

# **Aspen<sup>6</sup>      Aspen<sup>6</sup> LIGHT**

## **User Manual**

Please read this manual carefully and keep its instructions in mind while using your Aspen6 paraglider

<b>1. INTRODUCTION</b> .....	1	<b>5.3. SIV manoeuvres</b> .....	8
<b>2. YOUR PARAGLIDER</b> .....	1	5.3.1. Asymmetric Collapse .....	8
<b>2.1. Technical description</b> .....	1	5.3.2. Full-Frontal Collapse .....	9
<b>2.2. Technical data</b> .....	3	5.3.3. Deep stall.....	9
<b>2.3. Materials</b> .....	4	5.3.4. Full stall.....	9
<b>3. CERTIFICATION</b> .....	5	5.3.5. Spin.....	9
<b>4. ADJUSTING YOUR GLIDER</b> .....	5	<b>6. MAINTAINING YOUR GLIDER</b> .....	10
<b>4.1. Brake line adjustment</b> .....	5	<b>7. CHECKING YOUR GLIDER</b> .....	10
<b>4.2. Addition of the speed system</b> .....	6	<b>8. REPAIRING YOUR GLIDER</b> .....	11
<b>5. OPERATION IN FLIGHT</b> .....	6	<b>9. DIAGRAM AND DIMENSIONS</b> .....	12
<b>5.1. Standard flight</b> .....	6	<b>10. LINE PLAN</b> .....	13
5.1.1. Pre-flight check .....	6	<b>11. ENJOY YOUR FLYING</b> .....	14
5.1.2. Launch .....	6	<b>12. CUSTOMER CARE</b> .....	14
5.1.3. Flight.....	6		
5.1.4. Landing.....	7		
<b>5.2. Fast descent</b> .....	7		
5.2.1. Big Ears.....	7		
5.2.2. B-line Stall.....	7		
5.2.3. Spiral Dive.....	8		

## 1. INTRODUCTION

Congratulations on buying your new Aspen6 – a GRADIENT's latest high-performance wing in the EN-C category. We believe that you will be very satisfied with your new glider in terms of its flight characteristics, exceptional performance and really nice handling.

After two years of a great success of Aspen5, excellent reviews and over 1000 gliders sold world-wide, Gradient continues the Aspen family with a new glider, Aspen6 which is the next generation in the EN-C category.

Our aim was to create a glider which would follow tumultuous development of paragliding technology of the last years and at the same time would use the latest know-how in the development of materials. A glider which would bring further improvement of performance and still keep pilot comfort, dynamics, handling and safety typical for Gradient's gliders.

In order to reduce line consumption and to keep a small number of carrying ribs and attachment points we used our well proven Double Diagonal system together with the conception of a three-line layout.

To develop Aspen6, Gradient put the prototypes through their paces in a wide range of flying conditions: easy soaring, soaring in strong winds, weak to moderate thermals as well as extremely strong thermals in Africa, Gradient's favourite testing ground.

Aspen6 is designed as the EN-C glider and therefore it is supposed to be flown by experienced pilots who are capable of active flying. An outstanding performance, responsive handling, predictable behaviour and stability at the maximum speed make Aspen6 a very interesting solution for a wide range of experienced pilots who need high performance and safety for long XC flights.

This manual provides information which will help you to fly safely and to keep your wing in a good condition. If, after reading this booklet, you have any further questions or if you are uncertain about anything, please do not hesitate to contact Gradient or any authorised Gradient dealer. We will gladly answer all your questions.

We would be pleased to receive your feedback when you get to know your Aspen6.

## 2. YOUR PARAGLIDER

### 2.1. Technical description

Aspen6's ground plan has a slender, elliptical shape with a slight positive contortion of the leading edge and the new shaping of wing tips to minimize the induced drag. This means that the ears of the canopy are slightly swept back when inflated. This modern design has number of advantages. We have used knowledge and technology which have been used and gained through the development of predecessors such as Nevada2, Aspen5 and Avax-XC5 which all have very good performance and climbing agility. We have optimized everything for the maximum performance and stability at the whole speed range.

The glider's aerofoils has been specially developed to provide the maximum stability throughout the whole speed range. The leading edge is reinforced with integrated nylon stiffeners. This ensures optimal inflation of the wing and helps to keep the shape of the leading edge perfectly clean even at the maximum speed.

For perfect force distribution from the lines to the canopy we used the archs with nylon stiffeners in the B and C attachment points.

We have integrated nylon reinforcement directly into the ribs over C attachment points. This solution keeps a clean shape of the top surface of the canopy and helps with recovery after a collapse.

This glider has a unique **VO system** which is an improved shape of the cell openings for better inflation of the wing and for a more smooth air flow between the canopy and surroundings. Small rectangular

cell openings for sufficient pressurization during all flight modes and deep V-openings for easy inflation and leading the air flow to the bottom surface of the canopy. The combination of two cell openings shapes significantly reduces the aerodynamic drag during flights in turbulent conditions and keeps the air pressure within the canopy more consistent, especially in rough air.

