



# **Owners Manual Sir Edmund Shark**

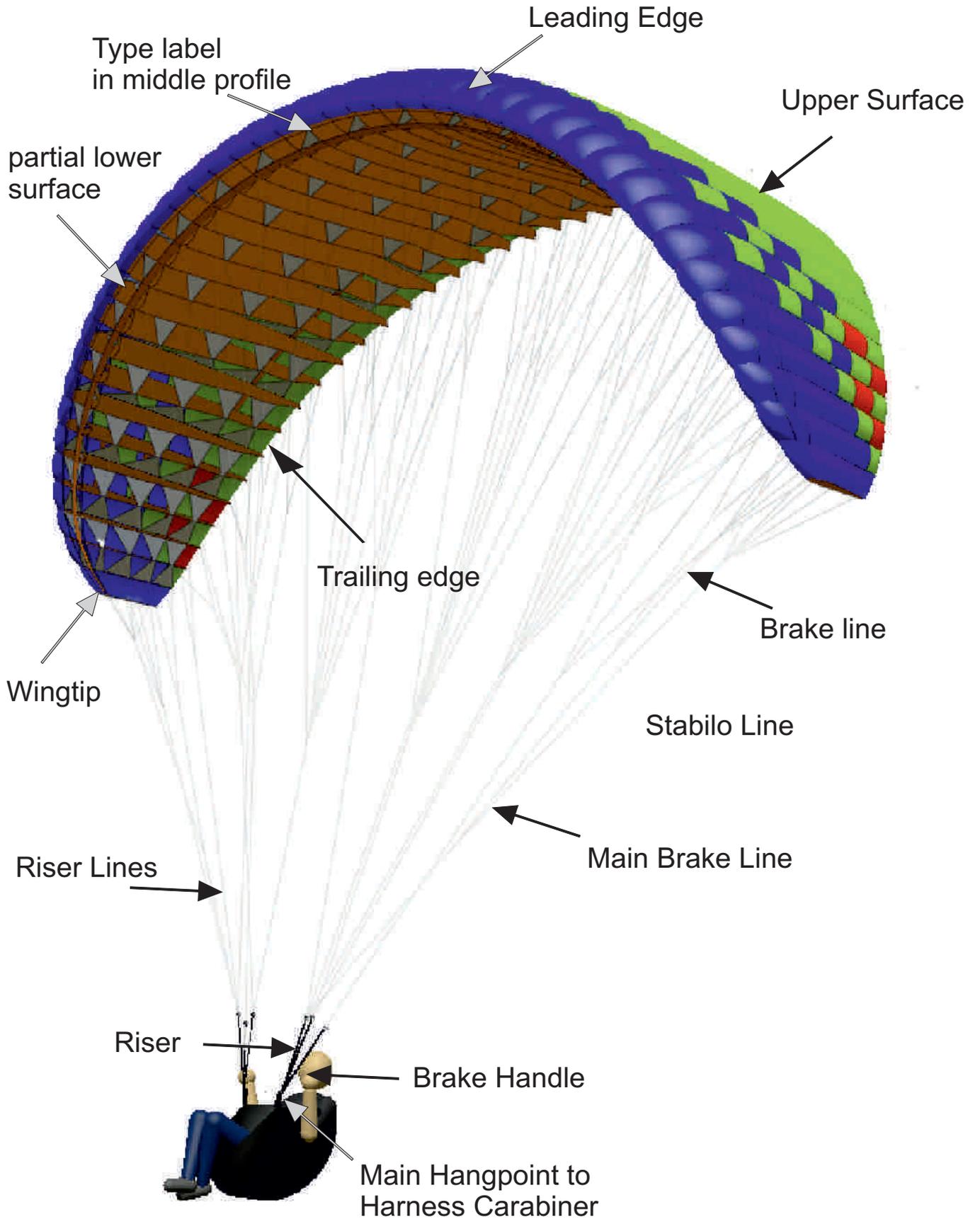
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**Technical Drawing:**





## 1. Dear Skyman Pilot

We are pleased to welcome you to the group of Skyman paraglider pilots. The Sir Edmund Shark was developed for those pilots who enjoy hike & fly, very good performance, high speed and high manoeuvrability and at the same time do not want to forego safety.

Like every paraglider, the Sir Edmund Shark has its own character and wants to be flown in its own way. In order to give you the greatest flying pleasure, we have created the following operating manual.

## 2. Important Notes:

### Reading this owner's manual is mandatory!

The paraglider must not be put into use without careful study of this manual in order to avoid operating errors. We hereby explicitly point out that no liability can be accepted for possible consequences of improper handling.

This paraglider is a "light air sports glider with an empty mass of less than 120 kg" in the paragliding sector. At the time of delivery, it complies with the provisions of the German Airworthiness Requirement (LTF) and the European Standard EN 926-2, Category B in all sizes.

New gliders must be flown in by the seller. This flight has to be confirmed with date and signature on the attached measurement protocol and on the type label of the paraglider.

Any unauthorized modification to the paraglider will invalidate the type approval!

The pilot is responsible of the airworthiness of his glider! It is also the pilot's responsibility to ensure that all legal regulations necessary for the operation of this glider are met (e.g. pilot license, insurance, etc.).

It is presupposed that the abilities of the user correspond to the requirements of the device!

The use of the paraglider is at your own risk! The liability of the manufacturer or distributor is excluded!

The following owner's manual has been compiled to the best of our knowledge and belief. However, it is quite possible that different aspects may change in the course of time due to (flight) technical innovations or changed approval tests and/or teaching methods. Therefore it is advisable in any case to obtain "updates" in suitable form about possible changed opinions and tests either from us or from the appropriate authorities.

## 3. Target group:

The Sir Edmund Shark is classified in category B according to LTF (German airworthiness requirements) and EN 926-2 at the same time. After both tests, the Sir Edmund Shark is only certified as a single-seater. It is suitable for experienced and performance-oriented pilots.

Whether the Sir Edmund Shark is finally suitable for the pilot's own flying purpose and ability should always be discussed personally with the dealer.

We recommend every pilot to do a safety training and to play as much as possible with his glider on the ground. Perfect control of the glider on the ground and in the air is the key to maximum flying fun and the best insurance for accident-free flying.



## **4. Technical Description:**

### **Canopy construction:**

The Sir Edmund Shark is made from extremely lightweight Dominico 10D nylon fabric and NCV Industries fabric. These synthetically produced fabrics have a reinforcing thread net woven into them, which prevents further tearing and increases the tensile strength at the seams. The coating makes the fabric water repellent, UV resistant and air impermeable.

The Sir Edmund Shark is a so-called "Hybrid Single Skin" and essentially consists of topsail panels and profile-giving flares. The leading edge consists of a dynamic pressure filled spar which provides stability and aerodynamic quality.

### **Suspension System:**

The lines of the Sir Edmund Shark consist of polyester-coated and uncoated aramid and polyester-coated PES / Dyneema, depending on the location. The strength of the individual lines varies from 50 to 360 daN depending on the location.

Depending on where they are installed, the lines are divided into gallery lines (at the top of the canopy), middle lines, riser lines (main lines above of the riser), stabiliser lines (at the wingtip) and brake lines (at the top of the trailing edge) and main brake lines (at the brake handle). There are no devices that are adjustable.

The lines are divided into A / B / C / D level and brake and are colour coded for easy checking.

The riser of the Sir Edmund Shark has 2 risers on each side.

The line configuration and the article reference can be seen in the individual line plan.

### **Acceleration System:**

The Sir Edmund Shark has a foot acceleration system that automatically returns to the original position after use. The risers does not have a lockable trimmer.

The acceleration system shortens the A risers and reduces the angle of attack of the canopy. In normal flight all risers have the same length (52,5 cm with link). The A-risers are shortened by up to 11 cm when the acceleration system is operated. The B-risers are not shortened.

