

IKUMA 3

User manual &
Technical data



PIVIUK BEYOND
THE GLIDE

Go *the distance*

WELCOME

We welcome you to our team and thank you for the trust you have placed in our Niviuk paraglider.

We would like you to share the enthusiasm with which we have created this paraglider and the importance and care with which we have developed the design and manufacture of this new model. All this, in order to be able to offer you the maximum pleasure in every flight under a Niviuk paraglider.

The new IKUMA 3 is the perfect wing for your long distance cross-country flights. Dare to go further with this EN B+ classified glider, which offers unparalleled comfort and manoeuvrability. It is the perfect balance between safety and efficiency to make your adventures an authentic and, above all, fun experience.

Get that perfect flying feeling with this accessible, high performance glider. Go the distance with confidence and excitement!

We are sure you will enjoy flying this paraglider and you will soon discover the meaning of our philosophy:

“Give importance to the small details to make big things happen”.

This is the user manual and we recommend you read it carefully.

CATEGORIES



PROGRESSION



CROSS-COUNTRY



USER MANUAL

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

Whilst it provides information, 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 for information purposes only and 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 3 manual.

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

01

CHARACTERISTICS	5
1.1 TARGET GROUP	5
1.2 CERTIFICATION	5
1.3 IN-FLIGHT BEHAVIOR	5
1.4 TECHNOLOGIES, CONSTRUCTION, MATERIALS	6
1.5 ELEMENTS, COMPONENTS	7

02

UNPACKING AND ASSEMBLY	7
2.1 CHOOSING THE RIGHT LOCATION	7
2.2 PROCEDURE	7
2.3 CONNECTING THE HARNESS	7
2.4 HARNESS TYPE	7
2.5 SPEED-BAR	8
2.5.1 SPEED SYSTEM ASSEMBLY	8
2.5.2 CHANGING THE RISER CORDS	8
2.6 INSPECTION AND WING INFLATION ON THE GROUND	8
2.7 ADJUSTING THE BRAKES	9

03

THE FIRST FLIGHT	10
3.1 CHOOSING THE RIGHT LOCATION	10
3.2 PREPARATION	10
3.3 FLIGHT PLAN	10
3.4 PRE-FLIGHT CHECK	10
3.5 LAUNCH ASSISTANCE PEGS	10
3.6 WING INFLATION, CONTROL AND TAKEOFF	10
3.7 LANDING	10
3.8 PACKING	10

04

IN FLIGHT	11
4.1 FLYING IN TURBULENCE	11
4.2 POSSIBLE CONFIGURATIONS	11
4.3 ACCELERATED FLIGHT	12
4.4 FLYING WITHOUT BRAKE LINES	12
4.5 LINE KNOT(S) IN FLIGHT	12

05

LOSING ALTITUDE	13
5.1 BIG EARS	13
5.2 SPIRAL DIVE	13
5.3 SLOW DESCENT TECHNIQUE	13

06

SPECIAL METHODS	14
6.1 TOWING	14
6.2 ACROBATIC FLIGHT	14

07

CARE AND MAINTENANCE	15
7.1 MAINTENANCE	15
7.2 STORAGE	15
7.3 CHECKS AND INSPECTIONS	15
7.4 REPAIRS	15

08

SAFETY AND RESPONSABILITY	16
----------------------------------	-----------

09

GUARANTEE	16
------------------	-----------

10

ANNEXES	17
10.1 TECHNICAL SPECIFICATIONS	18
10.2 COLOURS	19
10.3 MATERIALS	20
10.4 LINE PLAN	21
10.5 RISER PLAN	22
10.6 LINE MEASUREMENTS BY SIZE	23
10.7 TOTAL LINE LENGTH	29
10.8 MINIMUM STRENGTH OF SUSPENSION LINES	31
10.9 MAILLON & PULLEY	32
10.10 CERTIFICATION	33

1. CHARACTERISTICS

1.1 TARGET GROUP

The new IKUMA 3 is the perfect wing for your long distance cross-country flights. Dare to go further with this EN B+ classified glider, which offers unparalleled comfort and manoeuvrability. The new aerofoil, optimised for performance and damping, will allow you to enjoy your flights like never before.

The IKUMA 3 is conceived and designed for intermediate pilots. It is suitable for all those who want to begin cross-country flying and decide to make long distance flights with safety. Get that perfect flying feeling with this accessible, high performance glider. Go the distance with confidence and excitement!

1.2 CERTIFICATION

The IKUMA 3 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 8 G.

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

The flight test resulted in the following certification of the IKUMA 3 for all sizes (20, 22, 24, 26, 28 and 30):

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 at all levels of training and qualification.

For further information on the flight test and the corresponding certification, please see the final pages of this manual or see or visit the [Downloads section](#).

1.3 IN-FLIGHT BEHAVIOUR

Niviuk developed this wing by adopting very specific goals: to offer the best possible features, excellent handling, to make flying easier for the pilot.

Our other aims were to achieve optimal performance while maintaining the highest level of safety. To ensure that the wing transmits the

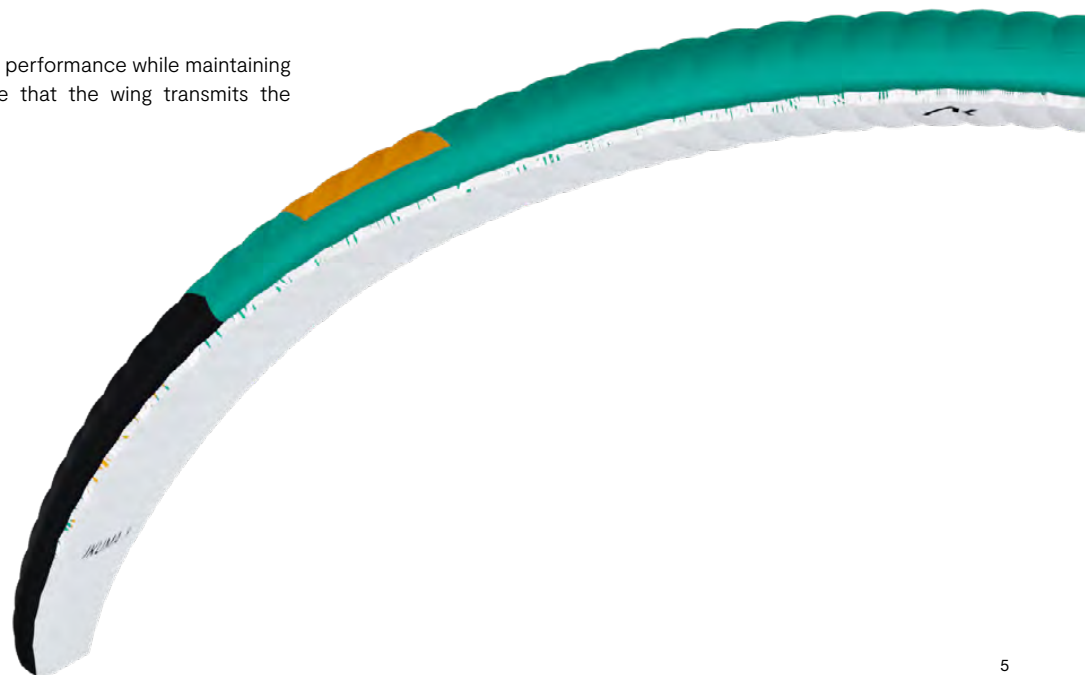
maximum feedback in an understandable and comfortable way so that the pilot can focus on piloting and enjoying the flight. And, with active piloting, take advantage of all favourable conditions.

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 3 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 TECHNOLOGIES, CONSTRUCTION, MATERIALS

The IKUMA 3 benefits from all the construction and assembly techniques used in our factory. 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 – the system is characterised by the arrangement of the air inlets, to ensure optimal maintenance of internal pressure across the whole range of angles of attack.

The result? Having greater internal pressure means better tolerance of turbulence, greater consistency of the profile shape across the speed range; excellent handling at low speed is achieved by allowing the pilot to extend the braking limit, there is a lower risk of collapse and consequently, greater control and 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.

Nitinol now features in all our wings.

Structured Leading Edge (SLE) – the application of Nitinol rods in the leading edge. This technology provides increased strength and stability by maintaining the shape of the aerofoil throughout all phases of flight. This increases performance, efficiency and stability, absorbs turbulence better and makes the wing much more durable over time.

3D Pattern Cut Optimisation (3DP) – this involves placing the fabric of each panel in one direction only, taking as a reference its location on the leading edge. It has been proved that, if the cloth pattern is correctly aligned to the direction of the load axes, the material deforms much less flight after flight, so the leading edge keeps its shape better and is much more durable over time.

Over the years, the design of our paragliding and paramotoring wings has evolved a lot, with a positive and specific advancement of the leading edge.

3D Leading Edge (3DL) – this means adjusting the material of the leading edge to avoid ballooning and the creases that form in this curved area of the wing. Specifically, the leading edge is divided into “sub-panels” sewn into each of the cells at the front of the glider. As a result, the tension of the leading edge cloth is perfectly uniform, increasing the performance and durability of the glider.

Structured Middle Chord (SMC) – Nitinol rods in the middle-rear part of the profile form the SMC. This technology gives much more solidity and stability to maintain its shape. The profile is taut at all times, without creases, and fully optimised for all flight phases. Increases performance and makes the wing much more durable over time.

Drag Reduction Structure (DRS) – the DRS aims to reduce the adverse pressure gradient and drag by optimising the aerodynamic shape of the wing. Its application makes the airflow direction much more progressive at the trailing edge. This increases performance without reducing safety and control of the wing.