Thanks to the **VO system** the nose part of profile has a smooth shape. The smooth shape of the canopy delivers the aerodynamic cleanness and small aerodynamic drag. Different and complicated types of the leading edge have a bigger aerodynamic drag.

The layout of the line attachment points improves stability at the maximum speed – an essential feature of modern high-performance gliders. This layout also delivers a great endurance of the canopy. The shock and load tests of Aspen6 demonstrate its qualities. During these tests Aspen6 at the size of 30 square metres withstood the average loading force of 162 kg under the force of 8G without any failure or damage.

The well-proven three rows and three-level line concept with three main lines per a side is used. All lines are made from special and very strong uncovered lines (Edelrid Aramid Magix Pro and Liros Dyneema DC). All these lines have the advantage of splice loops, giving maximum overall endurance, durability and the lowest possible aerodynamic drag. Loops of main A and B lines are covered with a small sleeve coloured cover for a protection and better recognition.

The sophisticated combination of Dyneema and Aramid lines with different behaviour of shrinking characteristics maintains the right geometry of the suspension system for a long time. We have created two line layouts with different lines diameters. Stronger lines for the size 30 and thinner lines for smaller sizes. Both layouts were successfully tested by shock and load tests. With this solution Aspen6 gained great strength for size 30 and the lowest aerodynamic drag for smaller sizes.

The main C-lines are connected to the karabiners through loops, allowing easier adjustment when your glider is serviced.

Aspen6 is supplied with a well proven three-riser speed-system which gives great maximum speed.

The risers are made from 15mm wide webbing from PES material with small and special shaped carabiners Peguet. Low aerodynamic drag and light weight are benefits of this solution.

Small, simple details make this glider complete. Gradient has paid attention to details too, including: clearing zip holes on the wing tips; with special karabiners, ball bearing pulleys for comfortable use of speed bar and a new rucksack, an inner bag and a riser bag.



## 2.2. Technical data

Aspen6	Units	22	24	26	28	30
Flat Area	[m <sup>2</sup> ]	20,97	22,73	24,73	27,25	29,56
Projected area	[m <sup>2</sup> ]	17,44	18,93	20,56	22,64	24,55
Span	[m]	11,64	12,12	12,64	13,27	13,82
Projected span	[m]	9,33	9,72	10,13	10,63	11,07
Aspect ratio	[1]	6,46	6,46	6,46	6,46	6,46
Projected aspect ratio	[1]	4,99	4,99	4,99	4,99	4,99
Max. chord	[m]	2,19	2,25	2,35	2,46	2,56
Min. chord	[m]	0,63	0,66	0,69	0,72	0,75
Number of cells		66	66	66	66	66
Line consumption <sup>1</sup>	[m]	234,9	244,3	254,5	270,2	286,2
Weight of the glider	[kg]	-	4,50	4,70	5,20	5,50
Weight of the Light glider	[kg]	3,70	4,00	4,20	-	-
Take-off weight range <sup>2</sup>	[kg]	65-75	70-90	85-105	95-119	110-135
Certification EN		C	C	C	C	C

<sup>1</sup> - Line consumption is the sum of lengths of all lines including brake lines.

<sup>2</sup> - Take-off weight is the weight of the pilot including equipment and paraglider (approx. 20-25 kg or approx. 10-20kg for Light glider)

### Length of the riser:

Aspen6-22		A	B	C
non-accelerated	[mm]	440	440	443
accelerated	[mm]	310	340	443
Aspen6-24		A	B	C
non-accelerated	[mm]	460	460	463
accelerated	[mm]	322	353	463
Aspen6-26		A	B	C
non-accelerated	[mm]	480	480	483
accelerated	[mm]	325	357	483
Aspen6-28		A	B	C
non-accelerated	[mm]	500	500	503
accelerated	[mm]	340	373	503
Aspen6-30		A	B	C
non-accelerated	[mm]	500	500	503
accelerated	[mm]	340	373	503

Risers are without trimmers.

Length tolerance of risers is +/-5mm.