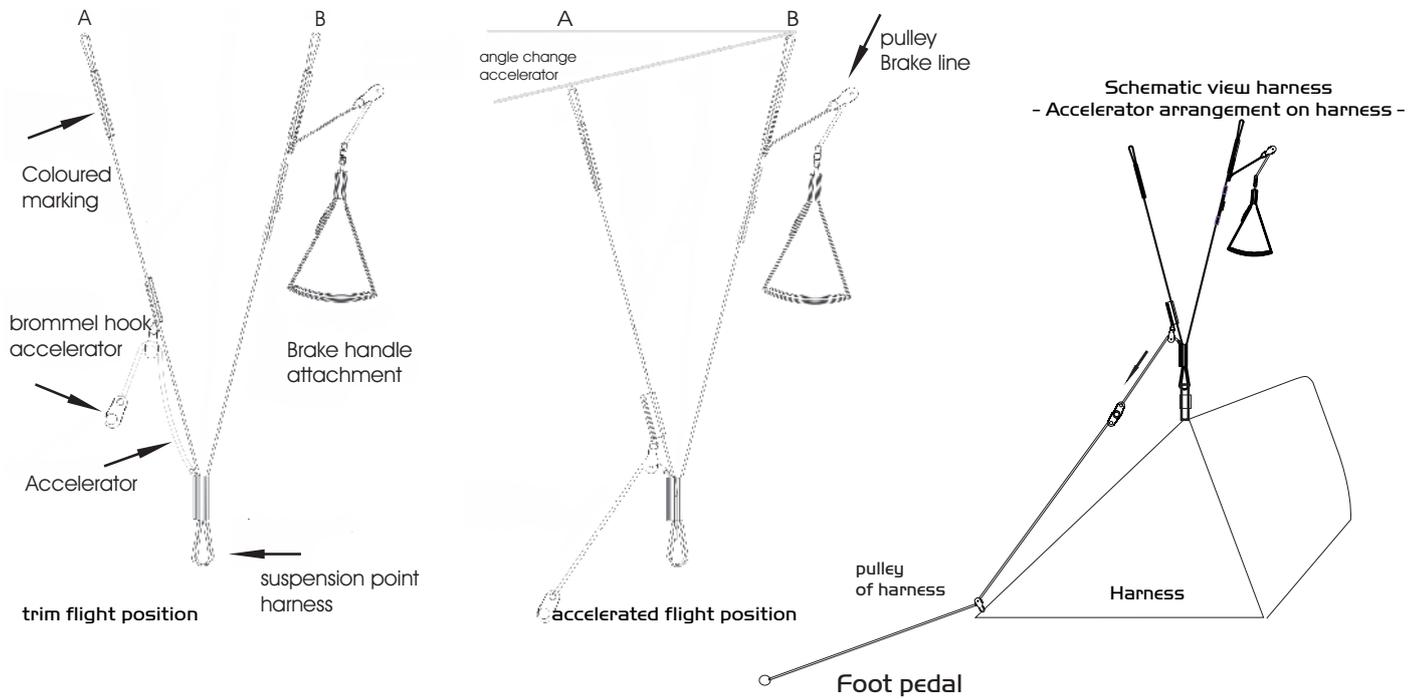
### **Functionality and handling:**

Before take-off, the brummel hooks are hooked into the brummel hook of the acceleration system of the harness's foot accelerator. Make sure that the suspended accelerator is running freely. The length of the foot accelerator must be set correctly before using it for the first time. This is done best in the simulator. The length is set correctly if the accelerator rope still has some slack and is not under tension when the accelerator is not in use.

By operating the foot accelerator the pilot shortens the A risers by a pulley system which reduces the force.



## Overview risers:



## 5. Technical Data:

size	17	20	23
cells	42	42	42
flat area (m <sup>2</sup> )	17	20	23
flat span (m)	9,84	10,67	11,44
flat a/r	5,7	5,7	5,7
area proj. (m <sup>2</sup> )	14,26	16,77	19,29
span proj. (m)	7,7	8,35	8,95
a/r proj.	4,16	4,16	4,16
Chord center (m)	2,11	2,29	2,46
Chord tip (m)	0,42	0,46	0,49
certified take off weight (kg)	60 - 85	70 - 100	90 - 119
recommended take off weight (kg)	65 - 85	80 - 100	95 - 119
LTF/ EN categorie	B	B	B

Changes of these data are possible!



## **6. Harness**

The Sir Edmund Shark has been tested according to EN 926-2:2013 with harnesses of the following dimensions:

Weight range up to 80 kg:	40 (+/-2) cm chest strap width, 40 cm (+/- 1) cm suspension height
Weight range 80 to 100 kg:	44 (+/-2) cm chest strap width, 42 cm (+/- 1) cm suspension height
Weight range over 100 kg:	48 (+/-2) cm chest strap width, 44 cm (+/- 1) cm suspension height

## **7. Checking the paraglider:**

Every paraglider delivered is checked and measured several times by us before delivery. Nevertheless, we recommend that you check the new paraglider thoroughly according to the following points.

These instructions should also be followed if the paraglider has to be checked after intensive flight, hard manoeuvres or tree landings.

- The seams on the line suspension loops, on the risers and on the canopy must be checked for damage.
- Are all lines free of damage and correctly sewn?
- Are all line locks correctly screwed and the plastic inserts fastened?
- All the panels, including the ribs and V-tapes, must be inspected for cracks.

Any damage, however inconspicuous, must be inspected and repaired by an expert. A damaged paraglider is not airworthy!

## **8. Adjusting the steering lines:**

The two main steering lines lead to a multiple line branching, which are fixed at the trailing edge. At the risers the steering lines run through a guide pulley and each is connected with a handle. These control handles are attached to the risers with two snap fasteners during transport. The steering line length is set correctly at the manufacturer and normally does not have to be changed. The adjustment point is marked on the main steering line and provided with an additional sheathing of the line (chafe protection). It must have at least 5 cm of free travel in flight (before the brakes are taken hold of) and should not be altered. The improper change of the steering line length changes the flight behaviour and impairs the safety of the glider.

## **9. Flight operation:**

The following pages are not intended to be a guide for paragliding. Rather, we want to introduce you to the special features of the Sir Edmund Shark and give you some important information for flight and safety. Other special flight manoeuvres or configurations of the glider are not recommended.

### **9.1. Take-off preparations:**

A careful pre-flight check must be carried out before each take-off. The risers, lines and canopy must be checked for wear. It also must be ensured that the line links are tightly closed and secured against twisting with a plastic clip. The harness must be put on with the greatest care. After putting on all buckles have to be checked again if they are closed correctly. The correct closure of the rescue system container and the correct fit of the rescue system handle must also be checked (see harness manual).

If a defect is found, do not take off under any circumstances!

The Sir Edmund Shark can best be started if it is laid out in an arch. When laying out, the canopy must be laid out against the wind.

Separate the lines and brake lines carefully and sort the risers. All lines must be free and without entangling or knots. There must be no lines under the canopy.

Once all preparations have been completed, the main carabiners of the harness are connected to the risers. Make sure that the carabiners are closed. When using a foot accelerator, the two brummel hooks are also to be connected. Make sure that the acceleration system is free and untwisted.



## **Checklist:**

### **Paraglider:**

- Canopy without damage?
- Risers without damage
- Line links tightly closed?
- Lines without damage?
- all lines free and without entanglement and knots? Also brake lines?

### **Harness:**

- Rescue system container closed?
- Rescue system handle correctly attached?
- all buckles and main carabiners closed?

### **Take-off:**

- Risers not attached twisted?
- Speedsystem not attached twisted?
- Brake handle and correct riser taken up?
- Is the pilots position in the middle so that all lines are symmetrically tensioned?
- Is the wind direction okay?
- Obstacles on the ground?
- Air space free?

