

EN

Gravij2

MANUAL

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Congratulations on buying your
GRAVIS2
and welcome to the family
of ICARO - pilots!

Before you get to know your glider please read the manual, there is important information inside.

Your GRAVIS2 is pattern tested in B.

Therefore, the glider is a “paragliders are with good passive safety and forgiving flying characteristics and fairly resistant to abnormal behaviour at flight. It is suitable for all pilots including pilots of all levels”.

The flight maneuvers during the certification process should not be overrated. Certification results provide only little information when you flying in thermically active and turbulent air because the glider classifications serve to inform solely with regard to the performance of a paraglider during extreme flight maneuvers in stable air conditions.

The Gravis 2 in the sizes M, ML and L also fulfilled the DGAC criteria and can therefore be used as a motor-driven paraglider (PPG).

The use of this paraglider is entirely at your own risk.

It may be only used for those purposes described in this manual.

It is strictly prohibited to fly the GRAVIS2

- ***under the influence of drugs or alcohol,***
- ***in insufficient experience or training of pilots,***
- ***without guilty license,***
- ***beyond the minimum and maximum recommended Take Off- Weight,***
- ***with damaged glider, lines, risers or harness***
- ***in the rain, in snow, in the clouds and fog and in turbulent weather conditions,***
- ***with motor drive (except size M, ML and L)***
- ***tandem- flying and Aerobatics.***

The trimmers may not be used to increase the speed in flight **without motor**, otherwise the EN type test is no longer valid. Only the accelerator is to be used for this.

The GRAVIS 2 with the motorized risers may only be used for flights **without motor** if the riser is attached to the lower attachment point, the trimmers are closed and the straps A, A1, B and C are the same length.

If you cannot keep your glider under control use the rescue system in good time. Always pay attention to ground distance.

Our products are made with great care and state of the art. Each glider before it is delivered to the dealer or flight school is checked by ICARO paragliders (incoming test). This date is entered in the identification plate and as well guarantee as the first 2-year-check period starts. The incoming test must also be documented in the manual. Test flights are made only on a random basis.

On that score an approved ICARO dealer or teacher of the flight school must inflate a new ICARO paraglider in the wind or should carry out the first flight before the wing is handed over to you. This date is entered in the identification plate and as well warranty as the first 2-year-check period starts. If this seal is missing, it must be assumed that this glider is not identical in construction with the model tested at the specification center.

The use of this paraglider is entirely at your own risk. Every pilot bears the responsibility of his/her own safety.

In order to get to know your glider, we recommend that you practice with your glider on the ground. Pulling up in flat gradients is great practice for fine tuning your launch techniques. Here you can get to learn the reactions of your glider without any stress and hectic. Ground practice pays off in the air.

All technical data and instructions were drawn up with great care. ICARO paragliders cannot be made responsible for any possible errors in this manual.

Important information in this manual is written in ***fat cursive writing***.

Any important changes to this manual will be published in our homepage (www.icaro-paragliders.de).

Should you decide to sell this glider at a later date, please pass on this manual to the new owner.

Each alteration of the glider (lines, canopy, and riser) is dangerous and reactions of the glider are not predictable. Your glider will lose its pattern test result and guarantee.

You can only fly your glider with a valid flying license and in accordance with local rules and regulations.

The manufacturer or distributor assumes no responsibility for accidents occurring while using it.

Every pilot must ensure that the glider is properly checked at regular intervals.

Many countries have specific regulations or laws regarding paragliding activity. It's your responsibility to know and observe the regulations of the region where you fly.

Environmental aspects:

The materials of which a paraglider is made require a special waste disposal. So please send disused gliders back to us. We will care about a professional waste disposal without costing for you.

Please do our nature-near sport in a way which does not stress nature and environment! Please do not walk beside the marked ways, do not leave your litter, do not make unnecessary loud noises and respect the sensitive balance in the mountains.

Especially at the launch site consideration is needed!

