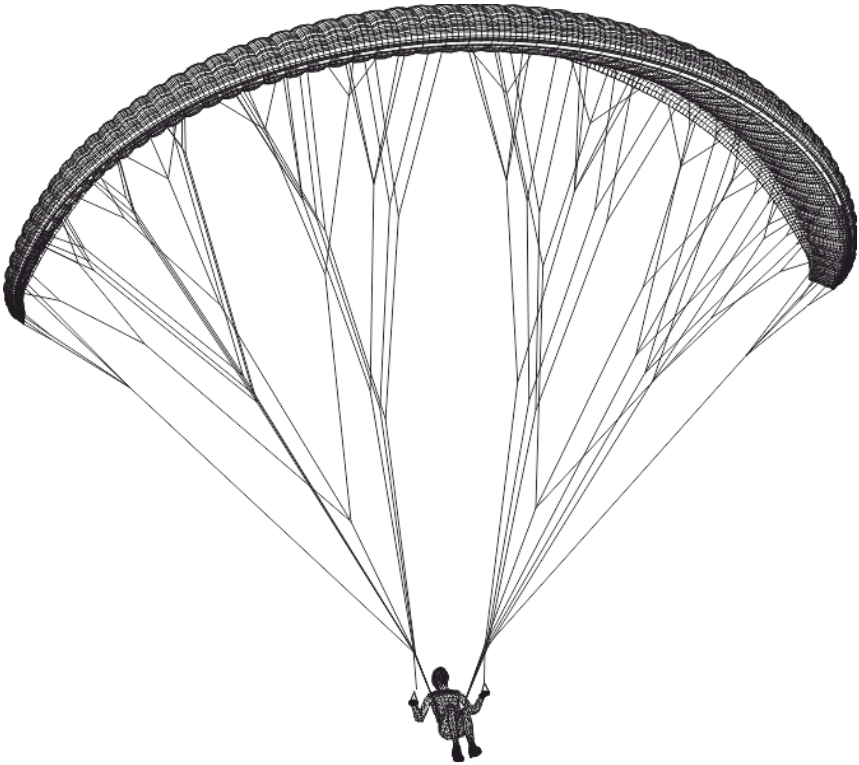

FACTOR 2

Version 1.0
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Congratulations, for choosing to fly a NOVA FACTOR 2. You have got a glider, to experience exiting and safe flights for many years.

This manual contains important information and instructions to use your glider. Please read the following pages carefully before your first flight. For questions and suggestions please contact us: info@nova-wings.com.

To find further information about this or other products please visit our website: www.nova-wings.com

To fully use all our maintainance and guarantee services you have to register your glider on our website. (click LOGIN & REGISTRATION)

For more information on our guarantee services have a look here: http://www.nova-wings.com/english/nova/guarantee.html

Now we wish you many nice ours in the air and a safe landing at the end of every flight.

NOVA Team

NOVA

Since the company was founded in 1989, NOVA has become one of the world's leading paraglider manufacturers with their head office in Terfens/Austria.

NOVA consists of a highly qualified team and most of the team members share the passion of flying with those pilots, who decided to fly a NOVA glider.

This passion and our Know-How are the fundamental parts of our work. By now, the passion and the Know-How are continuously growing. This is why we are for example pioneers in the area of air flow simulations, which allows us to predict certain properties of a new wing quite accurately on the computer.

Last but not least we have outstanding test pilots who provide a substantial contribution to make every new wing an unmistakable NOVA glider, which impresses in every aspect.

But NOVA doesn't only just stand for the development and the design of paragliders. We also want to take the responsibility for the manufacture of our gliders. That's why the production of NOVA-gliders takes place in our factory in the Hungarian town of Pecs. This allows us to influence important factors, for example quality assurance during the whole production process. Furthermore we can guarantee fair working conditions for about 100 NOVA-employees in Hungary.

We are convinced that the customer benefits from better employee working conditions, in terms of high-quality products.

What we want to achieve are happy and enthusiastic pilots, because the future of our sport depends on the enthusiasm of the people who are part of this wonderful sport.

The FACTOR 2

The FACTOR 2 is the successor of the well known and very successful FACTOR 1. The glider is a high performance EN C glider, which is dedicated to pilots with a solid amount of experience. For those pilots, the FACTOR 2 offers outstanding performance, a very pleasant handling characteristic and a lot of safety in practical conditions.

Short technical description

The FACTOR 2 has 61 cells. Six of those cells are closed stabilo cells on each side.

There are three layers of lines. The first layer, the A-lines are red. B and C lines are yellow. The brake layer, which is not one of the three line layers, is orange/red.
The risers consist of 4 belts. On the first two belts (red) both A stem lines are attached. Furthermore the speed system is fixed on the first A belt. On the next two belts the B and C stem lines are attached.

Safety

No matter if flying accelerated or at trim speed, the FACTOR 2 pilot can rely on a very stable wing in turbulent conditions. If a collapse occurs, it tends to be quite small and the reopening occurs without impulsiveness. The responsive brake and the increasing brake pressure helps to avoid an unintended stall when counter braking after a collapse.

The rather small aspect ratio makes cravats very unlikely.

The overall behaviour of the Factor 2 is very predictable for pilots with the proper amount experience.

We recommend to all Factor 2 pilots to test the behaviour after collapses themselves (during an SIV) to get their own impression.

Handling Characteristics

To optimise the handling characteristics the Factor 1 was our reference. We managed to further improve the handling behaviour: The Factor 2 is even more responsive and can be piloted very precisely. At the same time it offers enough pitch and roll stability to relax experienced pilots during long flights, as well as in turbulent conditions.

No matter if you want to fly wingovers, or if you want to stay inside a very strong thermal: The Factor 2 flies wherever you want it to move. The rather low aspect ratio and the high stability of the glider lead to a very balanced and easy handling characteristic.

Flying the Factor 2 is a lot of fun. But we also worked hard to improve the accelerated flight characteristics: The pressure to push the speed system is very small and the stability in accelerated flight is very high. This allows to comfortably use the whole speed range of the glider.

Performance

After the big performance gain, which we could achieve from Mentor 1 to Mentor 2 our goals were quite ambitious for the Factor 2, and we could finally reach them.

The Factor 2 glides clearly better than the Mentor 2 and the top speed is significantly higher.

But glide performance in general and accelerated glide performance in particular doesn't help a lot if the glider is not stable enough to fly through bumpy air without collapses. The Factor 2 excels in such conditions and cuts through turbulence with high pitch stability. Due to the small operating forces of the speed system it is easy to perform pitch corrections if necessary.