## **9.2. Take-off:**

As an extremely light single skin glider, the Sir Edmund Shark is very easy to launch.

The pilot, who is ready for take-off, holds the A-risers and brake handles in his hands on each side and pulls the A-lines slightly. If the take-off area is flat and there is little wind, you can alternatively take a step back towards the canopy and pull up the paraglider with more impulse. During the take-off run, the arms are first stretched sideways to the rear in line with the A-risers and are guided upwards as the paraglider rises.

As with all gliders, the most important thing when launching is not the force but the constancy of the tension. As the Sir Edmund Shark is very easy to inflate, it needs to be braked on steep take-off areas or in strong winds to avoid overtaking the canopy.

When launching the glider backwards in strong wind, it is easy to prevent premature take-off by following the glider while it is being pulled up. The best preparation for perfect strong wind launches is still playing on the ground for hours in the wind.

## **9.3. Straight flight:**

The Sir Edmund Shark has a trim speed of 37 to 39 km/h depending on the wing load with fully released steering lines. In calm air the Sir Edmund Shark reaches the minimum flying speed (depending on the wing load) with about 55 to 60cm brake line pull. In turbulent air we recommend to fly with 5 to 15 cm pulled steering lines. The current angle of attack of the canopy is then higher and it is more difficult to undercut the air at the profile nose.

According to EN 926-2:2013, the maximum symmetrical control travel is at least 55 cm for 80 kg take-off weight, at least 60 cm for 80 kg to 100 kg take-off weight and at least 65 cm for 100 kg take-off weight and above.

We understand all indicated cm values from the point where the trailing edge is pulled down, i.e. without the freewheel.



## **9.4. Accelerated flight:**

When the acceleration system is operated by the feet, the angle of attack of the canopy changes and the Sir Edmund Shark flies up to 8 km/h faster. Due to the higher speed the glider is more unstable and collapses more easily.

For safety reasons you should only fly accelerated in calm air with sufficient distance to the ground. Never let go of the brake handles during accelerated flying!

When flying into turbulence, the acceleration system must be deactivated immediately!

Pulling the steering lines during accelerated flight should also be avoided, as the nose will nod even more downwards for a short time due to the increased air resistance at the trailing edge and the danger of "undercutting" will increase and the glider can collapse violently.

If the glider collapses, the acceleration system must be deactivated immediately, then the canopy is first stabilized by the steering lines and then reopened.

## **9.5. Turns:**

The high agility of the Sir Edmund Shark is due to its special steering characteristics: It reacts very directly and without delay to control impulses.

By shifting the weight (the pilot leans on the inside of the curve), very flat curves can be flown with minimal loss of altitude.

Weight shifting and pulling on the inner steering line is suitable for fast changes of direction.

For thermal flying, the combination of weight shift, braking on the inside of the curve and controlled additional braking on the outside of the wing is best recommended. By pulling in the opposite direction and releasing (active flying) with the inner and outer brake, the curve radius and lateral position can be changed and the centering of the thermals can be optimised.

**Attention:** if the steering lines are pulled too far or too fast, there is a risk of stall!

A one-sided stall is clearly announced: the inner side of the wing curve becomes soft and the inner third of the wing almost "stops". If this flight condition has occurred, the inner brake must be released immediately.

## **9.6. Active flying:**

Active flying can prevent many collapses in advance!

Active flying means to fly the paraglider as stable and efficient as possible by shifting weight and steering impulses.

In turbulences and rough thermals the glider should always be held vertically above you by active flying with controlled brake inputs.

When flying into strong thermals, the angle of attack of the paraglider increases. If the brakes are released while flying into the thermals, the canopy can accelerate and remains almost above the pilot's head. The situation is different when flying into down winds: here the brakes are applied in a controlled manner.

## **9.7. Landing:**

The Sir Edmund Shark is very easy to land due to its landing boost system. In the final glide against the wind the wing can be let out slightly braked. At a height of approx. 1 m above ground, the angle of attack is raised and intercepted by an increased braking level. The time of landing should coincide with the full use of the brakes.

If there is a strong headwind, the use of the brakes should only be very controlled in order to avoid a stall before landing!

On this occasion we would like to suggest not to reduce the altitude by the risky bad habit of "pumping" if the approach is too high.

Also landings with steep curves or turns in the final approach are to be avoided absolutely.

After the landing the wing should not fall on the ground with the nose first. This can destroy the profiles and impair the material in the leading edge area on the long run!



## **10. Winch towing:**

The Sir Edmund Shark is suitable for winch towing. We generally recommend using a towing aid for all paragliders, which activates the acceleration system during the towing process.

This towing aid accelerates the paraglider during the towing process and thus not only simplifies the take-off procedure but also reduces the risk of deep stall and enables higher release heights.

**Attention:** Paragliders which are damp and/or whose line lengths/air permeability values are no longer within the permitted tolerance have a significantly increased risk of deep stall when towing with a winch!

Winch towing is only permitted with a valid winch towing licence. The special features of a towing site and the equipment used (winch, towing release, etc.) should always be discussed with the winch operator and the take-off officer first.

We expressly point out that the equipment required for towing must also be certified in any case.

## **11. Powered flight:**

The Sir Edmund Shark is currently not certified for flying with a paramotor.

## **12. Extreme flight situations:**

### **12.1. Side collapse:**

A side collapse is probably the most common malfunction in paragliding. If the Sir Edmund Shark collapses in turbulent air, this usually only occurs in the outer wing area.

In order to maintain the flight direction in this flight condition, the opposite, open wing side has to be braked.

If the canopy collapses very hard, the braking of the open side may only be very dosed to avoid a stall.

After the turning away has been prevented by counter-steering, the canopy can be opened again at the same time by pumping on the collapsed side.

If the side collapse is not actively counteracted, the Sir Edmund Shark usually opens automatically within less than half a turn. If the canopy does not open automatically due to the strong turbulence or other influences (entangled lines), the paraglider will turn into a spiral dive.

### **12.2. Entangled lines:**

In the event of large collapses or other extreme situations, any paraglider may become tangled. The collapsed sections of the wing tip will get caught in the lines. Without pilot reaction the glider turns into a very strong spiral.

Once this has happened, the turning of the wing must be stopped first by a sensible counter-brake.

If the rotation speed should continue to increase despite counter-action, the rescue parachute must be released immediately at low altitudes.

If the height is sufficient, the following possibilities can be used to try to release the entangled wing tip:

- Try a sensitive counter-braking and a very fast, resolute and deep pulling of the steering line at the entangled side.

- Pull the coloured Stabilo line.

If these measures are not successful, you can try to release the entangled wingtip with a full stall if the height is sufficient.

**Attention:**

The flight manoeuvres mentioned above are very demanding and can cause high altitude loss! If the pilot feels overstrained or if there is not enough altitude, the rescue system must be activated immediately!



### **12.3. Front stall:**

The collapse of the entire leading edge is usually caused by strong pulling on the A-belts, accelerated flying or sudden strong turbulence. Although this flight disorder looks spectacular, it is often not dangerous if the collapse depth is low. Often there are no turning movements, the glider usually opens quickly by itself and quickly picks up speed again. The opening can be accelerated by braking in a controlled manner on both sides.

Timely recognition of the situation and quick reaction by braking on both sides helps to keep the loss of altitude as low as possible and not to lose control of the malfunction.

### **12.4. Deep stall:**

During a deep stall, the paraglider has no forward speed and at the same time significantly increased sink rates. The deep stall is caused, among other things, by releasing the B-risers too slowly when the glider is in a B-stall, by an old and porous cloth, by damage to the lines or ribs, by pulling the C-risers or by an inadmissible take-off weight. Even if the canopy is wet or the air temperature is very low, the tendency to stall increases.

