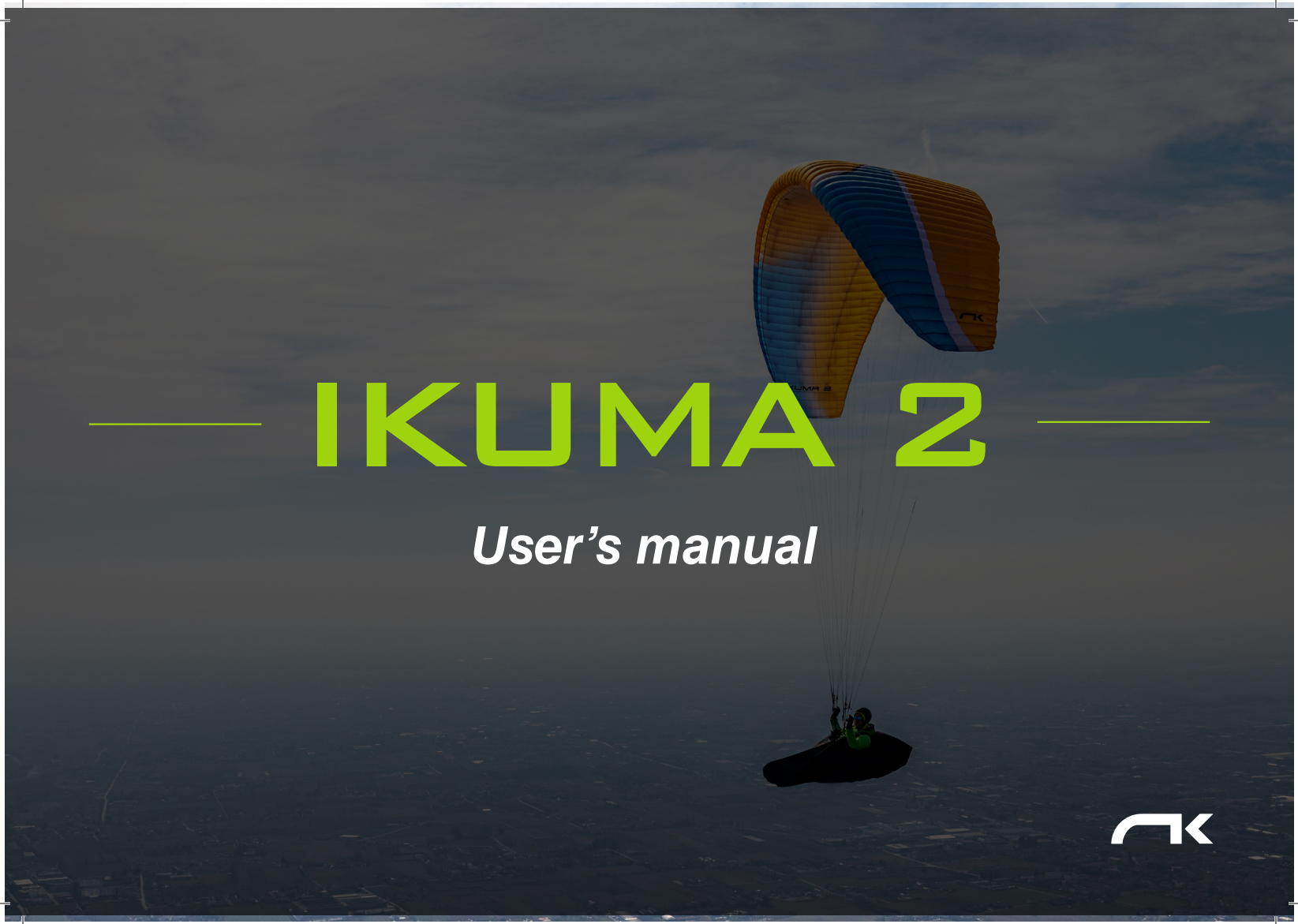

IKUMA 2

User's manual

IKUMA 2

ACCESSIBLE PERFORMANCE

We wish to welcome you to our team and thank you for your confidence in our glider product line.

We would like to share the enthusiasm with which we created this wing and the importance and care we took in the design and manufacture of this new model in order to offer maximum pleasure on every flight with a Niviuk glider.

The IKUMA 2 is not just a simple evolution of the previous model. Our designers started from scratch to better integrate the latest innovative technologies and produce the perfect glider to make the dream of flying and progressing come true.
Don't compromise. The new IKUMA 2 offers you the greatest accessibility and maximum performance in an EN B certified wing. The perfect balance between safety and efficiency to make your adventures a genuine and, above all, fun experience.
Its performance and handling are far superior to those of the first IKUMA. This continues the NIVIUK tradition of passion for small details which is reflected in this new design by the NIVIUK R&D team, with Olivier Nef at the helm.
We are confident you will enjoy flying this glider and will soon discover the meaning of our motto:

"The importance of small details".

This is the user manual and we recommend you read it carefully.
The **NIVIUK Gliders** Team.

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USER'S MANUAL

NIVIUK Gliders IKUMA 2

This manual provides you with the necessary information on the main characteristics of your new paraglider.

Whilst it provides information on the wing, it cannot be viewed as an instructional handbook and does not offer the training required to fly this type of paraglider. Training can only be undertaken at a certified paragliding school and each country has its own system of licensing. Only the aeronautical authorities of respective countries can determine pilot competence.

The information in this manual is provided in order to warn you against adverse flying situations and potential dangers.

Equally, we would like to remind you that it is important to carefully read all the contents of your new IKUMA 2 manual.

Misuse of this equipment could lead to severe injuries or death. The manufacturers and dealers cannot be held responsible for misuse of the paraglider. It is the responsibility of the pilot to ensure the equipment is used correctly.

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1. CHARACTERISTICS

1.1 WHO IS IT DESIGNED FOR?

It is aimed at pilots who are keen to begin flying cross-country and who want to achieve great distance flights in the safety of knowing that they can enjoy every kilometer in perfect harmony with their equipment.

1.2 CERTIFICATION

The IKUMA 2 has been submitted for the European EN and LTF certification. All certification tests were performed at the Swiss testing house Air Turquoise. All sizes passed the load, shock and flight tests.

The load test proved that the wing can withstand the stipulated 8G.

The shock test proved that the wing can resist 1000 daN of force.

The flight test resulted in the following certification for the IKUMA 2:

EN B
LTF B

We recommend that only pilots who are familiar with gliders of this certification or above fly this paraglider.

Only the aeronautical authorities of respective countries can determine pilot competence.

We recommend pilots read the flight test report carefully, especially the comments of the test pilot. The report contains all the necessary information on how the paraglider reacts during each of the tested manoeuvres.

It is important to note that different size wings will react differently during manoeuvres. Even within the same size, at maximum or minimum load, the behaviour and reactions of the wing may vary.

- Description of EN B class wing characteristics:
Paragliders with a high degree of passive safety and very forgiving flight characteristics. Gliders with high collapse resistance outside normal flight.

-Description of the skills required by the pilot to fly an EN B wing:
Designed for all pilots, including pilots under instruction.

For further information on the flight test and the corresponding certification number, please see the final pages of this manual or see niviuk.com.

1.3 IN-FLIGHT BEHAIVOR

Niviuk developed this wing by adopting very specific goals: to improve performance, excellent handling; to facilitate more control for the pilot.

To increase performance while maintaining the highest level of safety. To ensure that the wing transmits the maximum feedback in an understandable and comfortable way so that the pilot can focus on piloting and enjoying the flight. And, with smooth handling, take advantage of all favourable conditions.

