VRIL-WINGS

# DOUBLE-V

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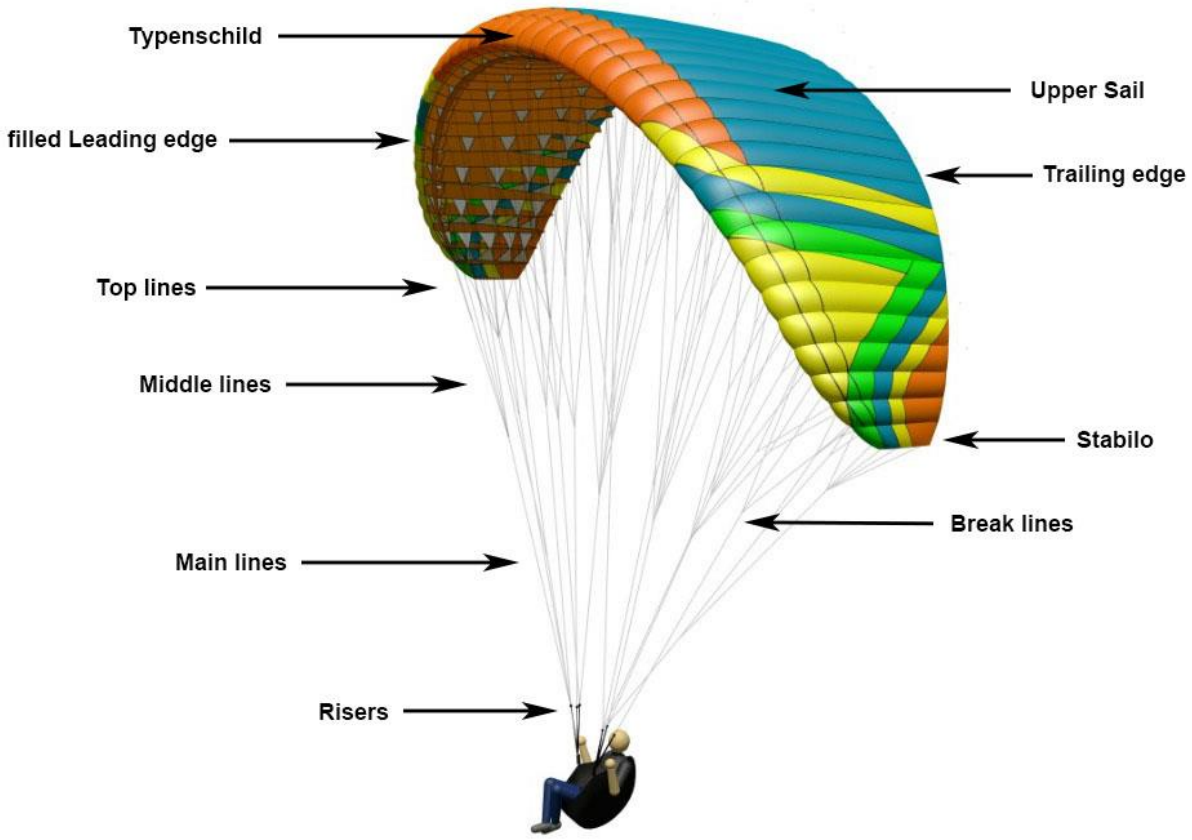

Typenschild
Upper Sail
filled Leading edge
Trailing edge
Top lines
Middle lines
Stabilo
Break lines
Main lines
Risers

# Welcome to

VRIL-Wings. We are delighted that you are interested in the DOUBLE-V.

The DOUBLE-V is a single skin tandem paraglider with a flat design of only 28 m² and an EN-B certification. This glider once again combines our philosophy of a small single skin surface with a material mix that combines stability and lightness. As we have very demanding test conditions in our home region of Montafon, both in terms of weather and wind, and as the launch sites for hike and fly are often very rugged and rough, the design of this wing is not only intended for easy meadow hike and flys, but also for high alpine and expedition use.

It is important to us that we are not just another light wing, but that we bring our own aspects to the sport.

With the DOUBLE-V you can share your hike and fly adventures with your loved ones and share the magic of one of the most beautiful sports.

# Important notes

**Reading this operating manual is mandatory!**

The paraglider must not be put into operation without careful study of this manual in order to avoid operating errors. We hereby expressly point out that no liability can be accepted for any consequences of improper handling.

At the time of delivery, this paraglider complies with the provisions of the German airworthiness requirement LTF / European standard EN 926-2 category B.

New gliders must be flown in by the seller. This flight must be confirmed with date and signature on the enclosed measurement report and on the type plate of the paraglider.

Any unauthorized modification to the paraglider will invalidate the operating license!

The pilot is responsible for the airworthiness of his aircraft! The pilot is also responsible for ensuring that all legal requirements for the operation of this aircraft are met (e.g. pilot's license, insurance, etc.).

It is assumed that the user's abilities meet the requirements of the device!

The use of the paraglider is exclusively at your own risk! The liability of the manufacturer or distributor is excluded!

The following operating instructions have been compiled to the best of our knowledge and belief. However, it is quite possible that various things may change over time due to (flight) technical innovations or changes in certification tests and/or teaching methods. It is therefore always advisable to obtain updates in a suitable form about any changes in teaching opinions and tests, either from us or from the relevant authorities.

# Target group

The VRIL DOUBLE-V is a single-skin tandem paraglider that is classified in the LTF/EN B category.

It is suitable for easy hike and fly as well as for high mountain tours, for private and commercial use.

Thanks to the wide weight range of 90-181 kg, even very light passengers and children can be flown without exceeding the weight limits.

The DOUBLE-V offers the very high passive safety typical of singleskin wings, coupled with a higher trim speed and therefore better upwind flying characteristics. The flight behavior is comparable to larger doubleskin tandem wings.

Whether the DOUBLE-V is ultimately suitable for your own flying purpose and ability should always be discussed personally with your specialist dealer.

We recommend that every pilot, if only out of responsibility for the passenger, completes safety training and plays with their equipment on the ground as much as possible. Perfect control of the glider on the ground and in the air is the key to maximum flying fun and the best insurance for accident-free flying.

# Technical description

**Cap structure**

The DOBLE-V is a wing in the Single Skin Hybrid class. The hybrid design, i.e. having a pressure-filled profile in the leading edge area, offers great advantages, especially when flying at speed. Flying with open trimmers is just as stable with the DOUBLE-V as at trim speed.

The canopy itself is made of NCV 70032 1580 E3W in the leading edge area and NCV 70032 1580 E3H in the rest of the canopy. This is the perfect combination for us.

