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manual

TUAREG

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TU A R E G

flight manual

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> congratulations

Congratulations on the purchase of your new **TUAREG**.

The **TUAREG** is a tandem wing that has been conceived and designed for both professional and recreational pilots, suitable of all kinds of flying styles, from a gentle glide down, to the most ambitious cross country flights. With easy launch characteristics, manoeuvrability and turn ability akin to a solo glider, and superb performance, the **TUAREG** makes it possible to core the smallest of thermals and climb even in the weakest lift.

We strongly recommend that before you even unfold the **TUAREG** you carefully read this manual in order to be aware of any limitations, as well as differences in performance, take-off and flight characteristics, landing procedures, emergency situations and maintenance.

We always appreciate your feedback, so please send us your comments, positive or negative, regarding to the **Windtech** line.

You are the best feedback and support for future products, and please remember that we are always happy to give you any help & advice.

Best winds

> **Windtech** team



> warning & liability

This manual has been created to give the pilot help and hints for the correct operation of this wing. By no means is this a substitute of a training course, or appropriate experience gained with years and hours of airtime, nor is this manual intended to give pilots knowledge regarding flight safety.

Windtech assumes that the purchasing pilot has the appropriate pilot's licence, has taken a training course, tandem insurance and has the ability and enough experience to safely fly the **TUAREC**.

This manual cannot be used for operational purposes. The flight log & registration card must be filled and stamped by the dealer & returned to **Windtech** in order to make a claim on the guarantee.

The use of this paraglider is entirely at the user's own risk. As with any adventure sport paragliding is a high risk activity-especially without taking the appropriate precautions-therefore it must be absolutely understood that **Windtech** & the dealer do not accept any responsibility for accidents, losses, injuries, direct or indirect damage following the use or misuse of this product.



> philosophy of design

When **Windtech** decided to make a tandem paraglider, we first established the main criteria that we felt would be the most important to make the perfect tandem wing. The wing had to be, above all, easy to inflate and launch in all conditions, with excellent handling, high glide performance, and that it would convert energy extremely well to give an effective flare, for softer landings.

For this we designed a paraglider with 51 cells of variable widths, not all of which have line attachment points due to the advanced structural relationship of lines/diagonals. In this way we have considerably reduced parasitic drag produced by the lines whilst at the same time endowing the interior of the wing with a higher internal pressure and creating calculated zones of greater longitudinal tension, very important for increasing resistance to tucks (above all frontal collapses).

The **TUAREG**'s new profile gives highly elevated security and performance, as well as a turning ability that is surprisingly efficient.

It has double profiles in the leading edge, therefore it is safer, specially when trims open and also has more performance at high speed.

The end result is a tandem that inflates quickly and easily during launch and is exceptionally stable and solid during the take-off run, giving great protection against having to abort launches and compromising the safety of yourself and your passenger.



During launch the **TUAREG** gives an exceptional degree of control, allowing the pilot to easily make precise corrections during the take-off run. Once airborne, the **TUAREG**'s superb feedback and responsive handling allows one to make the most of even the smallest thermals.

When the time comes to land, the exquisite handling characteristics and precision of the **TUAREG** serve as another great guarantee of safety since you can first of all guide yourself more precisely into exactly the spot you wanted to land in, confident that in the final moment, when you want to flare, you will be able to take advantage of the wings superb energy conversion, landing both you and your passenger easy and safety each time.

> construction and materials

Our primary concern is always keeping to the highest quality standards of materials and construction, to impress the pilots and so guarantee our future. For this reason, we never cut any corners when it comes to building in quality.

-- cloth

The upper and lower panels are made with 45-38 gr. Porcher Marine Skytex nylon. The ribs are made with stronger (slightly heavier grade) nylon of to prevent aerofoil deformation, even after several years of intensive use. Line attachment points are made of polyester.

--lines

The lines are of the highest quality and varying diameters, depending on which area of the glider they are in, but always of a diameter greater than a solo glider, capable of withstanding a force up to eight times the maximum load. The inner core is super aramid and the outer sheath polyester to protect against general wear and tear and UV.

> certification

The **TUAREG** is certified It is certified EN with A in all maneuvers but a B in the asymmetrical collapse maneuver.

