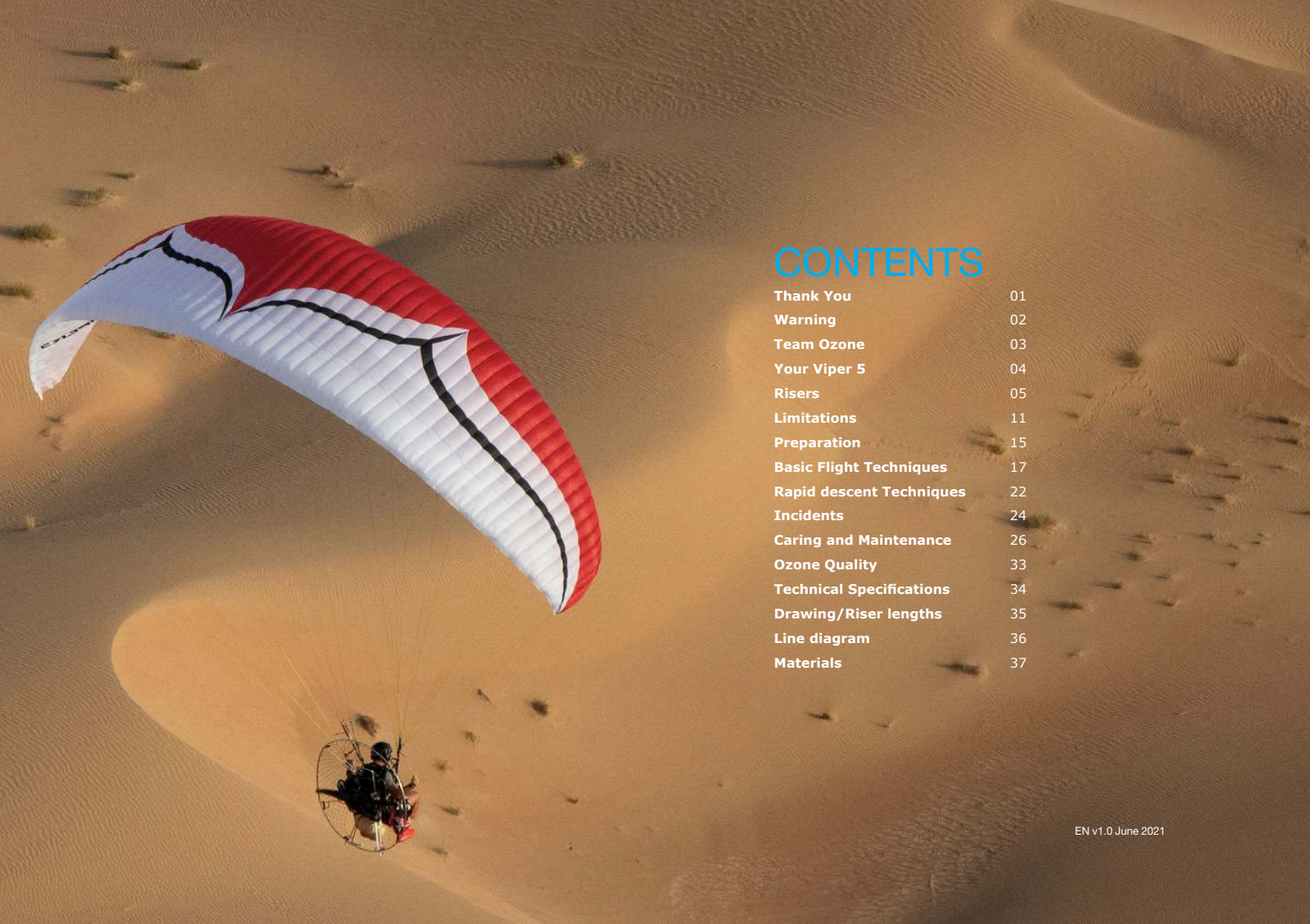
VIPER5

Pilots Manual EN



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THANK YOU

Thank you for choosing to fly Ozone. As a team of free flying enthusiasts, competitors and adventurers, Ozone's mission is to build agile paragliders of the highest quality with cutting edge designs, performance and maximum security.

Confidence and belief in your paraglider is a far greater asset than any small gains in performance - ask any of the Ozone pilots on your local hills, or those who have taken our gliders on ground-breaking adventures or stood on podiums around the world. All our research and development is concentrated on creating the best handling/performance characteristics possible with optimum security. Our development team is based in the south of France. This area - which includes the sites of Gourdon, Monaco and Col de Bleyne - guarantees us more than 300 flyable days per year, this is a great asset in the development of the Ozone range.

As pilots we fully understand just how big an investment a new paraglider is. We know that quality and value for money are essential considerations when choosing a new wing, so to keep costs low and quality high we manufacture all of our products in our own production facility. During production our wings undergo numerous rigorous quality control checks that are fully traceable, this way we can guarantee that all of our paragliders meet the same high standards.

It is essential that you read this manual before flying your wing for the first time. The manual will help you get the most out of your new wing, it details information about the design, tips and advice on how best to use it and how to care for your wing to ensure it has a long life and retains a high resale value. For the latest updates, including all technical datas please refer to the online version. This can be found on the product's page on at www.flyozone.com

If you need any further information about any of our products please check flyozone.com or contact your local dealer, school or any of us here at Ozone.

Safe Flying!
Team Ozone

WARNING

- Paragliding/Paramotoring is a potentially dangerous sport that can cause serious injury including bodily harm, paralysis and death. Flying an Ozone paraglider is undertaken with the full knowledge of the involved risks.
- As the owner of an Ozone paraglider you take exclusive responsibility for all risks associated with its use. Inappropriate use and or abuse of your equipment will increase these risks.
- Any liability claims resulting from use of this product towards the manufacturer, distributor or dealers are excluded.
- Be prepared to practice as much as you can - especially ground handling, as this is a critical aspect of paragliding. Poor control while on the ground is one of the most common causes of accidents.
- Be ready to continue your learning by attending advanced courses to follow the evolution of our sport, as techniques and materials keep improving.
- Use only certified paragliders, harnesses with protector and reserve parachutes that are free from modification, and use them only within their certified weight ranges. Please remember that flying a glider outside its certified configuration may jeopardise any insurance (e.g. liability, life etc) you have. It is your responsibility as the pilot to verify your insurance cover.
- Make sure you complete a thorough daily and preflight inspection of all of your equipment. Never attempt flying with unsuitable or damaged equipment.
- Always wear a helmet, gloves and boots.
- All pilots should have the appropriate level of license for their respective country and third party insurance.
- Make sure that you are physically and mentally healthy before flying.
- Choose the correct wing, harness and conditions for your level of experience.
- Pay special attention to the terrain you will be flying and the weather conditions before you launch. If you are unsure do not fly, and always add a large safety margin to all your decisions.
- **NEVER fly your glider in rain, snow, strong wind, clouds or turbulent weather conditions.**
- If you use good, safe judgment you will enjoy many years of paragliding/paramotoring.

TEAM OZONE

Everyone at Ozone continues to be driven by our passion for flying, our love of adventure and our quest to see Ozone's paraglider development create better, safer and more versatile paragliders.

The design team consists of David Dagault, Luc Armant, Fred Pieri, Russell Ogden, Honorin Hamard, Emilia Plak and Alex Mateos. Dav has a wealth of experience in competition flying, XC, XAlps and paraglider design. Luc, a dedicated XC and competition addict has a background in naval architecture. Fred, our resident geek is a mathematician, mechanical engineer and vol Biv specialist. Russ is a competition pilot and test pilot with 1000s of hours testing experience. Honorin has been flying since he was 13, naturally talented, he has already become world champion. Between them, they bring a wealth of knowledge, ideas and experience and work closely together in the design and testing process.

Former female World champion, Emilia Plak manages the paramotor department, she is helped by Alex Mateos. As two of the world's finest pilots holding World, European and French Paramotoring champion titles between them, they offer valuable advice and feedback throughout the development process, helping to produce the perfect blend of safety, speed and performance.