**Suspension system**

Depending on the installation location, the lines are made of polyester-coated and uncoated aramid and polyester-coated PES / Dyneema. The strength of the individual lines depends on the installation location and varies from 50 to 420 daN.

Depending on where they are installed, the brake lines are divided into gallery lines (at the top of the canopy), fork lines (between the canopies), main lines (at the bottom of the riser), stabilizer lines (at the wing tip) and brake lines (at the top of the trailing edge) and main brake lines (on the brake handle).

There are no devices that can be adjusted.

The suspension lines are divided into A/ B / C / D / E level and brake and are color-codedforeasy control.

The DOUBLE-V riser has 2 risers on each side.

The line arrangement and the article designation can be seen in the individual line plan.

**Acceleration system**

The DOUBLE-V has a trim system in the B riser.

The trimmer extends the B-riser and thus reduces the angle of attack of the canopy - the trimming speed increases.

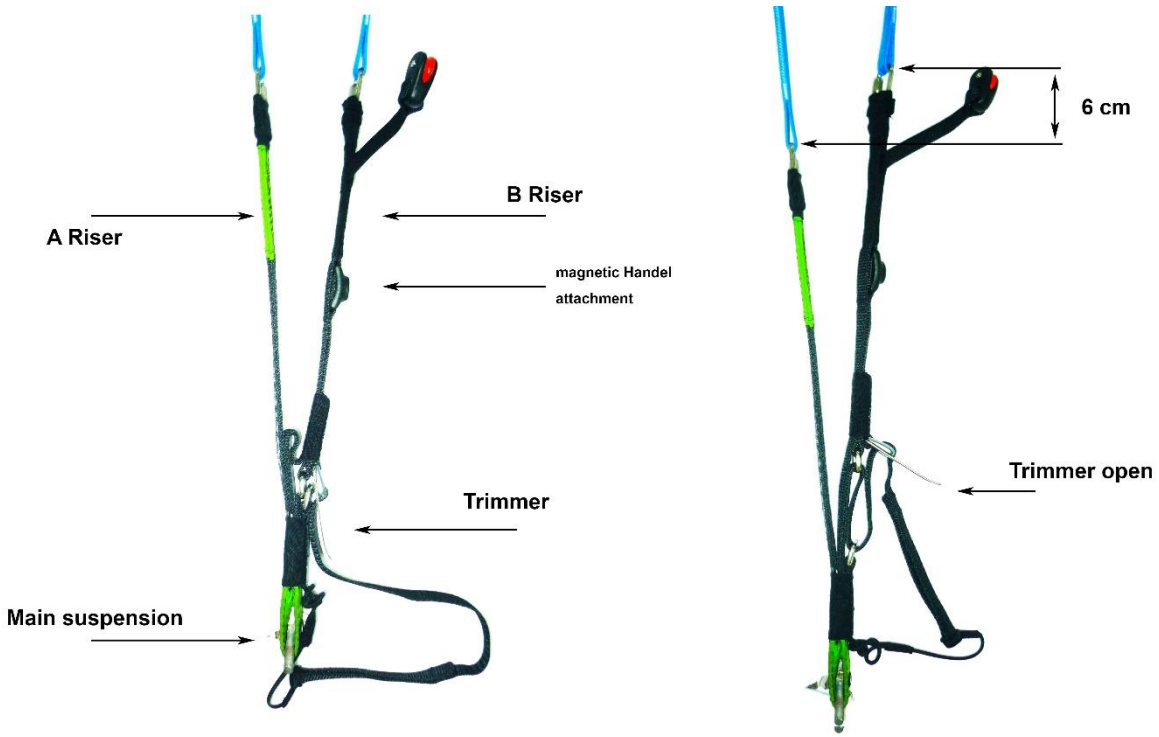
In normal flight, all risers are the same length. When the trimmer is activated, the B-risers are extended by up to 6 cm.

Functionality and handling :

The trimmers influence the take-off, flight and landing behavior of the glider. In the normal flight position, all risers are the same length, i.e. the trimmers are pulled down. To accelerate the glider, the trimmer adjustment buckle is opened. This lengthens the B riser, the angle of attack of the paraglider is reduced and the speed is increased. The adjustment buckle allows continuous adjustment from "fully closed" to "fully open". Both trimmers should always be set symmetrically to the same position.

With the DOUBLE-V, the trimmers also play a major role when landing. With lower wing loading, e.g. in the middle and lower take-off weight, the landing behavior can be improved with open trimmers. The wing flairs better with open trimmers.

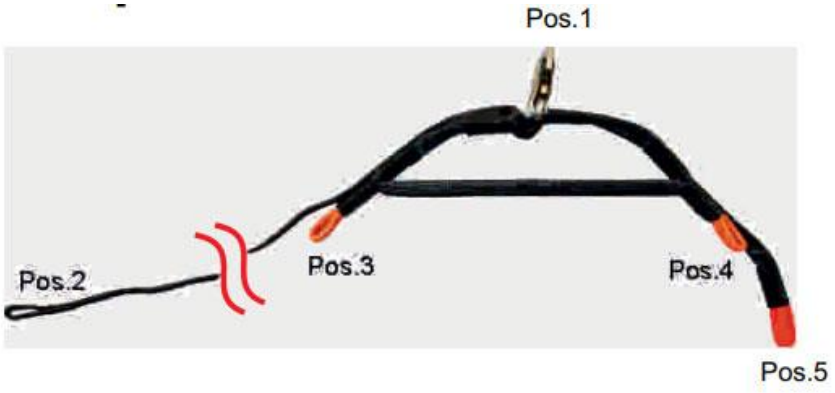
There are no accelerator and any other adjustable or removeable or adjustable devices on this glider.




**T-bar attachment points**

The T-Bar supplied as standard has the following attachment points:
Pos. 1: Attachment point for the paraglider (karabiner not included)
Pos. 2: fixed connection bridle for the rescue parachute (length 200 cm)
Pos. 3: Attachment point pilot
Pos. 4: Upper attachment point passenger (normal attachment)

Pos. 5: lower attachment point passenger (alternative attachment point for light passengers)
If there is any doubt about which attachment point is chosen for the passenger, this must always be tried out on a simulator before the first flight.