> performance

Fly a **TUAREG** in the correct size for you. Remember that if you fly outside of the weight range that the glider has been designed for, this could adversely affect the handling, stability and performance of the glider, and means that the glider is effectively no longer certified.

If your flying weight is below the stated minimum, the speed range will diminish and inflation problems may appear. Also the handling will degrade in turbulent conditions, and it will sustain collapses more easily.



If your flying weight is above the stipulated weight range, this will result in a higher minimum speed and faster landing speed and the stall speed of the glider will also be higher. If the glider suffers a collapse, or leaves normal flight configuration, the resulting behaviour will be more rapid and violent. As well as this, your sink rate will be higher and you will find it harder to stay up in light lift.

The **TUAREG** has medium brake resistance (adhering to weight range). The stall is found at 95% of the brake trav-

el and, to force the glider into an in flight full stall (not recommended on any kind of paraglider), requires almost all the weight of the pilot on the brakes.

The best glide on the **TUAREG**, not taking into consideration any horizontal or vertical movements of the air, is obtained simply by flying at the glider's trim speed. That is to say, by having the trimmers in standard position (when all the maillons are at equal level) and flying with no brake or speed system applied.

> flight

Before flying any paraglider, the pilot has to be sure that they are flying a glider that is suitable for their level of piloting, evaluating objectively and carefully their true capabilities.

In the case of tandem flying, this is even more important, as one is carrying a passenger and the price of any error will not only be paid for by the pilot.

Each and every glider has a meticulous checklist passed though our strict quality control in the factory. This includes line measurement, ground inflation and flight testing. Contact your distributor for more information about this, and if your glider has not been pre-inflated ask them to do so for you. Every glider should be test flown before it is sold.



Note that each glider has a unique sticker attached to the centre cell with the serial number, type of glider, size and weight range, month and year of fabrication.

We recommend that you inspect the risers, check that the maillons have been correctly installed and tightened, and make sure that the lines are not tangled.

As for the brakes, there should be around 10cm of excess line above the knot, during flight at trim speed and trims closed, the length of both lines should symmetric, and the movement through the pulleys smooth and easy.

We recommend that your first flight on your new glider be on a gentle slope in calm conditions before making any further higher flights, just to check the glider and for you to get used to flying it.

We also recommended that you use a harness that has an ABS cross strap system and that maximum width possible for the chest strap is 38 cm between karabiners.

For your own safety, we strongly recommend the use of back protection, helmet and **Windtech** WindSOS reserve.

-- launch

The **TUAREG** is extremely easy and efficient to launch.

If you have never flown a tandem before, we strongly advise that you take a course in tandem flying, with a qualified and experienced tandem pilot, before you start flying with other passengers, as you are directly responsible for the safety of your passenger.



The best thing is to make your first flights with large and forgiving take-offs and landing areas, in optimal weather conditions and a passenger who is also a pilot and so will be more able to collaborate with you during manoeuvres.

In this way, you will adapt rapidly to the great qualities of the **TUAREG**, without having to preoccupy yourself with too many new things at once, and so you will be enjoying great flights whilst minimizing the risk to yourself and your passenger.

It is very important to explain clearly the whole launch process to your passenger, point by point, and allowing for any eventualities, so that they know exactly what to do. As well as making the launch process easier for you, this will install confidence in them in your ability.

Before you take off, lay out the **TUAREG** in a slight arc. Always do all of your pre-flight checks (lines, maillons, risers, harness buckles, etc). Carefully observe all of the details that relevant to your launch (tension in the lines, windsock, obstacles, etc).

Without wind it is recommended to release 3 or 4 cm of trim.

You mustn't start the run either too slowly, or too fast, but you must always make the run decisively and assuredly to ensure that the wing carries the weight of you and your passenger.

When the **TUAREG** comes up above your head, give a gentle check on the brakes to stabilize the wing and establish a perfect tension across the glider and lines ready for the take-off run.

-- thermal flying

The best and most interesting flights, even better when made with company, are those flying in thermic conditions, and all pilots want to experiment and experience the wonder of flying in thermals. The **TUAREG** is blessed with superb handling and manoeuvrability, which means that you don't need a lot of brake to turn it, and by using the outside brake to control the airspeed of the outer wing, you can flatten the turn and climb exceptionally well and efficiently.