### 2.3. Materials

Canopy	Fabric code
Upper sail-leading edge	Porcher Marine 9017 Skytex E44 - Everlast, 42 g/m <sup>2</sup>
Upper sail-rear part	Porcher Marine 70032 Skytex E3W - Universal, 32 g/m <sup>2</sup>
Bottom sail	Porcher Marine 70032 Skytex E3W - Universal, 32 g/m <sup>2</sup>
Ribs, Diagonals	Porcher Marine 9017 Skytex E29 - Hard, 40 g/m <sup>2</sup>
Ribs non-loaded	Porcher Marine 70032 Skytex E4D - Hard, 32 g/m <sup>2</sup>
Reinforcements	NCV Laminated Skytex Film, 120 g/m <sup>2</sup>
Reinforcements	Nylon Rod Ø2 mm, Nitinol wire Ø1.1 mm
Suspension lines	Line Code
Lines-top level	Edelrid Aramid 8000/U-050, Ø0.5 mm
Lines-top level *	Liros Dyneema DC 100, Ø0.7 mm
Lines-top level	Liros Dyneema DC 060, Ø0.6 mm
Lines-top level	Liros Dyneema DC 040, Ø0.5 mm
Lines-middle level	Edelrid Aramid 8000/U-050, Ø0.5 mm
Lines-middle level	Edelrid Aramid 8000/U-090, Ø0.8 mm
Lines-middle level *	Liros Dyneema DC 120, Ø0.8 mm
Lines-middle level	Liros Dyneema DC 100, Ø0.7 mm
Lines-middle level	Liros Dyneema DC 060, Ø0.6 mm
Lines-bottom level	Edelrid Aramid 8000/U-090, Ø0.8 mm
Lines-bottom level	Edelrid Aramid 8000/U-130, Ø1.0 mm
Lines-bottom level	Edelrid Aramid 8000/U-190, Ø1.2 mm
Lines-bottom level *	Edelrid Aramid 8000/U-230, Ø1.3 mm
Brake lines	Line Code
Lines-top level	Liros Dyneema DC 040, Ø0.5 mm
Lines-middle level	Edelrid Aramid A8000/U-070, Ø0.70 mm
Lines-middle level	Edelrid Aramid A8000/U-090, Ø0.80 mm
Lines-bottom level	Edelrid Aramid A8000/U-190, Ø1.20 mm
Lines-bottom level	Edelrid Dyneema A-10/N-300-024, Ø2.50 mm
Risers	Fabric Code
Webbing	Mouka Tišnov PAD, 1.6 x15 mm
Pulleys Speed-system	Ronstan RF25109
Pulleys Brakes	Ronstan RF13101-2
Carabiners	Maillon Rapide MRSI03.5 S12

\*. size 30 only

#### Altered materials for Light version

Canopy	Fabric code
Upper sail-leading edge	Porcher Marine 70032 Skytex 32, E4G - Everlast, 36 g/m <sup>2</sup>
Upper sail-rear part	Porcher Marine 70000 Skytex 27, E3H - Classic II, 27 g/m <sup>2</sup>
Bottom sail	Porcher Marine 70000 Skytex 27, E3H - Classic II, 27 g/m <sup>2</sup>
Ribs, Diagonals A, B	Porcher Marine 70000 Skytex 27, E91 Hard, 27 g/m <sup>2</sup>
Diagonals C	Porcher Marine 9017 Skytex 40, E29 - Hard, 40 g/m <sup>2</sup>
Risers	Fabric Code
Low friction ring - brakes	Antal R07.05
Carabiners	Maillon Rapide MRDI03.5 S10



### 3. CERTIFICATION

Aspen6 is EN-C and LTF-C certified in all sizes.

The EN/LTF certificate for each Aspen6 is located on a rib in the middle of canopy. Certification is valid for the use with all ABS harnesses. This type of harness allows a certain degree of adjustment to be made to the length of the waist strap. Between 46 cm and 48 cm - with regard to size of the glider - is the recommended distance between the karabiners.

In common with all other paragliders, when looser cross-bracing is used while flying the Aspen6, the pilot's weight-shift control is greater. The glider is also more sensitive to the movement in the surrounding air. When cross-bracing is tighter, the pilot feels subjectively more stable, however turning by weight-shift is less effective.

**WARNING:** *The Aspen6 paraglider is only built for hill or tow launching. It is not built to withstand jumping from a plane, balloon, building or for any jumps where there is a belated opening of the canopy. Use of subsidiary motor (eg paramotoring) has not been tested by the manufacturer or by any other testing body.*

### 4. ADJUSTING YOUR GLIDER

Before it reaches the customer every Aspen6, goes through a final check and test-flight to verify that its characteristics and measurements correspond to the manufacturer's specifications. You may only make adjustments to brake-line lengths or to the speed system of your Aspen6 – and only then in keeping with the recommendations of this manual.

Other adjustments or changes to your Aspen6 lead to a loss of guarantee, airworthiness and validity of the certification. Do not endanger yourself and other pilots by amateur modification. If you have any suggestions for improvements let us know and our test-pilots will try out your ideas.

#### 4.1. Brake line adjustment

When you receive your new Aspen6 the main brake lines are adjusted to the length set during the certification test. This length should suit most pilots and is indicated on the main control line (R0.0) . It is of course possible to adjust the brake-line length to suit each pilot's physical build, height of harness hang points, or style of flying. We recommend that **you act wisely when adjusting brake-line length and change the length in small, successive steps.**

If you need to adjust brakes back to the basic position and the marks on the main brake lines are vague, use the following lengths for relevant size:

Aspen6 22: 110 cm  
 Aspen6 24: 115 cm  
 Aspen6 26: 120 cm  
 Aspen6 28: 126 cm  
 Aspen6 30: 131 cm

#### **Brake lines that are too short may:**

- Lead to fatigue from flying with your hands in an unnatural position.
- Impede recovery from certain unstable manoeuvres.
- Certainly reduce speed range of your glider.

#### **Brake lines that are too long may:**

- Hamper pilot's control during launch.
- Reduce control in extreme flying situations.
- Make it difficult to execute a good flare while landing.