Radial Sliced Diagonal (RSD) – this involves a redesign of the internal structure of the wing. It incorporates independent and efficiently oriented diagonals, i.e. following the direction of the cloth. This improves strength, reduces the overall weight of the glider and avoids deformation.

In order to improve stress distribution and reduce the number of attachment points and lines, most wings already have these diagonals, which are connected from the attachment points to the adjacent profiles.

C2B System – Manoeuvrability has been improved with the new C2B system that is integrated into the risers, and which allows a three-liner wing to be flown as if it were a two-liner. Steering with the C-risers automatically includes the B-risers. As a result, the wing has a much more efficient, controlled and precise handling without degrading the shape of the profile.

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 3 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 same fabric has been used as in the rest of the range, ensuring its guaranteed lightness, strength and durability without loss of colour.

The lines are made of unsheathed Dyneema and Aramid.

The diameter is adjusted according to the load, aiming for the best performance with the least drag.

The lines are produced semi-automatically and all seams are finished under the supervision of our specialists.

After final assembly on the canopy, the lineset is measured on each individual wing.

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

- The inner bag, to keep the glider protected during storage and transport.
- An adjustable compression strap, which allows the inner bag to be compressed as much as possible to reduce packing volume.
- A riser bag, to protect them and pack them neatly.
- A repair kit with self-adhesive Ripstop tape.
- A Kargo 130 rucksack for the IKUMA 3 in size 20, 22 and 24. This is not included in the scope of delivery, but its purchase is recommended. It is perfect for transporting all the equipment comfortably and with plenty of space.
- The Kargo 160 rucksack for the IKUMA 3 in size 26, 28 and 30. This is not included in the scope of delivery, but its purchase is recommended. It is perfect for transporting all the equipment comfortably and with plenty of space.



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 3.

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 paraglider out of the rucksack, open and unfold it on the ground with the lines positioned on the undersurface, 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 3 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.

2.4 HARNESS TYPE

The IKUMA 3 can be flown with virtually all current harnesses. If the harness used has an adjustable chest strap, we recommend adjusting it to the distance recommended during the certification, which varies according to size. See the certification report.

Distance between the risers:

- Size 20 – 40/44 cm
- Size 22 – 40/44 cm
- Size 24 – 40/44 cm
- Size 26 – 44/48 cm
- Size 28 – 44/48 cm
- Size 30 – 48 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.

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 3 includes a speed system with maximum travel depending on its size (see Full speed-bar). The speed system is operated by pushing with the feet on the speed-bar (not supplied as standard on this model) which the pilot must install by connecting it to the speed system on the risers (See 2.5.1: "Speed-bar installation").

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 is 180 mm in 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

By speed system we mean the speed-bar that the pilot pushes to accelerate, together with the two lines that connect it to the risers. Once you have decided on the type of speed-bar you wish to use, it is necessary to proceed with its installation. Something to consider:

The pilot can use the type of speed-bar they consider appropriate depending on the type of harness used and their preferences.

This configuration is detachable to facilitate its connection and/or disconnection to the risers and its respective adjustment.

For installation through the harness, the harness manufacturer's instructions must be followed. Most harnesses are already pre-fitted for this purpose.

The standard connection is made by means of the Brummel hooks in which the two grooves slide into each other to interlock, ensuring their use and connection/disconnection. However, any safe splicing system can be used.

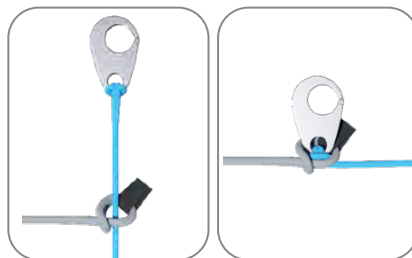


Diagram 1.
Speed-bar connection by means of the Brummel hook.

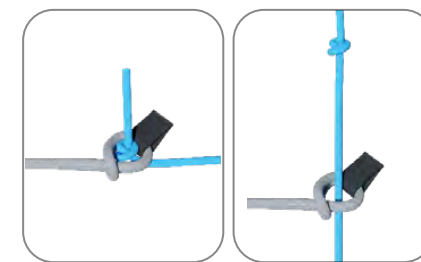


Diagram 2.
Speed-bar connection by means of kite loop (without Brummel hook).

1. A knot is tied in the speed-bar cord and passed through the connector of the webbing cord.
2. Tension is applied to both sides of the system until the knot tightens against the riser connector.

It should be noted that the connection procedure is exactly the same for the Brummel hook as for the kite loop, and is applicable to other connection systems or elements.

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. The pilot can use Brummel hooks, lark's foot/clove hitch, use a different knot, 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 3 as many times as necessary to familiarise yourself with its behaviour. Inflating the IKUMA 3 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 is 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 3. 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 CHOOSING THE RIGHT LOCATION

For the first flight 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 section 2 UNPACKING AND ASSEMBLY to prepare your equipment.

3.3 FLIGHT PLAN

It is necessary to make a flight plan in advance, to avoid possible errors in decision making.

3.4 PRE-FLIGHT CHECK

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 TAKEOFF

For launch, a smooth and progressive inflation is recommended. The IKUMA 3 is easy to inflate and does not require a great deal of physical effort. It has no tendency to overshoot, which allows a smooth inflation phase, giving way to a control phase with enough time to make the decision to accelerate and take off when the pilot wishes to do so.

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 3 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 takeoff 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 3 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 3 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.

Niviuk have designed the NKare Bag and the ZipNkare. These will assist you in quickly folding the paraglider, keeping the profile and integrity of the internal structures in perfect condition.

The NKare Bag will guide you through the folding process by allowing you to place the rods one on top of the other on the longitudinal axis to "concertina" pack the glider. Then you can easily make the sectional folds that each model requires. This folding system guarantees that both the cloth and the reinforcements of the internal structure remain in perfect condition. With the ZipNkare, it is possible to perform exactly the same folding procedure and with its zip closed, becomes a much easier to carry case.



4. IN FLIGHT

We recommend that you read the certification test report. The report contains all the necessary information on the IKUMA 3 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 3 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 provokes 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 manoeuvres 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 type of reaction to a manoeuvre 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 manoeuvres in real flight, so you can deal with these situations as safely as possible.

Asymmetric collapse

In spite of the IKUMA 3's profile stability, strong turbulent air may cause the wing to collapse asymmetrically in very strong turbulence, 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 3 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 3'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 3'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 360° 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 3.

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 3 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 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 3 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 3's profile was designed for stable flight throughout its entire speed range. Accelerating the wing can be useful 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 3's brake lines become disabled in flight, it will become necessary to pilot the wing gently using 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 should be pulled symmetrically 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 FLIGHT

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

“Big Ears” is a moderate descent technique, able to increase the sink rate to -3 a -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.

To perform the Big Ears manoeuvre, take the outer line on each A-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. Asymmetric reopening is recommended in order to avoid compromising the angle of attack, particularly flying near the ground or in turbulent conditions.

5.2 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 practise, 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 15 m/s onwards. Good enough reasons to familiarise 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.

5.3 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 3 does not experience any problem whilst being towed. Only qualified winch personnel should handle the certified equipment to carryout 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, 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 3 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 extreme or acrobatic flights to be any form of piloting different than standard flights. Learning aerobatic/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. When performing extreme maneuvers, you will subject both the glider and your body to centrifugal forces that can reach up to 4 or 5 g, wearing down the material much faster than with normal flight.



7. CARE AND MAINTENANCE

7.1 MAINTENANCE

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.

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. Thanks to these new technologies, paragliders are gaining more safety and performance, which requires greater care of the materials.

PLEASE NOTE: it is critical to avoid any kind of impact or dragging the leading edge on the ground. This part is reinforced with very durable and strong Nitinol rods that can be easily replaced. Dragging and/or hitting the leading edge can cause serious damage to the fabric, which is much more complicated and costly to repair.

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 you fly in sandy areas, avoid getting sand in the cells or down into the trailing edge. At the end of the flight, empty any sand that is in your wing. The openings at the end of the wingtips make this much easier.

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 60°C.

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

The IKUMA 3 must be periodically serviced. An inspection must be scheduled every 100 flying hours or every two years, whichever comes first.

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 the IKUMA 3.

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

The IKUMA 3 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.

The lines are made of a new material with a water-repellent coating (Magix Pro Dry), which makes it easier to untangle knots and simplifies line sorting before flying.

However, in order to maintain the wing's standard performance, it is necessary to keep the trim constantly adjusted.

Generally speaking, line lengths change with glider use. For this reason we recommend a trim check after approximately the first 30 hours of flight. The hours or actions required to repair lines may vary for

each wing depending on the conditions of each flying area, regional weather, temperature, humidity, terrain type, wing loading, etc.

Thanks to the experience and many years of paraglider inspections our R&D team has carried out, we have the necessary information to be able to define the real behaviour of the line. With these quality controls we can keep our wings at the optimum trim without any loss of performance due to wear and tear.

The most important detail to check and/or repair on the lines are the so-called "loops". In some models, such as the IKUMA 3, the wings are delivered with loops already installed as standard. These shall be released or readjusted depending on the current trim.

Never adjust a line according to the line length of another wing of the same type. Each length must be adapted and customised for each wing concerned, as a result of an analysis carried out by specialised and authorised personnel.

Length adjustments may never exceed 1% of the length permitted by the certification.

7.4 REPAIRS

In the case of small tears, you can temporarily repair these by using the Ripstop tape included in the repair kit, as long as no stitching is required to mend the fabric.