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To get to know your GRAVIS2

| Allowed for training | | | no | | | |
|---|-----------|---|----------|---------------|-----------------|------------------|
| Certified / allowed for flying with passengers | | | no/ no | | | |
| Certified / allowed for towing | | | yes/ yes | | | |
| Certified / allowed for aerobatics | | | no/ no | | | |
| Certified / allowed for flying with motor drive (only size M, ML and L) | | | yes/ yes | | | |
| Technical data | | XS | S | M | ML | L |
| Categorie EN / LTF | | B | B | B | B | B |
| Number of cells | | 42+40 | 42+40 | 42+40 | 42+40 | 42+40 |
| Number of risers | | 3+1 | 3+1 | 3+1 | 3+1 | 3+1 |
| Length of risers | mm | 520 | 520 | 520 | 520 | 520 |
| Weight of the glider | kg | 3,9 | 4,1 | 4,2 | 4,4 | 4,6 |
| Wing Area flat | m² | 22 | 24 | 26 | 28 | 30 |
| Wing Area projected | m² | 18,75 | 20,45 | 22,15 | 23,85 | 25,57 |
| Wing Span flat | m | 10,9 | 11,4 | 11,9 | 12,3 | 12,7 |
| Wing Span projected | m | 8,5 | 8,9 | 9,3 | 9,8 | 10,2 |
| Aspect Ratio | | 5,4 | 5,4 | 5,4 | 5,4 | 5,4 |
| Aspect Ratio projected | | 3,9 | 3,9 | 3,9 | 3,9 | 3,9 |
| Standard take off weight | kg | 60-75 | 70-85 | 80-95 | 90-105 | 100-125 |
| Extended take off weight | kg | 75-85 | 85-90 | 95-105 | 105-115 | 125-135 |
| Certified take of weight. | kg | 60-85 | 70-90 | 80-105 | 90-115 | 100-135 |
| Maximum way of the accelerator | mm | 135 | 135 | 135 | 150 | 150 |
| DGAC Homologation | | ----- | ----- | yes | yes | yes |
| DGAC Weight range (PPG) | kg | ----- | ----- | 80-110 | 90 - 120 | 100 - 140 |
| Length of motor risers | mm | ----- | ----- | 520 | 520 | 520 |
| Trimmer | | ----- | ----- | yes | yes | yes |
| Maximum way of the trimmer | mm | ----- | ----- | 100 | 100 | 100 |
| Accelerator | | ----- | ----- | yes | yes | yes |
| Maximum way of the accelerator | mm | ----- | ----- | 80 | 80 | 80 |
| Maximum power | kW | ----- | ----- | 30 | 30 | 30 |
| Recommended storage temp. | Celsius | + 5 ⁰ to + 30 ⁰ | | | | |
| Recommended storage humidity | % rel. LF | 55% bis 75% | | | | |
| Check interval | | 24 months or 150 operating hours, depending on what occurs sooner. | | | | |

The GRAVIS2 is a single-seated paraglider with a maximum of passive safety and a forgiving flight behavior. It is a symbiosis of safety, performance and dynamics, making it ideal for stress-free flying. He is neither suitable for aerobatics nor pattern tested.

The modern internal structure and the new high-performance material minimize the weight, making the GRAVIS 2 also ideal for hike and fly.

With the GRAVIS2, the profile and sail tension have been fundamentally reworked, resulting in a high pitch stability and directional stability. The modern internal construction minimizes the weight, the additional miniribs in the front edge double the number of cells in the flow-critical area.

In terms of performance and safety, the GRAVIS2 is the most balanced paraglider in the ICARO range. Especially in accelerated flight, it convinces by a manageable extreme flight behavior and an exceptional gliding for this class.

The GRAVIS2 has been pattern tested in all sizes in an extended weight range, allowing a seamless transition from one size to another for each body weight.

In the recommended weight range established by us on many flights, the GRAVIS2 has the optimum ratio of speed, ascent, safety and overall performance in all flight conditions.

The GRAVIS2 in sizes M, ML and L was subjected to the DGAC criteria and approved as a motorized paraglider. You can find additional information about flying with a motor under a separate article.