Mike Cavanagh is the boss and multiple winner of the UK XC league, when not out flying he generally keeps control of the mayhem. Back in the office Karine Marconi, Chloe Vila and Isabelle Martinez run the show. These wonderful ladies look after the ordering system, the dealers, the design team and the general day to day running of the company - without them it would be chaos.

Our own manufacturing facility in Vietnam is headed up by Dr Dave Pilkington who works relentlessly manufacturing gliders and producing prototypes as well as researching materials and manufacturing processes for our future products. He is backed up by a superb team managed by Khanh and Phong with over 1000 production staff.

YOUR VIPER 5

The Viper 5 is a high performance PPG wing designed for experienced pilots searching for the highest levels of efficiency, speed and performance. It features the latest design elements and technology taken directly from our high performance PG and PPG development programs to deliver a super-sleek, exciting wing, ideal for XC flying and classic competitions.

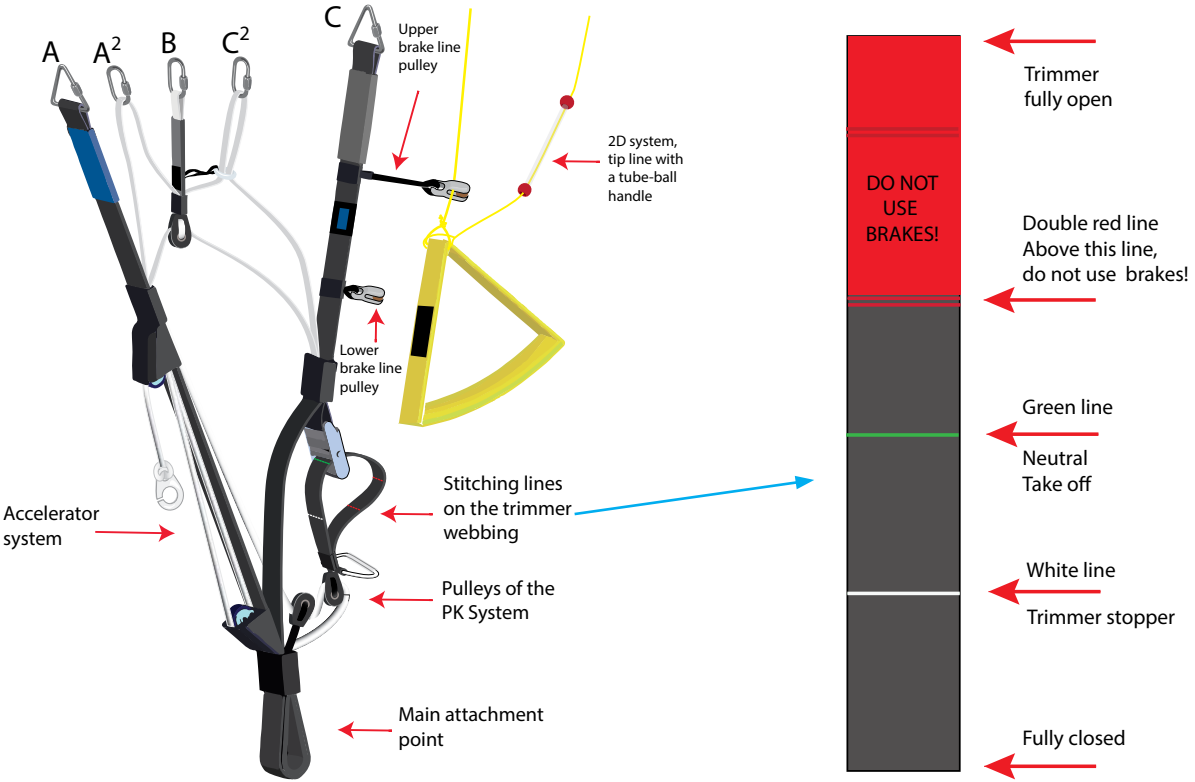
Based on the successful Viper 4, the Viper 5 shares the same planform, aspect ratio and cell count. Gains have been made by smoothing the airflow at the leading edge with double 3D shaping, improving the tension of the trailing edge for reduced drag at all angles of attack along with adjustments to the internal structure for better sail cohesion and solidity. The proven reflex profile is super solid throughout the speed range and accepts low angles of attack giving a very fast top speed, up to 10kmh faster than its predecessor.

Higher performance allows for better fuel efficiency and extended XC flights so there is no need to fly over-powered. In thermal conditions its behavior is similar to a free flight paragliding wing with very agile, intuitive handling and exceptional climb and glide performance. The use of light weight fabric on the lower surface Reduces the overall weight of the sail and gives improved handling, greater feel and better inflation characteristics.

The Viper 5 features updated risers with a built in PK system directly connecting the accelerator and trimmers for a more direct action and an increased top speed. The risers also feature long range trimmers and new Rollercam trimmer buckles for a smoother action that are easier to adjust in the air. The risers also feature a new 2D steering system which improves high speed control.

Combined, these features make the Viper 5 the perfect tool for classic competitions and XC flying: Fast, efficient, solid and agile. Designed specifically for competent, experienced pilots, the Viper 5 is a real pleasure to fly and is ready to take you on your next adventure.

RISERS & TRIMMERS



The risers feature long range Rollercam trimmers; stronger brake handle magnets; 2D steering system; PK accelerator system; fully adjustable brake pulley height settings and coloured A risers for easy identification. The risers are simple and easy to use, the full foot-operated accelerator range is always accessible irrespective of the trimmer position. Unlike some other PPG wings, it is safe and possible to use the full range of the speed system even with the trimmers in the fully slow position without reducing the inherent stability of the profile.

Trimmers

The long range trimmers feature a series of coloured stitching lines to aid the pilot.

The green line is the neutral position where all the risers are of the same length, this is the recommended take off setting. When set lower, below the green line the wing still inflates smoothly and cleanly, just slightly slower than when set to the green line, however the wing generates more lift, requiring less speed for take off. Setting the trimmers slower is recommended for lower powered engines, high wing loadings or high altitude take offs. The 'best' setting depends on your own personal preference.

The double red stitch lines indicate the maximum limit where it is safe to use the brakes for directional control without reducing the inherent stability of the profile. When flying faster than the red line, whether by further releasing the trimmers or applying additional speed bar, do not use the brakes, instead use the tip steering system for directional control.

The fully slow position is ideal for climbing under power and whilst thermalling or free flying, the brake pressure is at its lightest and the handling, sink rate and glide performance at its best. This is the most suitable (safest) position to set when flying in very turbulent air, the wing is easier to manage and the post collapse behaviour at its most benign. To increase cruise speed you can use the accelerator system, release the trimmers, or do both.

Due to the long trimmer range you must NOT shorten the factory set brake lengths otherwise you risk engaging the trailing edge when the trimmers are released.

Accelerator System

The risers feature a foot operated accelerator system with ball bearing pulleys for easy, comfortable high speed cruising. Maximum speed is achieved with the trimmers set to the green line and the speed bar fully accelerated (pulleys overlapped) but be careful, at this speed the wing is very fast and should only be used in calm conditions and with sufficient altitude.

The PK (Paap Kolar) System

The risers feature a PK system which links the front and rear risers to combine the effect of the accelerator and the trimmers. The advantage of the PK system is that it achieves greater speeds but with the same accelerator travel essential for competitive slalom flying where it is not efficient to keep releasing or pulling the trimmers along the course. When accelerating use a gentle action on the speed bar otherwise, due to the directness of the system it is possible to create a significant pitch movement. The brakes MUST NOT be touched whilst flying fast, instead use the TST for directional control.

The Ozone PK system is permanently built into the risers. The speed bar can be applied irrespective of the trimmer setting, unlike some other wings, it does not lock the trimmers in the fully slow position but allows the trimmers to be set as desired. Top speed is reached with the trimmers set to the green line and the speed system fully activated. Releasing the trimmers further with the accelerator engaged does not increase the top speed. Whilst pushing the speed bar, only use the tip steering lines for directional control. Never use the brakes.

The behaviour during collapse whilst using the PK risers could be more dynamic and the re-inflation could be slower than usual. Use active flying to control direction and pump out the deflation if necessary.