Target Group

The FACTOR 2 aims to appeal to pilots who have already gathered solid experience with lower rated gliders and want to enjoy the next level of handling characteristics and performance. The FACTOR 2 is also interesting for pilots who used to fly more demanding and who are looking for more passive safety.

Due to the outstanding performance, the FACTOR 2 is very interesting for XC pilots, who are looking for an excellent balance between performance and safety.

Pilots requirements:

The FACTOR 2 is a High Performance glider, which offers a very precise and dynamic handling behaviour. We only recommend the glider for pilots who are very well in control of certain techniques, like controlling a glider in turbulent conditions: The pilot should be able to prevent unwanted pitch or roll movement in bumpy air automaticly. If the pilot enters a strong thermal, he should intuitionally release the brakes to stop the glider from pitching backwards. When flying into sinking air, the pilot should apply more brakes.

The FACTOR 2 pilot should also be able to easily fly steep turns without unwanted pendulum movement. We think, that a pilot, who is not capable of those basic techniques will not be able to use the huge performance potential of the FACTOR 2.

To react quickly and without thinking is also necessary after collapses. We think, that this can only be achieved by training, which means by inducing collapses. (for example by attending a SIV) Training can also mean to spend some time on a training hill to work on your ground handling and take-off technique.

All this will help you, to get a better understanding of your glider and to become a better pilot.

Every pilot, who flies on their own has to be able to decide if their skills and equipment is adequate for the respective conditions. The FACTOR 2 offers a high level of safety for a pilot with proper skills, but misjudgements may still have serious consequences.

The best way to avoid misjudgements is a defensive approach to the sport. Sometimes it makes sense to pass on a flight, instead of getting yourself into conditions you cannot handle. Regular training improves your skills and enables you to enjoy your flights, even in more difficult conditions.

If you don’t meet the requirements for such a glider, you won’t be able to use the potential of the FACTOR 2. You will fly longer, further, safer and with more joy with a lower rated wing, like the MENTOR 2 for example.

Please consider these thoughts!

General information bevor implementing

First flight

Every NOVA glider has to be flown and checked through a NOVA dealer. This flight (date and pilot) has to be entered on the stabilo of the wing.

Registration

To get all warranty and service features, you have to register your glider on our Homepage. Please choose "LOGIN&REGISTRATION" and follow the advice for registration

Scope of delivery

The FACTOR 2 is shipped with a rucksack, an inner pack sack, a riserbag, the speed system, a windsock, the manual and a patch.

Modifications on the glider

Any modification (e.g. change of line lengths, changes on the speed system) causes a loss of air worthiness. We recommend that you contact NOVA before performing any kind of change.

Adjusting the length of the main brake line

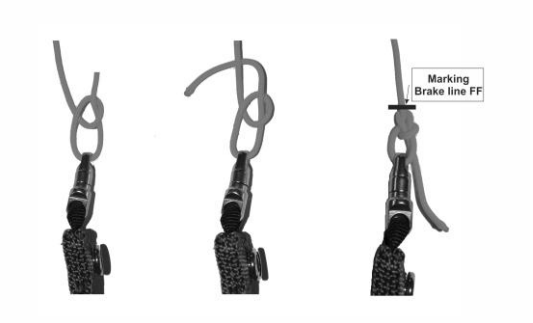
Especially if you use your glider with a motor it might be necessary to lengthen your main brake line. You have to make sure, that the length of both brakes is always the same. Further more you have to use a palstek to mount the brake handle to the brake line. (see picture below)

If you adjust the brake lengths for motor use, do not forget to shorten it again before flying the wing without a motor. Otherwise you might experience serious problems at take off.

The brake line must not be shorter than the original length. The black mark has to be always visible like shown in the picture below.

If the brake line is shorter, this might affect the safety of your glider.

Palstek



Suited harnesses

The FACTOR 2 is approved for any harness of the class "GH" (without diagonal bracing). This means almost every harness which is currently available.

The choice of the harness has a big influence on the flight characteristics of the FACTOR 2. There are harnesses which allow very effective weight shifting on the one hand, but which tip to the side in turbulences quite undamped on the other hand.

Other harnesses don't allow extreme weight shifting, but they will give the pilot a calmer feel in turbulent conditions.

A good flying school can help on this topic with individual advice.

Weight range

Each size of the FACTOR 2 is certified for a certain weight range. The weight refers to the "overall take off weight". This means the weight of the pilot, the glider, the harness and all other equipment.

If you fly the FACTOR 2 on the lower half of the weight range, the agility decreases and the glider will be more damped. In strong turbulences the wing tends to deform and to collapse slightly more than with a higher wing loading. If you mainly fly in weak conditions and you are not a fan of a very dynamic

flight behaviour, you should consider flying the FACTOR 2 in this weight range.

If you fly the FACTOR 2 on the upper half of the weight range, the agility and the stability in turbulences will increase. Also the speed will increase slightly. The self damping will decrease in turns, as well as after collapses, so if you often plan to fly in bumpy conditions and you want a dynamic flight characteristic you should go for the top of the weight range.

Flying the FACTOR 2

We suggest performing your first flights with a new wing in calm conditions to get used to the flight behaviour without any stress. We also recommend to do some take-offs on a training hill or some ground handling to get a good feeling for your glider from the very beginning.

Launch

Before every take off the pilot has to ensure that the equipment is in a proper condition, especially the glider, the harness and the reserve system.

Just before launch we recommend a check routine, which should be performed carefully. (Many accidents at take off could be avoided by a proper check!)

We recommend the following routine:

1.) Strapped up (Leg strap and chest strap on the harness and helmet strap all done up)

2.) Clipped in (Risers untwisted and connected to the karabiners, speed system attached and karabiners properly closed)

3.) Lines (A lines on top, all lines sorted, brake line unlooped between brake handle and pulley)

4.) Glider (glider lies arched with opened cell openings at take off.)

5.) Wind and airspace (wind suitable for launch and airspace in front of take off free of other gliders)

The FACTOR 2 has a very well balanced and easy take off behaviour. Corrections are easy to perform at any time and no special advice is needed for forward or reverse launches.

A proper take off technique can only be learnt by intensive training. That's why we recommend to spend some time on a training hill every once in a while. Also some ground handling will improve your take off skills. The best thing is to have an experienced pilot with you who can help with some advice.

Like this, you will soon be able to launch your glider confidently, even in difficult conditions. This will add a lot of safety to your flying and it allows you to enjoy your flights from the very beginning.