Any other tears or repairs should be done in a specialist repair shop by qualified personnel.

Damaged lines must be repaired or exchanged immediately.

Please refer to the line plan at the end of this manual.

We recommend any inspection or repair is performed by a Niviuk professional in our [official workshop](#).

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. GUARANTEE

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 to the paraglider or its components invalidates the guarantee and the certification.

If you notice a fault or defect on your paraglider, contact Niviuk immediately for a full inspection.



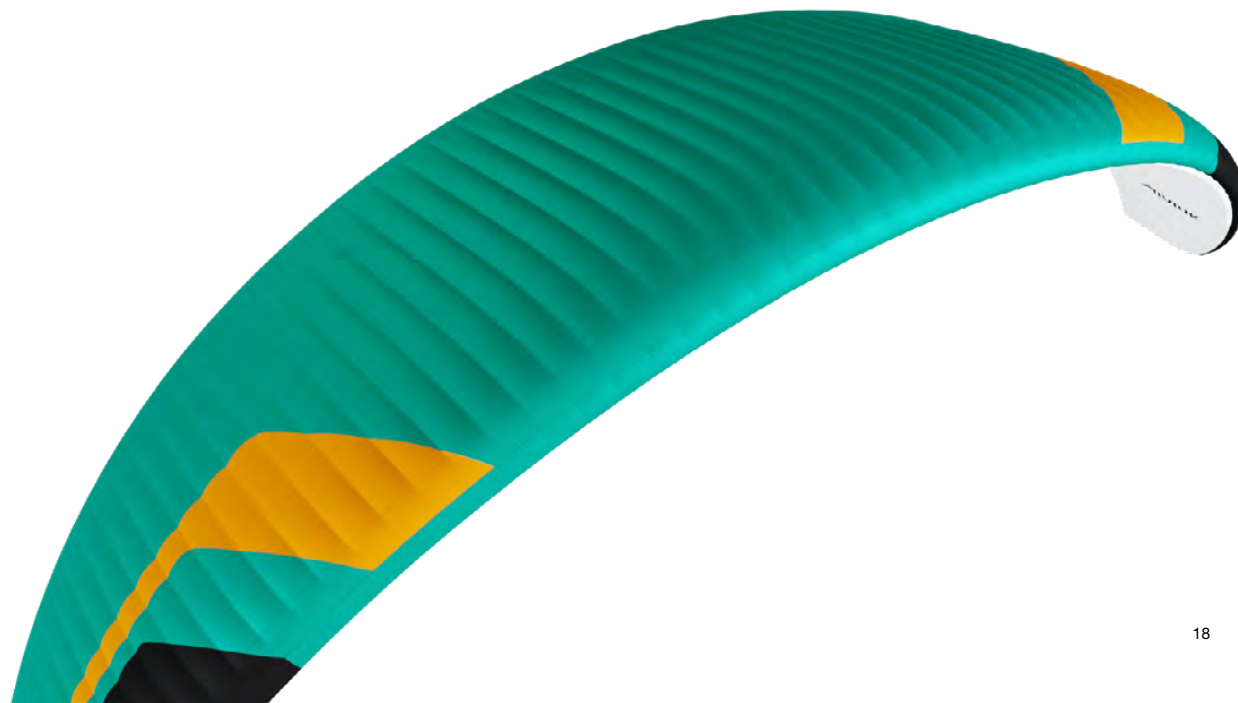
ANNEXES

10. ANNEXES

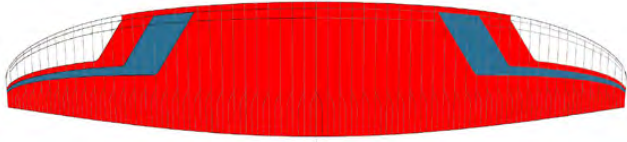
10.1 Technical specifications

			20	22	24	26	28	30
Cells	Number		62	62	62	62	62	62
Aspect ratio	Flat		5.7	5.7	5.7	5.7	5.7	5.7
	Projected		4.4	4.4	4.4	4.4	4.4	4.4
Area	Flat	m ²	19.8	21.8	23.8	25.8	27.8	29.8
	Projected	m ²	16.87	18.58	20.28	21.99	23.69	25.39
Span	Flat	m	10.62	11.15	11.65	12.13	12.59	13.03
Chord	Maximum	m	2.29	2.41	2.51	2.62	2.72	2.81
Lines	Total	m	203	214	224	233	242	251
	Main		2-1/4/2	2-1/4/2	2-1/4/2	2-1/4/2	2-1/4/2	2-1/4/2
Risers	Number	3+1	A-A'/B/C	A-A'/B/C	A-A'/B/C	A-A'/B/C	A-A'/B/C	A-A'/B/C
	Accelerator	mm	180	180	180	180	180	180
Glider weight		kg	3,85	4.2	4.5	4.7	5	5.3
Total weight in flight	Min-Max	kg	55-75	65-85	75-95	85-105	95-115	105-130
Certification			EN/LTF B+	EN/LTF B+	EN/LTF B+	EN/LTF B+	EN/LTF B+	EN/LTF B+

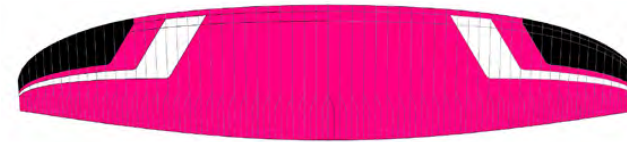
The total weight of the wing may differ ±2% due to variations in the weight of the fabric supplied by the manufacturers.



10.2 Colours



MARS	SB1	DRAGON RED	TOP	REF: 636
	SB2	WHITE	BOTTOM - ALL WHITE	REF: 001
	SB3	WHITE	HORN	REF: 001
	SB4	SLATE BLUE	SHADOW	REF: 317



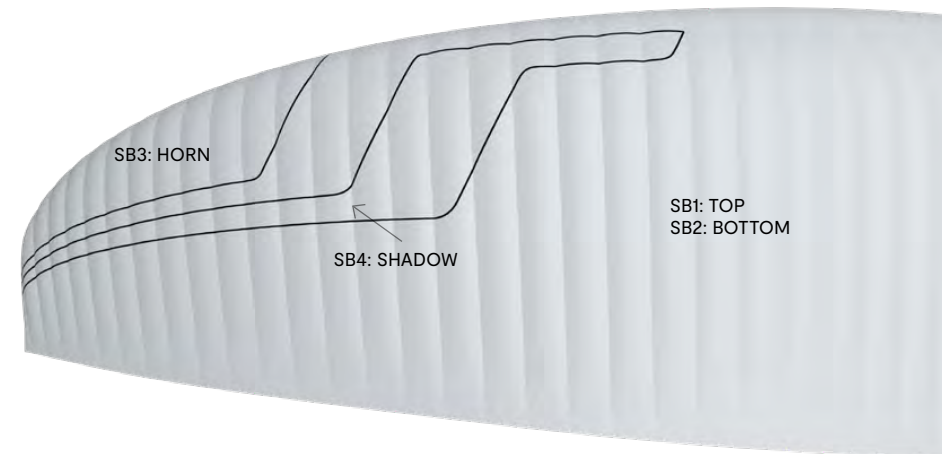
FUCHSIA	SB1	PINK	TOP	REF: 19-2047
	SB2	WHITE	BOTTOM - ALL WHITE	REF: 001
	SB3	BLACK	HORN	REF: 102
	SB4	WHITE	SHADOW	REF: 001



UNAKIT	SB1	SPECTRA GREEN	TOP	REF: 17-5335
	SB2	WHITE	BOTTOM - ALL WHITE	REF: 001
	SB3	BLACK	HORN	REF: 102
	SB4	ORANGE	SHADOW	REF: 744



NIMBUS	SB1	SLATE BLUE	TOP	REF: 317
	SB2	WHITE	BOTTOM - ALL WHITE	REF: 001
	SB3	LIMA	HORN	REF: 500
	SB4	WHITE	SHADOW	REF: 001