IMPORTANT

Using the accelerator decreases the angle of attack and can make the gliders recovery from a collapse more aggressive, therefore using the accelerator near the ground or in turbulence should be avoided.

IMPORTANT

When fully accelerated directional control should be maintained with the TST system. Do NOT use the brakes.

Brake Lines

The brake line lengths have been set carefully during testing. We feel it is better to have slightly long brake lines and to fly with a wrap when necessary. DO NOT shorten the factory set brake lengths otherwise you risk engaging the trailing edge when the trimmers are released.

- Ensure both main brake lines are of equal length.
- If a brake handle has been removed, check that its line is still routed through the pulley when it is replaced.
- When the brake handles are released in flight, the brake lines should be slack. There must be a substantial "bow" to guarantee no deformation of the trailing edge.
- There must be a minimum of 10cm of free play before the brakes begin to deform the trailing edge. This prevents the trailing edge from being deformed when using the speed system, releasing the trimmers or when controlling the wing with the TST.

Adjustable Brake Pulley Position

The height of the brake line pulley can be adjusted according to pilot preference and to suite the power unit's hang points height. Higher settings are for low hang point motors whilst a middle or lower setting are for units with higher hang points.

To adjust the pulley height, first remove them from the risers and re-attach at the desired position, then undo the Velcro magnet attachments and re-attach a few cms below the new pulley position. If you lower the pulley height, you must also lengthen the brake and TST lines by the same amount the pulleys have been lowered.

IMPORTANT
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 or the TST for directional control.

IMPORTANT
DO NOT shorten the factory set brake lengths.

IMPORTANT
If you adjust the brake pulley height, you MUST re lengthen the brake lines accordingly.

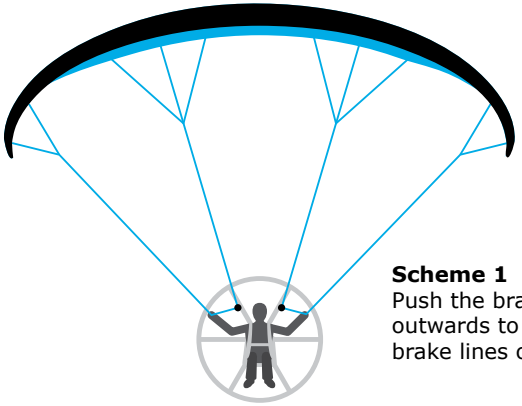
2D TST Steering System

The 2D system has been developed for competition slalom racing where precise control of the trailing edge is absolutely necessary. This system combines the brake lines and the TST so that each can be controlled independently or together giving added levels of precision.

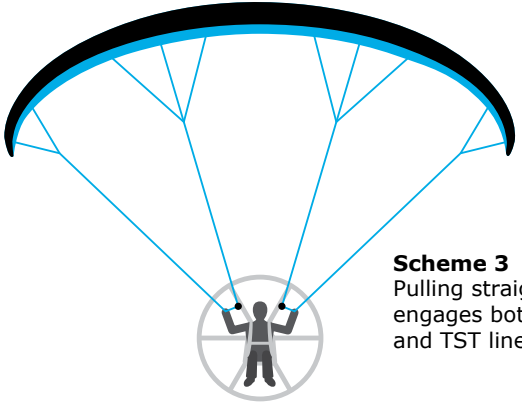
The 2D system can be set up and adjusted according to your personal preference, flying style and power unit hang point heights. The lower the brake pulley position on the risers the more effective the 2D steering system becomes, however the standard setting, as described below, is a good starting point for low hang point power units and a good compromise between comfort and ease of use.

The length of the TST line is critical and can be adjusted after the initial setup. Start by using the marked position on the TST line and then adjust to your preference thereafter. If you lower the brake pulley positions you must also re-lengthen the TST lines accordingly. The length of the brake lines must be adjusted so that they do not engage the trailing edge when accelerated to maximum speed (open trimmers and full speed bar). After any modification always check the set up on the ground before flying.

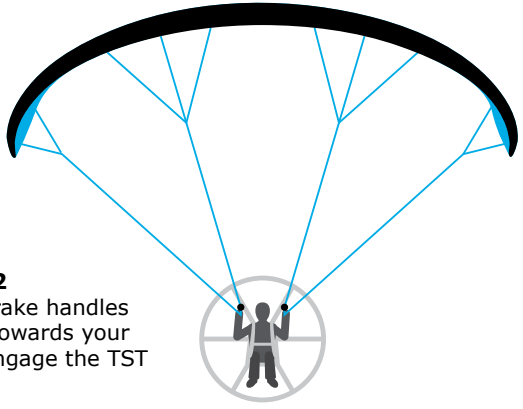
Pushing the handle away from your body engages the brakes in the middle of the trailing edge (Scheme 1), whilst pulling the hand close towards your body will engage the wing tips (Scheme 2). Pulling the brakes down in the normal manner will engage both the TST and the brakes (Scheme 3).



Scheme 1
Push the brake handles outwards to engage the brake lines only



Scheme 3
Pulling straight down engages both the brakes and TST lines



Scheme 2
Pull the brake handles inwards, towards your body to engage the TST lines

LIMITATIONS

Pilot Suitability

The Viper 5 has been designed as a high performance solo paramotoring wing for competent experienced pilots only. It is not suitable for beginner or intermediate pilots, nor is it intended for training, tandem flights or aerobatic manoeuvres.

Certification

In addition to our own extensive testing, this wing has passed the criteria required by the DGAC and has been load tested to the EN 926.1 standard. It has however, not undergone any independent flight certification.

IMPORTANT
In addition to our own extensive testing, the Viper 5 has passed the criteria required by the DGAC and has been load tested to the EN 926.1 standard.

Choosing Your Wing Size

The most suitable size wing for you depends on how you intend to use it. If you will be flying solely with a motor, aim for the middle of the PPG weight range (all up weight with wing, motor, fuel etc). However if you intend to also free fly with the wing, consider your all up free flying weight and aim to be near the top of the PG weight range.

Never fly above the recommended maximum PPG weight.

Wing Loading and Flight Characteristics

Wing loading has a significant effect on the flight characteristics and behavior of the wing. Heavily loaded, the Viper 5 is more responsive to pilot inputs and reacts more dynamically in turns with a greater loss of height. Recovery from collapses tend to be more impulsive and with higher pitch angles. High loading also makes the wing more likely to remain neutral in a spiral dive, especially when combined with a high hang point or trike power unit. Flying at the maximum recommended load is only suitable for more experienced pilots who have the necessary skills to control a more dynamic wing. High G rapid descent manoeuvres should be avoided when flying above the maximum recommended free flying weight or when flying with a trike or high hang point harness. Never fly above Ozone's recommended PPG weight range whilst under power.

IMPORTANT
Wing loading has a direct effect on the flying characteristics. The closer to the top of the recommended weight range the more dynamic and responsive the wing will be. Fly progressively.

Load test and wing loading information for PPG wings

To verify the structural strength of a paraglider or paramotor wing, the larger sizes of each model are subjected to the EN 926.1 load test. This test is comprised of two parts; a static shock test, and a sustained load test. First, using at least a 1000 kg weak link (higher for tandems) the wing must survive a brutal static shock test without any visible signs of damage to the lines or sail. The same wing then performs a sustained load test, inflated and pulled along a runway by a large truck until a three second average value of 8G is achieved without breaking. 8G is the minimum accepted load factor for EN certification, calculated by 8x the maximum permitted EN weight.

In addition to EN 926.1 our paramotor wings are also recognised by the DGAC, an entity responsible for Microlight (ULM) and lightweight powered aircraft (Paramotor) certification in France. Using the EN load test results, the DGAC accepts 5.25G as the maximum acceptable load factor. The recommended PG (free flight) and PPG (powered) weight ranges are indicated in the specifications for your reference.

We consider the DGAC load factor limit of 5.25G acceptable for "normal" PPG use - circuit flying, XC, adventure flying, Slalom racing, wing overs etc. Some rapid descent maneuvers fit into the "normal" definition: spiral dives with descent rates of ~10m/s are considered generally safe.

