Manual

ATTAK

MINI WING



SOL®
PARAGLIDERS

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WELCOME TO THE SOL TEAM

You have just acquired a high-quality product, manufactured under one of the most demanding industry standards worldwide. We are certain that this equipment will allow you to learn, increase and amplify your knowledge and technique during your flights.

We hope your Mini Wing Attak will provide you with many nice flights and that you're experiencing moments that will last forever in your memory. This way our philosophy will proof right: security, performance, easy handling and innovation.

Please, read this manual carefully. All necessary information you'll need for your new equipment is right here.

In case of questions or doubts regarding your paraglider or in case you simply are interested in our new products - we are at your dispose.

Thank you very much for choosing SOL PARAGLIDERS.

Symbols

Warnings and important notes - pay attention and read carefully

Additional information

Notes regarding environment protection

IMPORTANT NOTES

- As owner of a Sol Paraglider you are responsible for all possible risks existing by using this equipment. The inappropriate and/or abusive use of your equipment increases this risks.

- It's not possible to transfer this responsibility of risks, using this equipment, to the producer, distributor or seller.

- A regular training, whenever possible, especially on the ground, is indispensable and necessary. A poor handling and control of the glider, especially on the ground, is one of the most frequent causes of accidents.

- Always be prepared to improve your skills. Attending special workshops will improve your skills and maintain your knowledge about materials and techniques, which always are developing, up to date.

- Only use a certified paraglider, harness with protector and reserve and use them within the described and certified limits. Remember, if you fly a paraglider outside the certified norms your insurance will not pay the damage. It is in your responsibility as a pilot to know what your insurance covers.

- Sol Paragliders is flying and testing every single paraglider produced, to assure our clients full quality and function of every glider. We recommend that every new or reviewed paraglider will be tested on the ground and flew from the training hill by his pilot.

- Never take off without helmet, hand-gloves and boots.

- Check all your equipment before each flight. Never take off with an inappropriate or damaged equipment.

- As pilot you only are allowed to use a paraglider in accordance to your skills and in accordance to the instruction level required in each country.

- Before each flight check your physical and mental state. Are you fit to fly?

- Before take off choose the right Paraglider and environment, check the weather conditions, if you have any doubt - don't fly.

- Never fly during rain, snow, strong wind, turbulent conditions or if thunderstorm clouds are in the sky.

- If you are always flying with conscious - you'll be able to fly for many years your glider.

ATTAK - THE PROJECT

The ATTAK consists of 26 cells and has internal crossed diagonals applied at the profiles to distribute the weight uniformly. This maintains the canopy very shapely and cleans and reduces the induced drag.

The ATTAK was designed at the new software. Its enhanced design and profile are the result of our continuous development and refinement process in terms of performance paired with stability. The improved features of this project permit a large speed range and excellent stability.

Recommendation

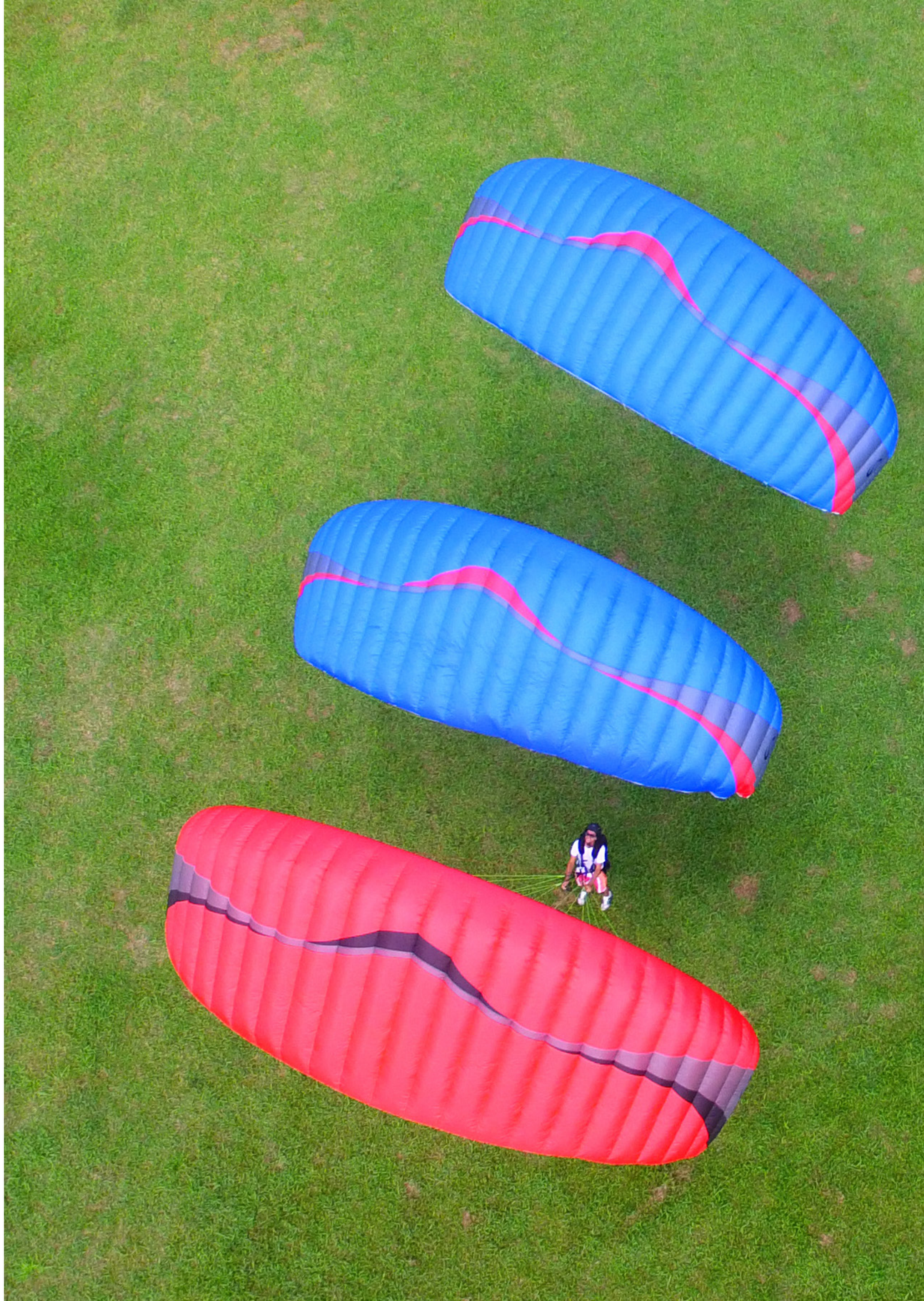
The mini wing flying concept is responsive, smooth and stable and attends to skilled and careful pilots with flying experience in dynamic handling to fly fast and in windier conditions when normal paragliders are not recommended.