Flying in the rain should be avoided as far as possible, as the raindrops on the canopy increase the  $V_{min}$  and thus the tendency to stall increases. Also very low temperatures can be problematic. In both cases, especially when the brakes are applied and/or the line geometry is no longer trimmed correctly.

If the glider is in a deep stall, you can recognize this by the fact that the noise is very low and the glider is in an unusual position above the pilot. In this case it is absolutely necessary to release the steering lines!

If the canopy and lines are in good condition, the Sir Edmund Shark will automatically pick up speed again within 2 to 3 seconds. If, for whatever reason, this is not the case, the A-risers must be pushed forward or the acceleration system must be activated.

If a glider has been in a continuous stall for no apparent reason (e.g. wet glider, flight in rain or inadmissible take-off weight), it must be checked before the next flight.

**Attention:** The brakes must not be applied in deep stall flight, as the paraglider immediately enters the full stall. A stable stall may no longer be released near the ground due to a possible pendulum movement. Instead, the pilot prepares himself for a hard landing, if possible with a landing fall.

### **12.5. Full stall:**

To initiate a full stall, both brake lines must be pulled through completely. When the stall speed is reached, the canopy empties abruptly and suddenly tilts backwards.

It is very important, despite the unpleasant reaction of the glider in a full stall, to keep the steering lines pulled through until the empty glider comes back over the pilot (approx. 3 to 6 seconds) and stabilizes in this position.

Only now the steering lines are reasonably fast (switching time  $\geq 2$  sec) and symmetrically released. The optimal recovery should take place in 2 phases: 1. prefilling of the canopy (slow release of the brakes up to shoulder height) until the canopy is fully open again; 2. recovery (braking to 0%).

If the canopy is released too quickly or asymmetrically, the result may be a large collapse or front stall.

**Attention:** A wrong, too early, asymmetrical or too fast released full stall can result in an extremely wide forward movement of the canopy! In extreme cases under the pilot!

### **12.6. Spin:**

By stalling one side, the flow can break off at half of the wing. This reverses the direction of air flow. The trailing edge, which is deeply braked, is then streamed from the back and flies in the opposite direction and the canopy rotates around its vertical axis.

There are 2 causes for a spin:

- A brake line is pulled through too quickly and too far (example: initiating a spiral dive).
- in slow flight one side is braked too much (example: in thermal circling)

If an inadvertently initiated negative turn is immediately released, the glider returns to normal flight without great loss of altitude. If the negative turn is held longer, the glider can accelerate and shoot forward on one side. This can result in an impulsive collapse or entanglement.



## 12.7. Wingover:

Tight turns to the left and right are flown alternately. The cross slope is progressively increased. If the dynamics and lateral position of this flight manoeuvre is too high, the outer wing can relieve the load. If the lateral inclination is further increased and the reaction is wrong, the result may be an impulsive, large-scale collapse.

**Full stall, spin and wingover on all paragliders can have life-threatening consequences!!**

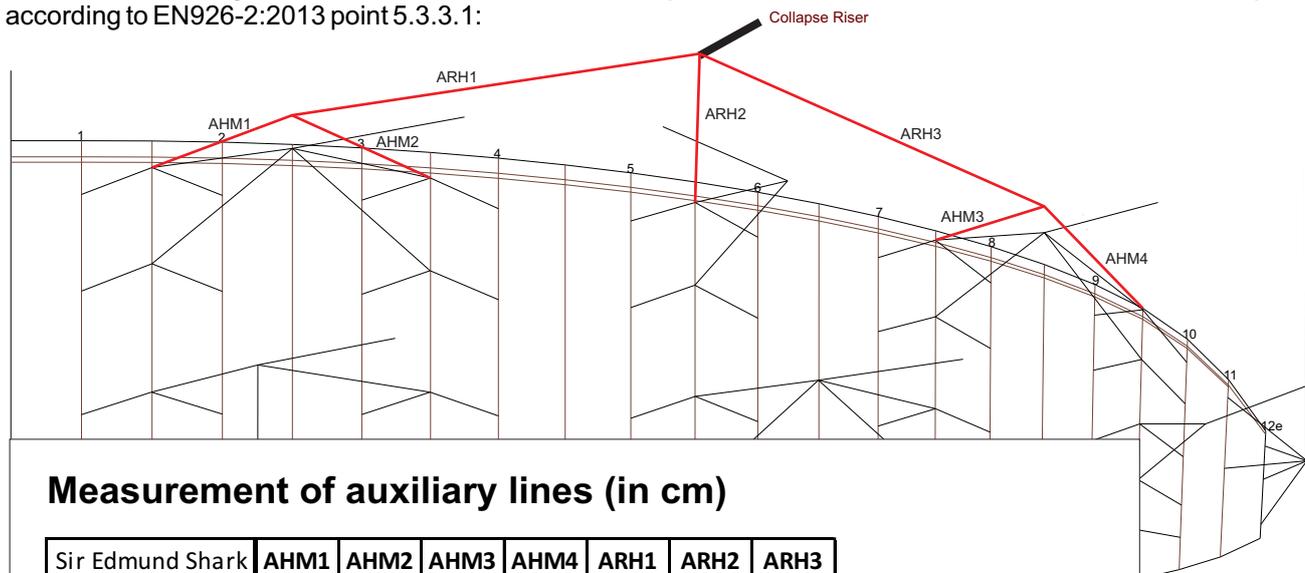
## 12.8. Acrobatic flying / Safety courses (SIV) / Testflight manoeuvres:

Compared to a normal paraglider where the ribs are protected within cell walls, the Sir Edmund Shark is more susceptible to damage due to its open structure. For this reason we do not recommend performing SIV or other acrobatic manoeuvres with the glider. This would shorten the life of the glider. Furthermore, if the manoeuvres are not flown correctly, this can lead to damage to the glider.

By merging the 2nd line level of the A and B lines onto a common A-riser line, the line drag could be reduced and at the same time the ground handling during line sorting could be simplified.

By merging the A/B line levels onto one riser, it is not possible to simulate a lateral collapse or front stall on the Sir Edmund Shark as with a conventionally rigged paraglider.

Therefore, for the test flights according to EN 926-2:2013, auxiliary lines were used to simulate a lateral collapse or a front stall according to this standard. The attachment points and dimensions of these lines must be specified according to EN926-2:2013 point 5.3.3.1:



### Measurement of auxiliary lines (in cm)

Sir Edmund Shark	AHM1	AHM2	AHM3	AHM4	ARH1	ARH2	ARH3
17	147	147	147	129	245	390	244
20	160	160	160	140	265	425	265
23	172	172	172	150	284	456	284
Lenth of Collapse Riser: minimum 60 cm							

## 12.9. Emergency steering:

If the steering lines fail, the Sir Edmund Shark can easily be steered by using the rear risers. The distance to the stall is of course much shorter when steering with the rear risers than with the steering lines, it is about 5-10 cm with the Sir Edmund Shark. You can also fly light curves by pulling the stabilo lines or by weight shifting.



## 13. Descent aids:

### 13.1. Spiral dive:

The spiral dive is the most efficient way to descend fast. However, high loads occur for material and pilot. It has to be taken into consideration that, depending on the daily shape, the outside temperature (cold!) and the sink rate, you may sooner or later lose consciousness. Many pilots slow down their breathing during the spiral or go over to press breathing, which increases the risk of losing control even more. At the first signs of dizziness, loss of consciousness and loss of vision, the spiral must be immediately stopped.

The spiral dive is initiated by carefully pulling the brake line on one side and shifting the weight to the inside of the curve. Due to the direct handling the Sir Edmund Shark quickly takes a high lateral inclination and flies a steep turn. As soon as the wing comes in front of the pilot ( goes on the nose ) an impulse is generated, which the pilot should follow by shifting his weight to the outside of the curve.

The sink rate and inclination in the spiral dive are increased by a controlled pulling of the brake line inside the curve. Slight braking on the outside of the curve prevents the outer wingtip from collapsing.