However, in our testing at Ozone we have recorded loads of up to 5.25G during 'normal' fully engaged, nose-down spiral dives, throughout the weight range. Theoretically, it should not be possible to break a wing whilst flying at the maximum PPG weight of the larger sizes (smaller wing sizes have an inherent safety margin due to the fact that the same number & type of lines carry a lower max weight), but when you consider:

a) the natural weakening of lines with age;
b) the potential of accidentally damaged lines during normal use;
c) and that during a spiral dive or other aggressive acrobatic manoeuvre the load is not distributed as evenly across the span as it is during a physical test;

There is significantly less structural safety margin in when flying close to the maximum DGAC weight.

IMPORTANT
It is strongly recommended to not perform deeply engaged, high sink rate spirals when flying with a trike.

For this reason, our recommendation to all PPG pilots when flying at high wing loadings (above the middle of the recommended PPG weight range) is to not perform deeply engaged nose down, high-G spirals and other aggressive aerobatic manoeuvres. Doing so poses a real risk of line failure with potentially fatal consequences.

Trike Flying

The Viper 5 may be used with a light solo trike so long as the maximum recommended weight range is respected. It is strongly recommended to not perform deeply engaged, high sink rate spirals when flying with a trike due to the increased risk of spiral neutrality / instability.

IMPORTANT
Do not perform high G spiral dives when flying with a trike or a high hang point harness.

Towing

The Viper 5 may be tow-launched. It is the pilot's responsibility to use suitable harness attachments and release mechanisms and to ensure that they are correctly trained on the equipment and system employed. All tow pilots should be qualified to tow, use a qualified tow operator with proper, certified equipment, and make sure all towing regulations are observed.

Flying in the Rain

Modern wings are susceptible to rain and moisture, flying with a wet wing can result in the loss of normal flight. Due to the efficient, wrinkle-free design of the sail, water tends to bead on the leading edge causing flow separation. Flow separation will make the wing more prone to entering inadvertent parachutal stalls, so flying in the rain, or with a wet wing (e.g early morning dew) should be avoided at all costs. If you are accidently caught-out in a rain shower, it is best to land immediately. If your wing becomes wet in the air it is advised to maintain accelerated flight using the speed bar and/or releasing the trimmers, even during the final approach.

IMPORTANT
Do not fly your wing when it is wet.

DO NOT use big ears as a descent technique, big ears increases drag, and with a wet wing this will further increase the chances of a parachutal stall occurring. Instead, lose height with gentle 360's and maintain your air speed at all times. If your wing enters parachutal stall when wet, immediately release the trimmers and accelerate the wing to regain airspeed.

Modifications

Your Ozone Viper 5 was designed and trimmed to give the optimum balance of performance, handling and safety. Any modification voids the certification and will also make the wing more difficult and dangerous to fly. For these reasons, we strongly recommend that you do not modify your glider in any way.

IMPORTANT
Do not modify your wing in any way.

Aerobatic Flying

This wing is not suitable for aerobatic manoeuvres, they are potentially very dangerous to perform and put abnormal stresses on the glider. Ozone strongly recommend you not undertake this style of flying.

Ozone cannot be held responsible for any damage or accident resulting from aerobatic flying.

IMPORTANT
Do not perform aerobatic manoeuvres.

SIV

It is permissible to practice SIV with the Viper 5 at trim speed only. Set the trimmers to the fully slow position and do not attempt to perform collapses accelerated or with the trimmers released. Do not attempt to perform any manoeuvres with the trimmers released, the reactions of the wing will be more aggressive and dynamic than with the trims set in the slow position.

IMPORTANT
During SIV set the trimmers to the slow position.

PREPARATION

Accelerator System

To set up the accelerator on the ground, ask a friend to pull your risers into their in-flight position while you sit in your harness. Now adjust the length of the line so that the main bar sits just beneath your seat. You should now be able to hook your heel in to the secondary (lower) loop of the accelerator.

The accelerator must be slack enough to ensure that the front risers are not pulled down in normal flight, but not so long that it is impossible to use the full range of the speed system. Ensure that the speed bar is secured in place before take off to avoid fouling the prop. Once set up, test the full range of the speed system in calm flying conditions: ensure that both risers are pulled evenly during operation. Fine-tuning can be completed when you are back on the ground.

Harness and Motor

The Viper 5 is suitable for all types of motor. There are many different motor units available and it is vitally important that you choose one that is suitable for your needs, weight and skill level. We recommend using units with low hang points or Goose neck systems. Using power units with high hang points is possible, but it will have a detrimental effect on the behaviour of the wing especially during spiral dives with an increased risk of neutrality.

IMPORTANT
We recommend flying with a chest strap set between 44-48cm.

Wing

To familiarise yourself with the glider it is a good idea to perform practice inflations and ground handling both with and without the motor. As with all new equipment, only fly in conditions that you would normally fly in and on a familiar site. Fly the wing in a progressive manner and be aware that wing loading has a direct effect on the wing's flying characteristics. The closer to the top of the recommended weight range the more dynamic and responsive the wing will be.

Preflight Checks

Lay out the wing downwind of your motor on its top surface in a pronounced arc, with the centre of the wing higher than the tips. As you unfold the wing check the upper and lower panels for any rips or tears, pay particular attention to the seams and line attachment points as these are load bearing. Never fly with a damaged wing.

Lay out the lines one side at a time and check for any obvious signs of damage. Hold the risers clear of the ground at shoulder height and starting with the brake lines, pull all lines clear. Repeat the process with the D, C, B and then the A lines, laying the checked lines on top of the previous set. Make sure no lines are tangled, knotted or snagged then mirror the process on the other side.

IMPORTANT
Always lay out your glider downwind of the motor, never leave the motor downwind of the wing or connected to the motor if unattended.

Take-off checklist:

1. Check reserve parachute - pin in and handle secure
2. Helmet on and fastened
3. All harness buckles closed - check leg-loops again
4. Carabiners and maillons tight
5. Holding the A's, your brake handles and throttle
6. Leading edge open
7. Aligned directly into wind
8. Engine warm and able to deliver full power
9. Trimmers set correctly
10. Prop clear of lines
11. Airspace and visibility clear

IMPORTANT
Never fly with a damaged sail or lines.

BASIC FLIGHT TECHNIQUES

Launching

Your Viper 5 will launch with either the forward or reverse launch techniques. To improve the inflation characteristics, it is advised to set the trimmers to the green lines.

When taking off under power, make sure there is enough clear space upwind of you to launch and climb out safely, avoiding trees, power lines and any other obstacles that may affect you should you have a power failure. Always fly with a safety margin so that power failures do not leave you compromised. You should always be able to glide power off to a suitable landing place.

Once clipped in, and you have gone through the take-off check list (above), stand central to the wing to ensure an even and progressive inflation. Whilst inflating your wing, you should hold both of the A risers on each side.

Run in an upright position so that the motor is generating forward thrust, do not lean too far forward otherwise the power of the motor will attempt to push you into the ground! When you have enough airspeed a gentle application of brake will help you lift off. Do not stop running until your feet have left the ground and you are sure of a safe climb out.

Forward Launch - Nil to Light winds

When the wind is favourable, move forward positively: your lines should become tight within one or two steps. The Viper 5 will immediately start to inflate. You should maintain a constant pressure on the risers until the wing is overhead.

Do not pull down or push the risers forward excessively, or the leading edge will deform and possibly collapse making taking-off more difficult and potentially dangerous.

Move smoothly throughout the entire launch, there is no need to rush or snatch at it. You should have plenty of time to look up and check your canopy before committing yourself. Once you are happy that the Viper 5 is inflated correctly, progressively apply full power and accelerate smoothly for the launch.

IMPORTANT

For take off and landing use only the brakes. In turbulent air use the brakes for directional, pitch and pressure control, DO NOT use the Tip Steering.

IMPORTANT

The trimmers should be set to the green line for the best inflation behaviour.

During a forward launch we advise to NOT use the power launch technique. During the inflation the power should be progressively applied once the wing is half way up. Applying the power too early may inhibit the inflation characteristics of the center part of the wing, causing the wing tips to come up faster.