Canopy

Sharknose profile, miniribs at the trailing edge and the rods in the profile nose are nothing new.

However, what differentiates the GRAVIS2 from its predecessor are the cloth material used, which reduces the weight even further, the optimized suspension points on the A-level, a completely new calculated performance profile and a further improved wind up and flair behavior. The openings on both sides of the canopy facilitate cleaning the cap inside.

The advantages that result from this profile for the pilot are:

- The glider will stall later and gives the pilot greater control leash area,
- in high speed flight profile has a higher dimensional stability than the conventional profiles and
- the reduced air resistance also brings a better gliding and climbing performance.

Lines

The entire line system is formed from individual lines, which are sewn and looped at both ends. The lines and stitching are subject to rigorous production controls, to ensure high and consistent manufacturing quality.

The end control of all line lengths is documented for all paragliders produced by ICARO paragliders. The complete geometry of the lines and the lengths is shown on the single line plan, which you find in the annex of the manual.

The GRAVIS2 is delivered from the factory with the best brake position for most pilots. But tall or short pilots, or those with a harness with non-standard attachment points might consider it necessary to change the position of the brake handles.

If the brakes are to be shortened, it is extremely important to avoid the adjustment affecting the glider's trim speed. There must always be some slack in the brakes when they are fully released. This can be checked with the glider inflated above the pilot's head. There should be a noticeable bow in the brake lines, and the brakes should be having no effect on the shape of the trailing edge.

If the brake lines are to be lengthened, it is important to ensure that the pilot can still stall the canopy (i.e. during extreme manoeuvres or landing) without the need to take wraps.

If you need to change the brake line lengths, do it maximum 5 cm at a time, and check it at an easy training hill. Check especially that both lines are the same length, as any asymmetry will lead to tiring and possible dangerous flying characteristics.

Risers

The Glider has 3-fold risers with separated A-risers an acceleration system which will be activated with a foot bar. The risers are signified. The main break line comes through a return pulley; the handle of the main break line is mounted on the C- riser. The acceleration system is mounted on the A- riser.

To fix it with the foot bar you must connect the brummel hooks of the foot bar with the brummel hook of the acceleration system.

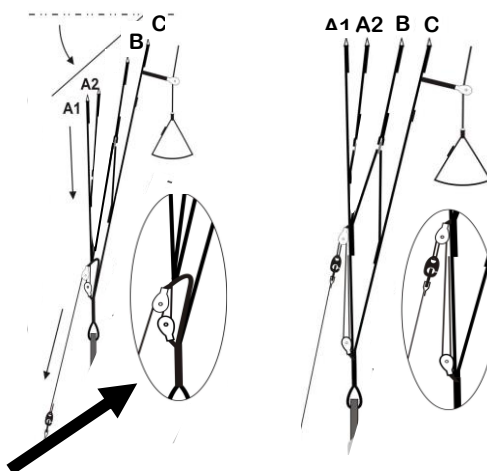
A special riser with trimmer and accelerator is optionally available for PPG. The GRAVIS 2 with the motorized risers may only be used for flights **without motor** if the riser is attached to the lower attachment point, the trimmers are closed and the straps A, A1, B and C are the same length.

Acceleration system

When flying normal all risers have the same length. When using the accelerator system, the risers are shortened by a constructive exactly defined length.

Therefore, the angle of attack of the canopy is smaller and speed increases.

The length of the accelerator is adjusted to the left and right of the foot pedal so that when your leg is fully extended, then the acceleration is at maximum – both rollers are touching.



Please pay attention that the glider will not be pre-accelerated, while the accelerator is loosened, when the acceleration ropes are set too short.

Assembling the accelerator is reliant upon the harness, e.g. numbers of return pulleys, rope guide ...

The more turbulent the weather conditions and when near the ground, the less acceleration should be used.

Do not use the acceleration system and brakes at the same time! It is very dangerous to use both simultaneously as it can result in serious collapses.