In all aspects of flight, the wing is very solid and stable. The glide is smooth, even when fully accelerated. During glides, the wing maintains altitude and the wing remains stable. Improved turn precision means handling is less physical and provides better feedback. Inflating the wing is much easier and gentler, without overshooting.
Flying this wing is very intuitive, with clear and useful feedback about the airmass. It responds to the pilot's inputs effectively and even in thermic and turbulent conditions it remains stable and solid.

The IKUMA 2 flies efficiently. It enters thermals with sufficient speed to centre in the lift and climbs progressively. The handling is progressive and effective for even more flying pleasure under an exciting wing of

extraordinary quality.

It is lightweight; even lighter in flight and easy to pilot, with outstanding turbulence buffering and a surprising range of speed for incredible glides.

1.4 CONSTRUCTION, MATERIALS

The IKUMA 2 has all the technological innovations used on other Niviuk gliders and is built with the most careful selection of current materials. It has all the current technology and accessories available to improve pilot comfort whilst increasing safety and performance.
In the design of all Niviuk products the team aims to ensure development and continuous improvement. The technologies developed in recent years have allowed us to develop greater, better wings. It is in this context that we would like to introduce the technologies included in this new model.

RAM Air Intake - this system is characterised by the arrangement of the air inlets, to ensure optimal maintenance of internal pressure. Thanks to this design, we were able to reduce their size, while maintaining the same air flow at all angles to improve laminar flow. More consistency across the whole speed range and better performance without compromising on safety.

Titanium Technology (TNT) - a revolutionary technique using titanium. Using Nitinol in the internal construction provides a more uniform profile and reduces the weight to gain efficiency in flight. Nitinol provides the highest level of protection against deformation, heat or breaks. The leading edge is more rigid and the wing surface remains perfectly taut, without creases or parasitic drag. This optimises glide in all phases of the flight. Because the flexible rods always return to their original shape, the integrity of the profile is never affected. Nitinol provides the highest level of protection against deformation, heat or breaks.

Structured Leading Edge (SLE) - the use of the SLE considerably reduces the amount of Mylar which was used in previous Niviuk wings and this also reduces the weight of the leading edge. Therefore it is easier to inflate this wing than a paraglider without this system.

3D Pattern Cut Optimisation (3DP) – the latest generation of wings require a new fabric panel pattern and cutting system. Creating separate panels for each of the sections at the front of the wing means the sail fabric is more taut and crease-free. During the cutting, the optimal orientation of the fabric section is selected, depending on its final location. If the fabric pattern is properly aligned with the axes of load, it suffers less deformation after repeated use, to the long-term benefit of the leading edge.

3D Leading Edge (3DL) - adding an extra seam to the longitudinal axis of the glider helps, on the one hand, give more consistency and volume to the profile (a more efficient 3D contour) and on the other, joins and shapes the leading edge panels. The fabric is guided by the panel position to ensure fewer creases and better load distribution. The result is a cleaner profile, which benefits the wing in terms of performance and durability.

Structured Trailing Edge (STE) - Optimises the profile without deforming it. The circulation of the air is more fluid, ensuring a cleaner airflow. When changing the angle of attack or when accelerated, the profile remains more uniform and the after braking, the wing returns to trim more progressively, faster and more actively.

Drag Reduction Structure (DRS) - The trailing edge has been reinforced with small ribs in order to distribute the pressure more evenly. This results in excellent manoeuvrability and greater control and precision.

Radial Sliced Diagonal (RSD) - A reinvention of the wing's internal structure. This new design is based on individual diagonal panels arranged in radial form, which increase the efficiency of the internal

structure considerably
The use of these technologies is a big technological leap forward in building wings and a big improvement in flight comfort.

For the construction process of the IKUMA 2 we use the same criteria, quality controls and manufacturing processes as in the rest of our range. From Olivier Nef's computer to fabric cutting, the operation does not allow for even a millimetre of error. The cutting of each wing component is performed by a rigorous, extremely meticulous, automated computer laser-cutting robotic arm.
This program also paints the guideline markers and numbers on each individual fabric piece, thus avoiding errors during this delicate process. The jigsaw puzzle assembly is made easier using this method and optimises the operation while making the quality control more efficient.
All Niviuk gliders go through an extremely thorough and detailed final inspection. The canopy is cut and assembled under strict quality control conditions facilitated by the automation of this process.
Every wing is individually checked with a final visual inspection.
The fabric used to manufacture the glider is light, resistant and durable. The fabric will not fade and is covered by our warranty.
The upper gallery lines are made from unsheathed Dyneema and all other lines are made from unsheathed Aramid.
The line diameter has been calculated depending on the workload and aims to achieve the required best performance with the least drag.
The lines are semi-automatically cut to length and all the sewing is completed under the supervision of our specialists.
Every line is checked and measured once the final assembly is concluded.
Each glider is packed following specific maintenance instructions as recommended by the fabric manufacturer.
Niviuk gliders are made of premium materials that meet the requirements of performance, durability and certification that the current market demands.

Information about the various materials used to manufacture the wing can be viewed in the final pages of this manual.

1.5 ELEMENTS, COMPONENTS

The IKUMA 2 is delivered with a series of accessories that will greatly assist you in the maintenance of your paraglider:

- A Kargo bag. This bag is large enough to hold all equipment comfortably and with plenty of space.
- An inner bag to protect the wing during storage and transport.
- An adjustable compression strap to compress the inner bag and reduce its volume.
- A bag to protect the risers, which will prevent metal parts from coming into contact with the cloth during storage.
- A repair kit with self-adhesive and spare O-rings to protect the maillons.

2. UNPACKING AND ASSEMBLY

2.1 CHOOSING THE RIGHT LOCATION.

We recommend unpacking and assembling the wing on a training hill or a flat clear area without too much wind and free of obstacles. It will help you to carry out all the recommended steps required to check and inflate the IKUMA 2 .
We recommend the whole installation procedure is supervised by a qualified professional instructor or official dealer. Only they can address any doubts in a safe and professional way.

2.2 PROCEDURE

Take the IKUMA 2 out of the rucksack, open and unfold it on the ground with the lines positioned on the under-surface, oriented in the direction of inflation. Check the condition of the fabric and the lines for defects. Check the maillons/IKS connecting the lines to the risers to make sure they are fully closed and tightened. Identify, and if necessary untangle, the A, B and C-lines, the brake lines and corresponding risers. Make sure that there are no knots.

2.3 CONNECTING THE HARNESS

The IKUMA 2 risers are colour-coded.
- Right: green
- Left: red

This colour-coding makes it easier to connect the wing to the correct side and helps prevent pre-flight errors.

Correctly connect the risers to the attachment points so that the risers and lines are correctly ordered and free of twists. Check that the IKS or carabiners are properly fastened and securely locked.

PLEASE NOTE! The IKUMA 2 features risers of different lengths. Size 22 uses risers of unequal lengths. In all other models the risers are equal length and interchangeable - but NOT on the size 22.

2.4 TYPE OF HARNESS

The IKUMA 2 can be flown with all current harness types, provided they can be adjusted to the settings stipulated in the certification.
Please note that these proscribed settings vary for each size and within each size if flown at the upper or lower end of the weight-range.