Reverse Launch -Light to Strong Winds
Lay out your Viper 5 as you would for the forward launch. However, this time face the wing, and attach the risers in the correct manor (half a turn in each riser, and crossed in the direction you want to turn). Now you can pull up the Viper 5 by its A-risers. Once the wing is overhead, brake it gently, turn and launch.

In stronger winds, be prepared to take a few steps towards the glider as it inflates. This will take some of the energy out of the glider and it will be less likely to over-fly you. Once stable and above your head apply progressive power and accelerate smoothly for a controlled take off.

Practice ground handling and launching as much as possible! It is great fun, and will give you a much better feel for your Viper 5s flight characteristics. It will also improve your overall enjoyment of flying by making your launches easier and safer.

The Climb Out
Once in the air you should continue flying into wind whilst gaining height. By setting the trimmers to the green line position you will achieve the best climb rate. Do not attempt to climb too steeply or too quickly by using the brakes or slow trim. The wing already has a high angle of attitude, coupled with a higher AoA (if you use the brakes) plus the engine's full thrust acting on the pilot, this could contribute to make the glider more prone to stall. Furthermore, in the event of an engine failure the resulting backward pendulum motion of the pilot and the forward dive of the wing may bring you back to the ground very hard. Do not initiate turns until you have sufficient height and airspeed. Avoid low turns downwind with insufficient airspeed.

IMPORTANT
Never take off with a glider that is not fully inflated or if you are not in control of the pitch/roll of your wing.

The Viper 5 is well damped in roll but under certain circumstances it is possible for the pilot to induce oscillations. This is caused by a combination of the engine/propeller torque and pilot weight shift and/or brake inputs. To stop oscillations it is best to reduce the power slightly and ensure that you remain static with weight shift and brake inputs. Once settled you can once again apply full power. Under full power the torque effect will attempt to gently turn the wing, using weight shift or adjusting the trims asymmetrically is the best method to correct this.

The handling characteristic of the Viper 5 is truly amazing. We have worked hard on tuning the wing so that it turns tightly but also efficiently, as the ability to climb in a turn is very important for powered and free flight, making the climb out fun and thermalling easy.

Normal Flight

Once at a safe height you can release the trimmers for a faster cruise speed. If your motor has enough power, the Viper 5 will achieve very good straight line speeds whilst maintaining level flight with trims fully released. Be cautious when releasing the trimmers beyond the double red lines, only do so in calm conditions and do not use the brakes for directional control, instead use the TST.

For better penetration in headwinds and improved glide performance in sinking air, crosswinds or headwinds, you should fly faster than trim speed by using the accelerator system, or the trimmers.

For maximum glide/sink rate efficiency whilst flying downwind, release the speed bar and set the trimmers to the slow position.

By pulling the trimmers to the slow position and applying a small amount of brake, the Viper 5 will achieve its best minimum-sink rate; this is the speed to use for thermalling and ridge soaring whilst free flying.

Turning

To familiarize yourself with the Viper 5 your first turns should be gradual and progressive. To make efficient and coordinated turns with the Viper 5 first look in the direction you want to go and check that the airspace is clear. Your first input for directional change should be weight-shift, followed by the smooth application of the brake until the desired bank angle is achieved. To regulate the speed and radius of the turn, coordinate your weight shift and use the outer brake.

IMPORTANT
Never initiate a turn at minimum speed (i.e. with full brakes on) as you could risk entering a spin.

Active Flying

In turbulent air the Shark nose Ozone reflex profile (OZRP) is very stable. It will resist reasonable levels of turbulence without pilot input. The faster the wing is flown the more inherent stability there is as the reflex has a greater effect. Using the speed system has exactly the same effect as releasing the trimmers so it is safe and possible to fly with the trimmers in the slow position whilst using the full range of the speed system.

IMPORTANT
Always keep hold of your brakes. Do not fly in turbulent conditions

The key elements of effective active flying are pitch control and pressure control: In very turbulent air, if the glider pitches hard in front of you, use the brakes to slow it down. Equally, if the glider drops behind you, release the brakes to allow it to speed up. Avoid flying with continuous amounts of brake in rough air as you could inadvertently stall the wing. Always consider your airspeed.

IMPORTANT
Never apply the brakes whilst flying faster than the red line position - it makes the wing more prone to collapse. During accelerated flight use the TST for directional control.

In mild turbulence it may be best to not attempt to fly the wing actively and let the profile absorb the turbulence itself, indeed small applications of the brakes can reduce the inherent stability of the profile. However in strong turbulence Ozone recommends to always return the trimmers to the slow position (fully pulled) and fly the glider actively. This way, you will be in the best position to react correctly should an incident occur. No pilot and no glider are immune to collapses however in strong turbulence, correct active flying will virtually eliminate any tendency to collapse. When the conditions are very turbulent, be more active and anticipate the movements of your wing. Always be aware of your altitude and do not over-react.

Landing

The Viper 5 shows no unusual landing characteristics. We recommend the trimmers be set to the green stitching lines for landings. You can land un-powered or powered, here are some tips:

- Always set up your landing early, give yourself plenty of options and a safe margin for error and make sure you are heading INTO wind.
- Once below 30 metres avoid turning tightly as the glider will have to dive to accelerate back to normal flight.
- Allow the glider to fly with speed for your final descent until you are around 1 metre above the ground. Apply the brakes slowly and progressively to slow the glider down until the glider stalls and you are able to step onto the ground.
- It is safest to perform un-powered landings as this reduces the likelihood of propeller damage caused by either falling over or allowing the lines to foul the prop. Turn off the engine at around 30m and glide in like a normal paraglider.
- Powered landings offer the chance to power up and continue with the flight if you misjudge your final approach, but can be more expensive if you get it wrong!
- Choose the appropriate approach style in function of the landing area and the conditions.
- In light winds you need a strong, long and progressive flare to bleed off all your excess ground speed. In strong winds your forward speed is already low so you are flaring only to soften the landing. A strong flare may result in the glider climbing upwards and backwards quickly, leaving you in a vulnerable position.
- In strong winds you need to turn towards the glider the second your feet touch the ground. Once facing the wing pull smoothly and symmetrically down on the brakes to stall the wing. If the glider pulls you, run toward it.
- If the wind is very strong, and you feel you might be dragged, stall the glider with the C risers. This stalls the Viper 5 in a very quick and controllable way and will drag you less than if you use the brakes.

RAPID DESCENT TECHNIQUES

Ozone would like to remind you that these manoeuvres should be learnt under the supervision of a qualified instructor and always used with caution. Never forget that properly analysing the conditions before launch will help avoid the need to use these techniques.

Big Ears

Folding in the wing tips of the Viper 5 increases its sink rate. This is useful for staying out of cloud or descending quickly. To pull big ears on the Viper 5 take hold of the outermost A-line (attached to the A^2 riser) on each side whilst keeping the brake handles in your hand. Pull down the A^2 risers until the tips of the wing fold under.

Do not use the brakes other than for re-inflation. For directional control while using the Big Ears, you should use weight shift steering. To reopen your big ears, release both baby As at the same time. To help re-inflation, brake gently one side at a time until tips regain pressure. Avoid deep symmetric applications of the brake as this could induce parachutal or full stalls.

Big ears and accelerator

Once the big ears are in you can further increase the sink rate by pushing on the accelerator bar. Never attempt to induce Big Ears with the speed bar already engaged, always make the Big ears before accelerating the wing otherwise you risk provoking a major asymmetric or symmetric deflation.

NEVER induce Big Ears in accelerated flight, this can lead to a major deflation. Always pull the Big Ears first and then apply the speed bar.

Big ears and spiral dive

Whilst it is possible to enter a spiral dive whilst holding in Big Ears, the high forces applied to the lower lines could exceed the breaking strain of the lines leading to equipment failure!

DO NOT perform spiral dives with Big Ears engaged.

B-Line Stall

B-stall is for fast descents in emergency situations only. B-stall is performed by symmetrically pulling down on the B-risers. The load applied on the B lines during this manoeuvre is not very good for your wing; only use it in emergency situations. To initiate the B-stall place your fingers between the lines above the maillons on the B risers. Do not release the brake handles. As you pull the B-lines down the airflow over the wing is broken and the glider loses

its forward speed but remains open and you will descend at around 6 m/s. If you pull too much B-line the glider may horseshoe and move around a lot.