## Technical data

## DoubleV Tandem

| **size** | **28** |
|---|---|
| **cells** | 42 |
| | |
| **flat area (m²)** | 28,00 |
| **span (m)** | 12,63 |
| **a/r** | 5,70 |
| | |
| **area proj. (m²)** | 23,48 |
| **span proj. (m)** | 9,88 |
| **a/r proj.** | 4,16 |
| | |
| **Chord center (m)** | 2,71 |
| **Chord tip (m)** | 0,54 |
| | |
| **Brodle Count** | 218 |
| **Brodle Length** | 380,00 |

**Harness** The DOUBLE-V has been tested and certified with LTF type GH harnesses and a distance between the carabiners of 55cm. When biplace flying, a special biplace harness should be used for the pilot because of the rescue parachute. Such harnesses are optimized for biplace flying in terms of function and comfort.A harness with a certified protector should always be used for the passenger. Especially "pedestrians" who are flying for the first time tend to sit down too early during take-off and landing. This risk of injury can be significantly reduced by using a harness with a protector.

**Rescue parachute** A special rescue system is required for biplace flying. It must be ensured that the rescue system is approved and has at least the same maximum load as the paraglider. The DOUBLE-V has a take-off weight of 181 kg, therefore a rescue system with at least 181 kg or more must be used.

Attachment point of the rescue parachute:The rescue parachute may only be attached to both sides of the T-bar at the suspension points provided for this purpose. The T-bar used must be type-tested. Please refer to the T-bar operating instructions for information on how to attach the reserve parachute. The T-bar must be installed by qualified personnel.

## Checking the paraglider

Every paraglider we deliver is checked and measured several times before delivery. Nevertheless, we recommend that you check your new paraglider thoroughly according to the following points. You should also follow these instructions if the paraglider needs to be checked after intensive flying, hard maneuvers or after tree landings.

- The seams on the line suspension loops, on the risers and on the canopy must be checked for damage.
- Are all lines free of damage and correctly sewn?
- Are all line locks screwed on correctly and the plastic inserts attached?
- All webs, including the ribs and V-bands, must be checked for cracks.

Any damage, no matter how insignificant, must be inspected and repaired by a specialist. A damaged paraglider is not airworthy!

## Adjusting the steering lines

The two main steering lines each lead to a multi-branched line spider, which is attached to the trailing edge (trailing edge). The steering lines run through a guide pulley on the risers and are each connected to a handle. These control handles are attached to the risers during transportation using two press studs. The steering line length is set correctly at the factory and does not normally need to be changed. The adjustment point is marked on the main control line and has an additional sheathing (chafe protection). It must have at least 5 cm of free travel in flight (before the brakes engage) and should not be altered. Improperly changing the length of the control line changes the flight behavior and impairs the safety of the glider.

## Launch preparations

A thorough pre-flight check must be carried out before every take-off. Check the risers, lines and canopy for damage. It must also be ensured that the line buckles are firmly closed and secured against twisting with a plastic clip.

The harness must be put on with the utmost care. After putting it on, check that all buckles are correctly closed. The correct closure of the reserve parachute container and the correct position of the reserve parachute handle must also be checked (see harness operating instructions).

If a defect is detected, do not start under any circumstances!

When laying out the canopy, it must be laid out against the wind. The line levels including brake lines must be carefully separated and the risers arranged. All lines must run freely and without entanglement or knots. There must be no lines under the canopy.

Once all preparations have been completed, the main carabiners of the tandem spreader bar are connected to the risers. Make sure that all carabiners are closed.

**Checklist**

Paraglider:

- Canopy without damage?
- Risers / tandem spreader without damage?
- Canvas locks firmly locked and secured against twisting (plastic clip)?
- Catch lines without damage?
- All lines free and without tangles and knots? Also brake lines?

Harness:

- Rescue equipment container locked?
- Is the rescue equipment handle correctly attached?
- all buckles closed (including passenger seat belt!)?
- Main carabiner (also passenger harness!)?

Start

- Are the risers not twisted?
- Trimmer set symmetrically?
- Brake handle and correct riser included?
- Pilot position centered so that all lines are symmetrically tensioned?
- Wind direction OK? - Obstacles on the ground? - Airspace clear?

# Start

In general, starting with single skin gliders is very easy. It is the same with the DOUBLE-V.

The canopy is very quick and easy to pull up, both with the A risers and with the A+B risers in your hand at the same time.

After 2-3 steps the canopy is already over the head and the pilot already has control of the launch phase. The inflation to control of the canopy is significantly faster than with any conventional canopy. This is a huge safety advantage.

The canopy can be lifted off much earlier by applying a light brake of approx. 20 %. Despite its small surface area, the DOUBLE-V has a shorter take-off roll than conventional tandem gliders. This is only not the case on very flat launch sites.

## Straight ahead flight

With the control lines released, the DOUBLE-V has a speed range of 32 - 45 km/h, depending on the wing loading and trim position. The minimum flying speed is reached with approx. 50 cm of brake, but the control pressure is already quite high. In turbulent conditions, it is advisable to fly with the brakes slightly applied and a brake travel of approx. 5-20 cm. The maximum symmetrical control travel is 65 cm. These length specifications refer to the actual brake travel without empty travel.

## Accelerated flight

The speed system is attached to the B-riser. It changes the angle of attack of the canopy and the DOUBLE-V then flies approx. 7 km/h faster. If the take-off weight is low or the risers are brand new, the lever for opening the trimmer may have to be pushed upwards a few times until the B-riser opens to its maximum.

## Curved flight

The DOUBLE-V reacts very directly and without delay to control inputs. By shifting weight (pilot leans on the inside of the turn), very flat turns can be flown with minimal loss of height. Shifting weight and pulling on the steering line on the inside of the turn is suitable for quick changes of direction. For thermal flying, the combination of weight transfer, braking on the inside of the turn and additional braking of the outer wing is best suited. By pulling and releasing in opposite directions (active flying) with the brakes on the inside and outside of the turn, the turn radius and lateral position can be changed and the centering of the thermal can be optimized.

Caution: if the control lines are pulled too far or too fast, there is a risk of stalling! A one-sided stall is clearly indicated: the inside of the turn becomes soft and the inner third of the wing almost "stops". If this flight condition has occurred, the brake on the inside of the turn must be released immediately.

## Active flying

Active flying can prevent many collapses before they happen! Active flying means flying the paraglider as stably and efficiently as possible by shifting your weight and using steering impulses. In turbulence and rough thermals, active flying should be used to keep the canopy as vertical as possible by applying the brakes in a controlled manner. When flying into strong thermals, the angle of attack of the glider increases. If the brakes are released while flying into the thermal, the canopy can accelerate and remains approximately above the pilot's head. The situation is different when flying into downdrafts: here the brakes are applied in a controlled manner.