Each brake line should be tied securely to its control handle. Use knots which will guarantee this, for example, Double Dragon.

## 4.2. Addition of the speed system

Aspen6 is equipped with a very effective foot-operated speed system as standard. Pressure on the foot stirrup shortens the A and B risers and by this reduces the angle of attack of the canopy. Make sure you can use the whole range when you attach your speed stirrup. For some pilots this will require the use of a two-step speed stirrup.

## 5. OPERATION IN FLIGHT

**This manual is intended as a guide to the characteristic features of your new Aspen6 paraglider. Under no circumstances should it be used as a 'learn-to-fly' manual for paragliding or as a substitute for a paragliding training course.**

### 5.1. Standard flight

#### 5.1.1. Pre-flight check

Pre-flight check is essential part of getting ready to fly and that's why you should pay special attention to it. Check the canopy and the lines for damage, clear the lines of any tangles, check the riser maillons, speedbar connectors and don't forget to check your harness and your reserve parachute.

**Before launch spread the canopy out into a slight arc and check that:**

- all cell openings are free
- no lines are looped around or under the canopy
- no lines are tangled or have a knot in them
- any twigs, grass or other objects are not entangled in the lines or in the canopy
- the risers are not twisted
- the brake lines run freely through the pulleys
- the knots on the brake handles are secure
- the karabiners on the risers are tightened

#### 5.1.2. Launch

Launching Aspen6 is straightforward, either by front launch or by reverse launch. A dynamic pull of the front risers (A, coloured red) will bring the canopy simply and easily above the pilot's head. The canopy inflates from the centre equally and smoothly. The Aspen6 has no tendency to outrun the pilot and quickly stabilises above the pilot. Once there, visually check the canopy and the lines before taking off. Take off can be made easier by a light pull on the brakes.

#### 5.1.3. Flight

Aspen6 is trimmed to fly at best glide when the brakes are fully up. Best sink rate is achieved when both brakes are drawn down evenly to about 10-15% of their range.

### Flying in turbulent conditions

When flying through severe turbulence, stabilise the canopy with simultaneously applying a little brake (C handles) to both sides. Flying with a little brake applied will also help to prevent deflations and give you more feedback about the air is doing and how the glider is reacting. Responding correctly to the paraglider's movement by means of the brakes and weight shift is known as 'active flying'. A pilot demonstrating good active-flying skills will significantly reduce both the number and severity of collapses he or she experiences.

### Turning

Aspen6 is very comfortable and pleasant in turns. Handling characteristics are responsive and accurate and demand no special habits or non-standard procedures. When developing Aspen6 special attention was devoted to the brake pressure. The result is that brake travel and pressure have been optimised.



Brake pressure is reassuringly progressive. In flight, brakes are firm but responsive and precise and allow perfect communication with the canopy. You will find that a harness with fairly loose cross-bracing will help the glider turn. In an emergency (e.g. a broken brake line) the glider can be steered with the rear risers or by weight shift.

### Using the speed system

Maximum speed is one of the strong points of Gradient paragliders and Aspen6 is no exception. Not only has the glider a very high maximum speed, but unlike some other paragliders the full speed range is useable. Don't forget that any collapse at full speed will be more severe than the same event experienced at normal trim speed. Always keep both hands on the controls when flying fast in turbulence and be ready to release the speed system immediately at the first sign of a collapse. Use the speed system very carefully, or not at all at low altitude.

#### 5.1.4. Landing

Landing with Aspen6 is very simple and shouldn't cause any problem. On your first flights you may be surprised at how well it glides. Take account of this when making your landing approach! Into wind, at about one metre above the ground pull the brakes down all the way. In nil-wind conditions, or if forced to make an emergency landing downwind, you may prefer to take a wrap around each control line to enable a more dynamic flare.

### 5.2. Fast descent

Sooner or later every pilot will need to descend quickly. It might be because of a sudden and unexpected change in the weather, reaching cloud base and not wishing to enter cloud, or simply because you need to finish your flight quickly. Additionally, if landing is thermic, it is often very difficult to land without using a rapid-descent method. There are three main methods for achieving a rapid descent and they are: Big Ears, B-Line Stall and Spiral Dive.

***Practise these manoeuvres under the supervision of an instructor and with a reserve parachute. Never compromise your safety.***

#### 5.2.1. Big Ears

This is the easiest technique for a rapid descent. Depending on how much of the wing tip you deflate, 3 m/s to 6 m/s sink rate can be achieved.

While in Big Ears your sink rate and forward speed can be further increased by using the speed system. Aspen6 can be steered while Big Ears are in by means of weight shift.

**Initiation:** Grab the outer A-lines on both sides as high as possible and pull them down smoothly. Hold them firmly. The effective area of the glider is reduced equally on both sides of the wing. The size of the deflated area depends on how deeply the lines are pulled down (or on the number of lines pulled – one or two outer lines on both sides). Be sure to pull both sides equally.