To exit the B-stall the B-risers should be released symmetrically and in one smooth, fast progressive motion. The glider will resume normal forward flight without further input. Check you have forward flight again before using the brakes. Do not release the B lines slowly, this may lead to a parachutal stall.

Spiral Dives

If you turn your Viper 5 in a series of tightening 360's it will enter a spiral dive. This will result in rapid height loss. Safe descent rates are possible but high speeds and high G-forces can build quickly leading to disorientation. Excessive G forces can lead to loss of consciousness. High descent rates, especially when combined with high wing loadings, high hangpoint power units and trikes increases the likelihood of the wing remaining neutral or possibly unstable in spiral.

To initiate a spiral dive, first set the trimmers to the green line or slower. DO NOT perform spiral dives with the trimmers released. Look and lean in to the direction you want to turn and then smoothly apply the inside brake. The Viper 5 will first turn almost 360 degrees before it drops into the spiral (depending on the input). Once in the spiral you should apply a little outside brake to keep the outer wing tip pressured and inflated.

To exit the spiral dive, weight shift away from the direction of rotation (if possible) and smoothly release the inside brake. If you do not have weightshift control (e.g high hang point unit or trike) you may need to apply outside brake to help exit the spiral. As the Viper 5 decelerates allow it to continue to turn until enough energy is lost for it to return to level flight without an excessive climb and surge.

Always be prepared to pilot the wing out of a spiral dive. In case of neutrality/instability use opposite weight shift and smoothly apply enough outside brake to provoke the glider to exit the spiral. If the rate of turn or descent does not change, use more opposite brake until it does so.

IMPORTANT
Always be prepared to pilot the wing out of a spiral dive. Use opposite weight shift and apply enough outside brake to stop the wing from spiralling.

IMPORTANT
Do not perform high G spiral dives when flying heavily loaded, when flying with a trike or a high hang point harness.

IMPORTANT
Do not perform spiral dives with the trimmers released.

INCIDENTS IN FLIGHT

Deflations

Due to the flexible form of a paraglider, turbulence may cause a portion of the wing suddenly to collapse. This can be anything from a small 30% (asymmetric) collapse to a complete (symmetric) collapse.

If you have a collapse, the first thing to do is to control your direction. You should fly away from the ground or obstacles and other pilots, or at least not to fly into them... Asymmetric collapses can be controlled by weight shifting away from the collapse and applying a small amount of brake to control your direction. This act will most of the time be enough for a full recovery of the wing.

Once a glider is deflated it is effectively a smaller wing, so the wing loading and stall speed are higher. This means the glider will spin or stall with less brake input than normal. In your efforts to stop the glider turning towards the collapsed side of the wing you must be very careful not to stall the side of the wing that is still flying. If you are unable to stop the glider turning without exceeding the stall point then allow the glider to turn whilst you reinflate the collapse.

If you have a deflation which does not spontaneously reinflate, make a long smooth progressive pump on the deflated side. This pumping action should take about 2 seconds per pump. Pumping too short and fast will not reinflate the wing and pumping too slow might take the glider close to, or beyond, the stall point.

Symmetrical collapses normally reinflate without pilot input, however 15 to 20cm of brake applied symmetrically will speed the process.

If your wing collapses in accelerated flight, immediately release the accelerator and pull the trimmers to the slow position before attempting to reinflate the canopy.

Cravats

If the tip of your wing gets stuck in the lines, this is called a 'cravat'. This can make your glider go into a spiral, which is difficult to control. The first solution to get out of this situation is to stabilise the glider into normal flight, i.e get control of your direction and then pull down the stabilo line (attached to the C riser) until the wing tip frees itself. You must be careful with any brake inputs or you may stall the opposite wing. You can also use strong deep pumps on the brake to the cravated side, when doing so it is important to lean away from the cravat otherwise you risk spinning or deepening the spiral. The aim is to empty the air out of the wing tip, but without spinning. Correctly done, this action will clear the cravat.

If it is a very large cravat and the above options have not worked then a full stall is another option. This should not be attempted unless you have been taught how to do it and can only be done with a large amount of altitude. Remember if the rotation is accelerating and you are unable to control it, you should throw your reserve parachute whilst you still have enough altitude.

IMPORTANT
A bad preparation on launch, aerobatic flying, flying a wing of too high a level or in conditions too strong for your ability, are the main causes of cravats.

Deep Stall / Parachutal stall

It is possible for gliders to enter a state of parachutal stall. This can be caused by several situations including; a very slow release from a B-line stall; flying the glider when wet; or after a front/symmetric deflation. The glider often looks as though it has recovered properly but carries on descending vertically without full forward motion. This situation is called 'deep stall' or 'parachutal stall'. Should it happen, your first reaction should be to fully raise both brakes, this action alone normally allows the glider to return to normal flight. If nothing happens after a few seconds, apply the speed bar or release the trimmers to regain normal flight. Ensure the glider has returned to normal flight (check your airspeed) before using the brakes again.

IMPORTANT
Only a few cms of input from your brakes can maintain your wing in the stall. Always release your wraps if you have taken them.

Never fly in rain or with a wet wing, this will significantly increase the likelihood of parachutal stall. If you are accidently caught-out in a rain shower, land immediately. DO NOT use big ears as a descent technique; big ears with a wet wing will further increase the chances of a parachutal stall occurring. Instead, lose height with gentle 360's and make sure to consider your air speed during final approach, use a small amount of speed bar if necessary.

IMPORTANT
Never fly in the rain or with a wet glider

CARE AND MAINTENANCE

Packing

To prolong the life of your wing and to keep the plastic reinforcements in the best possible condition it is very important to pack the wing carefully.

Ozone recommends to use the concertina packing method exactly as shown so that all of the cells rest alongside each other and the plastic reinforcements are not unnecessarily bent. Using an Ozone Saucisse or Saucisse light pack will help preserve the life of the wing and aid with the speed and ease of packing.

Step 1. Lay mushroomed wing on the ground. It is best to start from the mushroomed position as this reduces the dragging of the leading edge across the ground.

Step 2. Group LE reinforcements with the A tabs aligned, make sure the plastic reinforcements lay side by side.

Step 3. Lay wing on its side and Strap LE...Note the glider is NOT folded in half; it is folded with a complete concertina from tip to tip. It is really important to not stress the middle cell or bend the plastic too tightly.

Step 4. Group together the middle/trailing edge of the wing by sorting the folds near the B, C and D tabs.

If using a Saucisse pack go to Step 8.

Step 5. Once the LE and rear of the wing have been sorted, turn the whole wing on its side.

Step 6. Fold the wing with 3 or 4 folds whilst being careful to not crush the LE.

Step 7. Now place the folded wing into the stuff sack.

Step 8. If using the Saucisse Pack, carefully zip it up without trapping any material.

Step 9. Turn the Saucisse on its side and make the first fold just after the LE reinforcements. Do not fold the plastic reinforcements, use 3 or 4 folds around the LE.

IMPORTANT: Do NOT lay the wing flat on the ground before packing the glider, this will cause abrasion damage to the top surface as you pull the glider towards the middle. ALWAYS pack from a mushroom or lift the wing off the ground when gathering the wing and grouping the leading edge.

IMPORTANT: Do not fold the glider in the centre, you will bend the plastics, instead pack the wing with a full concertina method from tip to tip before packing into the stuff sac.