Harness

The GRAVIS2 is certified for use with harnesses GH type. Practically all modern harnesses are GH type harnesses. Older harnesses with fixed cross belts (GX type) are not certified and should not be used.

The adjustment of the harness chest strap controls the distance between karabiners and affects the handling and stability of the glider. Excessive tightening the chest strap increases stability but also the risk of twists following glider collapse, and it

also increases the frequency of getting collapses due to poor feedback from the glider.

The risk of twisting is also strongly affected by the seating position of pilot. Flying in a laid back (reclined) position makes it much more difficult to react in time to prevent riser twisting.

With the chest strap in a more closed position the glider also has more tendency to maintain a stable spiral, lengthening of the chest strap gives more feedback from the glider but decreases stability.

ICARO paragliders recommends following settings:

| Take-off weight | < 80kg | 80 kg -100 kg | > 100kg |
|--|---------------|---------------|---------------|
| Horizontal distance of the main karabiners | 38 cm – 42 cm | 42 cm – 46 cm | 46 cm – 50 cm |

Flying with the **GRAVIS2**

Flight preparation

- When choosing an area to lay out the glider before launching, try to find somewhere that is relatively free of stones and sharp rocks. Pay particular attention to the top surface, where the canopy touches the ground.
- Never step on your glider – stepping on it will weaken the cloth.
- We recommend keeping an eye on other pilots, spectators and smoking people near of the glider. Many of them do not appreciate the fragility of the lines and cloth.
- Whilst unfolding your paraglider check the canopy and cell walls for damage. Always take into consideration that the paraglider may have become damaged during transportation.
- Make sure that no sand, stones or snow get inside the canopy as the extra weight collected in the trailing edge may slow down or even stall the glider. Sharp edges damage the canopy.
- Check the lines for knots, twisting and damage, the brake lines for knots, kinks and their symmetric. Loose or incorrect brake knots can cause serious accidents through loss of the steering of the glider!
- Separate the line groups carefully and bring the risers in order. All lines must run freely from harness to canopy. It is equally important that the lines are unhindered and cannot get caught up during the launch.
- There should not be any lines underneath the canopy. If the lines wrap around the canopy, this can result in injury or death!
- Check the rescue system (handle's pins fixed in the loops and the closed cover of your harness).
- Check your harness and make sure that all connections to pilot are correctly closed. Check that all karabiners are closed and can not be opened accidentally in flight and the risers are not twisted.
- Check canopy (all cells are open), wind direction and airspace.

Do not launch if there are any defects!!!

Launch preparations

Before every launch you should carry out the standard 5-point checking procedure. Do the checks following the same sequence every time.

- Helmet, harness, carbines closed?
- Lines, risers and accelerator/ trimmer ok?
- Leading edge open?
- Wind direction and strength ok?
- Airspace and start area ok?

Launch

The most important thing during the take-off is, like at all other gliders too, not the force but the constancy of the pull.

At the start advice to fix the accelerator with the Velcro which is attached at the front of the sitting board, in order to avoid tripping while pulling up the glider or when starting up.

Hold only the middle A risers and the handles of the brakes. When you pull on the A-risers, the lines in the middle of the wing should be under tension before the lines on the wing ends. This ensures an even easier start.

Use progressive pressure on the A risers and the energy of our own bodies weight until the wing is fully inflated overhead. The canopy is inflated quickly due to the super short lines. When there is no pull from the lines and the wing is overhead, use slight pressure on the brake.

Look up and make sure that the canopy is fully inflated. After a few accelerating steps and at the same time let go of the brakes gently, you will take off. Then use slight pressure again on the brakes to fly at a speed with minimal sink rate.

When there is strong wind the reverse launch technique is recommended. Holding the brakes, turn around to face the wing passing one set of risers over your head as you turn. We suggest building a "wall" by partially inflating your glider on the ground, thus sorting out the lines thoroughly.

Towing

By towing by winch there are no special techniques needed.

Avoid large brake inputs until you are reasonably high if course correction is necessary close to the ground.

Do not try to climb steeply during the first part of the tow.