**Recovery:** Under normal circumstances Aspen6 will open automatically when the A-lines are released. Opening may be accelerated by gently pumping the brakes (repeated symmetrical braking on both sides).

**CAUTION:** *The bigger sink rate of the glider increases the angle of attack. By pushing the speed bar, this effect is compensated.*

#### 5.2.2. B-Line Stall

This is an effective rapid descent technique. Depending on how far the B-risers are pulled down, the sink rate is between 5 m/s and 8 m/s.

**Initiation:** Grab the B-risers at the top and smoothly pull them down until the canopy shows a spanwise crease where the B-lines attach to the sail. Your sink rate will increase considerably while your forward speed will decrease practically to zero. Don't be startled when the airflow over the top surface is

interrupted and the glider enters a parachutal stall without moving forward. It will soon stabilise above your head. **Stability of the canopy in this manoeuvre can be significantly improved when pulling the B-risers simultaneously down and outward.**

**Recovery:** On releasing the B-risers Aspen6 automatically returns to normal flight without staying in deep stall or shooting in front of the pilot. Let go of the risers smoothly and symmetrically.

**CAUTION:** *Do everything symmetrically and at the same time. If the B-risers are released unevenly the canopy can enter a turn. If the risers are released slowly and very unevenly you could enter a spin.*

### 5.2.3. Spiral Dive

The Spiral Dive is the most effective way of making a fast descent. Every pilot should be able to perform a spiral dive and one day you may need to. In a Spiral Dive always stay aware of your altitude, which decreases very rapidly. The sink rate reached in a Spiral Dive can be more than 16-18 m/s. During the manoeuvre the pilot and glider will experience strong centrifugal forces. Forces of greater than 3G are possible – a great strain on the pilot as well as the glider.

**Initiation:** Smoothly pull on one brake so that the glider goes from a normal 360-degree turn into a steep turn and from there into a spiral dive. The transition into a spiral dive can be made easier by weight shifting to the inner side of the turn. Keep an eye on the tension of the brakes all the time: reduced tension signals an overload of the glider and danger of falling into a negative spin.

**Recovery:** Aspen6 recovers from a Spiral Dive automatically as soon as the brakes are released. Release them smoothly and always finish a Spiral Dive with safe altitude!

**CAUTION:** *When exiting the Spiral Dive make sure your position in the harness is neutral. Recovery from a Spiral Dive can be delayed if you are weight shifting to the inner side of the turn.*

## 5.3. SIV manoeuvres

No matter what category of canopy you fly or what level of certification it has, in turbulence or in strong thermals you may experience all kinds of collapses.

Aspen6 behaves comfortably in these situations. Indeed not only does the glider deal with extreme flight situations automatically, but it also offers – for its category – an above-average degree of safety. Even so, you must follow all safety rules when practising SIV. Always pay attention to your altitude.

### Before performing any SIV manoeuvre remember:

- Practise throwing your reserve on the ground, in a simulator, so that reserve deployment is efficient and automatic.
- Rapid altitude loss and considerable rotational forces may develop during unstable manoeuvres. Take account of these factors when throwing your reserve.

#### 5.3.1. Asymmetric Collapse – one side of the canopy collapses

**Initiation:** Grab the outer A-line on one side and pull it down smoothly. The wing tip will collapse to form a characteristic Big Ear. The size of the ear depends on the depth to which the lines are pulled. You can stop any turn tendency by applying the opposite brake and by weight shifting onto the inflated side of the canopy.

**Recovery:** Under normal conditions Aspen6 will reinflate spontaneously when the pulled lines are released. Inflation time and loss of altitude can be reduced by suitable piloting. To stop any tendency to turn off course pull the brake on the inflated side (be careful not to overreact and stall the inflated side) and weight shift to that side. If the collapse remains then reinflate the collapsed side by 'pumping' the brake on the collapsed side.



**CAUTION:** *It is very important to execute this manoeuvre very carefully. Due to the high compactness of the leading edge and collapse resistance it is quite difficult to find a right degree of pulling of A-risers down. This applies particularly to the asymmetric collapse of 75% at full speed!*

### 5.3.2. Full Frontal Collapse

**Initiation:** Grab both A-risers at the top and pull them down fluently until the leading edge collapses.

**Recovery:** Recovery time depends on how much of the canopy has collapsed. In normal conditions Aspen6 will recover into normal flight automatically as soon as the front risers are released. **Applying the brakes on both sides simultaneously can help reopen the paraglider.**

**CAUTION:** *It is very important to execute this manoeuvre very carefully. Due to the high compactness of the leading edge it is quite difficult to find a right degree of pulling of A-risers down. If you pull them down too quickly, a massive collapse could happen!*

### 5.3.3. Deep stall

**Initiation:** Pull both brakes smoothly until the sink rate increases markedly and the forward speed reaches almost zero. The pull on the brakes should be controlled so that the canopy stays inflated and doesn't fall back into a full stall.

**Recovery:** Aspen6 cannot stay in deep stall flight, so after the brakes are released the glider automatically returns to normal flight. If you need to, you can accelerate recovery by pulling hard on both brakes, followed by a fast release. Or you can pull lightly on the A-risers.