# Landing

When landing with single-skin wings, a slightly different landing technique must generally be used. The DOUBLE-V is equipped with a landing booster, which brakes the E, D and C planes in the center of the wing, thereby significantly improving the flair. However, this should be practiced first.

Flair can be practiced in flight with the help of a Vario. Put your hands up and then pull the brakes with a steady brake application until the booster pulls and the wing flairs.

It can also be helpful to wind the brakes once when landing so that you can pull deeply, as the brake pressure increases as soon as the landing booster takes effect because several planes are also braked. The brake pressure during landing also increases with higher wing loading.

With a medium or lower take-off weight, landing with open trimmers can significantly improve the landing behavior.

We generally recommend the landing technique where the passenger lands next to the pilot. Both passenger and pilot should use harnesses approved for tandem flying.

# Side Collaps

The DOUBLE-V is very stable due to its single skin construction. If a malfunction does occur, it normally only occurs in the outer wing and opens again automatically. Despite its good-natured collapse behavior, the wing should always be flown actively.

# Hanger

In the event of large collapses or other extreme situations, so-called hang-ups can occur in any paraglider. The collapsed chambers of the wingtip get caught in the lines. If the pilot does not react, the glider goes into a stable spiral. If this happens, the first thing to do is to stop the turning movement by applying the brakes sensitively. If the speed of rotation continues to increase despite counter-steering, the rescue system must be deployed immediately at low altitude.

If the height is sufficient, the following options can be used to release the hanger:

- Counter-brake sensitively and try to reopen by pulling the steering line through very quickly, decisively and deeply on the hooked side.

- Pull the color-coded Stabilo leash.

- If these measures are not successful, an attempt can be made to release the hanger by means of a full stall if the height is sufficient.

**Caution:** The maneuvers mentioned above are very demanding and can destroy a lot of altitude! If the pilot feels overwhelmed or does not have sufficient altitude, the rescue system must be deployed immediately!!!

## Frontstall

The collapse of the entire leading edge is caused by turbulence, as with one-sided collapses. The canopy is briefly subjected to a negative flow (from above). This happens more frequently at accelerated flight than at normal speed. Although this flight disturbance looks spectacular, it is often not dangerous at low collapse depths. There are often no turning movements, the wing usually opens quickly on its own and quickly picks up speed again. The opening can be accelerated by applying the brakes on both sides.

Recognizing the situation in good time and reacting quickly by braking on both sides helps to keep the loss of height to a minimum and prevent the malfunction from getting out of control.

## Deepstall

In a stall, the paraglider has no forward speed and at the same time a very high sink rate. This can be caused by flying too slowly over the brake lines, trim changes, old and porous cloth, damage to the lines or ribs, pulling on the rear risers or excessive take-off weight. The tendency to stall also increases when the canopy is wet or the air temperature is very low.

Flying in the rain should be avoided if possible, as the raindrops on the canopy increase the Vmin and thus increase the tendency to stall. Very low temperatures can also be problematic. In both cases, especially if the brakes are applied and/or the line geometry no longer has the correct trim.

You can tell whether the glider is in a stall by the fact that the noise is very weak despite the brakes being released and the glider is in an unusual position above the pilot. In this case, it is essential to release the steering lines!

If the canopy and lines are in a serviceable condition, the DOUBLE-V will automatically start up again within 2 to 3 seconds. If this is not the case, for whatever reason, push the A-risers forward or open the trimmer.

If a glider was in continuous bag flight for no obvious reason (e.g. wet glider, flight in the rain or inadmissible take-off weight) it must be checked before the next flight.

**Caution:** Do not apply the brakes during a stall, as the glider will immediately go into a full stall. When close to the ground, a stable stall may no longer be recovered due to a possible pendulum movement. Instead, the pilot should prepare for a hard landing, preferably with a landing drop.

## Fullstall

To initiate a full stall, both brake lines must be pulled all the way through. The brake pressure on the DOUBLE-V is very high. When the stall speed is reached, the canopy suddenly moves backwards. It is very important to keep the brake lines pulled through until the glider stabilizes above the pilot, despite the unpleasant reaction to a full stall. The symetrical breaking distance is 65cm.

Only now should the brake lines be released moderately quickly (switching time >=2 sec) and symmetrically. The optimum recovery should take place in 2 phases: 1. pre-inflation of the canopy (slow release of the brakes to about shoulder height) until the canopy is open again over the entire span; 2. recovery (brakes at 0%)

If the maneuver is executed too quickly or asymmetrically, this can result in a large collapse or front stall.

**Caution:** An incorrect, too early, asymmetric or too fast full stall can result in the canopy shooting forward extremely far! In extreme cases, even under the pilot.

## Spin

By stalling one side, the flow can break off at half the wing. This results in a reversal of the airflow direction. The trailing edge, which has been braked low, is then subjected to a flow from behind and flies in the opposite direction, the wing rotates around its vertical axis.

There are 2 reasons for the spin:
- A brake line is pulled through too quickly and too far (example: initiating a spiral dive)
- in slow flight, one side is braked too hard (example: when circling in thermals)

If an accidentally initiated negative turn is exited immediately, the glider will return to normal flight without losing much height. If the negative turn is held for longer, the glider can accelerate and shoot forwards on one side during the recovery. This can result in impulsive collapses or hang-ups

## Wingover

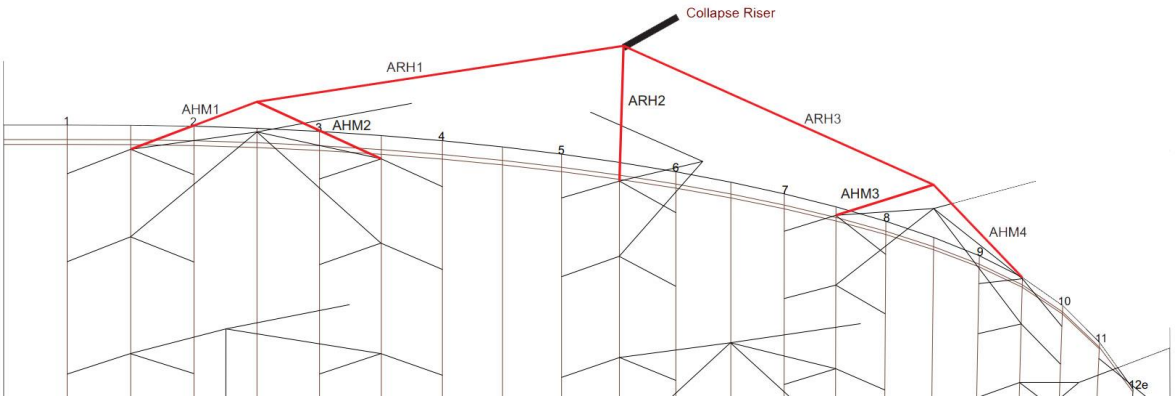
Tight turns are flown alternately to the left and right. The bank angle is increasingly increased. If the dynamics and bank angle of this maneuver are too high, the wing on the outside of the turn can unload. If the bank angle is increased further and you react incorrectly, this can result in an impulsive, large collapse.
**Full stalls, spins and wingovers can generally have life-threatening consequences with all paragliders!**

## Acro

Compared to a normal paraglider, where the ribs are protected inside the cell walls, the DOUBLE-V is more susceptible to damage due to its open structure. For this reason, we do not recommend performing SIV or other acrobatic maneuvers with the wing. This would shorten the life of the glider. Furthermore, if the maneuvers are not flown correctly, this can lead to damage to the wing.