Normal flight

If you release both brakes ("Hands up") the FACTOR 2 glides at the so called "trim speed". At this speed, the glide ratio reaches its maximum.

If you fly into a headwind or through sinking air, you should use the accelerator to maximise your glide ratio. If you use the accelerator in turbulent conditions, you have to consider more demanding reactions in the case of a collapse. So you should keep more distance from the ground if you fly accelerated.

If you fly in strong turbulences we recommend applying both brakes slightly. This increases the stability and you get good feedback through the brakes, which is necessary to fly your wing actively.

Flying actively means permanent control and correction of the angle of attack in turbulent air. If you fly from lift into an area of sinking air, the angle of attack will decrease and the wing will pitch down. A good pilot will realise this even before the wing pitches down, by a reduced brake pressure. The right reaction would be to apply the brakes more and thereby increase brake pressure to prevent the wing from pitching down or even from collapsing in turbulent conditions.

Flying from sinking air into lift is just the opposite: Without any pilot action, the angle of attack would increase and the wing would pitch up. The pilot can feel this, by an increased brake pressure. In this situation, the pilot should release the brakes to reduce the pitch movement.

To generalize:

If the brake pressure decreases and if the wing pitches down, the pilot should apply more brakes. If the brake pressure increases and if the wing pitches up, the brakes should be released.

With proper active flight control, the pilot can avoid most of the collapses and keep control in every moment. The best way to learn this is of course flying, but ground handling definitely helps to improve the feeling for the glider. A good training exercise is to stabilise the wing above your head with the brakes, without looking at it. This helps as well for improving the forward launch.

Turning

A smooth turn is an interaction of inner brake, outer brake and weight shifting. The difficulty is finding the right amount, which is important if you want to climb efficiently in thermals.

The FACTOR 2 turns quite sensitively, so only small inputs are needed for performing precise turns. Tight and quick turns or fast changes of turning direction without unwanted pendulum movement are quite complex and take some training. It should be the goal of every pilot to master these skills perfectly.

Attention:

If you can't use the brakes for steering the glider you can use the C-risers instead. (This might be necessary for example, if the brake lines tangled up due to a bad pre-launch check or less likely, if the main brake line tears).

The FACTOR 2 can be turned quite well with the C-risers combined with weight shifting. You can also land the glider nice and smooth just with the C-risers. Don't pull the C-risers too much, to avoid a deep stall!

Landing

Landing the FACTOR 2 is very easy. In turbulent conditions we recommend applying brakes (approximately 20% of the available brake travel) during the whole approach. This will increase the stability of the glider and the feeling of the wing.

Just before touch down you should apply more brake. Many times it makes sense to induce a stall.

Attention: A deep stall in just 2 meters height can cause a quite violent touch down. Make sure to not fully apply the brakes until you are close enough to the ground.

Manoeuvres for fast decent

Big ears

To do big ears, pull the outer A-line (attached on a separate belt) on both sides. Keep the brake handles (without extra wraps) in your hands.

As long as you keep both outer A-risers pulled, the wingtips will be folded and the sink speed will increase. We recommend to additionally push the speed bar to increase the sink speed further and to also increase forward speed. The drag of the folded wingtips increases the angle of attack. By pushing the speed bar, this effect is compensated.

To end the manoeuvre, release the A-risers. If the wingtips don't open automatically, you can inflate them by applying the brakes with a short impulse movement.

B-Stall

Due to the aspect ratio of the glider and due to the suspension layout, the FACTOR 2 can show a quite demanding behaviour when executing the B-Stall. But a manoeuvre for fast decent has work perfectly in very turbulent conditions. That's why we do not recommend the B-Stall with the FACTOR 2.

Deep spiral

The deep spiral is the most demanding of the three manoeuvres. (Ears, B-Stall and Deep Spiral) You should only practise it with a lot of altitude. The best way is to learn it under professional guidance.

Entering a deep spiral can be divided into two phases:
First, you fly a turn by applying one brake and by shifting your weight to the same side, the glider will bank up and increase its turning speed. This phase ends at a sink rate of roughly 8m/s – 10m/s. (depending on the wing loading)

Then at the beginning of the second phase the g-forces increase rapidly and the leading edge will lean towards the ground. In a fully developed deep spiral, the leading edge is almost parallel to the ground. The maximum sink rate with the FACTOR 2 can get up to 25m/s and more.

The first attempts to fly a deep spiral should be stopped clearly before reaching the second phase to get used to the quick rotation and to practice the exit without pendulum swinging. The exit should be performed by simply releasing the inner brake with a neutral weight-shift. The FACTOR 2 will then decrease its bank angle and go back to normal flight. To avoid a pendulum movement, the inner brake has to be pulled in the moment the wing wants to reduce its bank rapidly.
By applying the inner brake again, you force the glider to exit the spiral movement not rapidly but during two or three rotations. It is very important to master this exercise before continuing to the second phase of the deep spiral.

The pilot will feel the entering of this phase by the suddenly increased g-force. In this moment, the pilot is being pushed to the outer side of the harness. It is important to not counteract. So the pilot should lean to the outer side to avoid a stable spiral. (See below)

If the pilot weight shifts to the outer side, the spiral movement will get slower as soon as the pilot releases the inner brake. The rest of the exit works as explained above for the first phase of the deep spiral.

If the pilot shifts his weight clearly to the inner side, the FACTOR 2 might stay in a deep spiral, even when releasing both brakes. In this case, it helps to apply the outer brake, or both brakes and of course to shift the weight to the outer side.

Please don't underestimate the difficulty of learning the deep spiral. The sink rates are a lot higher than what you are used to from other manoeuvres and the fast rotation might lead to disorientation. The high g-loads of up to 3g make the manoeuvre even more demanding as you might have problems like the so called "black out", where you temporarily lose your vision due to the g-load. It is very important to get a feeling for the reactions of your body to this manoeuvre.

If you practice it well, it is a fun manoeuvre that enables you to loose height faster than with any other manoeuvre.

C-Stall

This manoeuvre can be found sporadically in some paragliding literature. We don't recommend it, because entering and exiting the C-stall can be very demanding and dangerous for many pilots.

Collapses

Asymmetric collapse

If you fly in strong turbulences, one side of the glider might collapse. This happens if one side of the wing doesn't produce lift anymore, due to a low angle of attack. If there is no lift, the lines get loose and the wing deforms or collapses.