To exit the spiral dive, the brake inside the curve is slowly released.

Rapid release of the brake means that the high airspeed (up to over 100 km/h) is translated in a strong pendulum movement into height. The result is an extreme deceleration at the end of the pendulum movement with subsequent tilting of the canopy. You also have to calculate that you will get into your own wake vortex (rotor)!

Due to the extreme loss of height in the spiral dive, it is always important to ensure sufficient safety height!

**Attention:** Almost every paraglider reaches a sink rate at which the canopy faces the openings downwards ("goes up on the nose!") and remains in this position despite releasing the steering lines and continues to spiral (stable spiral dive).

The Sir Edmund Shark has been classified B according to EN 926-2:2013. Due to unfavourable influences, however, the reactions can also be more demanding than described in this classification. The causes in such a case can be complex. For example: harness geometry (suspension height), cross straps, turbulent air, holding on to the riser, shifting the pilot's weight to the inside of the curve and similar.

If, against all expectations, a stable spiral dive should occur, this is released by shifting the pilot's weight to the outside of the curve and counter-braking in a controlled manner.

**Attention:** in a stable spiral dive, extreme g-loads can have an effect on the body and require a lot of physical strength!

### 13.2. Big Ears:

The so called "big ears" manoeuvre is an easy, but not very effective descent method where the forward speed is higher than the descent speed. It is more suitable to reduce the glide angle and to gain horizontal distance from a source of danger than to descend fast.

To perform "big ears", the two wingtips are folded symmetrically downwards by pulling the outer A-risers (A').

The "big ears" can increase the descent speed to approx. 5 m/sec. and reduce the glide angle.

By using the foot accelerator the sink rate and the forward speed can be increased significantly.

It is sufficient to release the outer A-risers to exit this manoeuvre. The wing tips of the Geronimo<sup>3</sup> usually opens automatically. The pilot can slightly brake to speed up the opening.

Attention: Never fly a spiral dive with big ears, because the middle A-lines are loaded beyond their limits.

### 13.3. B-Stall:

The B-stall is not possible with the Sir Edmund Shark due to its construction.



## **Summary:**

All descent aids should only be practised in calm air and at a sufficient safety height, preferably as part of a safety training, in order to be able to use them in emergency situations!

For all extreme flight manoeuvres and descent aids:

- first practice only under the guidance of a flight instructor or as part of a safety training course
- before starting the manoeuvres, ensure that the airspace under the pilot is free
- During the manoeuvre the pilot must have eye contact with the canopy and constantly check the altitude.

## **14. Folding, Care, Storage, Repairs, Maintenance, Disposal**

The condition of the paraglider affects your life in the air. A well-kept and properly treated paraglider can reach twice its age. To ensure that the Sir Edmund Shark carries its pilot as long as possible and safely through the air, please consider the following points:

### **Folding:**

For a long durability of the paraglider and to avoid unnecessary kinking of the nylon rods in the nose area, we recommend to fold the glider profile on profile (similar to an accordion), or to roll it together loosely seen from the stabilizer (without kinking the nylon rods). Improper packing and prolonged storage may cause deformation of parts in the glider.

### **Care:**

- The UV rays of the sun damage the fabric of the paraglider in the long run. Therefore the paraglider should not be unnecessarily exposed to sunlight.
- When unfolding the glider, make sure that neither the canopy nor the lines are heavily soiled. The dirt particles can damage the material.
- The line lengths should be checked after tree and water landings.
- Do not pull the paraglider over the ground. The coating of the cloth will be damaged.
- Moisture damages the coating of the cloth and shortens the service life.
- If the lines stick to the ground, they can be overstretched or torn off during take-off.
- Do not step on the lines!
- When folding up, please place the supplied textile bag underneath to avoid mechanical abrasion and damage of the sail.
- The lines should be bended as less as possible.
- After contact with salt water, rinse the equipment immediately with fresh water!
- Insects that got lost in the cells should be removed alive, not only because of animal love, but also because they secrete a corrosive liquid.
- Clean the paraglider only with water. Avoid mechanical stress such as brushing and rubbing. Chemical cleaning agents damage cloth and lines.

### **Storage:**

- The paraglider must always be stored in a dry place. If it gets wet, spread it out to dry as soon as possible (but not in full sunlight!).
- Do not store the glider near chemical vapours or gases.
- During transport and storage, especially in cars, make sure that the paraglider is not exposed to unnecessarily high temperatures.

### **Repairs:**

- Smaller rips in the fabric that do not run along the seam can be provisionally repaired with an adhesive sail from a paraglider dealer.
- All other types of damage, such as large rips, rips at seams, torn line hangpoints, torn and damaged lines may only be repaired by an authorised workshop or the manufacturer.
- Only original spare parts are to be used! A list of the lines used in the glider model can be found in the individual line



plan under item 16 "line lengths". The lines can only be purchased from the manufacturer.

- Any modification to the paraglider, except those approved by the manufacturer, will void the operating license of the equipment.

### **Maintenance:**

- The Sir Edmund Shark must be inspected at least every two years or every 100 operating hours by an authorized workshop or by the manufacturer.
- A line measurement should be performed every 20 flying hours and should be compared with the data sheet.

### **Disposal:**

- The materials used in a paraglider require proper disposal. Please return used equipment to us. We will dispose them properly.

## **15. Nature and landscape friendly behaviour:**

Actually self-evident, but here again expressly mentioned: Please practice our nature-orientated sport in such a way that nature and landscape are protected!

Please do not walk off the marked paths, leave no rubbish behind, do not make unnecessary noise and respect the sensitive balance in the mountains. Especially at the take-off place our respect to nature is required!

## **16. Line lengths**

### **Ageing of lines and trimming possibility**

So far it has always been thought that lines stretch under use. In the case of the middle A and B lines - where the heaviest load is attached - this is even true.

All lines (Kevlar as well as Dyneema lines) get cracks in their thin threads and then they begin to swell and shrink. The rear lines and the outer lines are loaded with only a few grams during flying. This leads to a slow shortening of the lines - because there is not enough load on the lines to stretch them during flying. On the technical side, almost nothing can be done. The Geronimo<sup>3</sup> is equipped with a minimal faster trim to avoid this shortening.

Less stressed lines are delivered with a trim knot. This can be used to lengthen the line if necessary.

The service company or the pilot now has the possibility to trim the glider without any problems and without having to replace the lines. A line measurement should be performed every 20 flying hours and should be compared with the data sheet. It is completely normal that lines can shrink by up to 30 mm at very intensive use.

All line changes are gradual. So they do not occur suddenly. You also do not crash, but often you only notice this when you are less able to fly against the wind or when the glider loses some of its performance.

Factory delivered configuration with triple loop on Stabilo line and B/C-riser lines for trimming during aging





## Line names:

All lines in Skyman paragliders are named according to the same scheme. When ordering replacement lines, please always determine the designation according to the following explanation and order it stating the type and size of glider!

The first digit indicates the line level (A, B, C, D; K = brake). The numbering starts from the centre of the glider at 1 and continues to the stabilizer.