Distance between the risers:

Size 22 - 40/44 cm
Size 24 - 40/44 cm
Size 26 - 44/48 cm
Size 28 - 44/48 cm
Size 30 - 48 cm

Distance between the harness/risers:

Size 22 - 42/44 cm
Size 24 - 44/44 cm
Size 26 - 46/43 cm
Size 28 - 44/44 cm
Size 30 - 43/44 cm

Care should be taken with the chest strap setting, as the distance of the chest strap setting will affect the handling of the glider. If the chest strap is too wide, it allows greater feedback but this carries the risk of affecting the stability of the wing.
If the chest strap is set too tightly, the wing feels more solid, but there is a loss of feedback and a risk of twisting in the case of a violent asymmetric collapse.

See the certification report.

2.5 SPEED-BAR

The speed-bar is a means of temporary acceleration by changing the flow over the profile. The speed system comes pre-installed on the risers and is not modifiable as it conforms to the measurements and limits stipulated in its certification.

The IKUMA 2 includes a speed system with maximum travel depending on its size (see below).
The speed system is engaged when the pilot pushes the speed-bar - not included as standard with this glider model - with their feet (see 2.5.1: Speed system assembly)

The speed system uses an action/reaction system. Released, the speed-bar is set to neutral. When the bar is pushed using the feet, the wing accelerates. The speed can be regulated by varying the pressure on the bar. Once the pressure on the bar is released, the speed system returns

to the neutral setting.

The speed system is efficient, sensitive and precise. The pilot can use the system whenever they want during the flight. In the neutral position the glider will fly at the standard speed and glide. Using full speed-bar, the wing will fly at maximum speed, but the glide will be adversely affected.

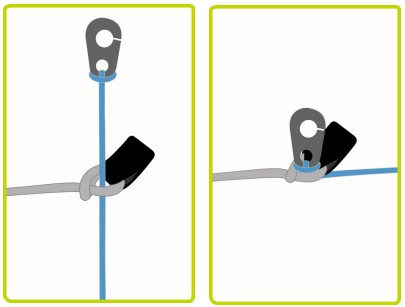
•Released speed-bar: the A, B and C-risers are aligned.
•Full speed-bar: the difference between the A - C-risers becomes 160 m/m for all sizes.

Please note!
The use of the speed system results in changes to the speed and reactions of the wing. For more information, please see the certification report.

2.5.1 SPEED SYSTEM ASSEMBLY.

The speed-bar consists of the bar that the pilot pushes with their feet, as well as the two cords that connect it to the speed system components on the risers. Once you have chosen the type of speed-bar you prefer, you must install it. Some considerations:

•You should use the type of speed-bar you consider appropriate, depending on the type of harness, personal preferences, etc.
•The speed-bar is detachable to facilitate its connection and / or disconnection to the risers as well as subsequent adjustment.
•To connect it to the harness, please follow the instructions of the harness manufacturer. The majority of harnesses have a speed system pre-installed.
•The standard connection of the speed-bar to the speed system is via Brummel hooks, where two slots in the hooks are interlocked, making their connection / disconnection easy. However, any connection system that is safe may be used.



2.5.2 CHANGING THE RISER CORDS.

In spite of the speed system having pulleys with bearings to reduce friction to a minimum, the frequency with which the speed-bar is used causes the cord to wear and you may need to replace them.

In all Niviuk gliders the speed system cords on the risers are completely removable and easily replaceable. You can use the Brummel hooks, not use them, remove them, use another type of connector, etc. It is even possible to fix the speed-bar cords directly to the speed system on the risers. This last option makes the connection / disconnection more laborious, but means the cord has maximum travel without obstructions or restrictions which is very useful for some models of harnesses.

2.6 INSPECTION AND WING INFLATION ON THE GROUND

After your gear has been thoroughly checked and the weather conditions deemed favourable for flying, inflate your IKUMA 2 as many times as necessary to familiarise yourself with its behaviour. Inflating the IKUMA 2 is easy and should not require a great deal of physical effort. Inflate the wing with a little pressure from the body using the harness. This may

be assisted by using the A-lines. Do not pull on them; just accompany the natural rising movement of the wing. Once the wing is inflated to the overhead position, appropriate control with the brakes will be sufficient to hold it there.

2.7 ADJUSTING THE BRAKES

The length of the main brake lines are adjusted at the factory and conform to the length stipulated during certification. However, they can be changed to suit your flying style. It is advisable to fly with the original setting for a period of time to get used to the actual behaviour of the IKUMA 2 . In case it is necessary to modify the brake length, loosen the knot, slide the line through the brake handle to the desired point and re-tighten the knot firmly. Only qualified personnel should carry out this adjustment. You must ensure that the modification does not affect the trailing edge and slow the glider down without pilot input. Both brake lines should be symmetrical and the same length. We recommend using a clove hitch or bowline knot.
When changing the brake length, it is necessary to check that they do not engage when the speed-bar is used. When we accelerate, the glider rotates over the C-riser and the trailing edge elevates. It is important to check that the brake is adjusted to take into consideration this extra distance during acceleration. With this profile deformation there is a risk of generating turbulence and causing a frontal or asymmetric collapse.

3. THE FIRST FLIGHT

3.1 CHOOSE THE RIGHT LOCATION

For the first flight with your IKUMA 2 we recommend going to your usual flying area and that a qualified instructor is present and supervising the entire procedure.

3.2 PREPARATION

Repeat the procedures detailed in chapter 2 UNPACKING AND ASSEMBLY in order to prepare your equipment.

3.3 FLIGHT PLAN

Planning a flight before taking off to avoid possible problems later is always a good idea.

3.4 PRE-FLIGHT CHECK LIST

Once ready, but before taking off, conduct another equipment inspection. Conduct a thorough visual check of your gear with the wing fully open, the lines untangled and properly laid out on the ground to ensure that all is in working order. Be certain the weather conditions are suited to your flying skill level.

3.5 WING INFLATION, CONTROL, AND TAKE-OFF

The IKUMA 2 comes up easily, without requiring additional energy, and does not overfly you. It is a straight-forward exercise, leaving enough time for you to decide whether to accelerate and take off or not.

If the wind permits, we recommend a reverse launch, as this allows a better visual inspection of the wing during inflation. In “strong” winds, the IKUMA 2 is especially easy to control using this launch technique. Winds of 25 to 30 km/h are considered strong for paragliding.

Correctly setting up the wing on the ground before take off is especially important. Choose an appropriate location facing the wind. Position the paraglider in a crescent configuration to facilitate inflation. A clean wing layout will ensure a trouble-free take off.

3.6 LANDING

The IKUMA 2 lands excellently, it converts the wing speed into lift at your demand, allowing an enormous margin of error. Wrapping the brake lines around your hand to get greater braking efficiency is not necessary.

3.7 PACKING

The IKUMA 2 has a complex leading edge, manufactured using a variety of different materials and it must be packed carefully. A correct folding method is very important to extend the useful life of your paraglider.

It should be concertina-packed, with the leading edge reinforcements flat and the flexible rods stacked one on top of the other. This method will keep the profile in its original shape and protect the integrity of the wing over time. Make sure the reinforcements are not bent or folded. It should not be folded too tightly to avoid damage to the cloth and/or lines.

At Niviuk we have designed the NKare Bag, a bag designed to assist you with rapid packing which helps maintain the integrity of the leading edge and its internal structures in perfect condition.

The NKare Bag guides you through the folding process, allowing you to concertina pack the wing with each rod on top of the other and then fold the wing as required. This folding system ensures that both the fabric and the reinforcements of the internal structure are kept in perfect condition.

4. IN FLIGHT

We recommend that you read the certification test report.

The report contains all the necessary information on the IKUMA 2 reacts during each of the tested manoeuvres.