Most of these collapses are rather small – they only affect a small part of the wingspan. In such a case, the FACTOR 2 continues to fly almost unaffected. If the collapse affects 50% of the wingspan or more, the wing will react considerably:

Due to the increased drag of the collapsed wing, the glider will turn to the collapsed side. Furthermore, the glider will pitch down because of the increased wing loading. (The glider has to increase its speed because of the reduced area – that's what causes the pitching down.)

The pilot can prevent the glider from pitching and turning, by applying the brake on the non collapsed side of the wing. If a collapse occurs close to the ground it is essential to react properly. The proper reaction should be taught at high altitude, ideally under professional guidance.

As explained above, most of the collapses can be prevented, if you fly actively!

Front tuck

A front tuck occurs, if the angle of attack gets too low on the whole wingspan, then the whole leading edge will collapse. After the asymmetric tuck, the FACTOR 2 will go back to normal flight automatically. The pilot can expedite the opening process by slightly applying both brakes.

Stall manoeuvres

Spin

If you pull one brake too much, you might induce a so called spin. The centre of rotation is no longer far outside the wing (like during a normal turn), but it moves inside the wing. Furthermore the rotation speed increases. The FACTOR 2 will go back to normal flight, if the pilot releases both brakes. The FACTOR 2's spin behaviour is easily manageable: It takes a lot of brake travel to induce the spin, and then the pilot has quite some time to react and release both brakes.

Fullstall

If you pull both brakes too far, the wing will perform a so called full stall. The wing suddenly stops its forward motion, but the pilot is still moving forward. So from the pilots view, the glider will tilt backwards. It is very important to not release the brakes in this moment. Otherwise the glider might surge forward below the pilot.

The Full Stall is a complex manoeuvre and the perfect execution can not be explained in this manual. If you want to learn a proper full stall, it makes sense to do this under professional guidance.

The available brake travel before stalling the wing depends on the size. It is approximately 50 cm for the FACTOR 2 XS, 53cm for the FACTOR 2 S, 58cm for the FACTOR 2 M, and 62cm for the FACTOR 2 L.
Those numbers are just a rough indication. (The publication of the brake travel is claimed by the EN 926.)

It would be dangerous to use the brake travel according to those numbers, because it is not practicable to measure the brake travel during flight, and in turbulences the stall might occur with less brake travel. If you want to use the whole brake travel of your glider safely, it is necessary do many intended spins and full stalls to get a feeling for the stall behaviour.

Deep/Parachutal stall

The Deep Stall, or Parachutal Stall is kind of the pre stage to a Full Stall. The wing has no forward motion and a high sink speed, but it is almost fully inflated. The pilot can enter the Deep Stall by applying both brakes. It is very difficult to keep the wing in a Deep Stall: If you pull the brakes a little too

much, the glider will enter a Full Stall. If you release the brakes too much, the glider will go back to normal flight. To practice a Deep Stall, it is necessary to master the Full Stall first.

A very old or worn out glider with a porous cloth or with a changed trim (due to many winch launches, or deep spirals) might stay in a deep stall even after releasing both brakes. Do not apply the brakes in such a situation, because the wing would then enter a full stall ! You can exit the deep stall by pushing the speed bar, or by simply pushing the A-risers forward. If you fly through rain, the risk of a deep stall is higher. We strongly advice against flying in rainy conditions. If it happens, that you get into rainfall, we recommend not performing a B-stall or Big Ears. Our recommendation is to leave the rain as soon as possible and to fly with both brakes released, or even accelerated, as this reduces the risk of a deep stall. (The available brake travel before entering a deep stall may be reduced significantly.)

Cravates

After a big collapse or after a badly executed Full Stall, a part of the wing might be tangled up in the lines, and won't reopen automatically. This is what you call a cravate. During our extensive test flights with the FACTOR 2 we never experienced a cravate but this situation cannot be eliminated with any paraglider.

In case of a cravate we recommend the following actions:

1.) Counter steer: Probably the wing wants to turn to the side of the cravate. In some cases, the turning happens quickly and will end in a stable deep spiral without the pilot's action. So it is important to react quickly by counter steering.

2.) Opening the cravate by applying the brake with an impulse movement: Some cravats can be opened with this method. It is important to keep the wing in straight flight by pulling the other brake all the time.

3.) Pulling the stabilo line: Some cravats can be opened by strongly pulling the stabilo line. (It is the orange line on the B-riser. Have a look at it or grab it every once in a while and you will be able to react quicker in a moment of danger.)

4.) Full stall: Many cravats can be opened by using the Full Stall. But of course you have to have solid experience with this manoeuvre to be able to use it properly.

5.) Induce a collapse: Sometimes it helps to induce a collapse on the side with the cravatte.

6.) Reserve: If you loose control or if you are not absolutely sure that you have enough height for further attempts to recover, immediately use your reserve!

Many pilots wait way too long before using their reserve. Some don't use the reserve at all if they lose control of their glider. We strongly recommend to at least mentally practice the use of the reserve from time to time: Grab the handle of the reserve in flight, like you would do it in case of emergency. Many clubs or schools offer to throw the rescue for example in a gym. The most realistic way of training is to use the reserve in real flight. Many SIV Clinics offer that as part of their training.

Winch launch

The FACTOR 2 is very easy to launch on the winch. You should start to climb at a flat angle.

We recommend the use of a towing device which accelerates the glider during the winch launch.

Speed system

Mounting the speed system

Most harnesses have two pulleys on each side. Some light harnesses have simple rings instead. Guide the accelerator ropes (included in the delivery) from top to bottom through these pulleys. Then fix the speed bar on the bottom of the ropes.

It is important to adjust the length correctly. If you set it too short, the glider might fly accelerated all the time, which definitely has to be avoided. If you set it too long, you might not be able to use the full accelerator travel.

We suggest adjusting the length quite long and then try to estimate the free travel in flight to shorten it after the flight.

Using the accelerator in flight

The speed system is very effective and smooth running. The glide performance is very good up to the maximum speed of the FACTOR 2. Please consider, that the wing behaves more dynamic if a collapse occurs in accelerated flight. You should be aware, that you might need more height to recover to normal flight!

Attention: It doesn't make sense to apply the brakes during accelerated flight. This will reduce the glide performance considerably, and it will make the wing more unstable. (Unlike in non accelerated flight!)

To turn, simply shift weight, or push the speed bar asymmetrically. (If you push the right side further, the wing will perform a left turn.)

You should also use the accelerator for pitch control: If the glider pitches up, push the speed bar more, if it pitches down, release the speed bar.

Measurements of the speed systems (publication required by EN 926)

If you use all the available accelerator travel, the A riser will get about 17.5cm shorter than the C riser on the FACTOR 2 S and FACTOR 2 M.