Top lines (upper level) are marked with the level and the number starting from the centre of the glider. Example: A 5 = the 5th A-line from the middle of the glider (Sir Edmund Shark 20 - M: 127,5 cm)

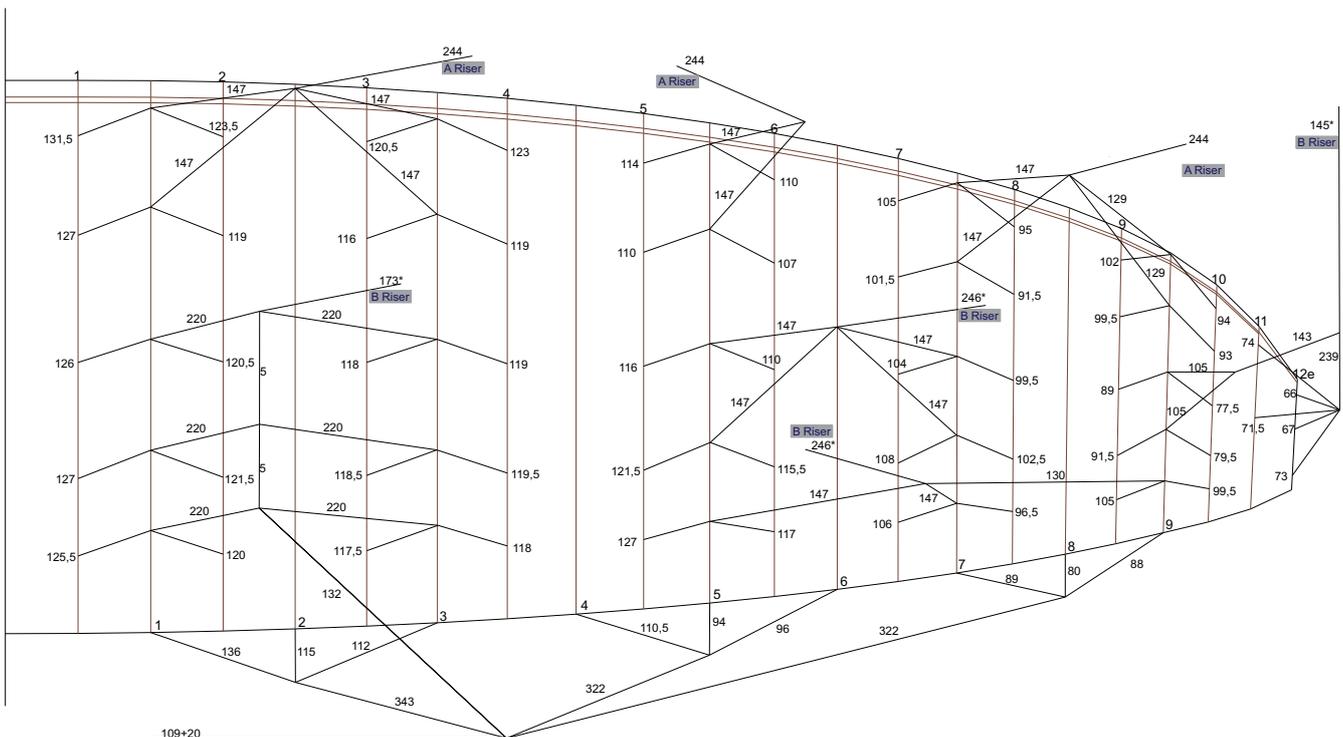
Middle lines (middle level) get the designation „M“. For example: CM4 = 4th middle line from the centre of the glider on the C-level (Sir Edmund Shark 20 - M: 160 cm)

The main lines have the additional wording 'R'. Example: AR2 = 2nd A-main line from the centre of the canopy (Sir Edmund Shark 20 - M: 265 cm)

Lines of the Landing Boosters are designated with the suffix Con. KR Con is the connection of the brake line KR to EM-level, CD Con is the line between CM and DM-Level, DE Con is the line between DM and EM-level.

line	A1 - A12	B1 - B12	C1 - C11	D1 - D10	E1 - E10	CD/DE Con
article	8000-050	8000-050	8000-050	8000-050	8000-050	7343-190
line	AM1 - AM5	BM1 - BM5	CL1	CM1 - CM6	DM1 - DM5	EM1 - EM5
article	8000-190	8000-190	8000-190	8000-135	8000-135	8000-135
line	AR1	AR2 - AR3	CR1	CR2	CR3	DR1
article	8000-360	8000-280	8000-280	8000-230	8000-190	8000-190
line	K Riser	KM	K Top	KR Con		
article	10-200	8000-090	8000-050	7343-190		

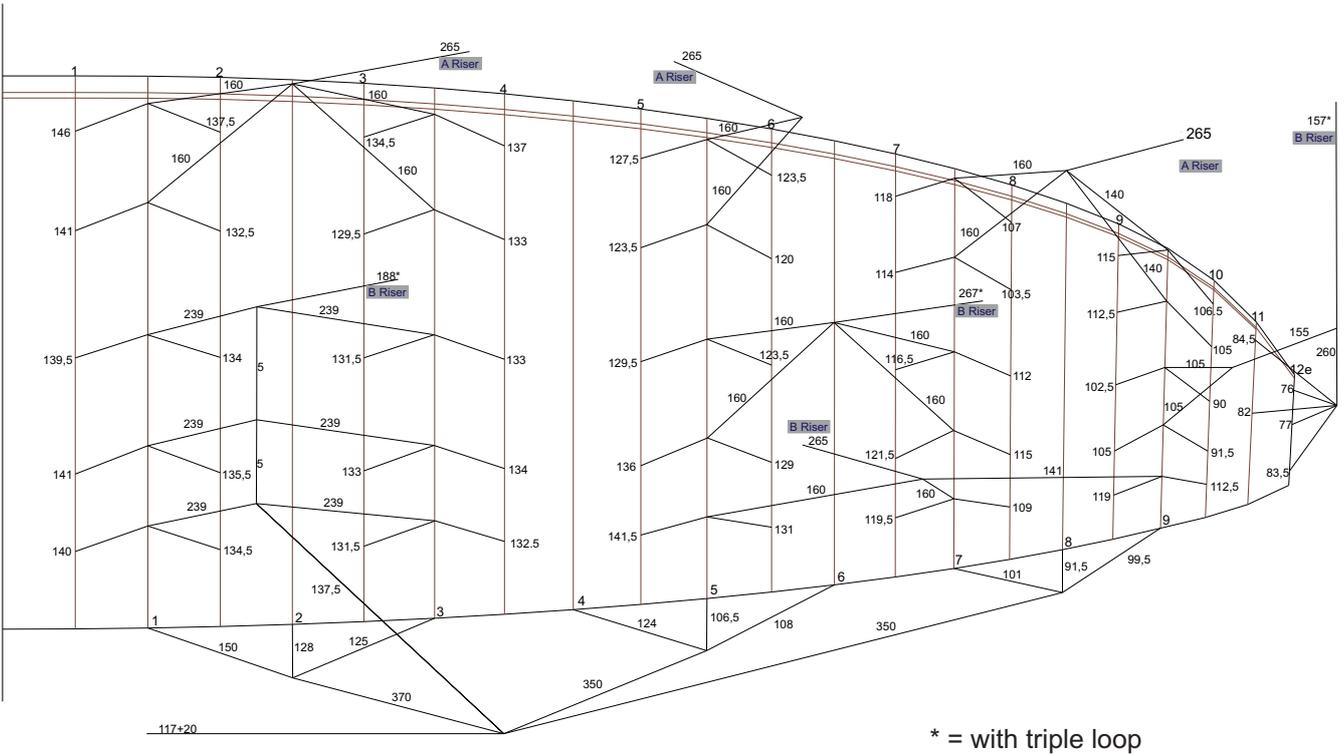
## 16.1. Single line length Sir Edmund Shark S - 17