By merging the 2nd line level of the A and B lines onto a common A main line, the line resistance was reduced and at the same time ground handling was simplified when sorting the lines. By combining the A/B line levels on one riser, the Sir Edmund Shark cannot simulate a lateral collapse or front stall as with a conventionally suspended paraglider. For the test flights in accordance with EN 926-2, auxiliary lines were therefore used to simulate a lateral collapse or a front stall in accordance with this standard.

The attachment points and dimensions of these lines must be specified in accordance with EN926-2:2013 point 5.3.3.1:




# Emergency control

If the steering lines fail, the DOUBLE-V can easily be steered with the rear risers or the rear outer trunk lines. The distance to the stall is of course much shorter when steering with the rear risers than with the steering lines; with the DOUBLE-V it is about 5-10 cm. Slight turns can also be flown by pulling the stabilo lines or by shifting your weight.

# Steep spiral

The spiral dive is the most efficient way to descend quickly. However, this puts a lot of strain on the material and the pilot. It must be borne in mind that you may lose consciousness sooner or later, depending on the form of the day, the outside temperature (cold!) and the sink rate achieved. Many pilots slow down their breathing during the spiral or switch to so-called pressurized breathing, which further increases the risk of losing control. At the first signs of nausea, loss of consciousness and reduced vision, the spiral must be exited immediately.

The spiral dive is initiated by carefully increasing the brake line pull on one side and shifting the weight to the inside of the turn. Due to the direct handling, the DOUBLE-V quickly assumes a high bank angle and flies a steep turn. As soon as the wing comes in front of the pilot (goes on the nose), an impulse is created which the pilot should follow by shifting his weight to the outside of the turn. The sink rate and bank angle in the spiral dive are increased by pulling the brake line on the inside of the turn. Slight braking on the outside of the turn prevents the outer wing tip from collapsing.

To exit the spiral dive, the brake on the inside of the turn is released slowly. Rapid recovery means that the high airspeed (up to over 100 km/h) is converted into height in a strong pendulum motion. This results in an extreme deceleration at the end of the pendulum motion with subsequent canopy stall. You must also be prepared to get caught in your own wake vortex (rotor)!

Due to the extreme loss of height in the spiral dive, always ensure sufficient safety height!

**Caution:** Almost every paraglider eventually reaches the sink rate at which the canopy aligns itself with the openings facing downwards ("goes on the nose!") and remains in this position despite releasing the control lines and continues to spiral down (stable spiral dive). The DOUBLE-V has been

rated B in accordance with EN 926-2:2013. Due to unfavorable influences, however, the reactions can also be more demanding than described in this classification. The causes in such a case can be complex. For example: harness geometry (suspension height), cross-risers, turbulent air, holding on to the riser, shifting the pilot's weight to the inside of the turn and similar. If, contrary to expectations, a stable spiral dive occurs, it can be avoided by shifting the pilot's weight to the outside of the turn and applying the brakes.

**Caution:** with a stable spiral dive, extreme G-loads can act on the body and require a great deal of effort!

## Big Ears

The so-called "Big ears" is a not too effective descent aid where the forward speed is higher than the sink rate. It is more suitable for reducing the glide ratio and gaining horizontal distance from a source of danger than descending quickly. To lay down the ears, the two outer wings are folded down symmetrically by pulling the outer A-risers. This can increase the sink rate to approx. 5 m/sec. and reduce the glide performance. By opening the trimmer, the sink rate and forward speed can be

significantly increased again.

The special feature of the DOUBLE-V is that the speed of the wing also increases when the ears are put on, which is an additional safety plus.

To exit, it is sufficient to release the A-risers again. The canopy of the DOUBLE-V usually opens automatically. The pilot can apply the brakes slightly to speed up the opening. Caution: Never fly a spiral dive with the ears attached, as this will push the middle A-lines beyond their limits.

## B-stall

The B-stall cannot be flown with the DOUBLE-V.

## Summary

All descent aids should only be practiced in calm air and at a sufficient safety height, preferably as part of a safety training course, so that they can be used in emergency situations!

The following applies to all extreme flight maneuvers and descent aids:
- first practice only under the guidance of a flight instructor or as part of safety training
- ensure that the airspace below the pilot is clear before initiating maneuvers
- During maneuvers, the pilot must maintain visual contact with the canopy and constantly monitor the altitude.

# Care, storage, repairs

Life in the air depends on the condition of the paraglider. A well-maintained and properly treated paraglider can reach twice its age. To ensure that the DOUBLE V carries its pilot safely through the air for as long as possible, please observe the following points:

Merge:

To ensure a long service life of the glider and to avoid bending the nylon rods in the nose area unnecessarily, we recommend folding the glider profile to profile (similar to an accordion), or rolling it up loosely from the stabilizer (without bending the nylon rods). If the glider is packed incorrectly and stored for long periods, parts of the glider may become deformed.

Care:

- The UV rays of the sun damage the fabric of the paraglider in the long term. The paraglider should therefore not be exposed to sunlight unnecessarily.
- When laying out the canopy, make sure that neither the canopy nor the lines are heavily soiled. The embedded dirt particles can damage the material.
- You should check the line lengths after tree and water landings.
- Do not pull the paraglider over the ground. The fabric coating will be damaged.
- Moisture damages the coating of the cloth and shortens its service life.
- If the lines are hanging on the ground, they can be overstretched or torn off during take-off.
- Do not step on the lines!
- When rolling up the sail, please place the supplied cloth bag underneath to avoid mechanical abrasion and damage to the sail.
- The lines should be kinked as little as possible.
- After contact with salt water, rinse the appliance thoroughly with fresh water immediately!
- Insects that have strayed into the chambers should be removed alive, not only out of love for the animals, but also because they secrete a corrosive liquid.
- Clean the paraglider with water at most. Avoid mechanical stresses such as brushing and rubbing. Chemical cleaning agents will damage the cloth and lines.