Service and maintenance

General advice

To keep your glider in good condition for many years, please consider the following advice:

- Don't expose your glider to unnecessary UV radiation – for example by leaving it on the landing site unpacked.
- Don't fold the nylon rod reinforcements at the cell openings too hard.
- If you pack the glider when it is wet or just damp, it has to be dried later. Don't leave it packed in a wet condition!

- When you practice ground handling, avoid crashing the glider hard on the ground with the leading edge, as this might lead to damage.

- Avoid unnecessary dirt or sharp stones touching the lines and the cloth. Don't step on the lines if they are laying on a stony surface!

- Humidity combined with dirt can lead to shrinking of the lines and thereby to the wrong trim on your glider. Saltwater (sweat) may damage the lines in the long run.

- To store your glider for a longer time, avoid a humid or a very hot environment. (Like in a car during hot summer days)

Cleaning

To clean the wing, only use water and a cleaning cloth. Never use any solvents. If there is sand, dirt or small stones inside the canopy, you should remove them because they will damage the coating of the cloth and the seams in the long run.

Repair

Repairs may only be performed by authorised service centres or by NOVA.

You can repair small holes or tears in the cloth (smaller than 5cm) yourself with a special self adhesive repair tape. (You can order it at NOVA or in any service centre.) If you are not sure about the damage, or if the damage affects parts of a seam, please contact NOVA. (info@nova-wings.com)

Check

We suggest a trim inspection (Nova Trim Tuning NTT) in the first year after the date of purchase. In the case that the NTT is done, the next full check (NFS: NOVA full service) has to be performed 3 years after purchase.

In the case that the NTT is not done, the wing needs a full check after 2 years after purchase. The check expert can define the next check interval on the basis of the wing's condition. In areas where conditions are harsh on the material (i.e. by salty air and sand next to the coast), an annual complete check (NFS) is strongly recommended!

The date of purchase of the new glider is decisive for any deadline concerning NTT and NFS, as well as for guarantee.

Attention: In the case of commercially used gliders, (tandems or school gliders) the NFS has to be performed every year.

Independent from the deadlines mentioned above:
A check (NFS) has to be performed not later than every 200 hours of flight, or every 400 flights. (Depending on what happens first.)

The check has to be confirmed with the check-stamp on the stabilo. All necessary documents for the inspection can be found on the NOVA homepage (http://www.nova-wings.com): Downloads: Check.

More information about our check system:
http://www.nova-wings.com/english/info_zone/ntt.html

Environment friendly behaviour

Apart from self-evident things, like not leaving your rubbish behind, we would like to appeal for a thoughtful behaviour towards animals, like birds of prey or game animals. If you notice, that your fly by affects those animals (like causing a shortening reaction) please increase your distance.

Disposal

Disused paragliders need a proper disposal. If you are not sure about the correct removal, please send your glider to NOVA.

Technical data

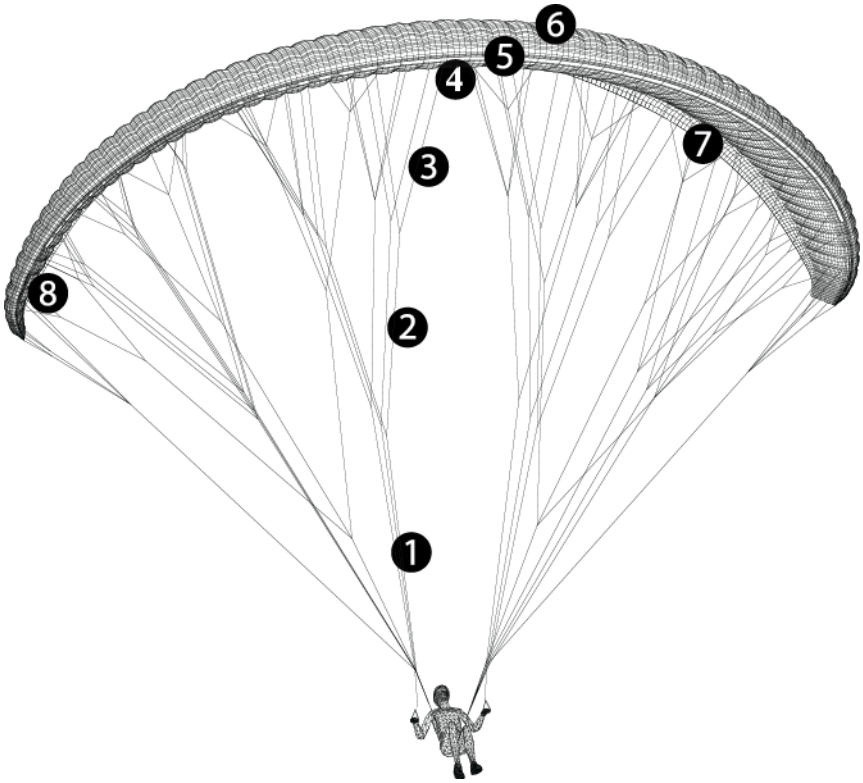
Size		XS	S	M	L
Zoom factor		0.91	0.96	1	1.045
Number of cells		63	63	63	63
Projected wingspan	**m**	8.78	9.27	9.65	10.09
Projected surface area	**m²**	18.2	20.3	22	24.1
Projected aspect ratio		4.23	4.23	4.23	4.23
Flat wingspan	**m**	11.47	12.10	12.61	13.17
Flat surface area	**m²**	21.83	24.3	26.36	28.79
Flat aspect ratio		6.03	6.03	6.03	6.03
Line diameter	**mm**	0.6 / 0.7 / 0.8 / 1.1 / 1.3 / 1.7			
Line length	**m**	6.64	7.01	7.3	7.63
Line consumption	**m**	233	246	256	268
max. profile depth	**m**	2.38	2.52	2.62	2.74
min. profile depth	**m**	0.6	0.64	0.66	0.69
Weight	**kg**	5.3	5.8	6.3	6.8
Legal take of weight LTF/EN[1]	**kg**	65-90	80-100	90-110	100-130
Places		1	1	1	1
Certification LTF/EN		(C)	**C**	**C**	(C)

