 | 4909 | KM5  | 691  |
| AM5 | 1582 | BM6 | 1748 | CMU2 | 664  | e1  | 850  | KM6  | 757  |
| AM6 | 1938 | BR1 | 3543 | CMU3 | 564  | e2  | 792  | KL2  | 5788 |
| AM7 | 988  | BR2 | 3861 | CMU4 | 727  | e3  | 795  | KR1  | 3429 |
| AM8 | 706  | BR3 | 3599 | CM7  | 1125 | e4  | 833  | KR2  | 3236 |
| AR1 | 3444 | BR4 | 4664 | CR1  | 4393 | e5  | 762  | KR3  | 3314 |
| AR2 | 3600 | BR3 | 3599 | CR2  | 4601 | e6  | 710  | KL1  | 2617 |
| AR3 | 3175 | BR4 | 4664 | CM5  | 1346 | e7  | 610  | KL1  | 2617 |
|     |      |     |      | CM6  | 1504 | e8  | 641  |      |      |
|     |      |     |      | CR3  | 3961 | e7  | 610  |      |      |

# Service Record

## Service No 1

Date  Stamp / Signature

N° flights

Type of Service

Notes

## Service No 2

Date  Stamp / Signature

N° flights

Type of Service

Notes

## Service No 3

Date  Stamp / Signature

N° flights

Type of Service

Notes

## Service No 4

Date  Stamp / Signature

N° flights

Type of Service

Notes

## Service No 5

Date  Stamp / Signature

N° flights

Type of Service

Notes

## Service No 6

Date  Stamp / Signature

N° flights

Type of Service

Notes

## Owner Record

Pilot No 1

First name

Family name

Street

City

Post code

Country

Telephone

Email:

## Owner Record

Pilot No 2

First name

Family name

Street

City

Post code

Country

Telephone

Email:

## Closing Words

Your paraglider is an advanced, stable glider that promises many hours of safe and enjoyable flying, provided you treat it with care and always respect the potential dangers of aviation.

Please always remember that flying can be dangerous and your safety depends on you. With careful treatment your wing should last for many years. It has been tested under current international airworthiness standards, and these represent the current knowledge concerning the safety of a glider. However, there are still unknown issues, for example the effective lifespan of the current generation of gliders and how much material material ageing is acceptable before airworthiness is affected. There are natural forces that can seriously threaten your safety, regardless of the quality of construction or the condition of your glider. Your security is ultimately your responsibility. We strongly recommend that you fly carefully, adapt to the weather conditions and keep your safety in mind.

Flying in a club or a school with experienced pilots is highly recommended.

We recommend that you fly with a standard harness, a reserve parachute and an approved helmet.

See you in the sky!

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