Certification

Load

Special characteristics

Speed - Dynamic



Technology



The 3 Riser System guarantees stability, 25% less lines, better weight distribution and less deformation throughout the years.



More uplift, even with the same wing area, and better pressure distribution along the whole wingspan.





LDT are Load Distribution Tapes between the suspension points for a weight distribution along the whole wing during flight, resulting in better performance and stability.



Fabrics composed out of different materials assure long life and more resistance with less deformation and weight.



Flexible nylon battens reinforcements.



Higher Project Aspect Ratio.



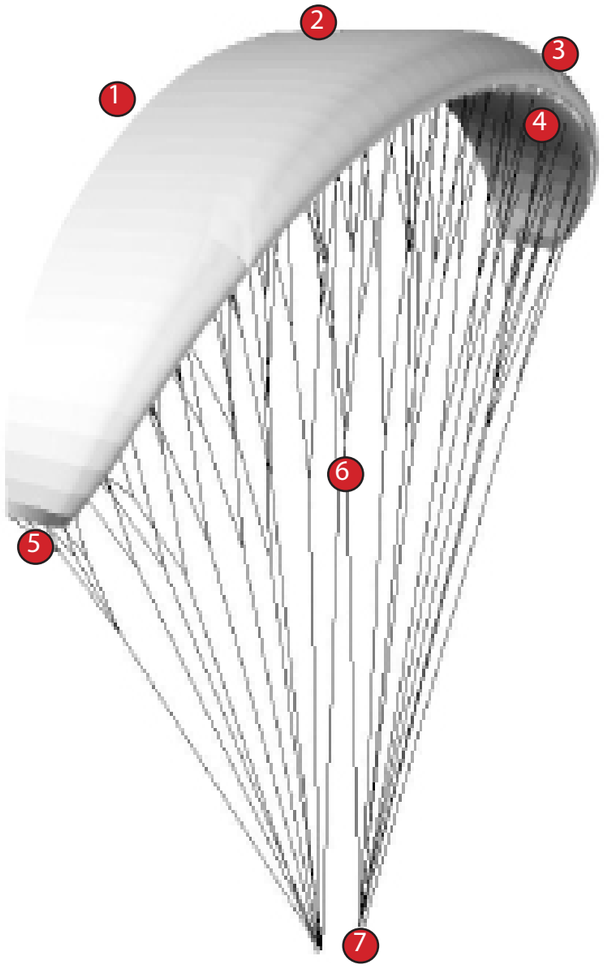
Tensile Power Tapes



Cutting edge technology laser equipments prepare all molds and parts of the canopy.

Overview mini wing

1. Trailing edge
2. Top
3. Leading edge
4. Bottom
5. Stabilo
6. Lines
7. Risers



Overview risers

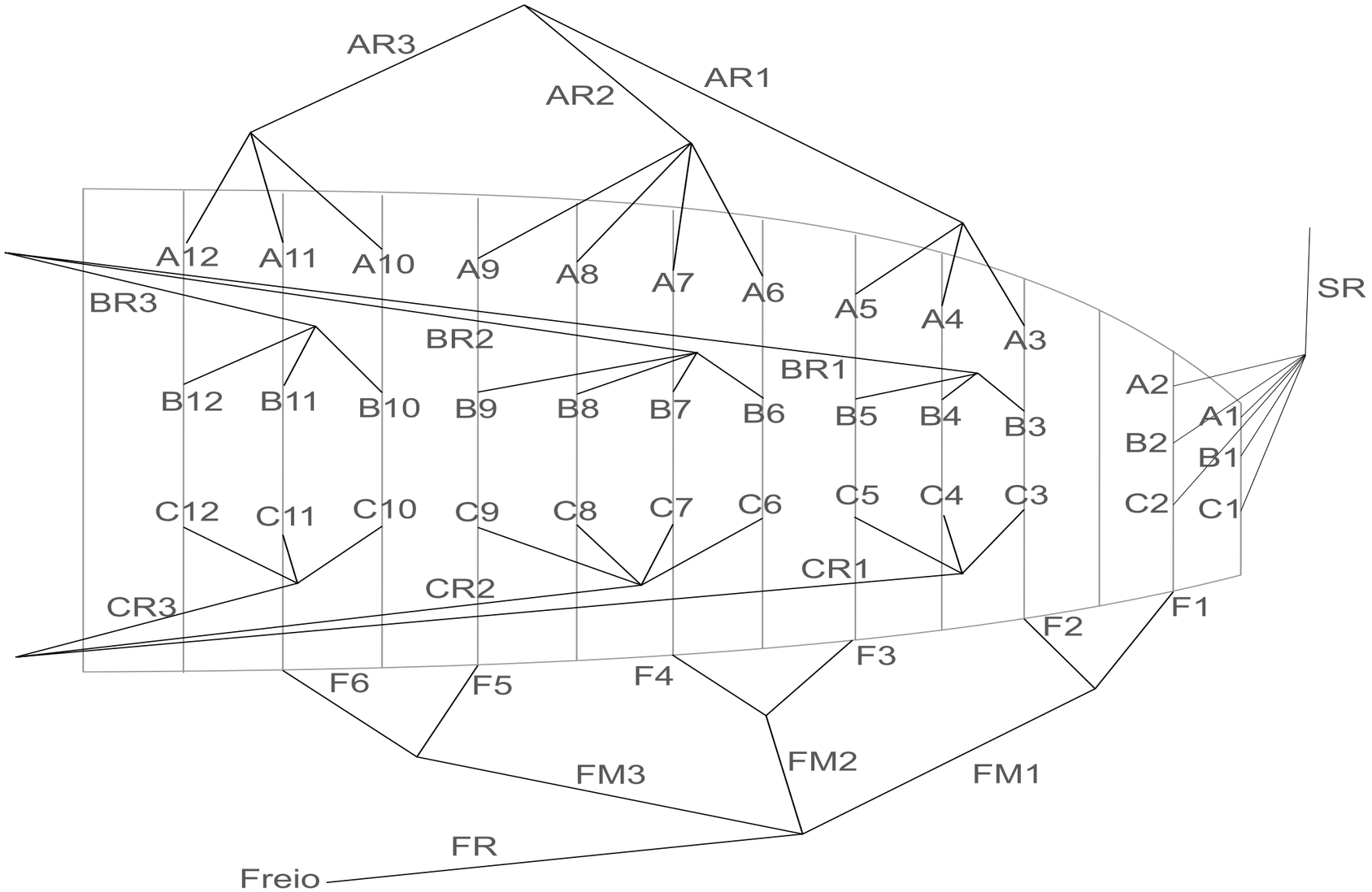
1. Riser A
2. Riser B
3. Riser C
4. Brake lines
5. Toggle connection
6. Toggle
7. Speed system
8. Accelerator
9. Accelerator connection
10. Connection to harness
11. Trimmer