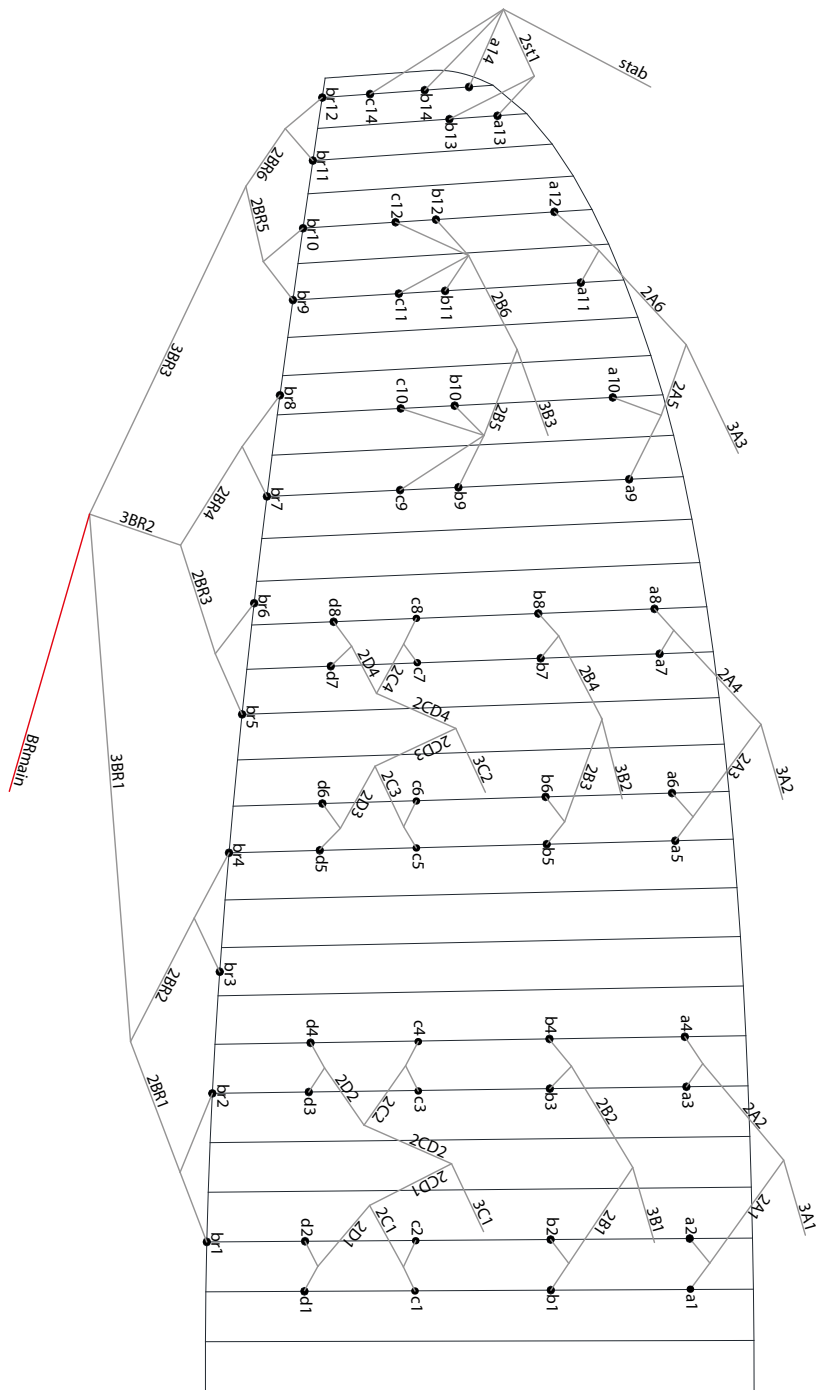
10.3 Materials

CANOPY	FABRIC CODE	SUPPLIER
UPPER SURFACE	HYPERAIRTEX-41 / HYPERAIRTEX-36	DOMINICO TEX CO (KOREA)
BOTTOM SURFACE	2044 32 PS	DOMINICO TEX CO (KOREA)
PROFILES	HYPERAIRTEX-41	DOMINICO TEX CO (KOREA)
DIAGONALS	HYPERAIRTEX-41	DOMINICO TEX CO (KOREA)
LOOPS	LKI - 12	KOLON IND. (KOREA)
REINFORCEMENT LOOPS	RIPSTOP FABRIC	DOMINICO TEX CO (KOREA)
TRAILING EDGE REINFORCEMENT	MYLAR	D-P (GERMANY)
RIBS REINFORCEMENT	LTN-0.8/0.5 STICK	SPORTWARE CO.CHINA
THREAD	SERAFIL 60	AMAN (GERMANY)

SUSPENSION LINES	FABRIC CODE	SUPPLIER
UPPER CASCADES	A-8001/U 50	EDELRID (GERMANY)
UPPER CASCADES	A-8001/U 70	EDELRID (GERMANY)
UPPER CASCADES	DC - 40	LIROS GMHB (GERMANY)
UPPER CASCADES	DC - 60	LIROS GMHB (GERMANY)
UPPER CASCADES	DC - 100	LIROS GMHB (GERMANY)
UPPER CASCADES	TNL-80	TEIJIM LIMITED (JAPAN)
MIDDLE CASCADES	A-8001/U 50	EDELRID (GERMANY)
MIDDLE CASCADES	A-8001/U 70	EDELRID (GERMANY)
MIDDLE CASCADES	A-8001/U 90	EDELRID (GERMANY)
MIDDLE CASCADES	A-8001/U 130	EDELRID (GERMANY)
MIDDLE CASCADES	TNL-80	TEIJIM LIMITED (JAPAN)
MAIN	TNL-80	TEIJIM LIMITED (JAPAN)
MAIN	TNL-140	TEIJIM LIMITED (JAPAN)
MAIN	TNL-220	TEIJIM LIMITED (JAPAN)
MAIN	TNL-280	TEIJIM LIMITED (JAPAN)
MAIN BREAK	TARAX-240	EDELRID (GERMANY)
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	SB15	RONSTAN (AUSTRALIA)

10.4 Line plan



LINE REPLACEMENT

The use of new high performance materials in modern wings is now common. The advantages of using these materials in terms of performance are widely acknowledged as part of our sport's evolution. However, along with those technological advances come additional responsibilities which cannot be avoided. As a result, line inspection and replacement must be carried out more frequently. That increased frequency appears to be encouraging some pilots to try to perform line replacement themselves.

WE STRONGLY RECOMMEND ANY LINE REPLACEMENT IS PERFORMED BY AN AUTHORISED SPECIALIST ONLY.

Ultimately, if the pilot decides to perform any line replacement without professional oversight they therefore assume all responsibility. In this case, these guidelines will have to be followed.

BEFORE REMOVING ANY LINES, CHECK:

- That the line plan is correct according to the glider model and size.
- That the line kit is complete and correct.
- Never assume but always check each individual line for the correct specification.

AFTER CONFIRMING THAT ALL LINES ARE CORRECT:

- Fit the new line(s) WITHOUT removing the label.
- Once replaced, measure each line length to confirm the correct measurement.
- Inflate the wing to check for irregularities.
- The line labels may then be removed but NOT BEFORE completion of the line replacement.

Niviuk strongly recommends for any line replacement to be carried out by an authorised professional only, and will not accept responsibility for any damage or injury caused as a result of incorrect re-assembly.

SPECIAL CONFIGURATION ON LINES 3C1 – 3C2 – 3B3

The 3C1 - 3C2 - 3B3 lines are connected to the maillon by means of a special fixation method. See diagram below.

The lark's foot/clove hitch is used to adjust the trim to the preset range. The loop will allow readjustment of the trim due to use, stretching or shrinking. Failure to make this loop compromises the trim of the wing and the safety of the pilot.



10.5 Riser plan

A	A'	B	C
3A1	3A3	3B1	3C1
3A2		3B2	3C2
		3B3	
		stab	



10.6 Line measurements by size

IKUMA 3 20

REF.	MAT.	kg	COLOR	mm	REF.	MAT.	kg	COLOR	mm	REF.	MAT.	kg	COLOR	mm	REF.	MAT.	kg	COLOR	mm	REF.	MAT.	kg	COLOR	mm
A					B					C					D					BRAKE				
a1	DC	100	WHT	274	b1	DC	60	WHT	271	c1	DC	40	WHT	275	d1	DC	40	WHT	276	br1	DC	40	WHT	767
a2	DC	60	WHT	239	b2	DC	60	WHT	236	c2	DC	40	WHT	227	d2	DC	40	WHT	231	br2	DC	40	WHT	386
a3	DC	60	WHT	252	b3	DC	60	WHT	249	c3	DC	40	WHT	239	d3	DC	40	WHT	245	br3	DC	40	WHT	558
a4	DC	60	WHT	259	b4	DC	60	WHT	256	c4	DC	40	WHT	264	d4	DC	40	WHT	263	br4	DC	40	WHT	571
a5	DC	60	WHT	257	b5	DC	60	WHT	253	c5	DC	40	WHT	257	d5	DC	40	WHT	260	br5	DC	40	WHT	578
a6	DC	60	WHT	221	b6	DC	40	WHT	219	c6	DC	40	WHT	211	d6	DC	40	WHT	211	br6	DC	40	WHT	431
a7	DC	60	WHT	227	b7	DC	40	WHT	222	c7	DC	40	WHT	216	d7	DC	40	WHT	228	br7	DC	40	WHT	429
a8	DC	60	WHT	234	b8	DC	60	WHT	231	c8	DC	40	WHT	238	d8	DC	40	WHT	232	br8	DC	40	WHT	517
a9	8001/U	70	ORG	507	b9	8001/U	50	ORG	587	c9	8001/U	50	BLUE	643						br9	DC	40	WHT	372
a10	8001/U	50	ORG	415	b10	8001/U	50	ORG	505	c10	8001/U	50	BLUE	562						br10	DC	40	WHT	297
a11	8001/U	50	ORG	476	b11	8001/U	50	ORG	519	c11	8001/U	50	BLUE	564						br11	DC	40	WHT	230
a12	8001/U	50	ORG	460	b12	8001/U	50	ORG	507	c12	8001/U	50	BLUE	551						br12	DC	40	WHT	332
a13	8001/U	50	ORG	587	b13	8001/U	50	ORG	569	c13	8001/U	50	ORG	1283										
a14	8001/U	50	ORG	1220	b14	8001/U	50	ORG	1221															
2A1	8001/U	130	ORG	1716	2B1	8001/U	130	BLUE	1695	2C1	8001/U	70	BLUE	479	2D1	8001/U	70	BLUE	550	2BR1	DC	40	WHT	899
2A2	8001/U	130	ORG	1658	2B2	8001/U	130	BLUE	1639	2C2	8001/U	70	BLUE	454	2D2	8001/U	70	BLUE	521	2BR2	DC	40	WHT	596
2A3	8001/U	130	ORG	1555	2B3	8001/U	130	BLUE	1529	2C3	8001/U	70	BLUE	440	2D3	8001/U	70	BLUE	505	2BR3	DC	40	WHT	778
2A4	8001/U	90	ORG	1483	2B4	8001/U	90	BLUE	1465	2C4	8001/U	70	BLUE	415	2D4	8001/U	70	BLUE	462	2BR4	DC	40	WHT	727
2A5	8001/U	70	ORG	1422	2B5	8001/U	70	BLUE	1272	2CD1	8001/U	90	BLUE	730						2BR5	DC	40	WHT	413
2A6	8001/U	70	ORG	1264	2B6	8001/U	70	BLUE	1180	2CD2	8001/U	90	BLUE	704						2BR6	DC	40	WHT	476
2ST1	8001/U	50	ORG	684						2CD3	8001/U	70	BLUE	674						3BR1	DC	60	WHT	2502
										2CD4	8001/U	70	BLUE	637						3BR2	DC	60	WHT	2109
																				3BR3	DC	60	WHT	2425
3A1	8001/U	230	ORG	4017	3B1	8001/U	190	BLUE	3958	3C1	8001/U	190	BLUE	4542						BRMAIN	TARAX	240	RED	2862
3A2	8001/U	190	ORG	4039	3B2	8001/U	130	BLUE	3993	3C2	8001/U	130	BLUE	4512						POINT AT:				2662
3A3	8001/U	190	ORG	3715	3B3	8001/U	90	BLUE	3776															
					STAB	8001/U	70	ORG	3993															