It is important to point out that the appropriate response to each adverse manoeuvre can vary from size to size; even within the same size at maximum or minimum load the behaviour and reactions of the wing may vary.

Having the knowledge that the testing house provides through the test report is fundamental to learning how to deal with possible situations.

To become familiar with the manoeuvres described below, we recommend practising within the auspices of a licensed training outfit.

4.1 FLYING IN TURBULENCE

The IKUMA 2 has an excellent profile to deal with incidents; it is very stable in all conditions and has a high degree of passive safety, even in turbulent conditions.

All paragliders must be piloted for the prevailing conditions and the pilot is the ultimate safety factor.

We recommend active flying in turbulent conditions, always taking measures to maintain control of the wing, preventing it from collapsing and restoring the speed required by the wing after each correction.

Do not correct the glider (braking) for too long in case this induces a stall. If you have to take corrective action, make the input then re-establish the correct flying speed.

4.2 POSSIBLE CONFIGURATIONS

To become familiar with the possible incidents described below, we recommend practising within the environment of a licensed training outfit. You must adapt your use of the brakes depending on the wing-loading and avoid over-steering.

It is important to note that the reaction to an incident can vary from one size of wing to another and even within the same size the behaviour and reactions may be different depending on the wing-loading.

In the test report, you will find all the necessary information on how to handle your new wing during each of the tested manoeuvres. Having this information is crucial to know how to react during these incidents in real flight, so you can deal with these situations as safely as possible.

Asymmetric collapse
In spite of the IKUMA 2's profile stability, strong turbulent air may cause the wing to collapse asymmetrically, especially if you do not fly actively and prevent the collapse. In this case the glider conveys a loss of pressure through the brake lines and the harness. To prevent the collapse from happening, pull the brake handle on the affected side of the wing. It will increase the incidence of the wing (angle of attack). If the collapse does happen, the IKUMA 2 will not react violently, the turning tendency is gradual and easily controlled. Weight-shift toward the open, flying side (the opposite side of the collapse) to keep the wing flying straight, while applying light brake pressure to that side if necessary. Normally, the collapsed side of the wing should then recover and reopen by itself. If it does not, try to weight-shift towards the collapsed side. If this does not resolve the issue, pull the brake handle on the collapsed side decisively and quickly all the way (100%) down and release it back up immediately. You may have to repeat this action to provoke the re-opening of the collapsed glider side. Do not over-brake or slow down the flying side of the wing (control the turn). Once the collapsed side is open make sure you return to normal flying speed.

Frontal collapse
Due to the IKUMA 2 's design, in normal flying conditions frontal collapses are unlikely to take place. The wing's profile has great buffering abilities when dealing with extreme incidence changes. A frontal collapse may occur in strong turbulent conditions, entering or exiting powerful thermals. Frontal collapses usually re-inflate without the glider turning, but a symmetrically applied quick braking action with a quick deep pump of both brakes will accelerate the re-inflation if necessary. Release the brake lines immediately to return to default glider air speed.

Negative spin
A negative spin does not conform to the IKUMA 2 's normal flight behaviour. Certain circumstances however, may provoke a negative spin (such as trying to turn when flying at very low air speed whilst applying a lot of brake). It is not easy to give any specific recommendation about this situation other than quickly restoring the wing's default air speed and angle of attack by progressively reducing the tension on the brake lines. The normal wing reaction will be to have a lateral surge on the re-accelerated side with a rotation not greater than 360º before returning to default air speed and a straight flight path trajectory.

Parachutal stall
The possibility of entering or remaining in a parachutal stall have been eliminated from the IKUMA 2 .
A parachutal stall is virtually impossible with this wing. If it did enter into a parachutal stall, the wing loses forward motion, becomes unstable and there is a lack of pressure on the brake lines, although the canopy appears to be fully inflated. To regain normal air speed, release brake line tension symmetrically and manually push on the A-lines or weight-shift your body to any side WITHOUT PULLING ON THE BRAKE LINES.

Deep Stall
The possibility of the IKUMA 2 stalling during normal flight is very unlikely.

It could only happen if you are flying at a very low air speed, whilst over-steering or performing dangerous manoeuvres in turbulent air.

To provoke a deep stall, the wing has to be slowed down to its minimum air speed by symmetrically pulling the brake lines all the way (100%) down until the stall point is reached and held there. The glider will first pitch rearward and then reposition itself overhead, rocking slightly, depending on how the manoeuvre is done.

When entering a stall, remain clear-headed and ease off the brake lines until reaching the half-way point of the total brake travel. The wing will then surge violently forward and could reach a point below you. It is most important to maintain brake pressure until the glider has returned to its default overhead flying position.

To resume normal flight conditions, progressively and symmetrically release the brake line tension to regain air speed. When the wing reaches the overhead position, the brakes must be fully released. The wing will then surge forward to regain full air speed. Do not brake excessively at this moment as the wing needs to accelerate to pull away from the stall configuration. If you have to control a possible frontal collapse, briefly pull both brake handles down to bring the wing back up and release them immediately while the glider is still in transition to reposition itself overhead.

Cravat
A cravat may happen after an asymmetric collapse, when the end of the wing is trapped between the lines. Depending on the nature of the tangle, this situation could rapidly cause the wing to spin. The corrective manoeuvres to use are the same as those applied in case of an asymmetric collapse: control the turn/spin by applying tension on the opposite brake and weight shift opposite to the turn. Then locate the 3STI stabilo line (attached to the wing tip) trapped between the other lines. This line has a different colour and is located on the outside position of the B-riser.

Pull this line until it is taut. This action will help to release the cravat. If ineffective, fly down to the nearest possible landing spot, controlling the direction with both weight-shift and the use of the brake opposite to the tangled side. Be cautious when attempting to undo a tangle while flying near terrain or other paragliders; it may not be possible to continue on the intended flight path.

Over-controlling
Most flying problems are caused by wrong pilot input, which then escalates into a cascade of unwanted and unpredicted incidents. We should note that the wrong inputs can lead to loss of control of the glider. The IKUMA 2 was designed to recover by itself in most cases. Do not try to over-correct it!

Generally speaking, the reactions of the wing, which are caused by too much input, are due to the length of time the pilot continues to over–control the wing. You have to allow the glider to re-establish normal flying speed and attitude after any type of incident.

4.3 ACCELERATED FLIGHT

The IKUMA 2 ’s profile was designed for stable flight throughout its entire speed range. The speed-bar can be used in strong winds or significant sink.
When accelerating the wing, the profile becomes more sensitive to turbulence and closer to a possible frontal collapse. If a loss in internal wing pressure is felt, tension on the speed-bar should be reduced to a minimum and a slight pull on the brake lines is recommended to increase the wing’s incidence angle. Remember to re-establish the air speed after correcting the angle of attack.

It is NOT recommended to accelerate near obstacles or in very turbulent conditions. If necessary, constantly adjust the movements and pressure on the speed-bar whilst doing the same to the brake lines. This balance is considered to be ‘active piloting’.

4.4 FLYING WITHOUT BRAKE LINES

If, for any reason at all, the IKUMA 2's brake lines become disabled in flight, it will become necessary to pilot the wing with the C-risers and weight shifting until landing. These risers steer easily because are not under significant tension. You will have to be careful and not handle them too heavily in case this causes a stall or negative spin. The wing must be flown at full speed (not accelerated) during the landing approach, and the C-risers will have to be pulled symmetrically all the way down shortly before contact with the ground. This braking method is not as effective as using the brake lines, and hence the wing will land with a higher ground speed.