Line plan

The suspension point design was developed for an ideal weight distribution and long life. During all consideration and calculation, security always is our first goal.. The used material mix for the lines of the Attak forms an ideal combination: long life with little deformation and aerodynamic drag.

Never and under no circumstances the line length can be altered!

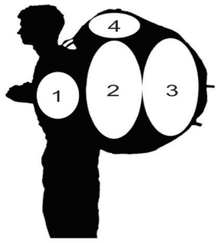


THE MINI WING - INFORMATION

Take off weight

Each mini wing seize is dedicated to a certain weight range, from a minimum take off weight to a maximum. The take off weight is the sum of the weight of:

1. the pilot
2. the mini wing
3. the harness with reserve
4. all flight accessories



It's not recommended to fly outside the weight range.

If your take off weight is between two weight ranges we suggest the following procedure:

- For a more accurate and dynamic handling or if you usually fly in the mountains and/or turbulent conditions, you should choose to fly in the upper weight range.

- For a better sink rate and if you usually fly above flat land and in light weather conditions, you should choose to fly in the lower weight range.

Tow release take off

The Attak was not designed and is not certified for towing flight. SOL Paragliders doesn't recommend this type of flight.

Flight with engine

The Attak was not designed and is not certified for engine flight. SOL Paragliders doesn't recommend this type of flight.

Tandem flight

The Attak was not designed and is not certified for tandem flight. SOL Paragliders doesn't recommend this type of flight.

PREPARING FOR FLIGHT

Laying out the mini wing

- Choose an easy training elevation with less inclination for the first flight, without obstacles and a day with easy weather conditions.
- Open your canopy and lay him down in shape of a horseshoe.
- Check fabric and lines, if there is any damage or fatigue caused by wear.
- Check if all quick links are closed.
- Identify, separate and organize all risers A, B, C and the brake lines.



It is extremely important that there are no entanglements and/or bunched lines present.

Harness

The Attak was tested within the standard of LTF with a harness of type GH. We can recommend for the Attak all harness of type ABS, tested with a carabiner connection height between 42 and 48 cm, measured form the seat and depending on the seize. Attention: the suspension height will influence the "normal" brake position. Always use a harness with back protection.

The distance between the carabiners should be correct. Together with your glider comes an "Easy Check" measure tape which might help you to check the distance exactly.

If the distance is not within the range, the glider could have extreme, dangerous or abnormal reaction in flight.



PARAGLIDER SOL								
SIZE	XXS	XS	S	M	L	XL	XXL	TANDEM
MEASURE	38 CM	38 CM	40 CM	42 CM	44 CM	46 CM	48 CM	44 CM

Connecting mini wing and harness

Without twisting the risers connect them with the carabiners of the harness. Check if they are connected and positioned in the right way without any twist. The (A) riser must be in front in flight direction.

Check if the carabiners are really looked and closed!

Accelerator

Most of modern harness have pulleys for assembling the Foot Speed System. The line must be firmly attached to the stirrup. The other end of the line is fed through the harness' pulleys and comes out vertically, and must be firmly attached to the clip of the quick look.
In order to adjust the Speed System, we suggest that you connect the harness and the risers, suspended from the ground. Ask a friend to pull the risers (A) upwards. At this time, adjust the length right to the bar in such way to be easily reachable with your feet in flight and by stretching the legs, make sure to allow for a clear path to maximize the accelerator usage.

Riser lengths

Riser lengths actually measured shall not differ more than ± 5 mm from the lengths laid down in the user's manual.



A	B	C
45 cm	45 cm	45 cm

No Foot speed System - Closed Trimmer

Recommended for downwind or scenic flight

Measure without quick links



A	B	C
37 cm	42 cm	45 cm

Foot speed System - Closed Trimmer

Advised for short short runs

Measure without quick links



A	B	C
37 cm	41 cm	50 cm

Foot speed System - Open Trimmer

Advised for short short runs

Measure without quick links



A	B	C
45 cm	47,5 cm	50 cm

No Foot speed System - Open Trimmer

Recommended for wind

Measure without quick links

FLIGHT

Take Off Check List

- Helmet closed?

- Carabiners looked and closed?

- Harness all looks closed?

- Carabiner distance OK.?

- Risers A in hands?

- Brake lines free, toggles in hand?

- Pilot stays in the midst of the canopy?

- Take off area free?

- Mini wing and pilot lined up against the wind?

- Air space in take off direction free?

Forward Take off

When ready to takeoff, the pilot must have risers A and the toggles in hand. The arms must be extended to the side, as if they are extensions of risers A. A decisive run allows a quick and stable inflation. After the initial inflation momentum, the pilot must keep the tension forward on risers A, not pulling them downwards, until the canopy is above his head. At this point, the brakes must be carefully activated and the pilot must be prepared for possible directional changes. A move to underneath the center of the mini wing is the best method for corrections, provided there is room for it. The pilot glances at last upwards to ensure the canopy is properly located above, completely unobstructed and inflated. Only at this point, the pilot decides whether or not to takeoff.