Storage:

- The paraglider must always be stored in a dry place. If it gets wet, it must be spread out to dry as soon as possible (but not in direct sunlight!).
- Do not store the paraglider in the vicinity of chemical vapors and gases.
- During transportation and storage, especially in cars, ensure that the paraglider is not exposed to unnecessarily high temperatures.

Repairs:

- Smaller tears in the fabric that do not run along the seam can be provisionally sealed with adhesive tape from a paraglider dealer.
- All other types of damage such as large tears, tears at the seams, torn out eyelets, torn and damaged lines may only be repaired or replaced by an authorized specialist company or the manufacturer.

- Only original spare parts are to be used! A list of the lines used in the glider model can be found in the individual line plan under point 16 "Individual line lengths". The lines can only be purchased from the manufacturer.
- Any modification to the paraglider other than those approved by the manufacturer will invalidate the operating license of the device.
- The DOUBLE-V must be checked every 24 months or every 100 operating hours at the latest (whichever comes first) by an authorized dealer or by the manufacturer. This inspection should also include the tandem spreader bar as the connecting element between the paraglider and harness.

Service life and replacement period of components:
The DOUBLE-V has no components that need to be replaced regularly. As the service life depends to a large extent on the user's care, we recommend that the paraglider and tandem spreader are regularly checked for signs of wear and tear and that any damaged components are replaced. Connecting elements used (e.g. carabiners on the tandem spreader bar) must be replaced in accordance with the manufacturer's instructions

# Nature and landscape-friendly behavior

It goes without saying, but we would like to emphasize once again: Please practice our nature-oriented sport in a way that protects nature and the landscape! Please do not go off the marked trails, do not leave any garbage behind, do not make unnecessary noise and respect the sensitive balance in the mountains. Our consideration for nature is especially important at the launch site!

### Disposal

The materials used in a paraglider require proper disposal. Please return any **disused equipment** to us. We will then dispose of it **appropriately**."

# Linen designation

Linen ageing and trimming options:
Until now, it has always been assumed that lines stretch under use. For the middle A and B lines - where most of the load is attached - this is actually true.

All lines (Kevlar as well as Dyneema lines) get tears in their thin threads and then swell up, so to speak, and the rear lines and the outer lines are only loaded with a few grams of weight when flying. This leads to gradual shortening when the lines are loaded - simply because there is too little load on them to stretch the line. There is very little that can be done about this technically. The DOUBLE V is equipped ex works with a minimally faster trim to prevent this shortening.

Low-load lines are supplied from the factory with a trim knot. This can be used to lengthen the line if necessary.

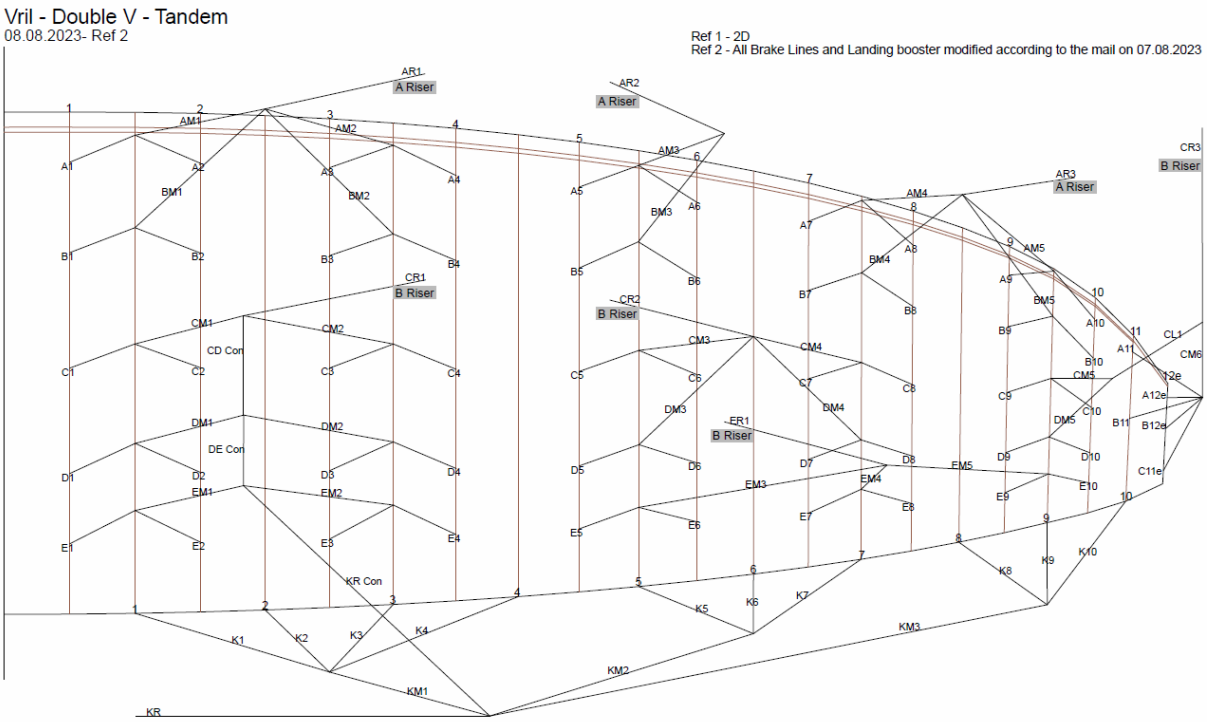
The check operation or the pilot now has the option of easily retrimming the glider without having to replace the lines. A line measurement should be carried out every 20 flying hours and compared with the data sheet. It is completely normal for lines to shrink by up to 30 mm with very intensive use.

All line changes are gradual. They do not occur suddenly. You don't crash, but you often only notice this when you are less effective in the wind or when the glider loses some power when flying.