4.5 LINE KNOT(S) IN FLIG

The best way to avoid knots and tangles is to thoroughly inspect the lines as part of a systematic pre-flight check. If a knot is spotted during the take off phase, immediately abort the launch sequence and stop.

If inadvertently taking off with a knotted line, the glider drift will need to be compensated by weight-shifting to the opposite side and applying a slight brake pull to that side. Gently pull the brake line to see if the knot can be undone or try to locate the problem line. Try pulling it to see if the knot can be undone. Beware of trying to clear a knotted line or untangle a line in flight when close to the terrain. If the knot is too tight and cannot be undone, carefully and safely fly to the nearest landing zone. Be careful: do not pull too hard on the brake handles because there will be an increased risk of stalling the wing or entering a negative spin. Before attempting to clear a knot, make sure there are no other pilots flying in the vicinity.

5. LOSING ALTITUDE

Knowledge of different descent techniques could become vital in certain situations. The most suitable descent method will depend on the particular situation.

To become familiar with the manoeuvres described below, we recommend practising within the environment of a licensed training outfit.

5.1 BIG EARS

The "Big ears" is a moderate descent technique, able to increase the sink rate to –3 or –4 m/s and reduces the ground speed by 3 to 5 km/h. The angle of attack and effective wing-loading will also increase due to the smaller surface area of the wing.

Standard technique

To perform the 'Big ears' manoeuvre, take the outermost line on each 3A3-riser and simultaneously, smoothly pull them outward and downward. The wingtips will fold in.
To re-establish forward speed and the correct angle of attack, accelerate once the ears are pulled.
Keep the ears pulled in until you have lost the desired altitude.
Let go of the lines to re-inflate the tips automatically. If they do not, try progressively pulling one brake then the other. We recommend inflating the wing tips asymmetrically, without major change to the angle of attack, especially when flying near the ground or flying in turbulence.

Beware of the risk of stalling!

The action of reaching for the outermost 3A3-lines to make ears, can inadvertently mean pulling the brakes. The same can happen when we are holding the tips down with the outermost 3A3-lines, it is possible to accidentally affect the brakes. This can obviously lead to a significant

speed decrease.

In paragliders with a very pronounced arc, pulling big ears means an increase in drag. On a very arched wing, the ears do not fold, they just hang. The increase of drag is more pronounced than on wings with a less pronounced arc.
The IKUMA 2 is designed with little chord, which is good in normal flight conditions. However, this same damping is what can cause us to have problems to regain normal flying speed after a high increase of the angle of attack and the added drag of the ears.
These particularities, together with turbulent thermic conditions, could cause an unintentional stall.

The solution: big ears may still be applied but you must be fully aware of the above-mentioned points and act accordingly. To avoid the stall, simply use half speed-bar (this is sufficient) to increase the speed and decrease the angle of incidence. This should allow you to maintain sufficient speed to prevent the stall. Take care not to pull the brakes while making the ears as this will make a stall more likely!

5.2 B3 TECHNIQUE

On the new generation paragliders the application of big ears can create a high degree of trailing edge turbulence. In addition, with the length of the cord and the arc of the wing, the ears have a tendency to “flap”, increasing the turbulence and causing the paraglider to lose too much airspeed, making it necessary for the pilot to recover it, either using the speed-bar or releasing the ears.
This new rapid descent technique was first discovered by our Niviuk team pilots in 2009 while flying a competition prototype wing, which, because of its line plan and high aspect ratio would not allow big ears to be applied. In fact, big ears on 2-liner wings can often prove difficult.

With the current 2 or 3-liner wings, the inability to pull big ears, or the risk involved in doing so, concerns many pilots who want to have a controlled rapid descent technique. For the above reasons we recommend using the 3B3 line.
This technique easily increases the descent rate without causing problems and without the risk of causing a collapse while maintaining high speed.
How? Locate the 3B3 line on your risers and, as you would when applying big ears, simply pull down firmly and smoothly until you see both wingtips drop back slightly. The forward speed of the glider speed will then reduce slightly, quickly stabilize and then increase. You will then experience a descent rate of around 5-6m/s.
We recommend the application of the speed bar whilst using this technique. Controlled turning of the wing can easily be maintained by weight shifting, exactly the same as you would with big ears. During this manoeuvre, the first sensation is a decrease in relative wind and a slight backwards inclination of the wing, as if going backwards.
To exit the manoeuvre release the lines as you would with big ears, control the pitch and the wing will quickly adopt normal flight. This new technique allows a comfortable and controllable rapid descent without the risk of experiencing a cravat. It is very comfortable and makes turning simple. We advise you to first try this technique in smooth conditions with sufficient altitude above appropriate terrain.
This is a new controlled descent technique that only needs a little practise to be executed with total comfort and effectiveness.

5.3 B-LINE STALL

When carrying out this manoeuvre, the wing stops flying, loses all horizontal speed and the pilot is no longer in control of the IKUMA 2.

The airflow over the profile is interrupted and the wing enters a situation similar to parachuting.

To enter this manoeuvre, the B-risers are gripped below the maillons and symmetrically pulled down together (approx. 20-30 cm) and maintained in that position.

Initiating the maneuver is physically demanding because it can take some strength to pull the risers down until the wing is deformed. After this, the physical effort is less. Continue to hold the risers in position. Once the wing is deformed, its horizontal speed will drop to 0 km/h; vertical descending speed increases to –6 to –8 m/s, depending on the conditions and how the manoeuvre is performed.

To exit the manoeuvre, simultaneously release both risers. The wing will then slightly surge forward and automatically return to normal flight. It is better to let go of the lines quickly rather than slowly.

This is an easy descent technique to perform, but remember that the wing will stop flying, will lose all forward horizontal speed, and its reactions will change markedly when compared to a normal flight configuration.

5.4 SPIRAL DIVE

This is a more effective way to rapidly lose altitude. Beware that the wing will experience and be subjected to a tremendous amount of descending and rotating speed (g-force), which can cause a loss of orientation and consciousness (blackout). This manoeuvre must therefore be done gradually to increase one's capacity to resist the g-force exerted on the body. With practice, you will fully appreciate and understand it. Only practise this manoeuvre at high altitude and with enough ground clearance.

To start the manoeuvre, first weight shift and pull the brake handle located on the inner side of the turn. The intensity of the turn can be controlled by braking slightly using the outer brake handle.

A paraglider flying at its maximum rotating speed can reach –20 m/s, or the equivalent of a 70 km/h vertical descent, and will stabilise in a spiral dive from 15m/s onwards.

Good enough reasons to familiarize yourself with the manoeuvre and understand how to exit it.

To exit this manoeuvre, the inner brake handle (down side of the turn) must progressively be relaxed while momentarily applying tension to the outer brake handle opposite to the turn. The pilot must also weight shift and lean towards the opposite side of the turn at the same time.

The exit should be performed gradually and smoothly so that the changes in pressure and speed can be noted.
When exiting the spiral, the glider will briefly experience an asymmetrical acceleration and dive, depending on how the manoeuvre was carried out.

Practise these manoeuvres at sufficient altitude and carefully.

5.5 SLOW DESCENT TECHNIQUE

This technique allows descent without straining the wing or taxing the pilot. Glide normally while searching for descending air and begin to turn as if climbing in a thermal, but with the intention to sink.

Common sense has to be used to avoid dangerous areas of rotor when looking for descending air. Safety first!

6. SPECIAL METHODS

6.1 TOWING

The IKUMA 2 does not experience any problem whilst being towed. Only qualified winch personnel should handle the certified equipment to carry out this operation. The wing must be inflated similarly as during a normal take off.