Reverse Take off

The preparation is the same as to forward take off. But this time you have to turn towards the canopy. During the turn lift the hand which is turning away from the mini wing with the risers above your head. Now you can inflate the mini wing with the red A risers. Push the risers up and let them go when the canopy is over your head. If necessary use the brakes gently. Turn out and begin the start run. Attention: check to turn out to the right side. Example you turned with your left side to the mini wing you have to turn out with your left side to the mini wing. Otherwise you will have made a 360 degree turn and all your risers are twisted.

In case of strong wind it could be necessary to make some steps towards the canopy during inflation. This take off method can be used even with little wind.



Thermals and Soaring

In turbulent conditions, the mini wing must be flown with the brakes softly applied, resulting in greater canopy stability. The pendulum effect back and forth must be avoided! The canopy must remain on top of the pilot. For this purpose, the speed must be increased by releasing the brakes upon entering a thermal (depending on its intensity) or braking on exit. This is part of the basic technique on "active flying".
During soaring, a minimum height of 50m over ground is highly recommended, for safety reasons. Knowing and respecting flight regulations is extremely important, especially when airspace within close proximities of mountains is shared among several pilots, where last minute anti-collision maneuvers are not executable.

Turns

The Attak is very sensitive, responding instantly to turn commands. Leveled turns can be achieved with the shifting of weight on the risers with minimum altitude loss. A combination of weight shifting and breaking technique is the most efficient way of executing turns in any situation. The given brake utilized determines the radius of turns.
By activating the brakes on the outside edge of the turns, as well as applying maximum weight shifting on the risers, the efficiency and resistance to collapse in turbulences (at the edge of thermals) is increased.
In case it becomes necessary to perform turns in a constrained space we recommend to release the outside brake in the given turn and pull a little more the brake on the inside of the turn.
The mini wing glides best when no brakes are applied.

By pulling either brake too strongly or suddenly, there is a danger of creating a negative spiral!

Accelerated flight

It is recommended to use the accelerator when flying against the wind or in zones with descending air. Due to a decreased angle of attack, the canopy may collapse easier than when set at the normal position. The pilot must remember that the higher the speed, the more dynamic the collapse response or symmetric closing will be.

- Exercise the use of the accelerator during calm conditions.
- Be cautious flying accelerated in difficult and turbulent conditions.
- Remember: The higher the speed the higher the descent rate.
- Check always on all accelerator parts for good function and signs of wear.

Active flying

For best performance during your flight, it is important to be always sensitive to what your canopy is trying to communicate. The key elements of active flying are: controlling the canopy advancement and the canopy pressure. If you apply gently the brakes (about +- 15cm) you are getting a good feedback about the canopy pressure, which can alter easily in turbulent air. You can feel it very well on the brakes. The general idea: keep the pressure constant.
Avoid flying excessively with the brakes on, cause you might brake to the point of stopping the canopy from flying. Always consider your aerodynamic speed. Your movements can be symmetric or asymmetric and both or one brake can be applied. This corrections control your flight and reduce the risk of collapses. We suggest that you practice on the ground. Canopy advancement and pressure loss can be simulated well on the ground.

Landing

Always choose a secure and clean landing side with lots of space, great distance to natural obstacles and is not under the influence of turbulent air.

- The final approach stage must be done in straight line upwind.

- With less than 30m above ground avoid steer turns, they may result in dangerous pendulous movements and the pilot could crash to the ground with high velocity.

- Before landing get up in your harness with the weight against the chest strap, especially in turbulent conditions.

- Fly with hands up, without brakes, until more or less 1m over ground. In turbulent conditions fly active until the end. Than apply slowly and progressively the brakes to reduce velocity until you can almost without speed land on the ground.

- Always adapt your landing on space, circumstances and wind.

- If the wind is strong and you feel it might be possible been dragged or uplifted after landing, pull symmetrically the B risers. This movement kills the mini wing fast and controlled and avoids a re-inflation or that the mini wing turns into a great sail. After killing the glider pull him back to you using the B risers.

FAST DESCENT MANEUVERS

The following maneuvers should be used only in emergency situations and need a special training fore safety use. If possible attend a workshop to learn and practice this maneuvers.
This maneuvers are used by cloud entrance and in case of approaching thunderstorms.

Remember: a good weather analysis before flight helps to avoid this maneuvers during flight.

Big ears

The Attak was not designed and is not certified for big ears. SOL Paragliders doesn't recommend this type of flight.

Positive spiral

A positive spiral has a high sink rate. But the high acceleration, G-Force, impedes to fly this maneuver for a long time. The G-Force may cause that the pilot looses his consciousness and spirals until he crashes the ground. The same high energy is acting on the equipment and will shorten his endurance.

A positive spiral never should be exercised in turbulent conditions or strong lateral wind. Under strong wind conditions the pilot has to remember that the lateral drift could be enormous.

When the pilot activates just one brake, slowly and progressively, the paraglider inclines sideways in a sharp angle and enters in a steep and quick turn, which may become a positive spiral. During a spiral the rotation radius can be controlled by the force applied to the inside brake.

In order to come out of the spiral, the pilot must release the brake slowly and shift his weight lightly to the outside of the turn. A sudden exit may result in an exaggerated forward movement of the canopy, and cause a collapse. For this reason, on the last turn, the inside brake of a given turn must be softly applied again.

In case the canopy collapses during this process, the spiral must be counter-acted, as the active canopy area will be reduced.

- Never combine big ears with spirals. The canopy active area reduction p l u s the 'G' force may result in line and/or canopy damage.
- Leaving a fast spiral must be executed slowly and progressively.
- The maneuver requires high altitudes (at least 600 meter over ground) and is dangerous, due high descent ratio the pilot can lose the altitude reference.

B-Stall

The Attak was not designed and is not certified for B-Stall. SOL Paragliders doesn't recommend this type of flight.

EXTREME FLIGHT SITUATIONS

Front-stall

Normally the mini wing opens on his own after a front-stall. In turbulent conditions it may happen that the canopy make a fast movement forward, in order to avoid another front-stall it is necessary to apply the brakes precisely.
Caution: If the brake lines are applied too much the glider could get into a full-stall.