Active flying

Active flying in normal flight means that the wing is always kept at a safe angle of attack and, if at all possible, vertically above the pilot. The moving air affecting the wing often changes the angle of attack in an unwanted way. When flying into an upwind the paraglider often bucks, the wing drops back, the angle of attack increases, getting closer to a stall. In upwind the canopy pitches forward, the angle of attack is reduced and there is the risk of a collapse. Both can occur symmetrically, on both sides or asymmetrically, on one side only. It is impossible to control the angle of attack by looking to the canopy. Look in the direction you are flying, changes in the horizon inform the pilot about the canopy's movements.

Braking is also an absolute must! If the canopy pitches forward, the angle of attack decreases. In the case of strong forward pitching there is a risk of the canopy collapsing due to its insufficient angle of attack. The pilot must therefore prevent the canopy from pitching forward by pulling the controls down on both sides. Inversely, the angle of attack increases if the wing drops back behind the pilot, e.g. when entering into a thermal. The canopy is closer to stalling.

In these flight situations a significant braking movement by the pilot can lead to a spin or a stall. When the wing drops back, the pilot therefore must not brake and/or if the pilot is already holding the controls low, he must release them accordingly.

Any change in the angle of attack immediately transfers in to a change in the control pressure of the brakes. The control pressure presents the pilot with immediate information on the angle of attack and on what the canopy is doing or about to do.

Flying with accelerator

When using the accelerator, be careful. The accelerator should be employed, in order to compensate for high angles of attack and the associated potential risk of a stall. Do not step too quickly because your glider will dive down from the strong change in angle of attack.

Put equal pressure on the speed bar with your feet until the pulley touches the A-riser and the glider will quickly gain speed and the sink speed remains very moderate from beginning up to full speed.

The more turbulent the weather conditions and when near the ground, the less acceleration should be used. Using the accelerator decreases the angle of attack and can make the glider more prone to collapse.

Do not use the acceleration system and brakes at the same time! It is very dangerous to use both simultaneously as it can result in serious collapses.

In flight **without engine**, trimmers must not be used, otherwise the EN type approval is no longer valid.

Turning

A combined steering technique is suitable for every situation. The glider is agile and reacts to steering impulses quickly and directly. Strong, one sided pulling of the brakes brings the glider into an obvious side angle and the glider flies fast steep curves until spiral dive begins.

If the brake lines are pulled too fast or too far the glider will be stalled!

A one-sided stall is signaled clearly by: The curves inner side of the wing is getting soft, and nearly stops. In this case you have to release the brake lines!

Landing

Always stand up in the harness in the landing position very early in order to be able to react as fast as possible to sudden events.

Set up your final landing leg to face into the wind to minimize groundspeed. If you leave the inflated leading edge bang on the ground, this can cause the cell walls to burst!

Do not brake too much, to avoid a stall of the glider in this very low altitude! Do not reduce height by “pumping” with the brakes.

Descent techniques

The methods described here can stress the material and structure of the paraglider and the pilot to their physical and psychological limits. They should therefore only be used for training and in emergency situations.

- ***Training of descent techniques and simulation of flight incidents (SFI) should only take place at professional safety training seminars with professional trainer and only while flying over water.***
- ***Before inducing any exercise control the airspace beneath.***
- ***During the exercises stay in contact with the canopy.***
- ***If the glider is out of control, use your reserve parachute.***

Big & Small Ears

The aim of this exercise is to descend in strong thermals. Only take the outer lines of the A-risers in your hand, without releasing the brakes and pull down leaving it run through your hands (use gloves!). Sink rate increases but not the forward speed. If you use the acceleration system then higher sink speeds can be achieved.

Reopen the wing by pushing up with your hands and if necessary then pump the brakes with short symmetric movements. For directional control while using the big ears, you should use weight shift.

Never attempt tight turns or spirals with Big Ears, as the A-lines will be over stressed.

B-Line-Stall

B-Line-Stall is not so effective, furthermore stresses the material of the glider and reduces operating life of the canopy. ICARO doesn't commend the B-stall.