IKUMA 3 22

REF.	MAT.	kg	COLOR	mm	REF.	MAT.	kg	COLOR	mm	REF.	MAT.	kg	COLOR	mm	REF.	MAT.	kg	COLOR	mm	REF.	MAT.	kg	COLOR	mm
A					B					C					D					BRAKE				
a1	DC	100	WHT	288	b1	DC	60	WHT	284	c1	DC	40	WHT	289	d1	DC	40	WHT	289	br1	DC	40	WHT	805
a2	DC	60	WHT	251	b2	DC	60	WHT	248	c2	DC	40	WHT	239	d2	DC	40	WHT	243	br2	DC	40	WHT	407
a3	DC	60	WHT	264	b3	DC	60	WHT	260	c3	DC	40	WHT	250	d3	DC	40	WHT	256	br3	DC	40	WHT	585
a4	DC	60	WHT	272	b4	DC	60	WHT	269	c4	DC	40	WHT	278	d4	DC	40	WHT	276	br4	DC	40	WHT	600
a5	DC	60	WHT	270	b5	DC	60	WHT	265	c5	DC	40	WHT	270	d5	DC	40	WHT	272	br5	DC	40	WHT	606
a6	DC	60	WHT	232	b6	DC	40	WHT	230	c6	DC	40	WHT	221	d6	DC	40	WHT	222	br6	DC	40	WHT	454
a7	DC	60	WHT	238	b7	DC	40	WHT	233	c7	DC	40	WHT	226	d7	DC	40	WHT	239	br7	DC	40	WHT	449
a8	DC	60	WHT	246	b8	DC	60	WHT	243	c8	DC	40	WHT	250	d8	DC	40	WHT	244	br8	DC	40	WHT	543
a9	8001/U	70	ORG	531	b9	8001/U	50	ORG	615	c9	8001/U	50	BLUE	675						br9	DC	40	WHT	390
a10	8001/U	50	ORG	436	b10	8001/U	50	ORG	530	c10	8001/U	50	BLUE	590						br10	DC	40	WHT	312
a11	8001/U	50	ORG	499	b11	8001/U	50	ORG	545	c11	8001/U	50	BLUE	591						br11	DC	40	WHT	241
a12	8001/U	50	ORG	483	b12	8001/U	50	ORG	532	c12	8001/U	50	BLUE	578						br12	DC	40	WHT	349
a13	8001/U	50	ORG	616	b13	8001/U	50	ORG	597	c13	8001/U	50	ORG	1346										
a14	8001/U	50	ORG	1281	b14	8001/U	50	ORG	1281															
2A1	8001/U	130	ORG	1799	2B1	8001/U	130	BLUE	1777	2C1	8001/U	70	Blue	501	2D1	8001/U	70	Blue	577	2BR1	DC	40	WHT	941
2A2	8001/U	130	ORG	1743	2B2	8001/U	130	BLUE	1722	2C2	8001/U	70	BLUE	478	2D2	8001/U	70	BLUE	548	2BR2	DC	40	WHT	627
2A3	8001/U	130	ORG	1630	2B3	8001/U	130	BLUE	1603	2C3	8001/U	70	BLUE	462	2D3	8001/U	70	BLUE	530	2BR3	DC	40	WHT	814
2A4	8001/U	90	ORG	1558	2B4	8001/U	90	BLUE	1540	2C4	8001/U	70	BLUE	436	2D4	8001/U	70	BLUE	485	2BR4	DC	40	WHT	766
2A5	8001/U	70	ORG	1492	2B5	8001/U	70	BLUE	1334	2CD1	8001/U	90	BLUE	765						2BR5	DC	40	WHT	432
2A6	8001/U	70	ORG	1328	2B6	8001/U	70	BLUE	1240	2CD2	8001/U	90	BLUE	740						2BR6	DC	40	WHT	501
2ST1	8001/U	50	ORG	718						2CD3	8001/U	70	BLUE	707						3BR1	DC	60	WHT	2620
										2CD4	8001/U	70	BLUE	669						3BR2	DC	60	WHT	2215
																				3BR3	DC	60	WHT	2553
3A1	8001/U	230	ORG	4250	3B1	8001/U	190	BLUE	4184	3C1	8001/U	190	BLUE	4795						BRMAIN	TARAX	240	RED	3023
3A2	8001/U	190	ORG	4279	3B2	8001/U	130	BLUE	4228	3C2	8001/U	130	BLUE	4771						POINT AT:				2823
3A3	8001/U	190	ORG	3940	3B3	8001/U	90	BLUE	4003															
					STAB	8001/U	70	ORG	4234															

IKUMA 3 24

REF.	MAT.	kg	COLOR	mm	REF.	MAT.	kg	COLOR	mm	REF.	MAT.	kg	COLOR	mm	REF.	MAT.	kg	COLOR	mm	REF.	MAT.	kg	COLOR	mm
A					B					C					D					BRAKE				
a1	DC	100	WHT	301	b1	DC	60	WHT	297	c1	DC	40	WHT	289	d1	DC	40	WHT	302	br1	DC	40	WHT	841
a2	DC	60	WHT	263	b2	DC	60	WHT	260	c2	DC	40	WHT	239	d2	DC	40	WHT	254	br2	DC	40	WHT	425
a3	DC	60	WHT	276	b3	DC	60	WHT	272	c3	DC	40	WHT	250	d3	DC	40	WHT	267	br3	DC	40	WHT	611
a4	DC	60	WHT	284	b4	DC	60	WHT	281	c4	DC	40	WHT	278	d4	DC	40	WHT	289	br4	DC	40	WHT	627
a5	DC	60	WHT	282	b5	DC	60	WHT	277	c5	DC	40	WHT	270	d5	DC	40	WHT	284	br5	DC	40	WHT	633
a6	DC	60	WHT	243	b6	DC	40	WHT	240	c6	DC	40	WHT	221	d6	DC	40	WHT	232	br6	DC	40	WHT	474
a7	DC	60	WHT	249	b7	DC	40	WHT	243	c7	DC	40	WHT	226	d7	DC	40	WHT	250	br7	DC	40	WHT	469
a8	DC	60	WHT	257	b8	DC	60	WHT	254	c8	DC	40	WHT	250	d8	DC	40	WHT	255	br8	DC	40	WHT	567
a9	8001/U	70	ORG	555	b9	8001/U	50	ORG	643	c9	8001/U	50	BLUE	675						br9	DC	40	WHT	407
a10	8001/U	50	ORG	455	b10	8001/U	50	ORG	553	c10	8001/U	50	BLUE	590						br10	DC	40	WHT	326
a11	8001/U	50	ORG	521	b11	8001/U	50	ORG	569	c11	8001/U	50	BLUE	591						br11	DC	40	WHT	251
a12	8001/U	50	ORG	504	b12	8001/U	50	ORG	556	c12	8001/U	50	BLUE	578						br12	DC	40	WHT	364
a13	8001/U	50	ORG	644	b13	8001/U	50	ORG	623	c13	8001/U	50	ORG	1346										
a14	8001/U	50	ORG	1338	b14	8001/U	50	ORG	1338															
2A1	8001/U	130	ORG	1880	2B1	8001/U	130	BLUE	1856	2C1	8001/U	70	Blue	501	2D1	8001/U	70	BLUE	602	2BR1	DC	40	WHT	984
2A2	8001/U	130	ORG	1821	2B2	8001/U	130	BLUE	1800	2C2	8001/U	70	BLUE	478	2D2	8001/U	70	BLUE	573	2BR2	DC	40	WHT	656
2A3	8001/U	130	ORG	1704	2B3	8001/U	130	BLUE	1675	2C3	8001/U	70	BLUE	462	2D3	8001/U	70	BLUE	554	2BR3	DC	40	WHT	850
2A4	8001/U	90	ORG	1628	2B4	8001/U	90	BLUE	1609	2C4	8001/U	70	BLUE	436	2D4	8001/U	70	BLUE	507	2BR4	DC	40	WHT	801
2A5	8001/U	70	ORG	1559	2B5	8001/U	70	BLUE	1394	2CD1	8001/U	90	BLUE	765						2BR5	DC	40	WHT	452
2A6	8001/U	70	ORG	1387	2B6	8001/U	70	BLUE	1294	2CD2	8001/U	90	BLUE	740						2BR6	DC	40	WHT	523
2ST1	8001/U	50	ORG	750						2CD3	8001/U	70	BLUE	707						3BR1	DC	60	WHT	2737
										2CD4	8001/U	70	BLUE	669						3BR2	DC	60	WHT	2314
																				3BR3	DC	60	WHT	2668
3A1	8001/U	230	ORG	4464	3B1	8001/U	190	BLUE	4396	3C1	8001/U	190	BLUE	4795						BRMAIN	TARAX	240	RED	3167
3A2	8001/U	190	ORG	4494	3B2	8001/U	130	BLUE	4442	3C2	8001/U	130	BLUE	4771						POINT AT:				2967
3A3	8001/U	190	ORG	4140	3B3	8001/U	90	BLUE	4205															
					STAB	8001/U	70	ORG	4444															