Lateral closing

Active flying almost ever avoids lateral closing. If lateral closing happens, the canopy folds predictable and progressively from the tip to the center. This corresponds a collapse of 50% or more and results in a slight tendency for a turn. The mini wing can be held on course using the brake on the open side.
Normally the mini wing opens on his own. If the collapse happens during accelerated flight the canopy has a more dynamic reaction, but even than the turn can be controlled without problems.
To facilitate the closed side to fill the pilot has to pull down slowly (ca. 2 seconds) the brake on the closed side and let go again (pump). Shifting the weight to the open side helps to re-inflate the sail and increases security, cause the brake has to be used less and this avoids a full-stall.
Without action, the mini wing will begin a positive spiral. The pilot must lightly apply the brake on the external side to stop a spiral and at the same time shift his weight on the same side until the canopy is stabilized. Exactly at this stage of pendulum effect under the canopy, it is important that the pilot controls carefully the amount of force applied on the brakes, and often it is needed to decrease the force. Once a straight flight is achieved, the closed side can be re-inflated by the pumping action.



Parachutal

This mini wing does not have parachutal flight tendencies and recovers on its own from an intentional parachutal flight induced by braking commands. In case of a parachutal flight after an extreme situation loose the brakes and use the accelerator. Before using the brakes again make sure that the mini wing flies normally.

If the mini wing is wet or the regular inspections weren't made, the risk of a parachutal flight exists.

Full-stall

The mini wing has a long way on the brakes before he enters a full-stall. A full-stall happens if the brakes are pulled symmetrically and excessively downwards. Normally the mini wing starts to fly backwards and deforms to a horseshoe, the opening on the front.

Before terminating the canopy must be stabilized. Afterwards both brake lines have to be loosened symmetrically and slowly, to avoid that the canopy kicks forward.

Negative spiral

The mini wing has a long way on the brakes and difficulties to enter in a negative spiral. But if one of the brakes is extremely pulled downwards it can happen.
The side with the brake pulled down enters in a stall, while the other side maintains open. In this case the brake must be loosened at once, before the mini wing turns 180º, in order to get the mini wing back to normal flight. Depending on the situation in which the brake is loosened, the canopy can react quite dynamic and kick forward provoking a collapse.

Line Over

If the tip of the wing is trapped in lines it could cause a positive spiral, which is difficult to control. To get out of this situation, first stabilize your mini wing and get him into normal flight. In other words control direction. Than pump on the side of the Line Over. During this procedure lean on the opposite side, otherwise there is a risk to turn or increase the spiral.
You also may try to pull the stabilo lines SR, the outer lines on the blue riser B, to free the canopy. Watch out for the brake to avoid a stall on the clean side.
If the Line Over is big and all the counter action does not help and the mini wing is not to manage, release the reserve, whilst you are having height enough.

Emergency flying

In case of a brake line crack or the brake line is trapped or anything else happened and doesn't allow to use the brakes, use the C risers and weight shifting to steer the mini wing. Land on the nearest possible side. This situation could happen in case of poor maintenance of the equipment or an extreme flight situation.

Attention: the steering commands on C risers are much shorter than on the brake lines.

PACKING YOUR MINI WING

There are different ways who can help to extend the life of your mini wing. One way is to fold the mini wing right. It's most important to watch out for the reinforcements to maintain the take off characteristics and the performance. We are recommending the "Origami Method" and the use of a Origami-Pack Sack (see below). Together with your mini wing you get a traditional pack sack who also protects your mini wing. How to use it we describe after the "Origami Method".

Traditional-Method



Step 1: Bundle up your mini wing in form of a cabbage. This way you're avoiding that the mini wing drags over the ground during folding.



Step 2: Begin with the center of the trailing edge. Put one profile over the other. Each side separate.



Step 3: Now do it in the same way with the leading edge profiles. Put the reinforcements of top and bottom in the right way, don't close the cell openings and push out the fabric.

Step 4: Fold the wing like an accordion from both sides and put one side over the other. Now all reinforcements are laying side-wise one above the other.







Step 5: Fold the sack as shown in the photo. This method is very gentle to the more stiffer parts of the mini wing.

Step 6: At last put the mini wing into the protection bag.



Storing

Most part of the mini wing fabric is Nylon. As all other synthetic materials it suffers and deteriorates under the influence of ultraviolet radiation (UV). It looses his stiffness and gets more porous. Whenever it is possible avoid to submit your glider to the sun light, it has a high UV rate, especially in heights. It is recommended to store your mini wing very well whilst it not in use. It should be stored dry in a dry place, protected from UV rays, distant from chemical products. Avoid to store the glider in hot places like the trunk of a car.

Back Pack

We recommend that you store your equipment in the back pack. That way it is easy to transport and protect. Your back pack was designed to be useful and comfort. Do it this way:



Step 1: Open your back pack and put your mini wing in.

Step 2: Your harness put above the glider and close the zipper.





Step 3: Store your helmet and accessories between the glider and the harness or in the upper part of the back pack.

Step 4: Close all parts and pockets of the back pack.



INSPECTION

Your mini wing has strictly to follow the required inspection intervals. The first inspection check is mandatory completing 24 months, 100 hours flights or 100 flights, whichever comes first.After the first inspection any wing must be checked yearly or at each 12 months, 100 hours flights or 100 flights, whichever comes first.
. In any of these inspections may occur that a shorter period for the next inspection will be defined (f. ex. 6 months 50 hours flights or 50 flights).
Without performing the mandatory inspections, the mini wing loses its certification and the warranty becomes null and void.
After any kind of accident or a long period without use: sent the mini wing for inspection to an authorized dealer's workshop or to the manufacturer. It's for your own good.
Minor repairs (see below) you could do by yourself, but all other repairs must only be made by an authorized dealer's workshop or the manufacturer.

REPAIRS

Repairs must only be made by an authorized dealer's workshop or to the manufacturer.
In case of minor repairs you are receiving with your mini wing a basic repair kit. It contains adhesive labels in case of minor tears and quick link sealing.

FABRIC TEARS

Small tears up to 10 cm away from the line suspension points may be fixed by yourself. Beyond that the maintenance must be made by an authorized dealer's workshop or the manufacturer.