If you want fly a B-stall anyhow pay attention.

It is very dangerous performing a B-line-stall incorrectly and following errors must be avoided:

- ***pulling too far on the B-line-stall aid, so that the A-lines are pulled too,***
- ***exit is too slow,***
- ***releasing the B-line-stall aid without simultaneously pushing up with your hands,***
- ***using brakes during or directly after exiting,***
- ***Brakes must not be shortened by twisting around your hand during the exercise.***

Spiral Dive

In a controlled spiral dive, the pilot applies an active flying technique in the same way as when circling in thermals. The strong centrifugal forces in a spiral dive, however, change the control pressure. It increases by a multiple of the force.

Even in moderate spirals, the pilot reaches double acceleration of gravity (2G). Subsequently, the control pressure also doubles.

To initiate a spiral dive, look in the direction you want to go, roll your body weight in that direction and at the same time smoothly pull down on the inside brake. The GRAVIS2 will start to turn, and then drop into a spiral.

In the spiral dive an uncontrolled acceleration of the canopy must be prevented. As the canopy always accelerates via the outside of the wing, the spiral speed is controlled via the outside brake by applying the active flying technique.

If the speed increases in an unwanted manner, pull the brakes further to slow down. If the wing becomes too slow, it can be speeded up by releasing the outside control.

If you pull abruptly and too far on the brakes, the canopy may enter a negative spin. When entering a spiral dive keep the brake on the outer curve released.

The glider does not have a tendency for stable spiral dive.

If under certain conditions, it should go into a stable spiral dive then actively exit the maneuver by bringing your weight into a neutral position, release the brakes of the inner curve side and brake gently on the outer curve side until you notice that the wing starts to level out. Then gently brake on the inside curve for several turns until normal flights returns.

Wingover

The **GRAVIS2** is an agile glider, and it is quite easy to get to an excessively high angle of bank in just a few turns. Practice wingovers gently at first, as there is a chance of quite large collapses at high bank angles.

What happens when it happens?

Knots and tangles

The best way to avoid knots and tangles is to inspect the lines before you inflate the wing for take-off. If you notice a knot before take-off, immediately stop running and do not take-off.

If you have taken-off with a knot you will have to correct the drift by leaning on the opposite side of the knot and gently apply the brake line on that side too. You can gently try to pull on the brake line to see if the knot becomes unfastened or try to identify the line with the knot in it. Try to pull the identified line to see if the knot releases. If the knot is too tight and you cannot remove it, carefully and safely fly to the nearest landing place.

Be very careful when trying to remove a knot. When there are knots in the lines or when they are tangled, do not pull too hard on the brake lines, there is an increased risk of the wing to stalling or negative turn being initiated.

Deep / Parachute Stall

Your glider has been carefully designed to resist entering deep stall.

Before exiting a deep stall please ensure that the brakes are fully released. Actively exit the deep stall by reaching up and push forward with both palms on the A-risers or pull on them. Avoid flying in very humid air or in rain. A wet canopy may have very unpredictable flying characteristics, one of which is a radically increased risk of deep stall.

Never pull the brake-lines during a parachute stall, because the glider would go into a full stall immediately. If you find yourself flying in unavoidable rain we strongly recommend that you avoid any sudden movements or radical brake line input, that you do not pull Big Ears or B-Line-Stall, and that you steer clear of turbulence and avoid a deep flare on landing.

Asymmetric Collapse

While flying in turbulent conditions it may occur that a portion of your glider deflates. However, just like in flying in turbulences, please pull gently on both brakes. Re-inflation is speeded up by counteracting the turning movement of the canopy until normal forward flight return. Then pump the brake line on the collapsed side.

If the canopy is in front of the pilot after an asymmetrical collapse, the pilot must immediately and decisively brake down the open side to prevent an uncontrolled rotation. The same rule applies here: If the wing is ahead, braking is a must. Sometimes, however, the angle of attack on the open, not-collapsed side is relatively high and the wing is behind the pilot. Then a significant control movement would definitely cause a stall and its potentially extreme reactions.