**CAUTION:** *If you pull too hard on the A-risers you may experience a full frontal collapse.*

### 5.3.4. Full stall

**Initiation:** Wind the control lines once or twice around your hands and pull both of them down smoothly. Hold them down until the canopy falls behind the pilot and deforms into a characteristic crescent shape. Hold your hands firmly (press them underneath the seat) and be careful that you do not release the brakes prematurely or asymmetrically.

**Recovery:** Aspen6 recovers from a full stall automatically once the brakes are smoothly released. During correct recovery from a full stall Aspen6 shows no extreme tendencies such as diving in front of the pilot. If the brakes are released prematurely or too quickly there is a possible tendency for the glider to dive ahead of the pilot. This can be corrected by adequate simultaneous braking on both-sides.

**CAUTION:** *When exiting a Full Stall, if the brakes are released asymmetrically the glider may suffer a massive asymmetrical collapse followed by a tendency to enter a spin.*

### 5.3.5. Spin

**Initiation:** Slow down by braking to nearly minimum speed. Then pull a brake on one side all the way down while simultaneously releasing the brake on the other side. Because the stalled side falls back, the canopy suffers airflow disruption over one half of the wing which results in a spin and a rapid loss of altitude.

**Recovery:** Under normal circumstances Aspen6 is capable of recovering from a spin automatically when the brakes are released.

**Caution:** *In general, when there is a very fast or a long-lasting rotation and when the brakes are released too quickly, the canopy may shoot in front of the pilot followed by a massive asymmetrical collapse.*

**Warning:** *Whenever a paraglider is not in normal flight and airflow is disrupted there is always a rapid increase in sink rate and therefore a substantial loss of altitude.*

**Remember:** *When practising SIV the wrong manoeuvre at the wrong time may change a fairly easy situation into a dangerous problem. You are also exposing your glider to forces that may damage it. Practise SIV manoeuvres only under the supervision of an instructor and with a reserve parachute.*

## 6. MAINTAINING YOUR GLIDER

If you handle your glider with care and store it in a suitable place it can last you a very long time. On the other hand, neglecting maintenance, bad storage and the use of unsuitable cleaning products can reduce the lifespan of your glider significantly or may even make it dangerous.

### You must keep to these rules:

- Choose a suitable area for your launches. Lines caught on roots or rocks lead to unnecessary strain on the attachment tabs during inflation. Snagging the lines may rip the canopy tissue or damage lines.
- When landing, **never let the canopy fall on its leading edge** in front of the pilot. The effect of these forceful collisions and the sudden pressure increase can severely damage the air-resistant coating of the canopy as well as weaken the ribs and seams.
- Protect the canopy from unnecessary strain. Inconsiderate handling of your glider – pulling it over grass, soil, sand or rocks – will significantly reduce its lifetime and increase porosity.
- When preparing the paraglider for a launch or when ground handling, be sure not to step on any of the lines or the canopy.
- Don't tie any unnecessary knots in the lines. Packing methods where special knots are made in the lines as used on parachutes and reserve parachutes are not suitable for packing the lines used on paragliders.
- Protect your canopy and lines from unnecessary exposure to sunlight. UV-rays can damage many parts of a paraglider.
- Try **not to pack your glider when wet**. If it's unavoidable then dry it as soon as possible but away from direct sunlight. **Be careful to avoid storing your canopy wet** - this is the most common reason for cloth degradation, and is easily preventable.
- Don't let your glider come into contact with seawater. If it does, rinse the lines, canopy and risers with fresh water and dry before storing.
- After flight or when storing always use the inner protection sack.
- When storing or during transport make sure your glider isn't exposed to temperatures higher than 50 degrees Celsius.
- Never let the paraglider come into contact with chemicals. Clean the glider with clean lukewarm water only.
- When packing the glider we recommend concertina folding the reinforced leading edge to avoid damaging the plastic reinforcements.
- For long-term storage don't pack the glider too tightly. Store it in a cold, dry and well-ventilated room.
- After tree- or water-landings always examine the glider carefully. If you suspect that the flight features of your paraglider have changed, contact an authorised Gradient supplier as soon as possible.

## 7. CHECKING YOUR GLIDER

After 150 flying hours or two years your Aspen6 must be thoroughly checked and tested by the manufacturer or by a Gradient authorised service centre. This check is primarily focused on:

- measuring of porosity
- measuring of tear strength of fabric
- sewing of panels, attachment points, cell openings, etc.
- condition of lines and risers
- line strength
- geometry of the suspension system



All data are recorded in the test report. On the basis of the real wing's condition, authorized technician will define the next check interval: under normal circumstances it is two years.