- Clean the spot where the adhesive label will be applied with a humid cloth.
- The adhesive label has to be at least 2,5 cm larger than the tear.
- Round the edges, otherwise the adhesive label could loosen after the aplication.
- Apply on both sides of the tear.

LINE CRACK

In case of a line crack we recommend to contact your dealer, an authorized dealer's workshop or the manufacturer. After the repair test the glider on the ground and check if everything is alright.

QUICK LINK SEALING

Along with your kit you're get sealing for the quick links. Don't leave your risers without them, because they avoid the movement of the screw nut, making it impossible to open.

WARRANTY

Every paraglider manufactured by SOL Paragliders has a Warranty of 3 Years or 300 Hours of Flight, whichever comes first. Our technology, through the utilization of quality materials and the adoption of new manufacturing processes, allows us to offer you, our client this added bonus.

1. This warranty refers to materials and possible processing defects of the paraglider. The conditions below have to be considered carefully.

2. This warranty is valid for all paragliders from SOL with LTF/EN certification, rated for leisure use only. This warranty does not include paragliders used professionally (school, competitions, aerobatics, etc).

3. Due to the extreme use, competition and acro paragliders and gliders used professionally are not included in the SOL 3 years (300 flight hours) warranty. All paragliders used for competition or acro have a 1 year warrant for production errors.

WARRANTY TERMS

1. A warranty registration has to be filled out correctly within 30 days after the purchase (you can find the registration here: www.solparagliders.com.br/registro.php).

2. All flights must be logged providing information on date, place and length of flight.

3. The equipment must be kept and used in accordance with the instructions provided in this manual. All the storage, folding, cleaning and care instructions must be carefully taken.

4. Maintenance and inspections can only be performed by the manufacturer or authorized dealers workshops and must be properly documented.

5. Your paraglider has strictly to follow the required inspection intervals. The first inspection check is mandatory completing 24 months or 100 flights, whichever comes first. After the first inspection any wing must be checked yearly or at each 100 flights, whichever comes first. In any of these inspections may occur that a shorter period for the next inspection will be defined (f. ex. 6 months or 50 flights). Without performing the mandatory inspections, the paraglider loses its certification and the warranty becomes null and void.

6. The owner is responsible for all shipping expenses to and from the manufacturer.

7. In order to make a plea for repair or equipment exchange, which shall be decided and performed only by SOL Paragliders, the owner must send the paraglider to the manufacturer with the following documents:

- A copy of all inspection data and the log book (flight data)
- A copy of the warranty registration from SOL Paragliders

TIS WARRANTY DOES NOT COVER

1. Any alterations on original fabric colors, lines and risers.

2. Any damage caused by chemical products, sand, friction, cleaning products or salt water.

3. Any damage caused as a result of errors during operation of the harness, incidents or emergency situations.

4. Any damage caused by inadequate operation of the paraglider.

5. A paraglider that may have been subjected of any alteration from the original design and without proper permission from SOL Paragliders.

6. Damages caused by inappropriate transport, storage or settings of the paraglider.

7. Damages caused by the use of not compatible components with the paraglider.

8. Damages caused by the use of inappropriate packaging for the transport.

9. Products without original identification label and serial number.

10. Handling the paraglider otherwise than to the instructions given in the owner´s manual.

ENVIRONMENT AND RECYCLING

Please be aware of our environment: don't toss your garbage into nature, respect the animals. Remember: nature is our mini wing engine.

If your mini wing gets out of use remember it cannot be recycled. Please give it to your dealer or your flying-school, they should know how to handle it.

OPERATION LIMITS

In conformity of LTF standard:
Temperatures between -30 degree till +70 degree of Celsius during the storage shouldn't influence the use and security.
Temperatures between -30 degree till +50 degree of Celsius and a variation of humidity between 25% and 100% during the use shouldn't influence the use and security.

Remember: Your product is a high quality product and was made out of carefully chosen materials. Store your equipment carefully and keep up the maintenance. The operating temperature limit is below -30° C.

FINAL WORDS

Safety is the major theme of our sport. In order to fly safely, pilots must train, study, practice and be alert to the dangers around us. In order to achieve excellent safety levels, we must fly regularly as much as possible, don't go beyond our limitations and avoid exposing ourselves to unnecessary dangers. Learning to fly is a slow process and takes years, so don't pressure yourself. If conditions are not favorable, keep your equipment stored away.

Don't overestimate your skills and be honest with yourself. Every year we see many accidents which in most cases could be prevented with a minor adjustment.

We are a part of the community in which we live: friends, family and even people we don't necessarily know worry about us. Our obligation towards this community is to keep ourselves healthy and that at each landing we will be one landing happier than before. We fly so that we can feel more alive.

We wish you good and safe flights with your new mini wing.

SOL Paragliders Team !!

TECHNICAL DATA

Weight, measure and data

Model	16	18	20	
Cells	26	26	26	
Real Surface	16,00	18,00	20,00	m^2
Real Span	8,00	8,41	8,90	m
Real A/R	4,00	4,00	4,00	
Projected Surface	13,70	15,75	17,80	m^2
Projected Span	6,40	6,70	7,10	m
Projected A/R	3,01	3,01	3,01	
Line diameter		1,1 - 1,5 - 2,1 - 2,5		mm
Height	463	493	522	cm
Profile max.	237	252	268	cm
Profile min.	84	90	95	cm
Mini wing weight	3,4	3,6	3,8	kg
Take off weight	65-80	80-95	95-110	Kg
Certification	Load	Load	Load	
Accelerator	8	8	8	cm
Risers	3	3	3	
Trimmer	5	5	5	cm
Other connected or adjustable parts	0	0	0	

Weight can vary between 150g depending on the batch of materials and weather conditions.