When working the thermal lift we must close the trim (this is all maillons at equal level.

Thermal flying conditions can make flying much more challenging and difficult. Only the most experienced pilots should fly in strong thermal conditions. There is always a degree of associated turbulence in thermal conditions, and when the pilot encounters turbulence they must fly "actively", with precise brake input and weight-shift, ideally with collaboration from the passenger as well by shifting the weight from one side to the other one.

In the case of extreme turbulence, so long as you haven't got big-ears in, as a rough guide fly very actively with around 30 per cent brake.

> flying in turbulence

-- asymmetrical tuck / collapse

An asymmetric tuck / collapse is when part (one side) of the wing (say 20% or anything up to 90% of the span) tucks or collapses, usually induced by turbulence but sometimes also though poor pilot control in turns and wingovers.

The **TUAREG** is tested and certified to automatically recover without correction by the pilot with a maximum direction change of 90 degrees of turn, but with the correct input the pilot can minimise any turning, and height loss, and help the glider recover more quickly.

There are 3 basic steps to follow immediately if you have a collapse:

- 1: Weight shift to the flying side of your glider (away from the collapsed side). This helps stop the rotation & increases pressure in the wing in the inflated side.
- 2: If needed apply the correct amount of brake to the open (flying) side to slow any rotation (spiral) induced by the collapse. Be very careful not to use too much brake as it's possible to stall the flying side of the glider, and enter further unstable situations which may be harder to recover from than the collapse itself.
- 3: Once the glider has straightened out, or the spiral has slowed, smoothly pull down the brake on the collapsed side, with a long stroke/pump, & the deflated side of the glider should re-inflate. As the glider re-opens release the brake immediately but progressively after a small surge forward.

-- front / symmetrical tuck collapse

A front tuck / collapse is a symmetric tuck of the leading edge of the wing, starting from the centre of the canopy to the wing tip. This can be either a tucking of just the central part of the leading edge of the glider, which can sometimes cause a front 'horseshoe' or 'rosette-ing' of the glider, or even a complete 'front tuck' of the whole canopy in extreme situations.



When flying, a front tuck may occur either when leaving a strong thermal, or more often while using the speed system in turbulent air, or even sometimes whilst flying into the wake turbulence down-wind of another glider.

Remember, the pilot can learn to help stop collapses by flying 'actively', but if a front tuck does occur it will easily clear itself. Re-inflating the wing can be helped by correct pilot input and, once the glider is overhead, symmetrically applying 40% of both brakes & then releasing immediately will get pressure back in to the glider and speed up the recovery. Do not brake when the glider is behind you, as this can stall the wing, but wait for the glider to come forwards above your head, then brake.

-- asymmetric stall (spin)

This is a very difficult situation for the pilot to provoke with the **TUAREG**, given its excellent feedback and very low stall speed, you have to really abuse the controls a lot to manage it.

Even so, a spin can be induced if, for example, the pilot is turning very slowly and tightly in a thermal (near the stall point), and wants to tighten the turn further, for whatever reason. If the pilot brakes too much on the inside brake, stalling the wing on that side, the wing may then go into a spin.

Beware in turbulent air, as it is easier to stall, or spin, the wing due to the already a turbulent airflow.

If a spin is entered, return to normal flight by raising both hands to return air speed to the stalled side of the wing. Be careful, as this may cause the wing to surge and dive for-

wards as it tries to regain airspeed. This dive can be more or less violent, depending on various factors. The pilot should check this dive, using up to 60% brakes, which must then be released as soon as the dive is stopped.

-- landing

You must always plan your landing with the trims locked, therefore the final glide will be at a slower speed.

You need to pay particular attention with your first landings, above all, if they are your first tandem flights or you are used to the glide angle of your old glider, as the **TUAREG's** excellent performance might surprise you.

On final approach the pilot should have hands up (keeping a feel of the wing and flying actively in case of unexpected turbulence) to let the glider build up speed. This extra speed will mean that the glider has more energy to convert when you flare, and so leading to a softer landing.