It is important to use the brakes to correct the flight path alignment, especially if the glider begins to turn. Since the wing is subject to a slow airspeed and with a high positive angle of attack, we must make any corrections with a high degree of feel and delicacy, in order to avoid a stall.

6.2 ACROBATIC FLIGHT

Although the IKUMA 2 was tested by expert acrobatic pilots in extreme situations, it was not designed for it. We do not recommend using this glider for acrobatic flying!!!

We consider acrobatic flights to be any form of piloting different than standard flights. Learning acrobatic manoeuvres should be conducted under the supervision of qualified instructors within a school environment and over water with all safety/rescue elements in place. Centrifugal forces as high as 4 to 5 g can be exerted on the body and wing during extreme manoeuvres.

7. CARE AND MAINTENANCE

7.1 MAINTENANCE

Niviuk we are firmly committed to make technology accessible to all pilots. Therefore our wings are equipped with the latest technological advances gained from the experience of our R&D team.

Careful maintenance of your equipment will ensure continued top performance. Apart from the general checks, we recommend actively maintaining your equipment.

A pre-flight check is obligatory before each flight.
If there is any damage to the equipment or you suspect any areas of the wing are susceptible to wear, you should inspect these and act accordingly.

All incidents involving the leading edge should be reviewed. A hard impact of the leading edge against a hard surface can damage the sail cloth.

Unsheathed lines provide increased performance, but this means more care should be taken when using and maintaining the wing.

Thanks to TNT, the wing has more safety and performance, but this means being more careful with the material. If any Nitinol rod is damaged, they are easily replaceable.

The fabric and the lines do not need to be washed. If they become dirty, clean them with a soft damp cloth, using only water. Do not use detergents or other chemicals.

If your wing is wet from contact with water, place it in a dry area, air it and keep it away from direct sunlight.

Direct sunlight may damage the wing's materials and cause premature aging. After landing, do not leave the wing exposed to the sun. Pack it properly and stow it away in its backpack.

If your wing is wet from contact with salt water, immerse it in fresh water and dry it away from direct sunlight.

7.2 STORAGE

It is important for the wing to be correctly folded when stored. Keep it in the in a cool, dry place away from solvents, fuels, oils.

Do not leave your gear inside a car boot, as cars left in the sun can become very hot. A rucksack can reach temperatures up to 60ºC.

Weight should not be laid on top of the equipment.

It is very important to pack the wing correctly before storage.

In case of long-term storage it is advisable, if possible, that the wing is not compressed and it should be stored loosely without direct contact with the ground. Humidity and heating can have an adverse effect on the equipment.

7.3 CHECKS AND INSPECTIONS

Inspections

The IKUMA 2 must be periodically serviced. An inspection must be scheduled every 100 flying hours or every two years whichever comes first (EN/LTF norm).

We strongly recommend that any repairs should
be done in a specialist repair shop by qualified personnel.
This will guarantee the airworthiness and continued certification of your IKUMA 2.

A thorough pre-flight check must be performed before every flight.

Checking unsheathed lines

The IKUMA 2 is fitted with unsheathed lines. Their durability conforms to unsheathed line standards. Their strength is guaranteed and their resistance to UV is one of the highest in this type of lines.
However, one of the obligations derived from the use of these lines is the need to maintain the trim of your IKUMA 2 within the stipulated ranges.
We recommend checking the lines after the first +/- 30 flying hours.

Why is this necessary?
Thanks to our research and experience acquired over time by our R&D team, we are capable of predicting how lines will perform.

Following the recommended inspections will allow you to maintain the wing in optimum condition.
The maintenance carried out on each wing will be different depending on the conditions of each flying area, climate, temperature, humidity, type of terrain, wing load, etc.

With regard to the so-called “loops”, some models are delivered with loops already made. To adjust the trim these can be loosened or readjusted. However, a wing should not be trimmed according to the measurements copied from another wing of the same type. Each trim setting is individual to each wing, and is determined after measurements and subsequent analysis by specialised personnel.

7.4 REPAIRS

We recommend any inspection or repair is performed by a Niviuk professional in our official workshop: http://niviuk.com/content/service.
Any modification of the glider made in an external workshop will invalidate the guarantee of the product. Niviuk cannot be held responsible for any issues or damage resulting from modifications or repairs carried out by unqualified professionals or who are not approved by the manufacturer.

8. SAFETY AND RESPONSIBILITY

It is well known that free-flying with a paraglider is considered a high-risk sport, where safety depends on the person who is practicing it.

Incorrect use of this equipment may cause severe, life-changing injuries to the pilot, or even death.

Manufacturers and dealers cannot be held responsible for your decisions, actions or accidents that may result from participating in this sport.

You must not use this equipment if you have not been properly trained to use it. Do not take advice or accept any informal training from anyone who is not properly qualified as a flight instructor.

9. GARANTEE

The equipment and components are covered by a 2-year warranty against any manufacturing defect.

The warranty does not cover misuse of the equipment.

Any modification of the paraglider or its components invalidates the guarantee and its certification.
a) The following are not considered to be modifications: line trimming, line repair or replacement. The above must all be carried out according to the parameters stipulated by NIVIUK and in accordance with its certification.

10. ANNEXES

10. TECHNICAL DATA

10.1 TECHNICAL DATA

			22	24	26	28	30
CELLS	**Number**		61	61	61	61	61
ASPECT RATIO	**Flat**		5,7	5,7	5,7	5,7	5,7
AREA	**Flat**	m2	22	24	26	28	30
	Projected	m2	18,84	20,55	22,27	23,98	25,69
SPAN	**Flat**	m	11,2	11,7	12,17	12,63	13,07
CHORD	**Maximum**	m	2,41	2,51	2,62	2,71	2,81
LINES	**Total**	m	232	243	253	263	272
	Main		2-1/4/3	2-1/4/3	2-1/4/3	2-1/4/3	2-1/4/3
RISERS	**Number**	3+1	A-A'/B/C	A-A'/B/C	A-A'/B/C	A-A'/B/C	A-A'/B/C
	Accelerator	mm	145	145	145	145	145
WEIGHT IN FLIGHT	**Min-Max**	Kg	65-85	75-95	85-105	95-115	105-130
GLIDER WEIGHT		Kg	4,1	4,4	4,6	4,9	5,2
CERTIFICATION	**EN/LTF**		B	B	B	B	B

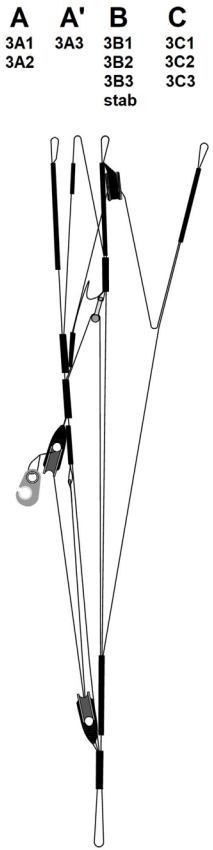
10.2 MATERIALS DESCRIPTION

CANOPY	FABRIC CODE	SUPPLIER
UPPER SURFACE	30 DMF / N20 DMF	DOMINICO TEX CO (KOREA)
BOTTOM SURFACE	2044 32 PS	DOMINICO TEX CO (KOREA)
PROFILES	30 DFM / 2044 32 FM	DOMINICO TEX CO (KOREA)
DIAGONALS	30 DFM / 2044 32 FM	DOMINICO TEX CO (KOREA)
LOOPS	LKI - 10	KOLON IND. (KOREA)
REIFORCEMENT LOOPS	RIPSTOP FABRIC	DOMINICO TEX CO (KOREA)
TRAILING EDGE REIFORCEMENT	MYLAR	D-P (GERMANY)
RIBS REIFORCEMNET	LTN-0.8 STICK	SPORTWARE CO.CHINA
THREAD	SERAFIL 60	AMAN (GERMANY)