[1] Pilot + total equipment

Overview risers

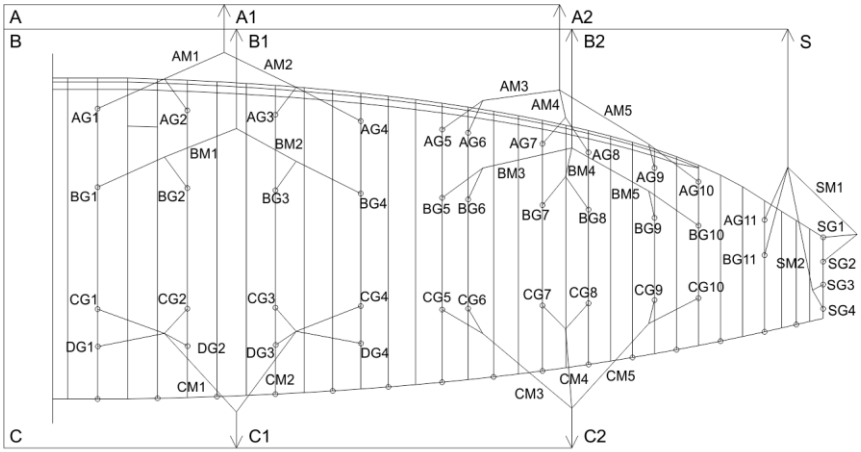
1	A1-riser	**5**	Main suspension loop
2	A2-riser (EARS)	**6**	Speed clips
3	B-riser (B-Stall)	**7**	Shackle
4	C-riser	**8**	Brake handle

Overview Glider



1	Stem Lines	**5**	Cell Openings
2	Middle Lines	**6**	Top sail
3	Top Lines	**7**	Trailing edge
4	Bottom sail	**8**	Nameplate

Line plans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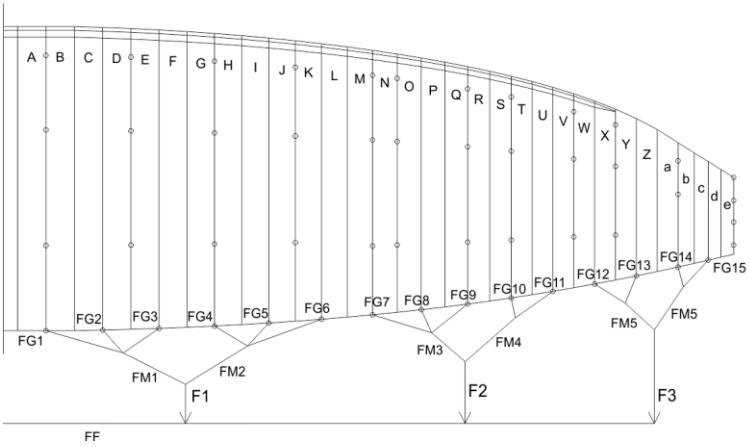
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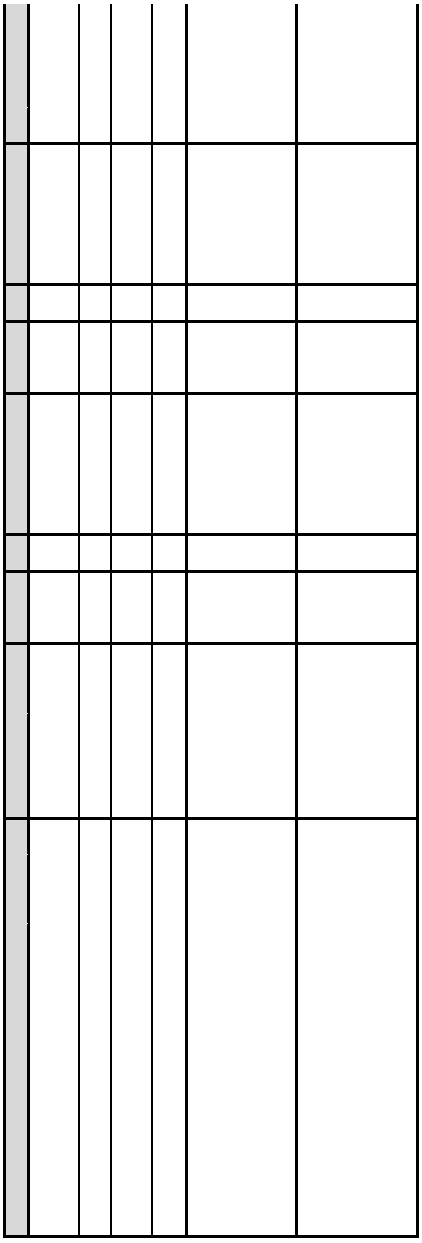
FG10
FG11
FG12
FG13
FG14
FG15
FM1
FM2
FM3
FM4
FM5
FM5
F1
F2
F3
FF

Line lengths

	Factor 2				Linetype	Linetype Factor2 L
	XS	S	M	L		



Over all line lengths

You can find the overall line lengths (from the shackle to the loops on the bottom sail) on the homepage of the Para-Academy. (www.para-academy.eu) Please note, that you can not calculate the over all length, by just adding the single line lengths listed above!

Check instruction

Introduction

The NOVA Full Service – NFS (complete check) and the **NOVA Trim Tuning NTT** (trim check) shall ensure the flight safety of the paraglider.

Personel requirements for performing a check

Only check centers, which are authorised by NOVA may carry out checks. You can find all authorised persons / check centre on our homepage: www.nova-wings.com/english/nova/checkcenter.html
If you have questions about checks in your country, you can either contact NOVA (info@nova-wings.com), or the NOVA distributor in your country: www.nova-wings.com/english/nova/distributors.html

Necessary documents and devices for performing a check

- Line plan: www.nova-wings.com/english/downloads/lineplans.html
- List of material: www.nova-wings.com/english/downloads/check.html
- Previous NFS check protocols (if you don't perform the first NFS on the glider)
- Line measurement device (Laser telemeter and a special device to ensure measurement with constant line load – ask NOVA for further information)
- Porosity meter (Kretschmer or JDC)
- „Betsometer" for checking the cloth strength.
- Line tear machine according to EN926-1:4.6.3
- Maintenance and calibration documentation of all the measurement devices.

Check intervall

We schedule a trim inspection (NOVA Trim Tuning NTT) within the first year after the date of purchase (new glider) In the case that the NTT is not done, the wing needs a full check after 2 years after purchase (new glider). The check expert can define the next check interval on the basis of the wing's condition. In areas where conditions are harsh on the material (i.e. by salty air and sand next to the coast), an annual complete check (NFS) is strongly recommended! We recommend the same for wings which are used for regular acro flying.
The date of purchase of the new glider is decisive for any deadline concerning NTT and NFS, as well as for guarantee.
Attention:
In the case of commercially used gliders, (tandems or school gliders) the NFS has to be performed every year.