In light or nil winds the pilot will need a committed symmetric flare at around 1 meter above the ground.

In stronger winds less of a flare is needed.

The flight is not finished, and the pilot and passenger are never fully safe, until the glider is safely controlled on the ground.

Avoid letting the glider land on the leading edge. If the glider lands with force on the leading edge it is possible to burst the inner cells and walls of the wing and you should carefully examine the wing for any damage to the seams of the ribs to the cells. The best solution to put down the canopy when landing it is to gently put it down in one side. This way we will reduce 80% of the wind force and the safety will be increased.

> weather to fly

If in doubt about the weather and flying conditions, do not launch! Before going flying you should check the weather forecast & always ask more experienced pilots about the conditions expected for the day.

Never fly if there weather conditions are unsuitable, especially with any of the following present or even threatening: Strong wind; Rain; Thunderstorms; Cumuli nimbus; or Cumulus congestus. If you are already in the air then get down safely before it's too late! Always be aware of the weather changing and if in doubt land as quickly as is safely possible.

Even though the **TUAREG** It is certified EN this is not a guarantee against flying in turbulent air. Remember that even an airline jet can crash due to rotors and bad weather!

> rapid descent techniques

It is likely that on occasion the paraglider pilot may find themselves in a situation where they need to get down quickly, perhaps so that they can get out of danger and land safely. Because of this it is recommended that all pilots should learn about the various emergency descent techniques that are possible on a paraglider.

For information, we shall cover the basic techniques here.

More radical's manoeuvres such as full stall, asymmetrical stall or flat spin are not described in our manual. In order to learn more about and practice these manoeuvres you should do a special safety (SIV) course over water with an expert instructor. There should be a dedicated rescue boat standing by, and all safety precautions taken.

-- big ears

Big-ears is a simple descent technique & can sometimes be very useful for top landing, keeping out of cloud, and in an emergency if you are over-shooting your landing area.

To induce big-ears on the **TUAREG**, keep the brakes in your hands and reach up to hold the top of the special split-A risers (in red). Pull the lines out and down, one at a time, to collapse the tips of the wing (10 – 30% each side, depending on how much line you pull).

Make sure that you have the correct lines, that you do the correct action, and that you don't pull too much brake whilst pulling in the big ears. Also make sure you are looking where you are going whilst you are doing this.

Once holding in the big-ears, you will not be able to steer with the controls (brakes). You can steer the glider using weight shift, and with tandem the passenger can assist you to do this effectively.

Generally avoid using big-ears near the ground (below 200ft AGL), as the extra disturbance to the airflow over the wing that big-ears creates can make any paraglider more prone to deep stalling, especially in the turbulence and wind shear normally near the ground.

To exit big-ears, simply let go of the big-ear riser and wait for the wing tips to re-inflate themselves. If they do not inflate themselves then pump the brakes, one at a time, to help them re-inflate.

-- spiral dive

The Spiral dive is obtained by maintaining a tight 360 degree turn. Gradually the turn will accelerate, especially by pulling more on the inside brake and weight shifting harder into the turn, and so you will enter a spiral dive.

Be careful not to pull the brake too hard, too quickly, especially on entry, as it is possible to spin the glider in this way.

Very aggressive spiral dives can cause eyesight and equilibrium problems, extremely dangerous, especially near the ground.

Recovery from a spiral dive, this should be done gently and progressively. The inner brake must be progressively and slowly released, until the canopy assumes normal flight, and angle of bank, again. A good "rule of thumb" is to use the same number of 360-degree turns as you did on entry on exit to give a safe and progressive pullout. Be careful not to come out of a hard spiral dive too quickly, as the resulting climb-out can be extreme. If the glider dives hard after a hasty exit from a tight spiral dive, it may be necessary to damp the dive, with the brakes.

-- b-line stall

The **TUAREG** comes equipped with a special riser system to facilitate entering a b-line stall, with handles similar to those of the brakes. If one pulls these the **TUAREG** will enter the b-line stall and come straight down, drifting with the wind.

One can control the rate of descent by pulling more or less on the b-line handles, obtaining descent rates of between 5 and 11 m/s. To exit from this configuration, SYMETRICALLY raise both b-line handles AT THE SAME TIME, letting go of the risers for the last 10cm. The **TUAREG** will regain flight spontaneously, with a small dive.