IKUMA 3 26

REF.	MAT.	kg	COLOR	mm	REF.	MAT.	kg	COLOR	mm	REF.	MAT.	kg	COLOR	mm	REF.	MAT.	kg	COLOR	mm	REF.	MAT.	kg	COLOR	mm
A					B					C					D					BRAKE				
a1	DC	100	WHT	313	b1	DC	60	WHT	309	c1	DC	40	WHT	314	d1	DC	40	WHT	314	br1	DC	40	WHT	876
a2	DC	60	WHT	274	b2	DC	60	WHT	271	c2	DC	40	WHT	260	d2	DC	40	WHT	264	br2	DC	40	WHT	444
a3	DC	60	WHT	287	b3	DC	60	WHT	283	c3	DC	40	WHT	272	d3	DC	40	WHT	278	br3	DC	40	WHT	635
a4	DC	60	WHT	296	b4	DC	60	WHT	293	c4	DC	40	WHT	302	d4	DC	40	WHT	301	br4	DC	40	WHT	653
a5	DC	60	WHT	293	b5	DC	60	WHT	288	c5	DC	40	WHT	294	d5	DC	40	WHT	296	br5	DC	40	WHT	659
a6	DC	60	WHT	253	b6	DC	40	WHT	250	c6	DC	40	WHT	241	d6	DC	40	WHT	241	br6	DC	40	WHT	495
a7	DC	60	WHT	259	b7	DC	40	WHT	253	c7	DC	40	WHT	246	d7	DC	40	WHT	260	br7	DC	40	WHT	488
a8	DC	60	WHT	268	b8	DC	60	WHT	264	c8	DC	40	WHT	272	d8	DC	40	WHT	265	br8	DC	40	WHT	591
a9	8001/U	70	ORG	578	b9	8001/U	50	ORG	670	c9	8001/U	50	BLUE	734						br9	DC	40	WHT	424
a10	8001/U	50	ORG	474	b10	8001/U	50	ORG	576	c10	8001/U	50	BLUE	641						br10	DC	40	WHT	340
a11	8001/U	50	ORG	543	b11	8001/U	50	ORG	593	c11	8001/U	50	BLUE	644						br11	DC	40	WHT	261
a12	8001/U	50	ORG	525	b12	8001/U	50	ORG	579	c12	8001/U	50	BLUE	629						br12	DC	40	WHT	380
a13	8001/U	50	ORG	671	b13	8001/U	50	ORG	649	c13	8001/U	50	ORG	1464										
a14	8001/U	50	ORG	1394	b14	8001/U	50	ORG	1394															
2A1	8001/U	130	ORG	1956	2B1	8001/U	130	BLUE	1932	2C1	8001/U	70	BLUE	545	2D1	8001/U	70	BLUE	627	2BR1	DC	40	WHT	1023
2A2	8001/U	130	ORG	1897	2B2	8001/U	130	BLUE	1875	2C2	8001/U	70	BLUE	520	2D2	8001/U	70	BLUE	597	2BR2	DC	40	WHT	684
2A3	8001/U	130	ORG	1774	2B3	8001/U	130	BLUE	1744	2C3	8001/U	70	BLUE	502	2D3	8001/U	70	BLUE	576	2BR3	DC	40	WHT	885
2A4	8001/U	90	ORG	1695	2B4	8001/U	90	BLUE	1676	2C4	8001/U	70	BLUE	474	2D4	8001/U	70	BLUE	528	2BR4	DC	40	WHT	835
2A5	8001/U	70	ORG	1623	2B5	8001/U	70	BLUE	1452	2CD1	8001/U	90	BLUE	832						2BR5	DC	40	WHT	470
2A6	8001/U	70	ORG	1444	2B6	8001/U	70	BLUE	1348	2CD2	8001/U	90	BLUE	805						2BR6	DC	40	WHT	546
2ST1	8001/U	50	ORG	781						2CD3	8001/U	70	BLUE	769						3BR1	DC	60	WHT	2847
										2CD4	8001/U	70	BLUE	728						3BR2	DC	60	WHT	2410
																				3BR3	DC	60	WHT	2782
3A1	8001/U	230	ORG	4675	3B1	8001/U	190	BLUE	4601	3C1	8001/U	190	BLUE	5265						BRMAIN	TARAX	240	RED	3310
3A2	8001/U	190	ORG	4710	3B2	8001/U	130	BLUE	4653	3C2	8001/U	130	BLUE	5240						POINT AT:				3110
3A3	8001/U	190	ORG	4339	3B3	8001/U	90	BLUE	4405															
					STAB	8001/U	70	ORG	4656															

IKUMA 3 28

REF.	MAT.	kg	COLOR	mm	REF.	MAT.	kg	COLOR	mm	REF.	MAT.	kg	COLOR	mm	REF.	MAT.	kg	COLOR	mm	REF.	MAT.	kg	COLOR	mm
A					B					C					D					BRAKE				
a1	DC	60	WHT	285	b1	DC	60	WHT	321	c1	DC	40	WHT	326	d1	DC	40	WHT	326	br1	DC	40	WHT	910
a2	DC	60	WHT	297	b2	DC	60	WHT	281	c2	DC	40	WHT	270	d2	DC	40	WHT	275	br2	DC	40	WHT	461
a3	DC	60	WHT	308	b3	DC	60	WHT	293	c3	DC	40	WHT	282	d3	DC	40	WHT	289	br3	DC	40	WHT	659
a4	DC	60	WHT	304	b4	DC	60	WHT	304	c4	DC	40	WHT	314	d4	DC	40	WHT	312	br4	DC	40	WHT	678
a5	DC	60	WHT	263	b5	DC	60	WHT	299	c5	DC	40	WHT	305	d5	DC	40	WHT	307	br5	DC	40	WHT	684
a6	DC	60	WHT	269	b6	DC	40	WHT	260	c6	DC	40	WHT	250	d6	DC	40	WHT	251	br6	DC	40	WHT	514
a7	DC	60	WHT	278	b7	DC	40	WHT	263	c7	DC	40	WHT	255	d7	DC	40	WHT	270	br7	DC	40	WHT	506
a8	8001/U	70	ORG	600	b8	DC	60	WHT	275	c8	DC	40	WHT	282	d8	DC	40	WHT	276	br8	DC	40	WHT	613
a9	8001/U	50	ORG	492	b9	8001/U	50	ORG	695	c9	8001/U	50	BLUE	762						br9	DC	40	WHT	440
a10	8001/U	50	ORG	563	b10	8001/U	50	ORG	598	c10	8001/U	50	BLUE	666						br10	DC	40	WHT	354
a11	8001/U	50	ORG	545	b11	8001/U	50	ORG	615	c11	8001/U	50	BLUE	668						br11	DC	40	WHT	271
a12	8001/U	50	ORG	696	b12	8001/U	50	ORG	601	c12	8001/U	50	BLUE	652						br12	DC	40	WHT	394
a13	8001/U	50	ORG	1447	b13	8001/U	50	ORG	674	c13	8001/U	50	ORG	1519										
a14	8001/U	50	ORG	1394	b14	8001/U	50	ORG	1447															
2A1	8001/U	130	ORG	2030	2B1	8001/U	130	BLUE	2005	2C1	8001/U	70	BLUE	565	2D1	8001/U	70	BLUE	650	2BR1	DC	40	WHT	1061
2A2	8001/U	130	ORG	1971	2B2	8001/U	130	BLUE	1948	2C2	8001/U	70	BLUE	541	2D2	8001/U	70	BLUE	620	2BR2	DC	40	WHT	711
2A3	8001/U	130	ORG	1841	2B3	8001/U	130	BLUE	1810	2C3	8001/U	70	BLUE	521	2D3	8001/U	70	BLUE	598	2BR3	DC	40	WHT	917
2A4	8001/U	90	ORG	1761	2B4	8001/U	90	BLUE	1740	2C4	8001/U	70	BLUE	493	2D4	8001/U	70	BLUE	548	2BR4	DC	40	WHT	868
2A5	8001/U	70	ORG	1685	2B5	8001/U	70	BLUE	1507	2CD1	8001/U	90	BLUE	863						2BR5	DC	40	WHT	487
2A6	8001/U	70	ORG	1500	2B6	8001/U	70	BLUE	1399	2CD2	8001/U	90	BLUE	836						2BR6	DC	40	WHT	567
2ST1	8001/U	50	ORG	811						2CD3	8001/U	70	BLUE	798						3BR1	DC	60	WHT	2953
										2CD4	8001/U	70	BLUE	756						3BR2	DC	60	WHT	2503
																				3BR3	DC	60	WHT	2891
3A1	8001/U	230	ORG	4873	3B1	8001/U	190	BLUE	4798	3C1	8001/U	190	BLUE	5486						BRMAIN	TARAX	240	RED	3448
3A2	8001/U	190	ORG	4913	3B2	8001/U	130	BLUE	4855	3C2	8001/U	130	BLUE	5463						POINT AT:				3248
3A3	8001/U	190	ORG	4531	3B3	8001/U	90	BLUE	4598															
					STAB	8001/U	70	ORG	4859															