***We recommend the geometry check every year for keeping the best performance of your Aspen6.***

***Life span of the lines is usually four years or 200 flying hours, after that we recommend to replace.***

***The complete line set by Gradient or a Gradient authorized service centre.***

## **8. REPAIRING YOUR GLIDER**

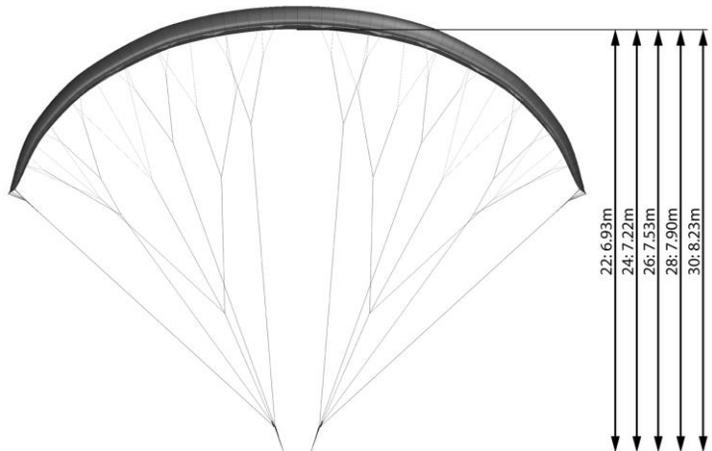
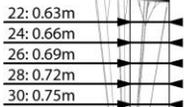
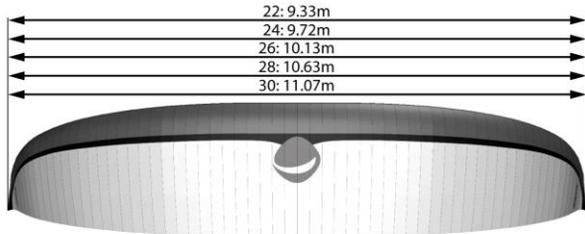
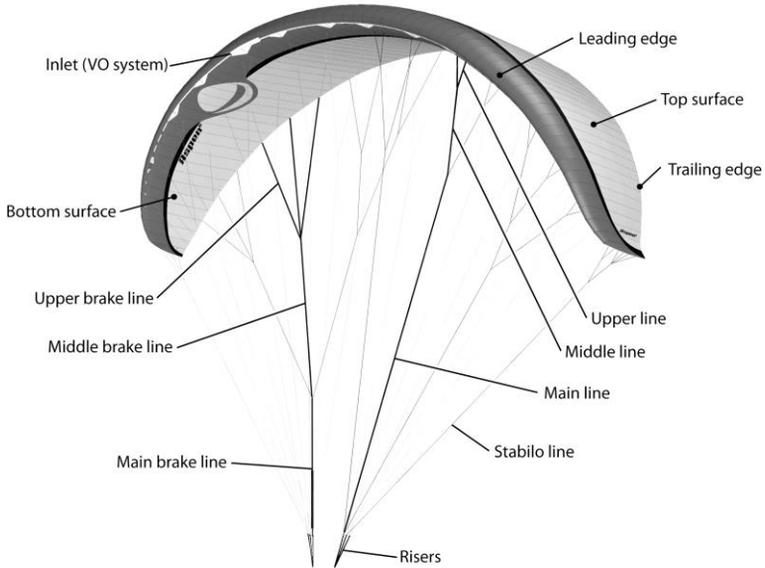
Only small repairs, that don't change the airworthiness of the paraglider, may be done by the user. These include: fixing small tears (but not seams) up to 10 cm; changing damaged lines; and changing rubber line-fixation rings on the small karabiners.