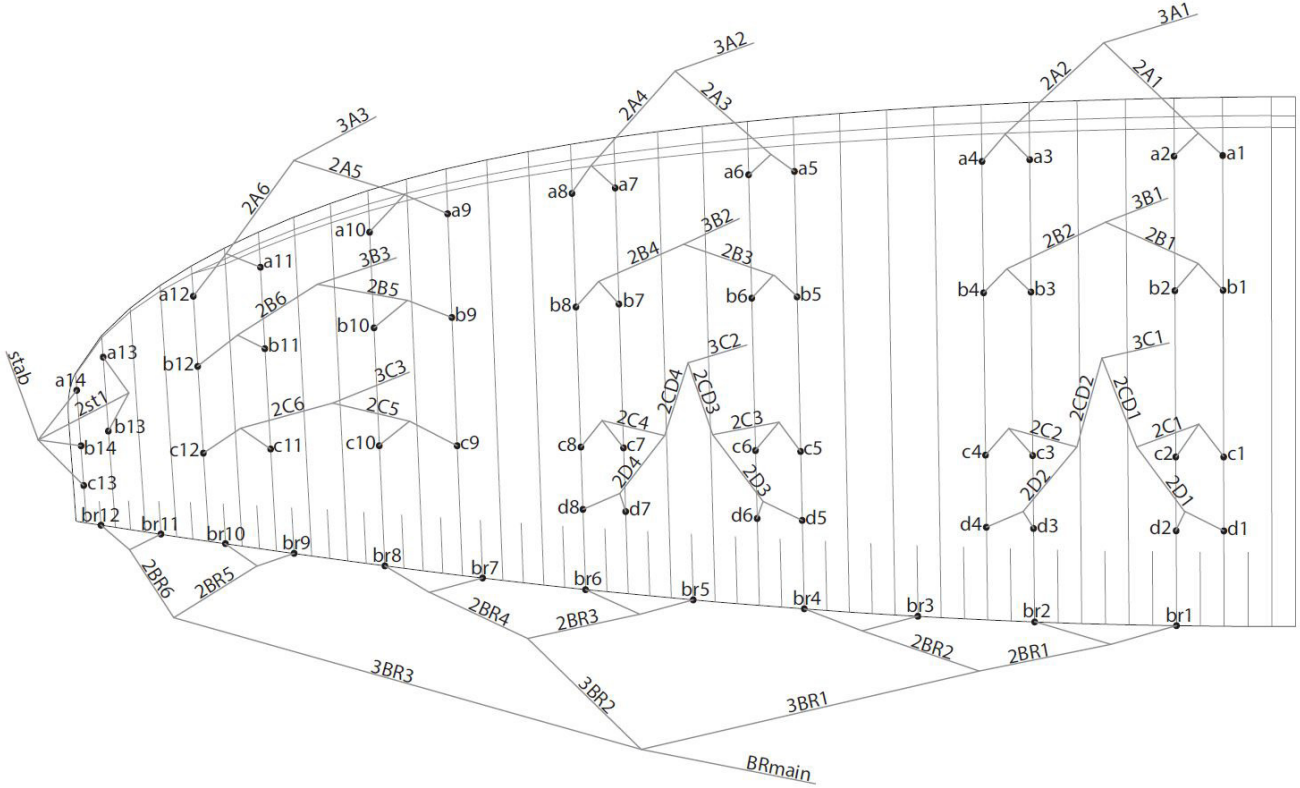
SUSPENSION LINES	FABRIC CODE	SUPPLIER
UPPER CASCADES	DC - 60	LIROS GMHB (GERMANY)
UPPER CASCADES	DC - 40	LIROS GMHB (GERMANY)
MIDDLE CASCADES	DC - 60	LIROS GMHB (GERMANY)
MIDDLE CASCADES	DC - 40	LIROS GMHB (GERMANY)
MIDDLE CASCADES	A-8000/U 70	EDELRID (GERMANY)
MIDDLE CASCADES	A-8000/U 90	EDELRID (GERMANY)
MIDDLE CASCADES	A-8000/U 130	EDELRID (GERMANY)
MAIN	A-8000/U 90	EDELRID (GERMANY)
MAIN	A-8000/U 130	EDELRID (GERMANY)
MAIN	A-8000/U 190	EDELRID (GERMANY)
MAIN	A-8000/U 230	EDELRID (GERMANY)
MAIN BREAK	TNL - 280	TEIJIM LIMITED (JAPAN)
THREAD	SERAFIL 60	AMAN (GERMANY)

RISERS	FABRIC CODE	SUPPLIER
MATERIAL	3455	COUSIN (FRANCE)
COLOR INDICATOR	210D	TECNI SANGLES (FRANCE)
THREAD	V138	COATS (ENGLAND)
MAILLONS	3.5	ANSUNG PRECISION (KOREA)
PULLEYS	RF25109	RONSTAN (AUSTRALIA)

10.3 RISERS PLAN



10.4 SUSPENSION PLAN



10.5 DIMENSIONS IKUMA 2 22

LINES HEIGHT mm

	A	B	C	D	BR
1	6930	6841	6938	7021	7384
2	6882	6794	6874	6961	6965
3	6842	6754	6833	6919	6822
4	6852	6765	6862	6941	6850
5	6794	6710	6807	6885	6699
6	6761	6678	6761	6839	6538
7	6710	6633	6714	6786	6503
8	6724	6648	6744	6797	6618
9	6645	6577	6652		6468
10	6562	6499	6568		6413
11	6468	6417	6486		6388
12	6440	6381	6456		6470
13	6195	6172	6190		
14	6128	6126			

RISERS LENGHT mm

	A	A'	B	C
	470	470	470	470 STANDARD
	340	340	383	470 ACCELERATED

10.6 DIMENSIONS IKUMA 2 24

LINES HEIGHT mm

	A	B	C	D	BR
1	7242	7144	7245	7330	7723
2	7192	7094	7179	7270	7300
3	7152	7055	7140	7230	7135
4	7163	7066	7170	7253	7151
5	7101	7009	7111	7192	6987
6	7067	6976	7063	7144	6812
7	7012	6927	7015	7089	6770
8	7027	6944	7046	7101	6893
9	6945	6873	6943		6746
10	6859	6792	6856		6696
11	6758	6707	6770		6673
12	6729	6670	6738		6755
13	6476	6452	6469		
14	6406	6404			

RISERS LENGHT mm

	A	A'	B	C
	470	470	470	470 STANDARD
	340	340	383	470 ACCELERATED

10.7 DIMENSIONS IKUMA 2 26

LINES HEIGHT mm

	A	B	C	D	BR
1	7540	7435	7525	7615	8053
2	7487	7385	7462	7551	7588
3	7448	7345	7413	7503	7437
4	7460	7358	7446	7531	7468
5	7396	7296	7399	7474	7305
6	7364	7263	7350	7429	7134
7	7309	7212	7297	7379	7098
8	7319	7227	7326	7393	7219
9	7236	7153	7236		7064
10	7149	7075	7142		7004
11	7048	6986	7050		6974
12	7015	6947	7014		7067
13	6751	6727	6739		
14	6682	6677			