Independent from the deadlines mentioned above:

A check (NFS) has to be performed not later than every 200 hours of flight, or every 400 flights. (Depending on what happens first.)
The check has to be confirmed with the check-stamp on the stabilo. All necessary documents for the inspection can be found on the NOVA homepage (http://www.nova-wings.com): Service & Downloads

Performing the Check

Identifying the glider

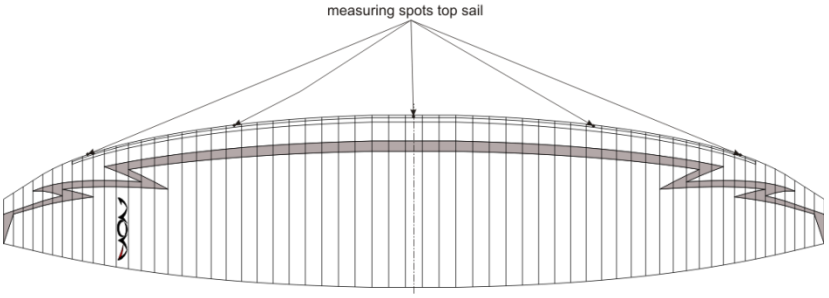
The glider type and the serial number of the glider can be found on the wing tip. Please ensure that the certification tag is on the middle rib of the wing.

Checking the porosity

The porosity check has to be performed on 5 spots on the top sail. These spots have to be clean (no sand, no dust) and without damage (e.g. small holes). Otherwise the result would be falsified.
The average value on the top sail has to be used to judge the gliders condition. If one value is a lot lower than the other values, please repeat the measurement and move the measurement spot slightly.

Evaluation of the measurements for the top sail:

JDC	Kretschmer	Evaluation
15-30	50-100	Strongly used
<15	<50	Not sufficient



If the result is “strongly” used, this has to be recorded in the check protocol. In this case, the next check has to be scheduled one year later.
If the result is “not sufficient” the glider looses its airworthiness. This has to be recorded in the check protocol as well.

Checking the cloth strength

Checking the cloth strength is carried out with the so called betsometer on one spot on the top sail and on one spot on the bottom sail. Both spots should be chosen in the middle of the wing (front section). If the cloth tears at a load of 600g, the strength is not sufficient and the glider looses its airworthiness. If the cloth does not tear at 600g the glider passes and the test shall be aborted. The result has to be entered in the check protocol.

Visual inspection of the canopy

The canopy has to be checked for damages which might affect the airworthiness of the glider. This contains damages on the top sail, the bottom sail, the ribs, the diagonal ribs and all seams. (Especially in the area of the cell openings, as well as the seams of the suspension loops on the bottom sail.)
Small tears and holes (up to about 5cm) on the top- or bottom sail can be repaired with “NOVA adhesive repair tape”. If the tear is bigger than 5cm or if it is close to a seam, the repairing has to be carried out by NOVA or by an accredited repair centre. (Same for damages on the ribs, or diagonal ribs.)
Every damage and repairing has to be entered in the check protocol.

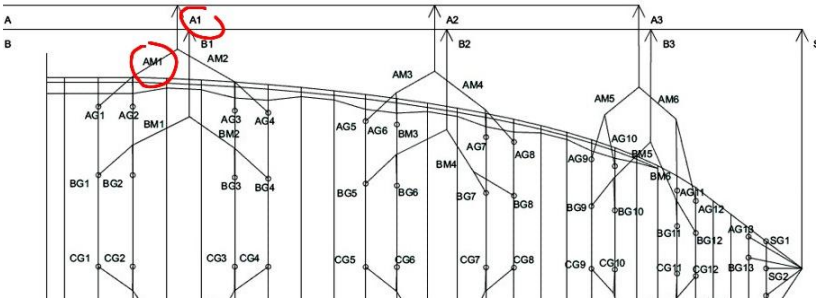
Check of the line condition

The paraglider has to be spreaded and every single line has to be checked. The lines have to by manually scanned on their whole length. If you detect a damage, on the coating or on the core, the line has to be replaced. Furthermore the sewing and the line loops have to be controlled.
Every damage and repairing has to be entered in the check protocol.

Measuring the line strength

The ripping test has to be carried out at the first NFS. (so 2, or 3 years after purchase)
How to perform the ripping test:
One lower line and one mid line have to be ripped. The A-lines in the centre of the wing are the ones with the most loads in flight, so you have to rip the A1 and the A1M (inner mid line).

Attention: If a glider has just two line levels, (only lower lines and top lines, e.g. Mentor 2) the ripping test has to include the top level. The strength of the top line has to meet the criteria which are required for the mid lines on a glider with three line levels. (See explanation below)
In other words: If there are just two line levels, the top lines have to be treated the same way, like the mid lines on a glider with three line levels.



If you check an old glider, make sure, you don't rip a line, which has been replaced in a former ripping test!
To avoid that a priori we recommend, ripping the A1 lower line, and A1M mid line on the right side for the first ripping test. For the next test, rip those lines

on the left side. Then A2, and A2M on the right. Then those lines on the left, and so on …
Further more you have to enter the ripped lines and the breaking load in the check protocol!
The ripping test has to be performed with a special machine and with a feed of 1m/min. (see EN 926-2:4.6.3)
If one of the ripped lines doesn't meet the requirements, all lines on the glider have to be replaced. You can find the requirements in the table below.
Before tearing the length of the lines has to be measured. The torn lines have to be replaced. Please find the used line materials and the correct seam pattern on our homepage:
http://www.nova-wings.com/english/downloads/check.html
http://www.nova-wings.com/download/files/line_sewing_new.pdf
The braking strength has to be noted in the check report.