**When repairing your paraglider on your own keep to the following rules:**

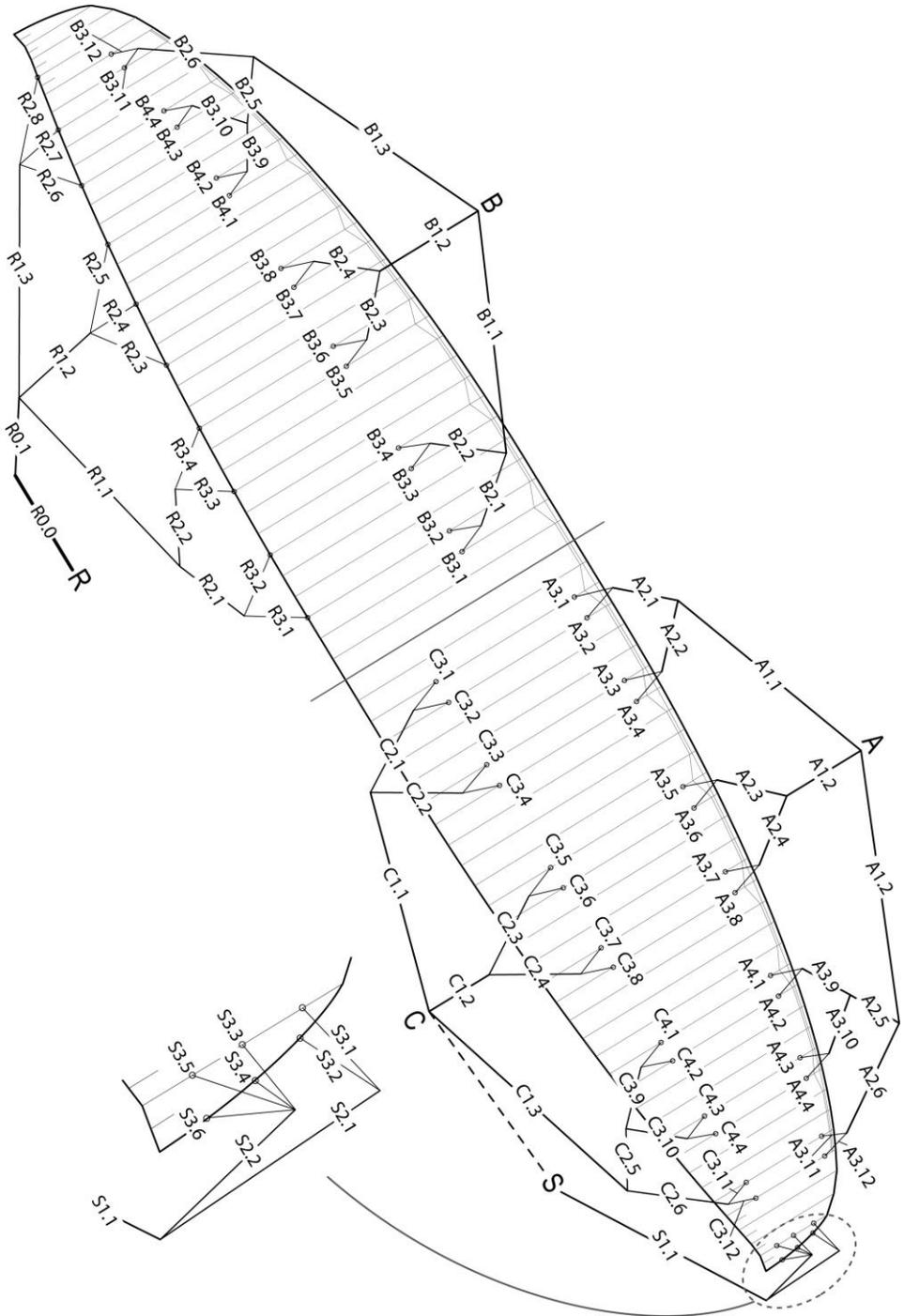
- When repairing the sail use a self-adhesive patch specified for this purpose. Every Aspen6 comes with a small amount of self-adhesive material which is enough for small repairs.
- The only admissible repairs done on lines are those where the damaged lines are changed for new ones. Lines must be exclusively supplied by Gradient; an authorised dealer or authorised service centre. When ordering new lines use the codes in the attached line diagram. Use the code 'ASP6' and size of the glider, followed by the line code. E.g. the outside long line in row A for a Aspen6-28 is: 'ASP6-28 A1.2'.
- An exception to this is an emergency repair of brake line while out flying. For this purpose Gradient encloses a spare line with every Aspen6 with a prepared loop on one end. To get the right length adjust it according to the same line on the opposite side of the canopy. As soon as you can, change the line for an original one from your authorised Gradient service centre.
- After changing any line a thorough pre-flight check must be done. Don't hesitate to ask your instructor or an experienced colleague for help. If you're not sure, entrust the job to either the manufacturer or an authorised Gradient dealer.

If you have to replace any of the line-tidy rings (a spare rings are supplied with each Aspen6) check that the lines haven't been swapped accidentally and that they are returned to the small karabiner in the correct order.

### 9. DIAGRAM & DIMENSIONS



### 10. LINE PLAN



## 11. ENJOY YOUR FLYING

Even though Aspen6 has outstanding performance and stability it must be understood that even the safest paraglider is an aircraft and that all air sports can be relatively dangerous.

Remember that your safety lies in your own hands and that it is always your responsibility to be well prepared.

Never underestimate weather conditions. And never forget that you are flying for pleasure and not to become a 'fallen hero'. Remember this and the fun that only free-flying can bring will be yours.

We believe that your sensible attitude and the flight characteristics of your Aspen6 will combine to ensure you have many hours of fantastic flying.

For all our gliders we use Porcher materials which are made under environmental laws of the EU and all the coating is environmentally friendly.

When your glider gets to the end of its life we recommend to use Porcher recycling Program to dispose it.

**GRADIENT wishes you many fabulous flights and happy landings.**



*Lukáš Pohl*  
R&D team - designer



*Ondřej Dupal*  
R&D team - director

## 12. CUSTOMER CARE

Please contact your nearest Gradient dealer for any questions concerning your Gradient equipment.

You can find the list of all Gradient dealers on our website.

<http://www.gradient.cx/en/Agencies>

For all other questions or requests please email us at [gradient@gradient.cx](mailto:gradient@gradient.cx)

Our production and development centre is located in the Czech Republic

Gradient.s.r.o.  
Plzeňská 130/221  
150 00 Praha 5 – Motol  
Czech Republic

Tel/Fax: +420 257 216 319  
[www.gradient.cx](http://www.gradient.cx)  
[gradient@gradient.cx](mailto:gradient@gradient.cx)