> maintenance

Store the paraglider in a dry space away from chemical agents, UV light and high temperature.

If the canopy has been packed wet it is necessary to reopen it and let it dry before packing away for a sustained period. Keep the canopy and lines clean, as dirt may penetrate into the fibres and damage them.

Clean the paraglider only with fresh water and a soft sponge. If the glider comes into contact with salt water, wash the glider as soon as possible with fresh water & then dry completely. Avoid contact with chemical agents like oil, petrol, solvent and similar, which can damage the fabric and its surface covering.

We strongly recommend you to have a full inspection of the paraglider by **Windtech** or the distributor at least once a year. Besides this you should check periodically the lines, cloth and stitching. Check the lines for fraying, or the stitching coming undone, and measure them to check for any shrinking.

Small tears in the sail can be repaired by using adhesive spinnaker cloth repair patches, which we supply with every new glider. Big tears and repairs affecting sewing or structural parts of the paraglider must be carried out only by the manufacturer or authorised service centres.

> warranty

This glider carries a two-years guarantee from defects due to materials and manufacturing.

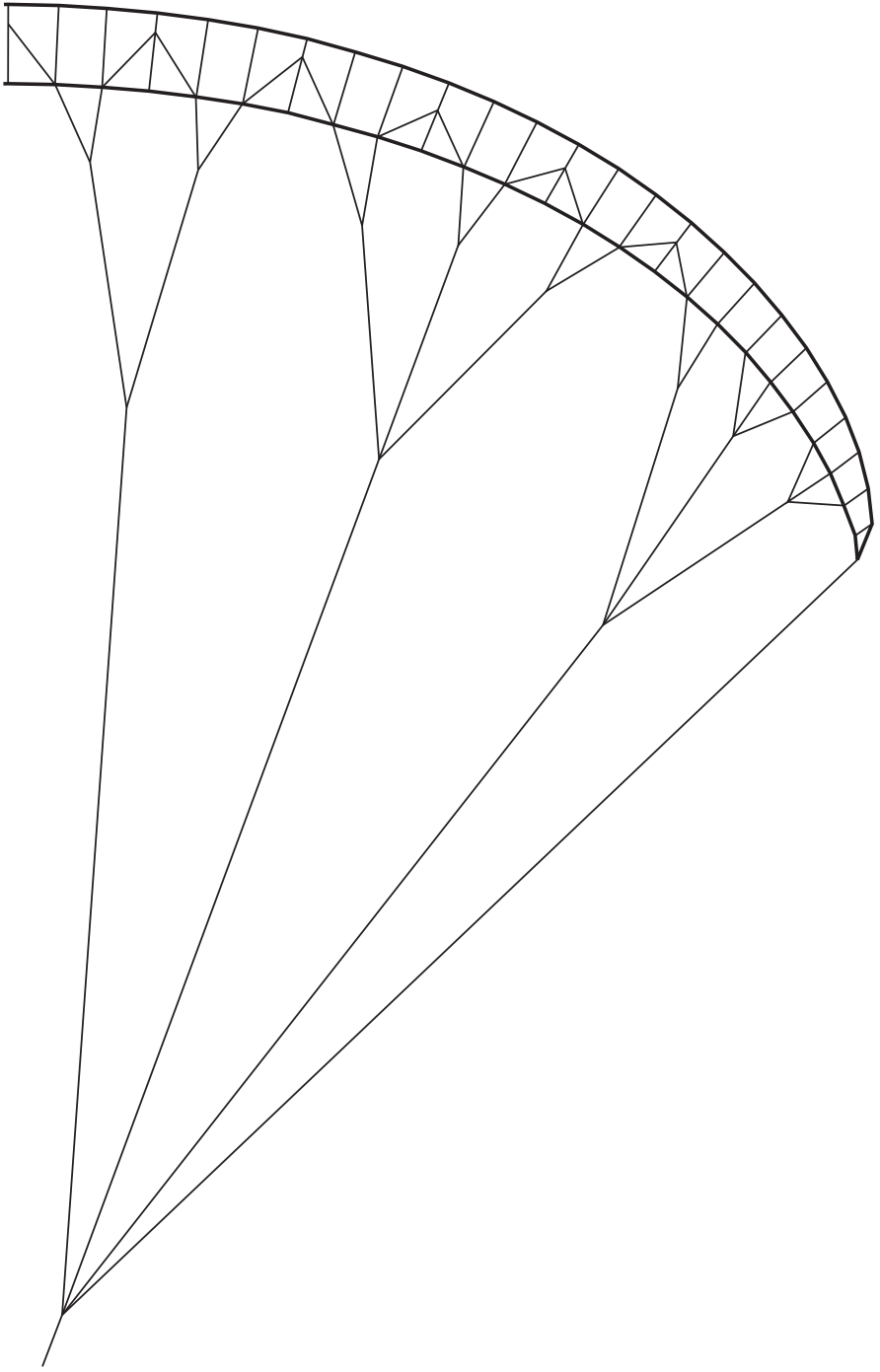
In the case of materials becoming defective during the period of the guarantee **Windtech** will replace them. Before any warranty replacement can be made the purchaser will have to send the product to **Windtech** for their inspection. If a product is deemed to be defective by **Windtech**, the warranty covers the repair or replacement of the defective product only. **Windtech** will not be responsible for any costs, losses or damages incurred as a result of loss of this product. **Windtech** is not responsible for mailing costs or material costs used other than what is found to be defective.