Gliders with Dyneema lines on all A-lines and B-lines

The ripping test doesn't have to be carried out at the first NFS (so 2, or 3 years after purchase), because Dyneema (PPSL) lines don't loose much strength in normal use. That's why the ripping test doesn't have to be carried out before the second NFS.
But we recommend performing a ripping test at the first NFS if:

- if the wing is used for acro flying regularly
- if the lines got in contact with salt water, or if the glider was used a lot in salty air
- if the lines got in contact with sweat a lot (e.g. school gliders on the training hill, due to sweaty hands)
- if the glider was exposed to sand for a lot of time
- if the glider was exposed to heat (> 50°C, e.g. in a car) for a long time

Minimum required strength for the lower and mid lines

	max. Startgewicht	Reißfestigkeit pro Stammleine 8g	Reißfestigkeit pro Stammleine 10 g	Reißfestigkeit pro Mittelelement 8g	Reißfestigkeit pro Mittelelement 10g
2 Stammleinen = (8A/B) (Syntax;Primax;Rookie;Ra...)	60 kg	75 daN	90 daN	45 daN	54 daN
	65 kg	81 daN	98 daN	49 daN	59 daN
	70 kg	88 daN	105 daN	53 daN	63 daN
	75 kg	75 daN	94 daN	45 daN	56 daN
	80 kg	80 daN	100 daN	48 daN	60 daN
	85 kg	85 daN	106 daN	51 daN	64 daN
	90 kg	90 daN	113 daN	54 daN	68 daN
	95 kg	95 daN	119 daN	57 daN	71 daN
	100 kg	100 daN	125 daN	60 daN	75 daN
	105 kg	105 daN	131 daN	63 daN	79 daN
	110 kg	110 daN	138 daN	66 daN	83 daN
	115 kg	115 daN	144 daN	69 daN	86 daN
	120 kg	120 daN	150 daN	72 daN	90 daN
	125 kg	125 daN	156 daN	75 daN	94 daN
	130 kg	130 daN	163 daN	78 daN	98 daN
	190 kg	190 daN	238 daN	114 daN	143 daN
	220 kg	220 daN	275 daN	132 daN	165 daN
	240 kg	240 daN	300 daN	144 daN	180 daN
3 Stammleinen = (12A/B) (X-act,Pheron,Mentor...)	60 kg	40 daN	50 daN	24 daN	30 daN
	65 kg	43 daN	54 daN	26 daN	33 daN
	70 kg	47 daN	58 daN	28 daN	35 daN
	75 kg	50 daN	63 daN	30 daN	38 daN
	80 kg	53 daN	67 daN	32 daN	40 daN
	85 kg	57 daN	71 daN	34 daN	43 daN
	90 kg	60 daN	75 daN	36 daN	45 daN
	95 kg	63 daN	79 daN	38 daN	48 daN
	100 kg	67 daN	83 daN	40 daN	50 daN
	105 kg	70 daN	88 daN	42 daN	53 daN
	110 kg	73 daN	92 daN	44 daN	55 daN

	115	kg	77	daN	96	daN	46	daN	58	daN
	120	kg	80	daN	100	daN	48	daN	60	daN
	125	kg	83	daN	104	daN	50	daN	63	daN
	130	kg	87	daN	108	daN	52	daN	65	daN
	140	kg	93	daN	117	daN	56	daN	70	daN
	150	kg	100	daN	125	daN	60	daN	75	daN
	160	kg	107	daN	133	daN	64	daN	80	daN
	170	kg	113	daN	142	daN	68	daN	85	daN
	180	kg	120	daN	150	daN	72	daN	90	daN
	190	kg	127	daN	158	daN	76	daN	95	daN
	200	kg	133	daN	167	daN	80	daN	100	daN
	210	kg	140	daN	175	daN	84	daN	105	daN
	190	kg	127	daN	158	daN	76	daN	95	daN
	220	kg	147	daN	183	daN	88	daN	110	daN
	235	kg	157	daN	196	daN	94	daN	118	daN
	250	kg	167	daN	208	daN	100	daN	125	daN

4 Stammleinen = (16A/B) (Philou..)	60	kg	30	daN	38	daN	18	daN	23	daN
	65	kg	33	daN	41	daN	20	daN	24	daN
	70	kg	35	daN	44	daN	21	daN	26	daN
	75	kg	38	daN	47	daN	23	daN	28	daN
	80	kg	40	daN	50	daN	24	daN	30	daN
	85	kg	43	daN	53	daN	26	daN	32	daN
	90	kg	45	daN	56	daN	27	daN	34	daN
	95	kg	48	daN	59	daN	29	daN	36	daN
	100	kg	50	daN	63	daN	30	daN	38	daN
	105	kg	53	daN	66	daN	32	daN	39	daN
	110	kg	55	daN	69	daN	33	daN	41	daN
	115	kg	58	daN	72	daN	35	daN	43	daN
	120	kg	60	daN	75	daN	36	daN	45	daN
	125	kg	63	daN	78	daN	38	daN	47	daN
	130	kg	65	daN	81	daN	39	daN	49	daN

8G

The breaking load of the line equates to the LTF threshold. The lines should be replaced, because the strength of the lines would soon be below the LTF limit.

If the breaking load is in between 8g and 10g we strongly recommend scheduling the next NFS after just one year instead of two. If the wing is used for Acro flying or for more than 100hours a year, the lines have to be replaced.

> 10G

The breaking load is well above the LTF limit of 8 G. For normal use (less than 400 flights and 200 hours per 2 years, no Acro) we recommend the next NFS after two years.

Note:

The values in the table above for the mid lines are valid for all gliders which have two mid lines per lower line. For gliders with three mid lines per lower line (e.g. Carbon) you have to calculate the strength limit as follows:
Get the value for the lower line from the table and divide it by three. Then multiply this value by 1.2 to get the strength limit for the mid line. For example:
If the limit for the lower line is 120 daN, the limit for the mid line (in case of three mid lines) is 48 daN. = (120 / 3) * 1.2

If you want to perform a ripping test on the top lines (not obligatory), the calculation is as follows: Multiply the max. Take-off weight by the G-load. Then divide this value by the number of all A and B top lines. (no stabile lines!) This value has to be multiplied by 1.2.

For example:
Maximum take-off weight=110kg
Number of A & B top lines=40
Necessary G load= 10g

Minimum strength= [(110*10)/40]*1.2=33 daN

Checking the risers

The risers have to be checked for abrasion and damage, especially on the main suspension loop, on the seams, and on the shackles. The shackles have to be tightened properly. Damaged or missing o-rings have to be replaced. Also check the speed system for damages. Make sure, that the length of the speed systems rope is sufficient: The A-riser must not be shortened, if you stretch all risers.
A damaged riser has to be replaced by a new one.

Measuring the line lengths

The measurement of the lines has to be performed with a special measuring device (see Necessary documents and devices for performing a check) and our own Software. (see www.nova-wings.com/english/info_zone/ntt.html). With this software and our computer online system (COS) all relevant data is recorded and saved on a server.

To use this system, you have to get a proper introduction at NOVA International. Then you will get the access to our online system. (Find a list with all authorized persons and check centres here: (www.nova-wings.com/english/nova/checkcenter.html)

Documentation

After performing the check, the check sheet has to be saved on the computer. Then a protocol will be generated automatically, which has to be printed and handed to the costumer.
The NFS has to be entered on the glider. (As well as the date of the next NFS)

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