IKUMA 3 30

REF.	MAT.	kg	COLOR	mm	REF.	MAT.	kg	COLOR	mm	REF.	MAT.	kg	COLOR	mm	REF.	MAT.	kg	COLOR	mm	REF.	MAT.	kg	COLOR	mm
A					B					C					D					BRAKE				
a1	DC	100	WHT	336	b1	DC	60	WHT	332	c1	DC	40	WHT	337	d1	DC	40	WHT	338	br1	DC	40	WHT	942
a2	DC	60	WHT	295	b2	DC	60	WHT	292	c2	DC	40	WHT	280	d2	DC	40	WHT	285	br2	DC	40	WHT	478
a3	DC	60	WHT	308	b3	DC	60	WHT	304	c3	DC	40	WHT	291	d3	DC	40	WHT	299	br3	DC	40	WHT	682
a4	DC	100	WHT	319	b4	DC	60	WHT	315	c4	DC	40	WHT	325	d4	DC	40	WHT	323	br4	DC	40	WHT	702
a5	DC	100	WHT	315	b5	DC	60	WHT	310	c5	DC	40	WHT	316	d5	DC	40	WHT	318	br5	DC	40	WHT	708
a6	DC	60	WHT	272	b6	DC	40	WHT	269	c6	DC	40	WHT	259	d6	DC	40	WHT	260	br6	DC	40	WHT	533
a7	DC	60	WHT	278	b7	DC	40	WHT	272	c7	DC	40	WHT	264	d7	DC	40	WHT	279	br7	DC	40	WHT	523
a8	DC	60	WHT	288	b8	DC	60	WHT	284	c8	DC	40	WHT	292	d8	DC	40	WHT	285	br8	DC	40	WHT	635
a9	8001/U	70	ORG	621	b9	8001/U	50	ORG	720	c9	8001/U	50	BLUE	789						br9	DC	40	WHT	455
a10	8001/U	50	ORG	510	b10	8001/U	50	ORG	619	c10	8001/U	50	BLUE	689						br10	DC	40	WHT	367
a11	8001/U	50	ORG	583	b11	8001/U	50	ORG	637	c11	8001/U	50	BLUE	692						br11	DC	40	WHT	280
a12	8001/U	50	ORG	565	b12	8001/U	50	ORG	622	c12	8001/U	50	BLUE	675						br12	DC	40	WHT	408
a13	8001/U	50	ORG	721	b13	8001/U	50	ORG	697	c13	8001/U	50	ORG	1573										
a14	8001/U	50	ORG	1498	b14	8001/U	50	ORG	1498															
2A1	8001/U	190	ORG	2101	2B1	8001/U	130	BLUE	2075	2C1	8001/U	70	BLUE	584	2D1	8001/U	70	BLUE	673	2BR1	DC	40	Wht	1098
2A2	8001/U	130	ORG	2042	2B2	8001/U	130	BLUE	2018	2C2	8001/U	70	BLUE	560	2D2	8001/U	70	BLUE	643	2BR2	DC	40	WHT	736
2A3	8001/U	130	ORG	1906	2B3	8001/U	130	BLUE	1873	2C3	8001/U	70	BLUE	539	2D3	8001/U	70	BLUE	619	2BR3	DC	40	WHT	949
2A4	8001/U	130	ORG	1824	2B4	8001/U	90	BLUE	1802	2C4	8001/U	70	BLUE	510	2D4	8001/U	70	BLUE	568	2BR4	DC	40	WHT	900
2A5	8001/U	70	ORG	1744	2B5	8001/U	70	BLUE	1560	2CD1	8001/U	90	BLUE	893						2BR5	DC	40	WHT	504
2A6	8001/U	70	ORG	1553	2B6	8001/U	70	BLUE	1449	2CD2	8001/U	90	BLUE	866						2BR6	DC	40	WHT	588
2ST1	8001/U	50	ORG	840						2CD3	8001/U	70	BLUE	826						3BR1	DC	60	WHT	3055
										2CD4	8001/U	70	BLUE	783						3BR2	DC	60	WHT	2592
																				3BR3	DC	60	WHT	2997
3A1	8001/U	280	ORG	5055	3B1	8001/U	230	BLUE	4982	3C1	8001/U	190	BLUE	5700						BRMAIN	TARAX	240	RED	3581
3A2	8001/U	230	ORG	5102	3B2	8001/U	190	BLUE	5045	3C2	8001/U	130	BLUE	5678						POINT AT:				3381
3A3	8001/U	190	ORG	4716	3B3	8001/U	90	BLUE	4785															
					STAB	8001/U	70	ORG	5056															

10.7 Total line length

IKUMA 3 - 20

LINES HEIGHT + RISER mm

	A	B	C	D	BR
1	6544	6463	6544	6616	6869
2	6507	6428	6496	6571	6488
3	6463	6384	6457	6530	6356
4	6470	6391	6482	6548	6369
5	6389	6315	6405	6472	6164
6	6353	6281	6358	6424	6017
7	6290	6224	6300	6360	5965
8	6297	6232	6323	6364	6052
9	6199	6161	6221		5909
10	6109	6079	6139		5835
11	6014	6002	6049		5830
12	5997	5989	6036		5933
13	5814	5796	5830		
14	5763	5768			

RISERS LENGHT mm

A	A'	B	C	
530	530	530	530	STANDARD
350	350	410	530	ACCELERATED

IKUMA 3 - 22

LINES HEIGHT + RISER mm

	A	B	C	D	BR
1	6877	6782	6870	6946	7228
2	6839	6746	6820	6900	6830
3	6796	6704	6782	6859	6693
4	6804	6713	6810	6879	6708
5	6715	6637	6732	6803	6496
6	6678	6601	6684	6752	6344
7	6614	6543	6625	6687	6291
8	6622	6553	6649	6692	6385
9	6521	6480	6543		6236
10	6427	6395	6459		6159
11	6328	6315	6366		6156
12	6312	6302	6352		6264
13	6119	6100	6135		
14	6066	6070			

RISERS LENGHT mm

A	A'	B	C	
530	530	530	530	STANDARD
350	350	410	530	ACCELERATED

IKUMA 3 - 24

LINES HEIGHT + RISER mm

	A	B	C	D	BR
1	7188	7092	7191	7269	7562
2	7149	7055	7138	7221	7146
3	7104	7011	7099	7179	7004
4	7112	7020	7128	7201	7020
5	7025	6939	7046	7120	6797
6	6986	6902	6995	7068	6638
7	6919	6841	6933	6999	6584
8	6927	6852	6958	7004	6682
9	6801	6784	6847		6527
10	6703	6694	6758		6446
11	6599	6610	6660		6442
12	6582	6597	6646		6555
13	6392	6371	6408		
14	6336	6340			

RISERS LENGHT mm

A	A'	B	C	
530	530	530	530	STANDARD
350	350	410	530	ACCELERATED

IKUMA 3 - 26

LINES HEIGHT + RISER mm

	A	B	C	D	BR
1	7483	7384	7486	7568	7899
2	7443	7346	7432	7518	7467
3	7398	7301	7392	7475	7319
4	7407	7311	7422	7498	7337
5	7318	7229	7338	7414	7107
6	7278	7191	7285	7359	6943
7	7208	7128	7221	7289	6886
8	7217	7139	7247	7294	6989
9	7085	7068	7132		6829
10	6983	6974	7039		6745
11	6875	6887	6938		6742
12	6857	6873	6923		6861
13	6661	6639	6677		
14	6603	6607			

RISERS LENGHT mm

A	A'	B	C	
530	530	530	530	STANDARD
350	350	410	530	ACCELERATED

IKUMA 3 - 28

LINES HEIGHT + RISER mm

	A	B	C	D	BR
1	7766	7669	7770	7855	8215
2	7726	7629	7714	7804	7766
3	7680	7584	7675	7761	7614
4	7691	7595	7707	7784	7633
5	7599	7511	7620	7699	7395
6	7558	7472	7565	7643	7225
7	7487	7407	7500	7570	7168
8	7496	7419	7527	7576	7275
9	7363	7344	7408		7109
10	7257	7247	7312		7023
11	7145	7156	7206		7020
12	7127	7142	7190		7143
13	6922	6900	6938		
14	6862	6866			

RISERS LENGHT mm

A	A'	B	C	
530	530	530	530	STANDARD
350	350	410	530	ACCELERATED

IKUMA 3 - 30

LINES HEIGHT + RISER mm

	A	B	C	D	BR
1	8039	7933	8034	8123	8513
2	7997	7893	7977	8070	8050
3	7951	7849	7937	8026	7892
4	7962	7860	7971	8051	7913
5	7869	7774	7882	7964	7668
6	7826	7734	7825	7906	7493
7	7753	7667	7758	7830	7434
8	7763	7680	7786	7837	7546
9	7629	7592	7661		7374
10	7519	7491	7561		7285
11	7403	7398	7452		7283
12	7385	7383	7436		7411
13	7168	7144	7183		
14	7105	7108			

RISERS LENGHT mm

A	A'	B	C	
530	530	530	530	STANDARD
350	350	410	530	ACCELERATED

10.8 Minimum strength of suspension lines

LINE REFERENCE	SIZE					
	20	22	24	26	28	30
8001U-50	17	20	22	24	27	30
8001U-70	20	23	25	28	31	35
8001U-90	33	38	42	47	51	58
8001U-130	40	45	50	55	61	69
8001U-190	70	79	88	98	107	121
8001U-230	81	92	103	114	124	141
8001U-280	90	102	114	126	138	156
DC-40	24	28	31	34	37	42
DC-60	36	41	46	50	55	62
DC-100	45	50	56	62	68	77

Minimum resistance values in daN

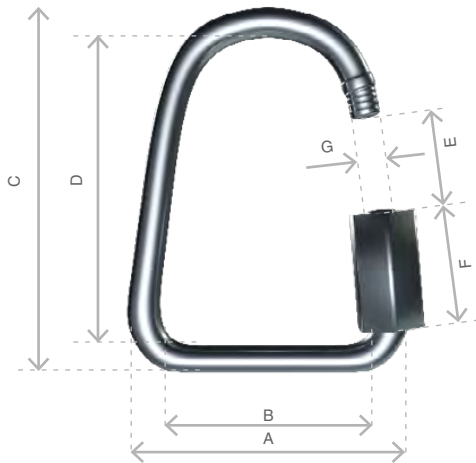
Based on the original experimental resistance values of each suspension line material obtained in certification tests, a correction factor is applied depending on the material and its aging, resulting in the reference values shown in the table.