Caring Tips

Careless ground handling damages many paragliders. Here are some things to avoid in order to prolong the life of your aircraft:

- DO NOT drag your wing along the ground to another take-off position - this damages the sailcloth. Lift it up and carry it.
- DO NOT try to open your wing in strong winds without untangling the lines first - this puts unnecessary strain on the lines.
- DO NOT walk on the wing or lines.
- DO NOT repeatedly inflate the glider and then allow it to crash back down. Try to keep this movement as smooth as possible by moving towards the glider as it comes down.
- DO NOT slam your glider down on the ground leading edge first! This impact puts great strain on the wing and stitching and can even explode cells.
- FLYING in salty air, in areas with abrasive surfaces (sand, rocks etc.) and ground handling in strong winds will accelerate the aging process.
- DO NOT fly in the rain or expose the wing to moisture.
- DO NOT expose the wing to unnecessary UV and heat. Pack away once you have finished flying. Do not leave it sitting in the sun.
- If you fly with a wrap, you should regularly undo the twisting that appears on the main brake lines. By twisting the line become shorter and you can end up with a constant tension on the trailing edge which can lead to problem on launch, stalling, glider not flying symmetrically.
- Change your main brake lines if they are damaged.
- Be Careful when groundhandling to not saw the brake lines against the risers or main lines. The abrasion caused by a sawing motion can damage the main lines and lead to premature ageing of the risers. If you notice any signs of abrasion, especially to the lines, make sure you get the wing professionally serviced and importantly modify your groundhandling technique to stop any further damage.
- Your Ozone wing has an opening closed using Velcro on the trailing edge of the tip called the 'Butt hole'. This has been designed to easily empty all the things which have been accumulating in your wing (sand, leaves, rocks, mobile phones etc).

Storage and Transport

Always store all your flying equipment in a dry room, protected from direct heat. Your wing should be dry before being packed away. Moisture, heat and humidity are the worst elements for damaging your glider. Storing a damp glider in your car under the sun would be terrible for example.

If you land in salt water, you must first rinse it thoroughly with clean fresh water. Dry the wing completely, preferably out of the sun, in the wind. Never use a hair dryer, etc.

IMPORTANT
Never pack away or store your glider wet.

Take care that no insects get packed away with the wing. They may eat the cloth and make holes in a bid to escape. They can also leave acidic deposits if they die and decompose.

Transport the wing in the supplied bags and keep away from oils, paints, chemicals, detergents etc.

Cleaning

Any kind of wiping/scratching can damage the coating of the cloth. We recommend to not clean the wing, but if you do have to, use a soft cloth dampened with a small amount of water and use gentle movements little by little across the surface.

IMPORTANT
Never use detergent or chemical cleaners.

Wing Repairs

Always let a registered dealer, professional repair centre or the manufacturer carry out any major or complex repairs, especially those near seam margins.

If you damage the sail:
If the rip is small and in the middle of a panel however you can fix it yourself. You'll find all the materials in the repair kit you need. The fabric can be simply mended with the sticky rip stop/ spinnaker tape. When cutting out the patches allow ample overlap of the tear and make sure both sides are different sizes. Make sure to round off each corner of the patches.

If you damage a line:
Any line that is visually damaged MUST be replaced. Use a reputable paragliding service centre to make the replacement lines or contact your local Ozone dealer.

It is important that replacement lines are made from the correct materials and diameters. You should check lengths against their counterpart on the other side of the wing to make ensure symmetry. Once the line has been replaced, inflate and check the glider before flying.

Maintenance Checks

Your wing, like a car, should be technically checked to ensure proper airworthiness. Your wing should be checked by a qualified professional for the first time after 24 months, or after 100 hours. The dimensions of the lines tend to move during the first part of their life, it is therefore recommended to have a performance trim check within the first 50hrs of use.

IMPORTANT
Take care of your glider and make sure you have it checked and serviced according to the schedule.

If you are a frequent flyer (more than 100 hrs per year), then we recommend that you get your glider checked annually. The checker should inform you about the condition of your glider and if some parts will need to be checked or changed before the next normal service check period.

The sail and the lines do not age in the same way or at the same rate; it is possible that you may have to change part or all of the lines during the wing's life. For this reason it is important to do regular inspections so that you know the exact condition of all of the components of your glider. We recommend that inspections are carried out by a qualified professional.

You alone are responsible for your flying kit and your safety depends on it. Take care of your equipment and have it regularly inspected. Changes in inflation/groundhandling/flying behaviour indicates the gliders aging, if you notice any changes you should have the wing checked before flying again. These are the basic elements of the check up.

Porosity is measured with a porosity meter, the time taken by a certain volume of air to go through a certain surface of the cloth. The time in seconds is the result. A measurement is

done in a several places on the top surface along the span of the glider behind the leading edge.

The tearing resistance of the cloth - A non-destructive test following the TS-108 standard which specifies minimum tear strength for sky diving canopies should be made using a Bettsometer. (B.M.A.A. Approved Patent No. GB 2270768 Clive Betts Sails)

Strength of the lines - An upper, middle and lower A line, along with a lower B and a lower C (and lower D if applicable) line should be tested for strength. Each line is tested to breaking point and the value recorded. The minimum value is 14G for all main riser lines calculated from the maximum certified flying weight of the glider. The added minimum strength for the middle lines and upper lines should be the same value. If the breaking strength is too close to the minimum value calculated, the professional should give a period after which you will have to test the strength of the lines again.

Lengths of the lines - The overall length (riser lines + mid lines + upper lines) has to be checked under 5Kgs of tension. The difference between the measured length and the original length should not exceed +/- 10mm. The changes that could appear are a slight shrink on the C or Ds and/or a slight stretch on the A, B. The consequences of these changes can include a slower trim speed, difficult inflation etc.

Risers - Visual inspection for signs of wear or abrasion. Differences to manual lengths should not exceed +/-5mm.

Canopy check - A full visual check should be carried out: All the components of the wing (stitching, ribs, diagonals, lines, tabs, ...) should be checked for signs of deterioration.

Finally, a test flight to confirm that the wing behaves normally should be carried out by a professional.

OZONE QUALITY GUARANTEE

At Ozone we take the quality of our products very seriously, all our gliders are made to the highest standards in our own manufacturing facility. Every glider manufactured goes through a stringent series of quality control procedures and all the components used to build your glider are traceable. We always welcome customer feedback and are committed to customer service. Ozone guarantees all of its products against manufacturer's defects or faults. Ozone will repair or replace any defective product free of charge. Ozone and its distributors provide the highest quality service and repair, any damage to products due to wear and tear will be repaired at a reasonable charge.

If you are unable to contact your dealer then you can contact us directly at info@flyozone.com

Summary

Safety is paramount in our sport. To be safe, we must be trained, practised and alert to the dangers around us. To achieve this we must fly as regularly as we can, ground handle as much as possible and take a continuous interest in the weather. If you are lacking in any of these areas you will be exposing yourself to more danger than is necessary. If you're good at ground handling you'll be able to launch confidently and safely whilst others struggle. Practice as much as you can, you'll be less likely to get hurt and more likely to have a great day flying.

Always respect the environment and look after your flying sites.

If you need to dispose the wing, do so in an environmentally responsible manner. Do not dispose of it with the normal household waste.

Finally, RESPECT the weather, it has more power than you can ever imagine. Understand what conditions are right for your level of flying and stay within that window.

Happy flying & enjoy your Viper 5.
Team Ozone

TECHNICAL SPECIFICATIONS

	16	18	20	22
No. of Cells	62	62	62	62
Projected Area (m^2)	13.7	15.4	17.1	18.8
Flat Area (m^2)	16	18	20	22
Projected Span (m)	7.68	8.15	8.59	9
Flat Span (m)	9.64	10.22	10.77	11.3
Projected Aspect Ratio	4.3	4.3	4.3	4.3
Flat Aspect Ratio	5.8	5.8	5.8	5.8
Root Chord (m)	2.1	2.23	2.35	2.46
Glider Weight (Kg)	3.64	3.91	4.18	4.46
Free flight Weight Range (Kg)	55-80	65-90	75-105	85-115
PPG Weight Range (Kg)	80-120	90-130	100-140	110-155
DGAC Certification	DGAC	DGAC	DGAC	DGAC

Load Test 166kg @8g 253kg @ 5.25g - DO NOT fly above Ozone's recommended weight limit