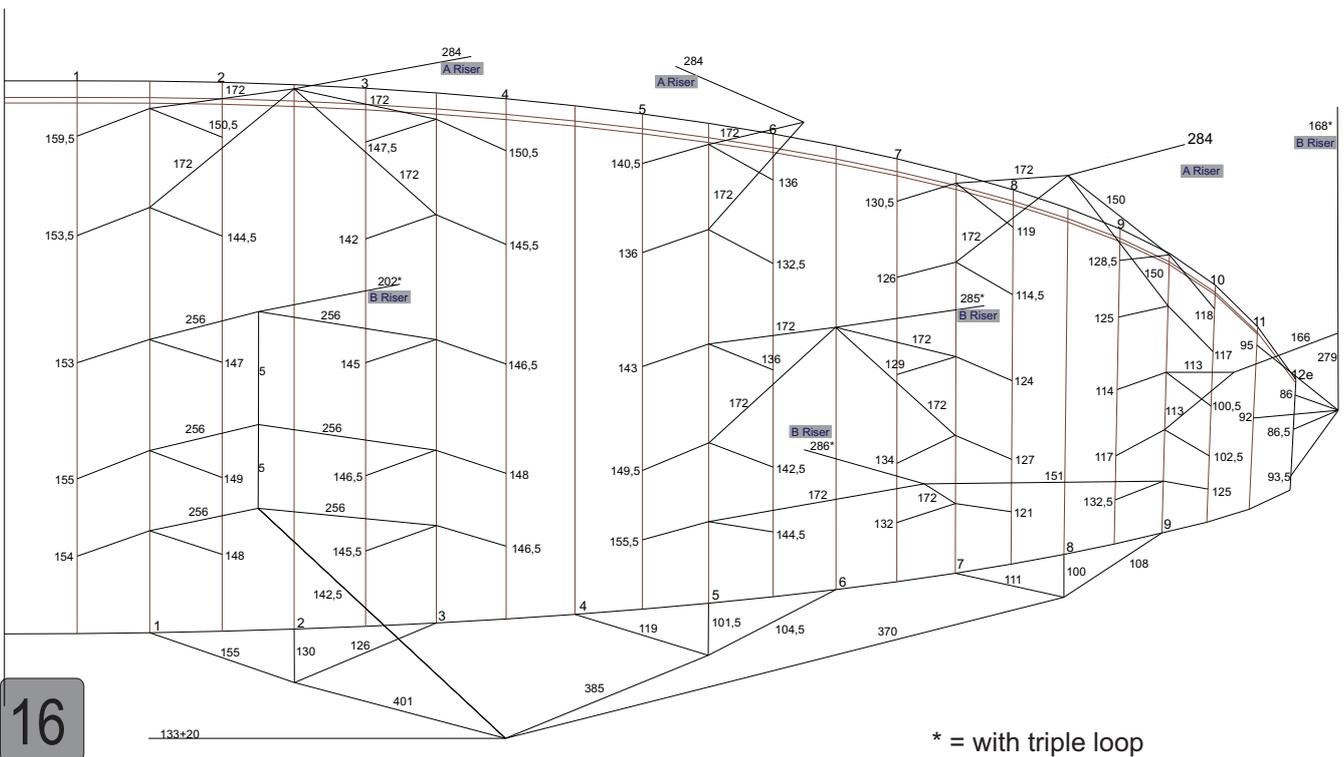
\* = with triple loop



## 16.2. Single line length Sir Edmund Shark M - 20



## 16.3. Single line length Sir Edmund Shark L - 23





## 17. Overall lengths

All line and riser lengths listed below are, in accordance with EN 926-2:2013, in conformity with the test specimen. The specified lengths have been checked by the testing laboratory and are within the tolerance permitted in the standard.

Lengths measured from suspension point of riser to lower sail (double skin area), resp. to end of profile/diagonal profile (single skin area), brake lines from trailing edge to end of main steering line, all under 50 N tension.

### 17.1. Overall line lengths Sir Edmund Shark S - 17

in mm	1	2	3	4	5	6	7	8	9	10	11	Stabi
A	5755	5675	5645	5670	5580	5540	5490	5390	5280	5200	5090	5010
B	5710	5630	5600	5630	5540	5510	5455	5355	5255	5190	5065	5020
C	5700	5645	5620	5630	5600	5540	5480	5435	5250	5135		5080
D	5755	5700	5670	5680	5655	5595	5520	5465	5275	5155		
E	5785	5730	5705	5710	5880	5610	5500	5405	5320	5265		
Brake	5880	5670	5640	5415	5250	5270	5200	5110	5190	2410(KR connection)		

### 17.2. Overall line lengths Sir Edmund Shark M - 20

in mm	1	2	3	4	5	6	7	8	9	10	11	Stabi
A	6235	6150	6120	6145	6050	6010	5955	5845	5725	5640	5520	5435
B	6185	6100	6070	6105	6010	5975	5915	5810	5700	5625	5495	5445
C	6170	6115	6090	6105	6070	6010	5940	5895	5700	5575		5510
D	6230	6175	6150	6160	6135	6065	5990	5925	5725	5590		
E	6265	6210	6180	6190	6190	6085	5970	5865	5775	5710		
Brake	6370	6150	6120	5910	5735	5750	5680	5585	5665	2545(KR connection)		

### 17.3. Overall line lengths Sir Edmund Shark L - 23

in mm	1	2	3	4	5	6	7	8	9	10	11	Stabi
A	6685	6595	6565	6595	6495	6450	6395	6280	6155	6050	5930	5840
B	6625	6535	6510	6545	6450	6415	6350	6235	6120	6040	5900	5845
C	6620	6560	6540	6555	6510	6440	6370	6320	6120	5985		5915
D	6685	6625	6600	6615	6575	6505	6420	6350	6150	6005		
E	6720	6660	6635	6645	6645	6535	6410	6300	6205	6130		
Brake	6890	6640	6600	6370	6195	6225	6140	6030	6110	2755 (KR connection)		

### 17.4. Riser length Sir Edmund Shark

mm	normal	accelerated
A	525	435
B	525	525

Lengths measured from suspension point to lower edge of shackle



## **18. Inspection instructions Sir Edmund Shark**

This inspection instruction is intended to ensure the flight safety of the paraglider to be inspected. In Germany it is legally based on the Ordinance on the Inspection of Aircraft (LuftGerPV) and represents the minimum technical requirements for the equipment and the scope of inspection.

Depending on the country of use, country-specific peculiarities may have to be observed. The minimum requirements must not be undercut.

Attention: Fly market GmbH & Co. KG is not liable for the work of the responsible person (or check company) who carries out the check. This person always works on his own responsibility!

If in doubt about the performance of the check or the airworthiness of the glider, contact the manufacturer.

### **18.1. Scope of the inspection**

- Air sports equipment is subject to inspection in Germany according to LuftGerPV §13/2:  
"The airworthiness of air sports equipment according to § 1 paragraph 4 of the Luftverkehrs-Zulassungs-Ordnung (Air Traffic Licensing Regulations) must be verified or had verified by the owner or on his behalf according to the instructions given by the manufacturer.  
The holder is responsible for the timely and complete performance of the inspections.  
He shall immediately notify the manufacturer of any defects in the aircraft or in the test instructions."
- The inspections may be carried out by the manufacturer, by persons appointed by him or by a person with sufficient expertise who fulfils the minimum personnel requirements specified under 18.3.
- In Germany, according to LuftGerPV §13/2, it is possible for the owner to inspect his aircraft himself. This is expressly not recommended by the manufacturer, as the owner usually does not fulfil the corresponding personnel and technical requirements (expertise, measuring instruments, etc).
- If a defect is found during the inspection, the glider must not be flown again. In this case, repairs must be carried out by the manufacturer or a person authorised by the manufacturer.

### **18.2. Inspection intervals**

The intervals for training equipment and commercially used tandem paragliders are every 12 months, all other paragliders every 24 months or after 100 operating hours.

A line measurement should be made every 20 flying hours and compared with the data sheet.

### **18.3. Personnel requirements for the inspection**

Personnel requirements for the inspection of paragliders used only for personal and single-seater use:

- A valid unrestricted pilot's licence for paragliders or an equivalent approved licence.
- Sufficient expertise for the re-testing of the paraglider to be tested (for example through type-specific training by the manufacturer or importer).