10.9 Maillon & Pulley

DESCRIPTION MAILLON

MAILLON	DELTA
CODE	3.5
MATERIAL	STAINLESS STEEL
SIZE	3 mm
WEIGHT	5 G/PIECE
QUANTITY	8 PIECES
INSERTS	4 GREEN / 4 BLACK

TECHNICAL SPECIFICATIONS



DIMENSIONS	mm
A	22
B	14
C	37
D	29
E	5
F	12
G	4
LOAD	KG
WORKING LIMIT	110
BREAKING	550

DESCRIPTION MAILLON

MATERIAL

AISI 304 STAINLESS STEEL STANDARD

CLOSING APPLIED BY MANUAL & ENTIRE SCREWING OF THE NUT TO GUARANTEE THE HIGHEST SAFETY (NO THREAD SHOULD BE OBVIOUS)

SYSTEMATIC CONTROL OF MAILLON QUICK-LINKS BEFORE EVERY FLIGHT

DESCRIPTION PULLEY

PULLEY	20 mm
CODE	RF25109
MATERIALS	STAINLESS STEEL
	NYLON
	CARBON ACETAL
BEARING	DELRIN®
WEIGHT	14 G/PIECE

TECHNICAL SPECIFICATIONS



DIMENSIONS	mm
A	20
B	33
Ø	5 max
LOAD	kg
WORKING LIMIT	200
BREAKING	400

10.10 Certification

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

test laboratory for paragliders, paraglider harnesses and paraglider reserve parachutes



Classification: **B**

In accordance with standards:
EN926-1:2015, EN926-2:2013+A1:2021
and NF1 2-565-20

PG_2322.2024

Date of issue (DMY):

18.03.2024

Manufacturer:

Niviuk Gliders / Air Games S.L.

Model:

Ikuma 3 20

Serial number:

IKUMA320FT

Configuration during flight tests

Paraglider		Accessories	
Maximum weight in flight [kg]	75	Range of speed system [cm]	19.0
Minimum weight in flight [kg]	55	Speed range using brakes [km/h]	12
Glider's weight [kg]	3.8	Total speed range with accessories [km/h]	26
Number of risers	3+1	Range of trimmers [cm]	n/a
Projected area [m ²]	16.87		

Harness used for testing (max weight)

Harness type **ABS**
Harness brand **Woody Valley srl**
Harness model **Wani Light 2 M**

Inspections (whichever happens first)
every 100 hours of use or every 24 months

Harness to risers distance [cm] **43**
Distance between risers [cm] **43**

Person or company having presented the glider for testing: **None**

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

The validation of this test report is given by the signature of the test manager on inspection certificate 91.20 // Rev 07 | 04.03.2022 // ISO | 91.21 // Page 1 of 1

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

test laboratory for paragliders, paraglider harnesses and paraglider reserve parachutes



Classification: **B**

In accordance with standards:
EN926-1:2015, EN926-2:2013+A1:2021
and NF1 2-565-20

PG_2292.2023

Date of issue (DMY):

28.11.2023

Manufacturer:

Niviuk Gliders / Air Games S.L.

Model:

Ikuma 3 22

Serial number:

SI461928

Configuration during flight tests

Paraglider		Accessories	
Maximum weight in flight (kg)	85	Range of speed system (cm)	19.8
Minimum weight in flight (kg)	65	Speed range using brakes (km/h)	12
Glider's weight (kg)	4.1	Total speed range with accessories (km/h)	26
Number of risers	3+1	Range of trimmers (cm)	n/a
Projected area (m ²)	18.58		

Harness used for testing (max weight)

Harness type **ABS**
Harness brand **Niviuk**
Harness model **Hamak M**

Inspections (whichever happens first)
every 100 hours of use or every 24 months

Harness to risers distance (cm) **42**
Distance between risers (cm) **44**

Person or company having presented the glider for testing: **None**

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

The validation of this test report is given by the signature of the test manager on inspection certificate 91.20 // Rev 07 | 04.03.2022 // ISO | 91.21 // Page 1 of 1



Classification: B

In accordance with standards:
EN926-1:2015, EN926-2:2013+A1:2021
and NfL 2-565-20

PG_2253.2023

Date of issue (DMY):

28.11.2023

Manufacturer:

Niviuk Gliders / Air Games S.L.

Model:

Ikuma 3 24

Serial number:

IKUMA3524

Configuration during flight tests

Paraglider		Accessories	
Maximum weight in flight (kg)	95	Range of speed system (cm)	20.2
Minimum weight in flight (kg)	75	Speed range using brakes (km/h)	12
Glider's weight (kg)	4.4	Total speed range with accessories (km/h)	26
Number of risers	3+1	Range of trimmers (cm)	n/a
Projected area (m2)	20.28		

Harness used for testing (max weight)		Inspections (whichever happens first)	
Harness type	ABS	every 100 hours of use or every 24 months	
Harness brand	Woody Valley srl		
Harness model	Wani Light 2 M	Person or company having presented the glider for testing: None	
Harness to risers distance (cm)	43		
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
B A A A A A A A B A A A A B A A A A A O



Classification: B

In accordance with standards:
EN926-1:2015, EN926-2:2013+A1:2021
and NfL 2-565-20

PG_2280.2023

Date of issue (DMY):

28.11.2023

Manufacturer:

Niviuk Gliders / Air Games S.L.

Model:

Ikuma 3 26

Serial number:

SI461926

Configuration during flight tests

Paraglider		Accessories	
Maximum weight in flight (kg)	105	Range of speed system (cm)	20.0
Minimum weight in flight (kg)	85	Speed range using brakes (km/h)	12
Glider's weight (kg)	4.6	Total speed range with accessories (km/h)	26
Number of risers	3+1	Range of trimmers (cm)	n/a
Projected area (m2)	21.99		

Harness used for testing (max weight)		Inspections (whichever happens first)	
Harness type	ABS	every 100 hours of use or every 24 months	
Harness brand	Advance Thun AG		
Harness model	Success 4 M	Person or company having presented the glider for testing: None	
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
B A A A A A A A B A A A A B A A A A A O



Classification: B

In accordance with standards:
EN926-1:2015, EN926-2:2013+A1:2021
and NF L 2-565-20 PG_2282.2023

Date of issue (DMY): 28.11.2023

Manufacturer: Niviuk Gliders / Air Games S.L.

Model: Ikuma 3 28

Serial number: SI461927

Configuration during flight tests

Paraglider		Accessories	
Maximum weight in flight (kg)	115	Range of speed system (cm)	19.9
Minimum weight in flight (kg)	95	Speed range using brakes (km/h)	12
Glider's weight (kg)	4.7	Total speed range with accessories (km/h)	26
Number of risers	3+1	Range of trimmers (cm)	n/a
Projected area (m2)	23.69		

Harness used for testing (max weight)		Inspections (whichever happens first)	
Harness type	ABS	every 100 hours of use or every 24 months	
Harness brand	Advance Thun AG		
Harness model	Success 4 M	Person or company having presented the glider for testing: None	
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
B A B A A A A A B A A A A A A A B A A A A 0



Classification: B

In accordance with standards:
EN926-1:2015, EN926-2:2013+A1:2021
and NF L 2-565-20 PG_2298.2023

Date of issue (DMY): 15.01.2024

Manufacturer: Niviuk Gliders / Air Games S.L.

Model: Ikuma 3 30

Serial number: IKUMA330FT

Configuration during flight tests

Paraglider		Accessories	
Maximum weight in flight [kg]	130	Range of speed system [cm]	19.8
Minimum weight in flight [kg]	105	Speed range using brakes [km/h]	12
Glider's weight [kg]	5.3	Total speed range with accessories [km/h]	26
Number of risers	3+1	Range of trimmers [cm]	n/a
Projected area [m²]	25.39		

Harness used for testing (max weight)		Inspections (whichever happens first)	
Harness type	ABS	every 100 hours of use or every 24 months	
Harness brand	Niviuk		
Harness model	Hamak L	Person or company having presented the glider for testing: None	
Harness to risers distance [cm]	47		
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
B A B A A A A A B A A A A B A A A A A A A 0



Niviuk Paragliders

C/ Del Ter 6 - nave D
17165 La Cellera de Ter - Girona - Spain
+34 972 422 878 | info@niviuk.com
www.niviuk.com