Riser Lengths Includes maillons

Neutral	
A	630mm
A^2	630mm
B	630mm
C^2	630mm
C	630mm

Untrimmed	
A	630mm
A^2	657.5mm
B	685mm
C^2	712.5mm
C	740mm

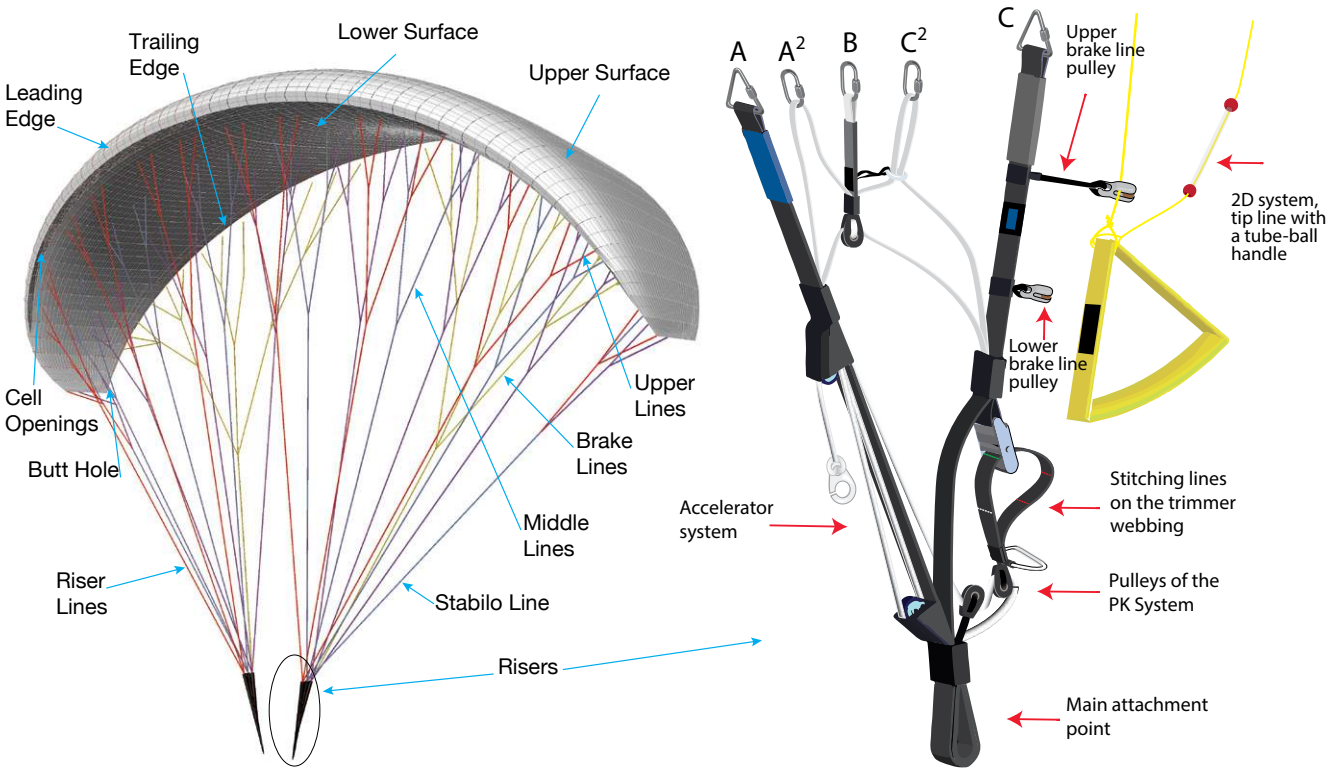
Trimmer range - 16cm

Trimmed	
A	630mm
A^2	617mm
B	604mm
C^2	592mm
C	579mm

Accelerated	
A	460mm
A^2	522mm
B	586mm
C^2	651mm
C	714mm

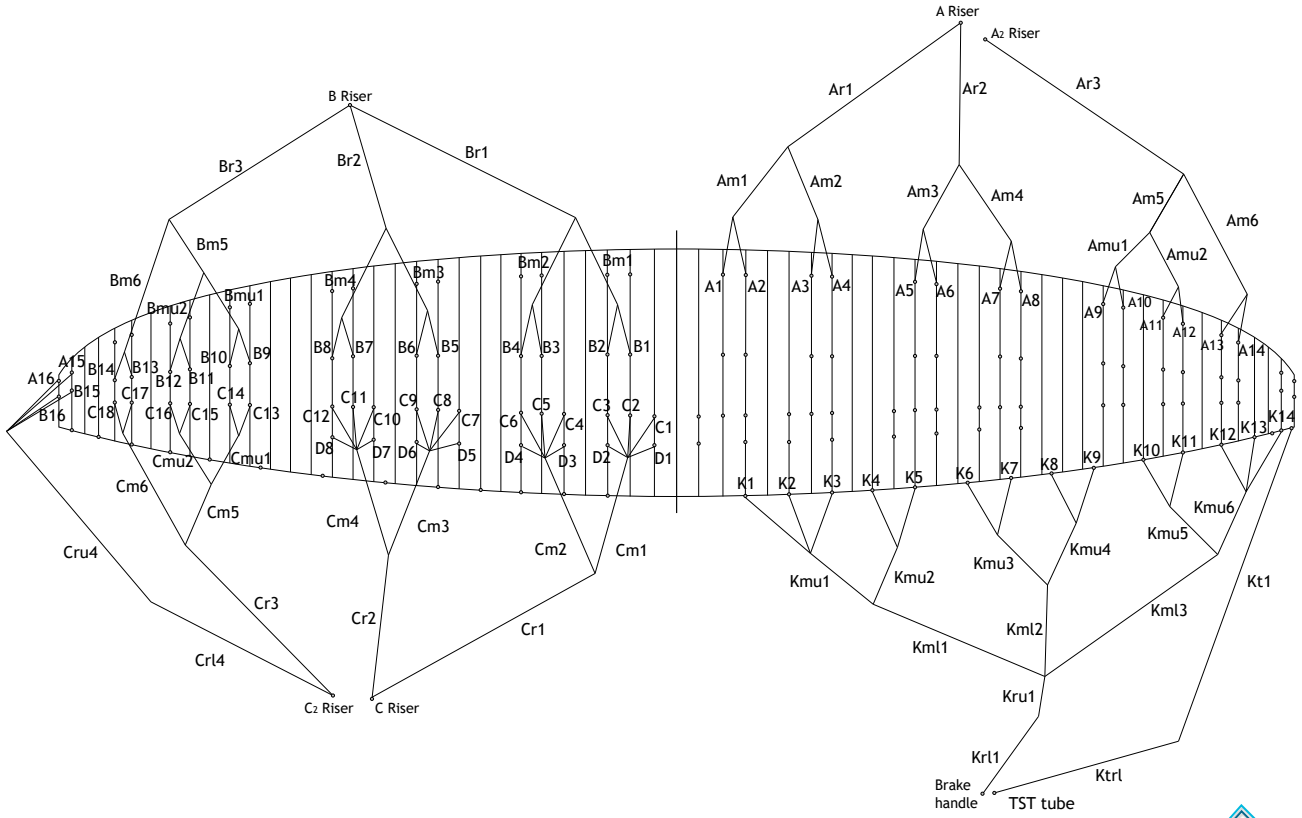
Accelerator range = 17cm - Size 16 = 15cm

TECHNICAL DRAWINGS



LINE DIAGRAM

Individual and linked line lengths can be found online.



MATERIALS

All Ozone gliders are made from the highest quality materials available.

Cloth

Upper Surface
Dominico DOKDO 30D MF
Lower Surface
Porcher 7000E71
Internal Ribs
Porcher Skytex 9017E29 / Porcher 7000E91
Leading Edge Reinforcement
Plastic pipe

Main Line Set

Riser Lines
Edelrid 8000U
Middle Lines
Edelrid 8000U
Upper Lines
Edelrid 8000U

Brake Lines

Main brake/ TST
Liros - 10-200-040/Edelrid 8000U
Middle brake lines
Edelrid 8000U
Upper brake lines
Edelrid 8000U

Risers and hardware

Shackles
Maillon Rapide - Peguet
Riser webbing
20mm zero stretch polyester webbing
Pulleys
Ronstan ball bearing

1258 Route de Grasse
Le Bar sur Loup
06620
France

Inspired by Nature, Driven by the Elements

WWW.FLYOZONE.COM