Personnel requirements for the inspection of paragliders used by third parties and for two-seaters:

- Sufficient expertise for the inspection of paragliders. This should at least be proven by, for example:
  - A professional training conducive to this inspection activity
  - A professional activity of two years in the manufacture or maintenance of paragliders and hang gliders or technically similar type.
  - Sufficient, type-specific training (e.g. training by the manufacturer or importer).



#### **18.4. Necessary documents**

- Current version of the inspection instructions
- Data sheets
- Previous inspection reports (only for further inspections)
- Maintenance and calibration documents for the measuring instruments
- manufacturer's corrective action instructions
- Airworthiness directive if applicable

#### **18.5. Prüfmittel**

The test equipment to be used for the individual test must necessarily be the equipment listed below:

- Air permeability measuring device: JDC or equivalent
- Length measuring device: steel measuring tape or laser measuring device
- Strength measuring device for lines according to EN926/1, 4.6.3: electronic measurement with sampling rate of at least 100Hz, speed rate for application of load between 0.7 m/min and 1 m/min
- Strength measuring device for canopy: Bettsometer, B.M.A. GB 2270768

All measuring devices must be calibrated and maintained at regular intervals according to the respective manufacturer's instructions.

#### **18.6. Test procedures**

##### **Identification of the equipment:**

- Once the paraglider has been handed over, an initial inspection is carried out and the paraglider is identified on the basis of the official manufacturer's documents.
- Check the type label and inscriptions for correctness, completeness and readability.

##### **Visual inspection of the canopy:**

- The upper and lower sail, leading edge, trailing edge, ribs (including any V-ribs), cell partitions, seams, flares and line loops are examined for cracks, shearing, stretching, damage to the coating, repairs and other conspicuous features. The test result must be recorded in the inspection report.
- In case of rips at the seams and other damages the repair must be carried out only by original spare parts and original seam pattern, no gluing with adhesive sail, use of non-original spare parts, etc.

##### **Visual inspection of the lines:**

- If the lines are damaged (seams, rips, folds, chafe marks, thickenings, core exits, etc.), they must be replaced immediately with original spare parts and original seam pattern.
- In case of injuries to the lines (seam pattern, coat, etc.), they must be replaced immediately with original spare parts and original seam pattern.

##### **Visual inspection of the connecting parts**

- All line shackles and any existing trimmers and speed systems must be checked for conspicuous features such as rips, chafing and difficult movement. Both risers are checked for shearing points, tears and heavy wear.



## Measurement of line lengths / riser:

- The individual lines are laid out and loaded with 5 daN. The measurement is carried out from the suspension point of the riser to the canopy including the suspension line loop. The total line lengths determined are documented in the inspection report and compared with the set line lengths. Compliance with the tolerances specified in the manufacturer's instructions must be documented in the inspection report.
- Total lengths must not deviate by more than +/- 10 mm from the nominal values. The determined values must not represent a significant trim shift.
- A trim shift is present, for example, when:
  - more than 50 % of the lines reach the tolerance limit, whereby the tolerance limit only deviates either in the + or - direction. (Example: A/B lines are 10 mm longer, while the C/D lines reach the target values)
  - or 25 % of the lines deviate the tolerance limits in both directions (+ and -) (Example: A/B lines are 5-10 mm longer, while at the same time the C/D lines are 5-10 mm shorter than the set values (Typical trim shift "backwards" due to ageing).
- Individual lines can be corrected by looping in or looping out in the event of a trim shift in order to establish a correct condition (e.g. by looping in A-lines that are too long or looping out C-lines that are too short at the line lock). When the correct trim condition has been restored by this measure, the absolute total lengths may not deviate from the set values by more than +/- 30 mm.
- Both risers are measured under a load of 5 daN. The values measured are to be compared with the specifications of the type data sheet and documented in the inspection report. Max +/- 5 mm difference in the riser lengths is allowed.

## Kontrolle der Leinenfestigkeit

- The proof of line strength shall be documented analogously to the proof required in EN926/1: 2016 or LTF 2-565-20 for the type test:
- The lines of the Sir Edmund Shark are made of very strong Edelrid Aramid lines. This means that if the overall condition of the lines is good, a break test after 24 months can be dispensed with in favour of an even ageing of the lines.
- Main line: One line from each line level (A, B, C) is removed from the centre of the canopy and the breaking load is determined. The removed lines are to be named in the inspection report. This is important so that the line replaced in the previous test is not tested in a subsequent retest. At further retests, main lines are tested on the opposite side or next to the middle main line (i.e. A2, B2, C2).
- Top lines/ middle line level: Above the main lines, one continuing line is removed up to the canopy and the breaking load is also determined. If the determined breaking load of the A-line is 1.5 times the nominal value (e.g. nominal value 50 daN, determined breaking load >75 daN), then a test of further lines on the B/C/D-levels can be omitted.
- Limit values of the individual lines for the Sir Edmund Shark:

Line position	Limit (daN)
AR 1	157
AR2 - AR3	128
CR1	128
CR2	115
CR3	104

Line position	Limit (daN)
DR1	104
AM1 - AM5, BM1 - BM5, CD/DE Con	85
CM1 - CM6, DM1 - DM5, EM1 - EM5	70
A/B/C/D/E Top	25



### **Inspection of the canopy strength::**

- The testing of the canopy strength is done with the Bettsometer (B.M.A.A. approved Patent No. GB 2270768 Clive Betts Sales). In this test, a needle-thick hole is made in the upper and lower sails in the area of the A-line attachment and the fabric is tested for its tear resistance. The limit value of the measurement is set at 400 g and a crack length of 5 mm.
- The exact test procedure is specified in the operating instructions for the Bettsometer. The measured value determined is entered in the inspection report.

### **Inspection of the air permeability of the cloth:**

- Using a JDC textile clock, a porosity measurement is carried out at at least 5 points on the upper sail (with at least 2 measuring points in the middle third of the canopy) and at least 3 points on the lower sail. The values determined are recorded in the inspection report. The measuring points on the upper/lower sail are distributed over the span and approx. 20-30 cm behind the leading edge.
- Limit values: no measuring point may reach a value below 15 seconds. If a measurement shows a value of less than 15 seconds, the paraglider loses its airworthiness.

### **Visual control of trim and settings:**

- All lines are to be checked according to the line overview plan to ensure that they are correctly configured up to the riser and that all line levels are running free.

### **Checkflight:**

- A check flight is only necessary after major repairs.
- During the check flight it must be determined whether the flight characteristics of the paraglider being tested have changed compared to a brand-new glider.
- The examiner must be capable of comparing the construction regulations with the flight behaviour of the paraglider to be tested and of determining any changes in the characteristics of the paraglider. This includes above all that the paraglider and its characteristics / flight behaviour are known to the examiner.
- The type certification standards applied at the time of approval of the type must be known.
- A check flight must include at least the following points: take-off behaviour, tendency to deep stall (return from B-stall), tendency to negative curves, steering range lengths, side collapse >50% .
- If the checked glider does not behave correctly in any way, it must no longer be flown and must be returned to the manufacturer for inspection. Under no circumstances should you attempt to rectify the fault yourself.

## **18.7. Documentation**

- All test results as well as all details of the glider (type, size, serial number, year of manufacture) must be recorded in the inspection report.
- Repair and maintenance work will also be noted on the inspection report.
- The overall state of the glider is displayed according to the checkboxes of the verification protocol. In the overall state, all determined values such as strength, porosity, etc. are included.
- If the inspection result is negative, contact the manufacturer to agree on the further procedure (e.g. sending the device to the manufacturer for repair).
- Exceptional defects must be reported to the manufacturer immediately!
- The inspection is to be marked on the glider next to the type label with an appropriate inspection stamp or label. The information must include at least the time of the next inspection, place, date, signature and name of the inspector.
- All inspection documents (inspection report and measurement report) shall be prepared in triplicate. The equipment owner, inspector and manufacturer each receive one copy (the copy must be submitted promptly). The retention period for the inspection documents is 6 years.