RISERS LENGHT mm

	A	A'	B	C
	470	470	470	470 STANDARD
	340	340	383	470 ACCELERATED

10.7 DIMENSIONS IKUMA 2 28

LINES HEIGHT mm

	A	B	C	D	BR
1	7820	7716	7828	7921	8321
2	7768	7664	7756	7855	7851
3	7728	7625	7715	7812	7692
4	7741	7638	7749	7838	7726
5	7680	7579	7689	7777	7560
6	7644	7544	7637	7725	7381
7	7586	7494	7587	7668	7344
8	7603	7513	7621	7681	7477
9	7512	7438	7515		7310
10	7418	7351	7421		7250
11	7310	7259	7328		7223
12	7279	7219	7294		7317
13	7008	6982	7005		
14	6935	6933			

RISERS LENGHT mm

	A	A'	B	C
	470	470	470	470 STANDARD
	340	340	383	470 ACCELERATED

10.7 DIMENSIONS IKUMA 2 30

LINES HEIGHT mm

	A	B	C	D	BR
1	8094	7986	8101	8198	8627
2	8041	7933	8028	8130	8140
3	8001	7894	7987	8087	7977
4	8015	7908	8022	8114	8012
5	7950	7850	7963	8055	7841
6	7912	7815	7911	8001	7657
7	7856	7765	7859	7943	7620
8	7873	7784	7895	7956	7758
9	7782	7704	7788		7585
10	7686	7614	7691		7524
11	7576	7519	7595		7496
12	7544	7478	7560		7594
13	7267	7240	7258		
14	7189	7186			

RISERS LENGHT mm

	A	A'	B	C
	470	470	470	470 STANDARD
	340	340	383	470 ACCELERATED

10.10 CERTIFICATION SPECIMEN TEST

IKUMA 2 22

AIR TURQUOISE SA | PARA-TEST.COM
Route du Pré-au-Comte 8 ▲ CH-1844 Villeneuve ▲ +41 (0)21 965 65 65

Test laboratory for paragliders, paraglider harnesses and paraglider reserve parachutes

paragliding by air turquoise

Classification: **B**

NIVIUK

In accordance with standards EN 926-1:2015, EN 926-2:2013 and LTF NFL II-91/09:	PG_1653.2020
Date of issue (DMY):	03.03.2020
Manufacturer:	Niviuk Gliders / Air Games S.L.
Model:	Ikuma 2 22
Serial number:	PI460890

Configuration during flight tests

Paraglider		**Accessories**	
Maximum weight in flight (kg)	**85**	Range of speed system (cm)	**16**
Minimum weight in flight (kg)	**65**	Speed range using brakes (km/h)	**14**
Glider's weight (kg)	**4.1**	Total speed range with accessories (km/h)	**24**
Number of risers	**3**	Range of trimmers (cm)	**0**
Projected area (m2)	**18.84**		

Harness used for testing (max weight)		**Inspections** (whichever happens first)
Harness type	**ABS**	every 24 months or every 100 flying hours
Harness brand	**Advance**	Warning! Before use refer to user's manual
Harness model	**Success 4 M**	Person or company having presented the glider for testing: **None**
Harness to risers distance (cm)	**44**	
Distance between risers (cm)	**44**	

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

IKUMA 2 24

AIR TURQUOISE SA | PARA-TEST.COM
Route du Pré-au-Comte 8 ▲ CH-1844 Villeneuve ▲ +41 (0)21 965 65 65

Test laboratory for paragliders, paraglider harnesses and paraglider reserve parachutes

paragliding by air turquoise

Classification: **B**

NIVIUK

In accordance with standards EN 926-1:2015, EN 926-2:2013 and LTF NFL II-91/09:	PG_1628.2019
Date of issue (DMY):	16.01.2020
Manufacturer:	Niviuk Gliders / Air Games S.L.
Model:	Ikuma 2 24
Serial number:	OIIK24V5

Configuration during flight tests

Paraglider		**Accessories**	
Maximum weight in flight (kg)	**95**	Range of speed system (cm)	**16**
Minimum weight in flight (kg)	**75**	Speed range using brakes (km/h)	**14**
Glider's weight (kg)	**4.4**	Total speed range with accessories (km/h)	**24**
Number of risers	**3**	Range of trimmers (cm)	**0**
Projected area (m2)	**20.55**		

Harness used for testing (max weight)		**Inspections** (whichever happens first)
Harness type	**ABS**	every 24 months or every 100 flying hours
Harness brand	**Supair**	Warning! Before use refer to user's manual
Harness model	**Altiplume M**	Person or company having presented the glider for testing: **None**
Harness to risers distance (cm)	**44**	
Distance between risers (cm)	**44**	

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

10.10 CERTIFICATION SPECIMEN TEST

IKUMA 2 26

AIR TURQUOISE SA | PARA-TEST.COM
Route du Pré-au-Comte 8 ▲ CH-1844 Villeneuve ▲ +41 (0)21 965 65 65

Test laboratory for paragliders, paraglider harnesses and paraglider reserve parachutes

paragliding by air turquoise

Classification: **B**

NIVIUK

In accordance with standards EN 926-1:2015, EN 926-2:2013 and LTF NFL II-91/09:	PG_1629.2019
Date of issue (DMY):	16.01.2020
Manufacturer:	Niviuk Gliders / Air Games S.L.
Model:	Ikuma 2 26
Serial number:	Ikuma2526V1

Configuration during flight tests

Paraglider		**Accessories**	
Maximum weight in flight (kg)	**105**	Range of speed system (cm)	**16**
Minimum weight in flight (kg)	**85**	Speed range using brakes (km/h)	**14**
Glider's weight (kg)	**4.6**	Total speed range with accessories (km/h)	**24**
Number of risers	**3**	Range of trimmers (cm)	**0**
Projected area (m2)	**22.27**		

Harness used for testing (max weight)		**Inspections** (whichever happens first)
Harness type	**ABS**	every 24 months or every 100 flying hours
Harness brand	**Icaro**	Warning! Before use refer to user's manual
Harness model	**Energy 2 L**	Person or company having presented the glider for testing: **Olivier Nef**
Harness to risers distance (cm)	**43**	
Distance between risers (cm)	**48**	

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

IKUMA 2 28

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Test laboratory for paragliders, paraglider harnesses and paraglider reserve parachutes

paragliding by air turquoise

Classification: **B**

NIVIUK

In accordance with standards EN 926-1:2015, EN 926-2:2013 and LTF NFL II-91/09:	PG_1674.2020
Date of issue (DMY):	08.04.2020
Manufacturer:	Niviuk Gliders / Air Games S.L.
Model:	Ikuma 2 28
Serial number:	PI460891

Configuration during flight tests

Paraglider		**Accessories**	
Maximum weight in flight (kg)	**115**	Range of speed system (cm)	**17**
Minimum weight in flight (kg)	**95**	Speed range using brakes (km/h)	**14**
Glider's weight (kg)	**5**	Total speed range with accessories (km/h)	**24**
Number of risers	**3**	Range of trimmers (cm)	**0**
Projected area (m2)	**23.98**		

Harness used for testing (max weight)		**Inspections** (whichever happens first)
Harness type	**ABS**	every 24 months or every 100 flying hours
Harness brand	**Supair**	Warning! Before use refer to user's manual
Harness model	**Evo XC 3 L**	Person or company having presented the glider for testing: **None**
Harness to risers distance (cm)	**44**	
Distance between risers (cm)	**48**	

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

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