Parts and materials

Top	WTX 40 PU + Silicon 40 gr/sm
Bottom	WTX 40 PU + Silicon 40 gr/sm
Profiles/Diagonal tapes	Pro-Nyl High Tenacity Nylon rip-stop Hard finish 36 gr/sm
Reinforcements	Nylon Maxfio 2,5 mm
Reinforcements inside/outside	Cetim Polyester 25mm
Loops	FRL0027 Polyester 10 X 1.0 mm white
Sewing thread on canopy	Graal Polyester filament continuous 60 white
Sewing thread on risers	Nylbond Polyester filament continuous 30 - 40 Black
Lines	Cousin Technora 988 1,1 - 1,5 -2,1 - 2,5
Quick Links	Ansung Precision 19 mm. 800 kg
Risers	Polyester Venus 19 mm. 1.600 kg
Pulleys	Nylon Sol 12 mm / ISR 16 mm ball bearing
Magnet clip	Magneten aus Alnico 15 mm - ISR
Accelerator clip	Aluminium - ISR

Lines

Model	988	988	988	988
Manufacturer	Cousin FRA	Cousin FRA	Cousin FRA	Cousin FRA
Number resistance test			LT 949	LKT 948
Diameter	1,18 mm	1,5 mm	2,18 mm	2,5 mm
Material	Technora	Technora	Technora	Technora
Rope coating	Polyester	Polyester	Polyester	Polyester
Resistance after bending			181,2 daN	182,4 daN

Line lengths

Attak 16

	A	B	C	F
1	4632	4650	4735	4681
2	4752	4726	4837	4844
3	4970	4953	5043	4991
4	5000	4979	5079	5052
5	5063	5035	5143	5160
6	5125	5092	5207	5294
7	5090	5053	5175	
8	5094	5053	5179	
9	5145	5100	5230	
10	5154	5107	5239	
11	5122	5074	5208	
12	5168	5119	5253	

Measuring incl. risers and carabiners with 5 daN load
Brake line measuring without riser.

Attak 18

	A	B	C	F
1	4922	4942	5032	4968
2	5049	5021	5139	5139
3	5277	5260	5356	5292
4	5308	5286	5393	5353
5	5374	5344	5458	5464
6	5437	5402	5524	5603
7	5398	5359	5488	
8	5400	5356	5491	
9	5452	5404	5542	
10	5458	5408	5550	
11	5423	5370	5514	
12	5469	5416	5560	

Measuring incl. risers and carabiners with 5 daN load
Brake line measuring without riser.

Attak 20

	A	B	C	F
1	5212	5232	5328	5276
2	5345	5315	5441	5455
3	5585	5564	5667	5614
4	5616	5593	5705	5675
5	5684	5652	5773	5789
6	5749	5712	5841	5932
7	5706	5664	5801	
8	5706	5660	5802	
9	5759	5708	5855	
10	5763	5710	5860	
11	5723	5668	5820	
12	5770	5714	5867	

Measuring incl. risers and carabiners with 5 daN load
Brake line measuring without riser.

Line lengths individually

Attak 16

Nome	Line reference		Diameter / mm	Number of lines	Length / mm
A1	Cousin Technora	988	1.18	2	1107
A2	Cousin Technora	988	1.18	2	1227
A3	Cousin Technora	988	1.18	2	1139
A4	Cousin Technora	988	1.18	2	1169
A5	Cousin Technora	988	1.18	2	1232
A6	Cousin Technora	988	1.5	2	1629
A7	Cousin Technora	988	1.5	2	1594
A8	Cousin Technora	988	1.5	2	1598
A9	Cousin Technora	988	1.5	2	1649
A10	Cousin Technora	988	1.5	2	1360
A11	Cousin Technora	988	1.5	2	1328
A12	Cousin Technora	988	1.5	2	1374
AR1	Cousin Technora	988	2.18	2	3389
AR2	Cousin Technora	988	2.5	2	3054
AR3	Cousin Technora	988	2.5	2	3352
B1	Cousin Technora	988	1.18	2	1125
B2	Cousin Technora	988	1.18	2	1201
B3	Cousin Technora	988	1.18	2	1137
B4	Cousin Technora	988	1.18	2	1163
B5	Cousin Technora	988	1.18	2	1219
B6	Cousin Technora	988	1.5	2	1621
B7	Cousin Technora	988	1.5	2	1582
B8	Cousin Technora	988	1.5	2	1582
B9	Cousin Technora	988	1.5	2	1629
B10	Cousin Technora	988	1.5	2	1347
B11	Cousin Technora	988	1.5	2	1314
B12	Cousin Technora	988	1.5	2	1359
SR	Cousin Technora	988	1.5	2	3083
BR1	Cousin Technora	988	2.18	2	3372
BR2	Cousin Technora	988	2.5	2	3027
BR3	Cousin Technora	988	2.5	2	3316
C1	Cousin Technora	988	1.18	2	1210
C2	Cousin Technora	988	1.18	2	1312
C3	Cousin Technora	988	1.18	2	1152
C4	Cousin Technora	988	1.18	2	1188
C5	Cousin Technora	988	1.18	2	1252
C6	Cousin Technora	988	1.18	2	1654
C7	Cousin Technora	988	1.18	2	1622
C8	Cousin Technora	988	1.18	2	1626
C9	Cousin Technora	988	1.18	2	1677
C10	Cousin Technora	988	1.18	2	1383
C11	Cousin Technora	988	1.18	2	1352
C12	Cousin Technora	988	1.18	2	1397
CR1	Cousin Technora	988	1.5	2	3447
CR2	Cousin Technora	988	2.1	2	3109
CR3	Cousin Technora	988	2.1	2	3109

Attak 16

Nome	Line reference		Diameter / mm	Number of lines	Length / mm
F1	Cousin Technora	988	1.18	2	734
F2	Cousin Technora	988	1.18	2	897
F3	Cousin Technora	988	1.18	2	892
F4	Cousin Technora	988	1.18	2	953
F5	Cousin Technora	988	1.18	2	1565
F6	Cousin Technora	988	1.18	2	1699
FM1	Cousin Technora	988	1.18	2	1969
FM2	Cousin Technora	988	1.18	2	2121
FM3	Cousin Technora	988	1.18	2	1617
FR	Cousin Technora	988	2.18	2	2000 + 300