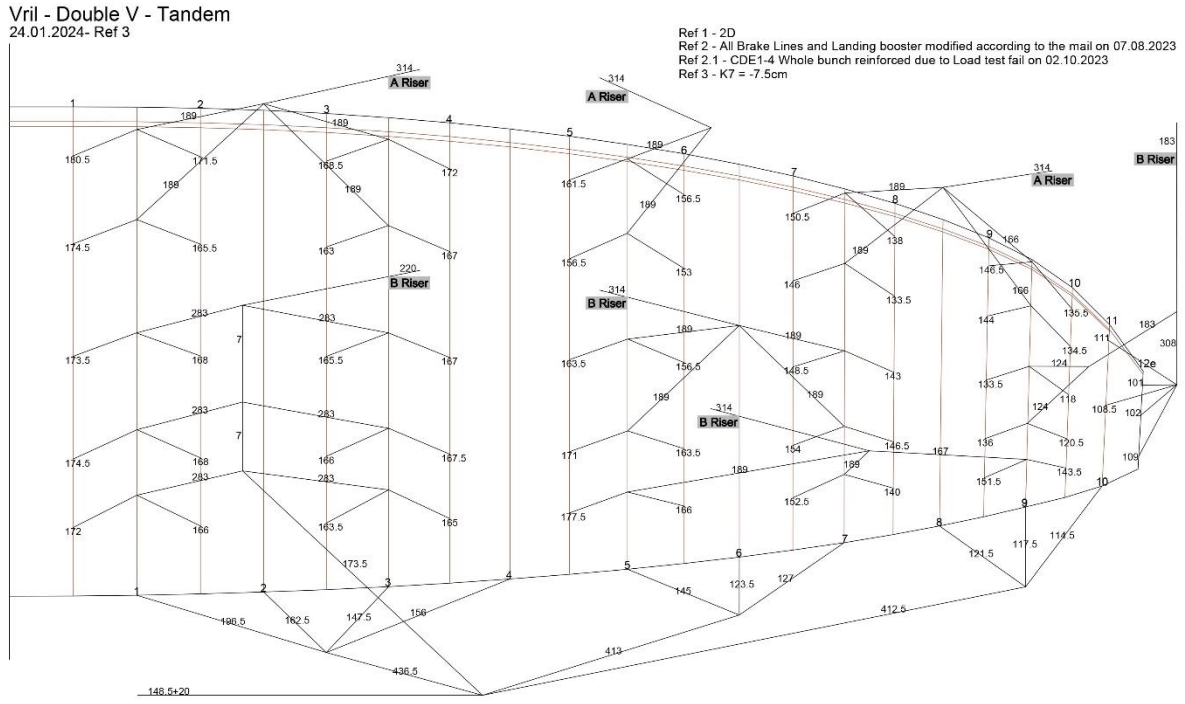
Linen designations:
All lines in VRIL gliders are labeled according to the same scheme. When ordering replacement lines, please always determine the designation according to the following explanation and order by specifying the glider type and size!

The first digit indicates the line level (A, B, C, D; K = brake). The numbering starts from the center of the canopy at 1 and is consecutive up to the stabilo.

- Gallery lines (top lines) are designated with the level and number starting from the center of the shade.
- Fork lines (middle floor) are given the designation "M"
- The master lines have the additional designation "R"
- The lines of the Landing Booster are marked with the suffix Con.




# Single line lengths DOUBLE-V



# Total line lengths

**VRIL DOUBLE-V Total line lengths**

| A | B | C | D | E | K |
|---|---|---|---|---|---|
| 7225 | 7165 | 7155 | 7235 | 7270 | 7815 |
| 7135 | 7075 | 7100 | 7170 | 7207 | 7475 |
| 7105 | 7050 | 7075 | 7150 | 7180 | 7325 |
| 7140 | 7090 | 7090 | 7165 | 7196 | 7410 |
| 7035 | 6985 | 7055 | 7130 | 7195 | 7065 |
| 6985 | 6950 | 6985 | 7055 | 7080 | 6860 |
| 6925 | 6880 | 6905 | 6960 | 6945 | 6979 |
| 6800 | 6755 | 6850 | 6885 | 6820 | 6835 |
| 6655 | 6630 | 6625 | 6650 | 6715 | 6796 |
| 6545 | 6535 | 6470 | 6495 | 6635 | 6765 |
| 6410 | 6385 | 6390 | | | |
| 6310 | 6320 | | | | |

# Carrying strap length

| | Trim | Trimmer open |
|---|---|---|
| A | 375 | 375 |
| B | 375 | 435 |

# Verification instruction

**Please note: VRIL-WIngs is not liable for errors made by the person responsible (or check company) who carries out the check. They always work at their own risk! If in doubt about the performance of the checks or the airworthiness of the device, always contact VRIL-Wings or, if necessary, send the device directly to us for inspection.**

Subject of the audit:

- Every type of paraglider is subject to mandatory inspection.
- The tests can be carried out by the manufacturer or a person authorized by the manufacturer who meets the following personnel requirements. Since 01.07.2001, it has also been legally possible for the owner to inspect his appliance himself. This option is expressly not recommended by the manufacturer, as the owner does not usually have the appropriate personnel and measuring equipment available. In addition, in this case the glider may only be flown by the owner - use of the glider by third parties is then excluded!!! A test report is created for each inspection. The owner is obliged to always keep the last document and to send a copy of this inspection report to the manufacturer. Each inspection step must be carried out conscientiously and entered in the inspection report.
- If a defect is found during the inspection, the device may no longer be flown. Repairs must then be carried out by the manufacturer or a person authorized by the manufacturer.

Inspection intervals:

- The interval for training equipment and commercially used tandem paragliders is every 12 months, for all other paragliders every 24 months or after 100 operating hours.

Personnel requirement for the inspection:

Personnel requirements for the inspection of paragliders used exclusively for personal and single-seat use:

- Possession of a valid unrestricted paragliding license or equivalent recognized license.
- Sufficient type-specific training at the manufacturer's or importer's premises. Note: If a GS has been tested exclusively for personal use, its use by third parties is excluded.

Personnel requirement for the inspection of paragliders used by third parties and for two-seaters:

- Vocational training conducive to the testing activity
- A professional activity of two years in the manufacture or maintenance of paragliders and hang gliders or technically similar types, of which 6 months within the last 24 months. In a manufacturing company for air sports equipment
- Sufficient, at least two-week type-related training at the manufacturer's or importer's premises
- One type-specific instruction per device type, which must be renewed annually.

Necessary documents:

- Current version of the inspection instructions
- Air sports equipment data sheet
- Unit test report
- Previous inspection reports (only for further inspections)
- Maintenance and calibration documents for the measuring devices
- Manufacturer's instructions for rectifying defects
- Airworthiness directives, if applicable

Test steps:

Identification of the device

- After the paraglider has been handed over, the aircraft is inspected and the paraglider is identified on the basis of the official manufacturer's documentation.
- Type plate and inscriptions must be checked for correctness, completeness and legibility

Visual inspection of the cap

- The upper and lower sail, leading edge, trailing edge, ribs (including any V-ribs), cell partitions, seams, flares and line loops are inspected for cracks, shearing, stretching, damage to the coating, repairs and other anomalies. The inspection result must be recorded in the inspection report
- In the event of tears at the seams and other damage, repairs must only be carried out using original spare parts and original seam patterns, no gluing with adhesive tape, use of non-original spare parts, etc.