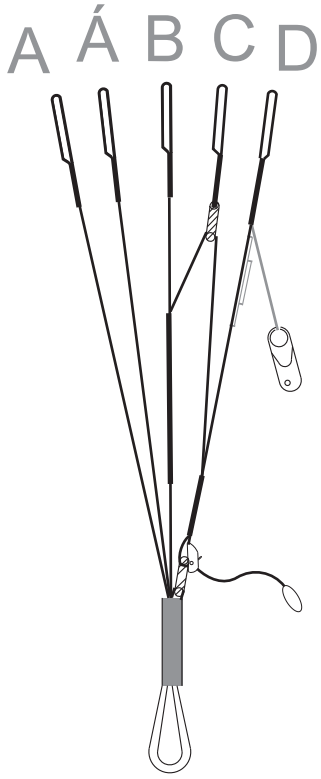
We exclude from the guarantee any damage caused by wear and tear in use, any misuse outside of the limits stipulated in this manual, damage due to excessive sun exposure, damage caused by improper handling & damage caused by anything other than defects in material & workmanship.

TUAREC

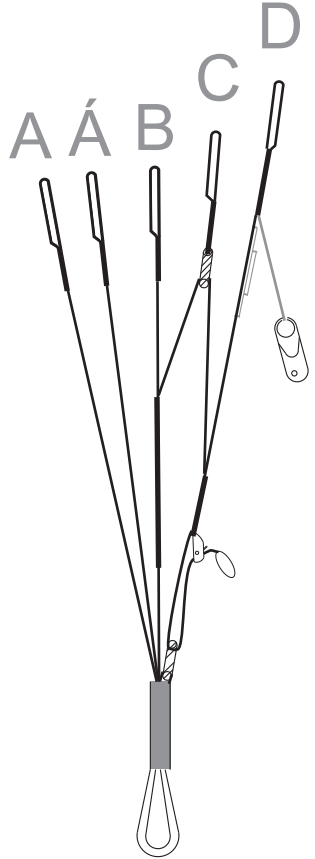
technical specifications

Size	39	43
Area (m ²)	39.11	43.07
Projected area (m ²)	34.69	38.2
Span (m)	14.49	15.2
Projected span (m)	12.05	12.62
Aspect ratio	5.36	5.36
Projected aspect ratio	4.18	4.18
Max. chord (m)	3.36	3.52
Min. chord (m)	0.66	0.69
N° cells	50	50
Line lenght (m)	8.86	9.30
Weight in fly (kg)	125-215	140-225
Weight with motor (kg)	125-300	140-310
Certification EN	B	B





A }
B } =420 mm
C }
D }



A=420 mm
B=420 mm
C=455 mm
D=490 mm

TU A R E G

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