Attak 18

Nome	Line reference		Diameter / mm	Number of lines	Length / mm
A1	Cousin Technora	988	1.18	2	1178
A2	Cousin Technora	988	1.18	2	1305
A3	Cousin Technora	988	1.18	2	1217
A4	Cousin Technora	988	1.18	2	1248
A5	Cousin Technora	988	1.18	2	1314
A6	Cousin Technora	988	1.5	2	1739
A7	Cousin Technora	988	1.5	2	1700
A8	Cousin Technora	988	1.5	2	1702
A9	Cousin Technora	988	1.5	2	1754
A10	Cousin Technora	988	1.5	2	1449
A11	Cousin Technora	988	1.5	2	1414
A12	Cousin Technora	988	1.5	2	1460
AR1	Cousin Technora	988	2.18	2	3618
AR2	Cousin Technora	988	2.5	2	3256
AR3	Cousin Technora	988	2.5	2	3567
B1	Cousin Technora	988	1.18	2	1198
B2	Cousin Technora	988	1.18	2	1277
B3	Cousin Technora	988	1.18	2	1216
B4	Cousin Technora	988	1.18	2	1242
B5	Cousin Technora	988	1.18	2	1300
B6	Cousin Technora	988	1.5	2	1731
B7	Cousin Technora	988	1.5	2	1688
B8	Cousin Technora	988	1.5	2	1685
B9	Cousin Technora	988	1.5	2	1733
B10	Cousin Technora	988	1.5	2	1436
B11	Cousin Technora	988	1.5	2	1398
B12	Cousin Technora	988	1.5	2	1444
SR	Cousin Technora	988	1.5	2	3302
BR1	Cousin Technora	988	2.18	2	3600
BR2	Cousin Technora	988	2.5	2	3227
BR3	Cousin Technora	988	2.5	2	3528
C1	Cousin Technora	988	1.18	2	1288
C2	Cousin Technora	988	1.18	2	1395
C3	Cousin Technora	988	1.18	2	1232
C4	Cousin Technora	988	1.18	2	1269
C5	Cousin Technora	988	1.18	2	1334
C6	Cousin Technora	988	1.18	2	1766
C7	Cousin Technora	988	1.18	2	1730
C8	Cousin Technora	988	1.18	2	1733
C9	Cousin Technora	988	1.18	2	1784
C10	Cousin Technora	988	1.18	2	1475
C11	Cousin Technora	988	1.18	2	1439
C12	Cousin Technora	988	1.18	2	1485
CR1	Cousin Technora	988	1.5	2	3680
CR2	Cousin Technora	988	2.1	2	3314
CR3	Cousin Technora	988	2.1	2	3621

Attak 18

Nome	Line reference		Diameter / mm	Number of lines	Length / mm
F1	Cousin Technora	988	1.18	2	786
F2	Cousin Technora	988	1.18	2	957
F3	Cousin Technora	988	1.18	2	953
F4	Cousin Technora	988	1.18	2	1014
F5	Cousin Technora	988	1.18	2	1667
F6	Cousin Technora	988	1.18	2	1806
FM1	Cousin Technora	988	1.18	2	2104
FM2	Cousin Technora	988	1.18	2	2261
FM3	Cousin Technora	988	1.18	2	1719
FR	Cousin Technora	988	2.18	2	2100 + 300

Attak 20

Nome	Line reference		Diameter / mm	Number of lines	Length / mm
A1	Cousin Technora	988	1.18	2	1250
A2	Cousin Technora	988	1.18	2	1383
A3	Cousin Technora	988	1.18	2	1296
A4	Cousin Technora	988	1.18	2	1327
A5	Cousin Technora	988	1.18	2	1395
A6	Cousin Technora	988	1.5	2	1850
A7	Cousin Technora	988	1.5	2	1807
A8	Cousin Technora	988	1.5	2	1807
A9	Cousin Technora	988	1.5	2	1860
A10	Cousin Technora	988	1.5	2	1539
A11	Cousin Technora	988	1.5	2	1499
A12	Cousin Technora	988	1.5	2	1546
AR1	Cousin Technora	988	2.18	2	3847
AR2	Cousin Technora	988	2.5	2	3457
AR3	Cousin Technora	988	2.5	2	3782
B1	Cousin Technora	988	1.18	2	1270
B2	Cousin Technora	988	1.18	2	1353
B3	Cousin Technora	988	1.18	2	1292
B4	Cousin Technora	988	1.18	2	1321
B5	Cousin Technora	988	1.18	2	1380
B6	Cousin Technora	988	1.5	2	1841
B7	Cousin Technora	988	1.5	2	1793
B8	Cousin Technora	988	1.5	2	1789
B9	Cousin Technora	988	1.5	2	1837
B10	Cousin Technora	988	1.5	2	1525
B11	Cousin Technora	988	1.5	2	1483
B12	Cousin Technora	988	1.5	2	1529
SR	Cousin Technora	988	1.5	2	3520
BR1	Cousin Technora	988	2.18	2	3828
BR2	Cousin Technora	988	2.5	2	3427
BR3	Cousin Technora	988	2.5	2	3741
C1	Cousin Technora	988	1.18	2	1366
C2	Cousin Technora	988	1.18	2	1479
C3	Cousin Technora	988	1.18	2	1311
C4	Cousin Technora	988	1.18	2	1349
C5	Cousin Technora	988	1.18	2	1417
C6	Cousin Technora	988	1.18	2	1878
C7	Cousin Technora	988	1.18	2	1838
C8	Cousin Technora	988	1.18	2	1839
C9	Cousin Technora	988	1.18	2	1892
C10	Cousin Technora	988	1.18	2	1566
C11	Cousin Technora	988	1.18	2	1526
C12	Cousin Technora	988	1.18	2	1573
CR1	Cousin Technora	988	1.5	2	3912
CR2	Cousin Technora	988	2.1	2	3519
CR3	Cousin Technora	988	2.1	2	3850

Attak 20

Nome	Line reference		Diameter / mm	Number of lines	Length / mm
F1	Cousin Technora	988	1.18	2	838
F2	Cousin Technora	988	1.18	2	1017
F3	Cousin Technora	988	1.18	2	1014
F4	Cousin Technora	988	1.18	2	1075
F5	Cousin Technora	988	1.18	2	1769
F6	Cousin Technora	988	1.18	2	1912
FM1	Cousin Technora	988	1.18	2	2240
FM2	Cousin Technora	988	1.18	2	2402
FM3	Cousin Technora	988	1.18	2	1822
FR	Cousin Technora	988	2.18	2	2220 + 300



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