Visual inspection of the lines

- If the lines are damaged (seams, tears, kinks, chafing, thickening, core leaks, etc.), they must be replaced immediately with original spare parts and the original seam pattern.
- In the event of damage to the lines (seam pattern of the sheath or similar), these must be replaced immediately with original spare parts and with the original seam pattern.

Visual inspection of the connecting parts

- All line buckles and any existing trimmers and speed systems must be checked for anomalies such as cracks, chafe marks and stiffness. Both risers are inspected for shear points, cracks and heavy wear and then measured under a load of 5 daN. The values determined must be compared with the specifications in the type data sheet and documented in the inspection report
- Max +/- 5 mm difference in the riser lengths is permissible

Measuring the line lengths

- The individual lines are laid out and loaded with 5 daN. The measurement is taken from the riser attachment point to the canopy including the suspension line loop. The rib numbering starts in the middle of the wing, with the wing sides being viewed in the direction of flight. The total line lengths determined are documented in the inspection report and compared with the nominal line lengths on the corresponding type rating sheet. The measurement of the opposite wing side can be carried out by a symmetry check, assuming the same conditions. Compliance with the tolerances specified in the manufacturer's instructions must be documented in the inspection report

- Limit values (tolerance values) may deviate by a maximum of +/- 15 mm from the type rating plate, whereby the tolerances must not result in any significant trim shift. The tolerances of the brake lines are +/- 25 mm deviation from the type rating plate.
- However, a fine trim must be carried out in 2 cases (the procedure must be requested from the manufacturer):
  1. if more than 50 % of the lines reach the tolerance limit, whereby the tolerance limit may only deviate in either the + or - direction (all values from 10-15 mm are calculated)
  2. or 25 % of the lines deviate from the tolerance limits in both directions (+ or -) (example: A/B lines are 10-15 mm longer, while at the same time the C/D lines are 10-15 mm shorter than in the type rating sheet (trim shift backwards due to ageing))

Checking the line strength

- Proof of line strength must be documented analogous to the proof required in the LTF for the type test:
- Stem line: Remove one main line from each line level (A, B, C) from the center of the canopy and determine the breaking load with the tensile strength tester. The removed lines must be named in the inspection report (e.g. A1, B1, C1, D1 on the left in the direction of flight). This is important so that the line replaced during the previous test is not tested during a subsequent retest. In the 3rd and 4th retest, trunk lines are tested next to the middle trunk line (i.e. A2, B2, C2). From the 5th retest onwards, the cycle starts again from the beginning (e.g. A1, B1, C1 in the direction of flight to the left, according to the first retest)
- Gallery lines: Above the main lines, an additional line is removed up to the cap and the breaking load is also determined. If the determined breaking load of the A gallery lines is 1.5 times the target value (e.g. target value 70 daN, determined breaking load >105 daN), then there is no need to test further gallery lines on the B/C/D levels.

Checking the cap strength

- The canopy strength test is carried out using the Bettsometer (B.M.A.A.aproved Patent No. GB 2270768 Clive Betts Sales). During this test, a needle-thick hole is punched in the upper and lower sail in the area of the A-liner linkage and the cloth is tested for its tear resistance. The limit value of the measurement is set at 800 g and a tear length of 5 mm
- The exact test procedure is specified in the operating instructions for the Bettsometer. The measured value is entered in the verification report

Checking the air permeability of the fabric

- Using a JDC textile watch, a porosity measurement is carried out at at least 5 points on the upper sail (whereby at least 2 measuring points must be in the middle third of the canopy) and at least 3 points on the lower sail. The values determined are documented in the inspection report. The measuring points on the upper/lower sail are distributed over the span approx. 20-30 cm behind the leading edge
- Limit values: no measuring point may reach a value of less than 10 seconds. If a measurement results in a value below 10 seconds, the paraglider loses its serviceability.

Visual inspection of trim and adjustment

- All lines must be checked according to the line overview plan to ensure that they are correctly attached and that all line levels are free. The brake lines must also be checked to ensure that everything is correctly attached and free.
- The visual inspection must correspond exactly to the line overview plan

Check flight

- A check flight is only necessary for major repairs.
- During the check flight it must be determined whether the flight characteristics of the paraglider to be checked have changed compared to a brand new device.
- The inspector's flying skills and experience must enable him to compare the construction specifications with the flight behavior of the paraglider to be inspected and to determine any changes in characteristics. This includes above all
- that the paraglider pattern and its characteristics / flight behavior are known to the inspector.
- The construction regulations applicable at the time of type approval must also be known.
- A check flight must include at least the following points: stall behavior, tendency to stall (restart from the B-stall), tendency to negative turns, control travel lengths, >50% one-sided collapse.
- If the checked device does not behave correctly in any way, it may no longer be flown with this device and must be returned to the manufacturer for inspection. Under no circumstances should you attempt to rectify the fault yourself.

Other tests

- Control of the line stretch:
  All innermost trunk lines must first be measured under a load of 6 daN and then loaded with 20 daN for 5 seconds and then measured again under 6 daN. This activity must be carried out before measuring the line lengths and the elongation values must be recorded in the inspection report.

# Test equipment

The test equipment to be used for the individual test must always be the equipment listed below:

- Air permeability meter
- Length measuring device
- Strength measuring device for lines
- Strength measuring device for cap

All measuring devices must be calibrated and maintained at regular intervals in accordance with the manufacturer's instructions.

# Documentation

- All test results and all details of the screen (type, size, serial number, year of manufacture) must be noted in the inspection report
- Repair and correction work is also noted on the inspection report.

- The overall condition of the appliance is specified according to the options to be ticked in the inspection report. All determined values such as strength, porosity, etc. are included in the overall condition
- In the event of a negative test result, contact the manufacturer to discuss the further procedure (e.g. return the device to the manufacturer for repair).
- Any unusual defects must be reported to the manufacturer immediately!
- The inspection is noted on the appliance next to the type plate with the corresponding inspection stamp. This inspection stamp must be completed in full with the time of the next inspection, place, date, signature and name of the inspector.
- All inspection documents (inspection report and measurement report) must be prepared in triplicate. The device owner, inspector and manufacturer each receive one copy (the copy must be sent promptly). The retention period for the inspection documents is 6 years.