If the collapsed part of the canopy is very big, you have to brake the open side very dosed (not too much!) to avoid a stall.

Symmetric Collapse

Your **GRAVIS2** normally re-inflates promptly in a symmetric collapse without pilot input.

Applying the brakes symmetrically will speed things up.

Emergency Steering

Should it no longer be possible to steer your glider, for example due to a broken line, the glider may be steered by gently pulling on either rear riser.

By steering this way airspeed is reduced hardly. Therefore, for landing you must change to the rear risers to control your glider. Handling will be more direct so being careful not to pull too hard.

Negative Spin

If the pilot abruptly applies full brake to one side of the glider while the other side is at zero brake, the faster side may fly around the braked and stalled side resulting in a spin. Alternatively, if flying very slowly with almost full brakes on both sides, if one hand releases one brake suddenly, while the other continues with full brake, the glider may enter a negative spin. To exit a spin just do "hands up" to release the brakes and the glider will return to normal flight.

If you do not have control over your glider and you are running out of altitude, immediately deploy your reserve parachute.

Front stall

After a front stall of the canopy, the wing moves backwards while the pilot with his higher mass moves further ahead. Wing behind, pilot ahead, significantly high angle of attack – there is only one thing to do:

Do not brake or you run the risk of a dangerous stall.

The pilot must not pull the control lines before the canopy is at least above him again. If the canopy then shoots forward dynamically, it is absolutely vital to stop the motion in a consistent and decisive manner via the brakes.

Full Stall

Spin and full stall are both dangerous and somewhat unpredictable exercises. Do not stall or spin your paraglider on purpose.

To initiate a full stable stall, apply both brakes to maximum arm extension. If possible, grasp the seat of your harness to assist keeping your arms locked. The pilot will swing back under the canopy and finally the canopy will stabilize to a full stall. Once in a stable stall, the exercise can be completed. Release the brakes just a little and let the glider fill until it regains shape. Then release the brakes fully and your glider will return to normal flight.

It is imperative that the pilot fully completes this exercise and holds on, as a premature release while the glider is still falling back may cause the glider to rapidly dive ahead past the pilot. There is a possibility of the pilot landing in or entangling in the glider.

Flying with motor (PPG)

In this appendix to the GRAVIS 2 manual you will find all relevant information about flying with a motor. This supplements the 3 chapters

- "Flying with the GRAVIS 2",
- "How do I get back down?", and
- "What do I do if it happens?"

because these are basically also valid for flights with a motor.

Application area

The GRAVIS 2 is ideal for powered flight due to its good all-round properties. For this, however, the optionally available motor risers must be used, which can also be used for flying without a motor.

Engine compatibility

The necessary test flights were carried out with a commercially available engine of the medium power class (30 kW).

Other engine models should, as long as they do not exceed this maximum output, show largely the same reactions.

Risers

The risers are equipped with trimmers, with which the torque of the motor can be balanced. The additional accelerator pedal is intended to change the angle of attack and thus to accelerate the paraglider.

The default setting of the trimmer is always closed and will

- to start,
- for landing,
- when climbing with a motor,
- for maneuvers intended to aid descent, and
- if the air is turbulent,

used.

The handling is best in the standard setting. In addition, in the event of a malfunction, the glider is in the optimal trim to recover as quickly as possible.

Flying with the trimmers open changes the behavior of the wing; Curves destroy more height and are steeper, the reopening of a side collapse is more dynamic. Therefore we do not recommend using the trimmer and the accelerator at the same time to increase speed.

Always set the trimmers to the default setting in turbulent air or before descending.

Start

Always lay out your paraglider on the leeward side of the engine. Never leave your engine or the paraglider with the engine on the leeward side of the paraglider connected when your equipment is unattended.

At the start, choose a sufficiently long, flat or gently sloping meadow without obstacles. Thanks to the excellent take-off behavior of the GRAVIS 2, the trimmers do not have to be opened during take-off because this increases the take-off speed and thus the take-off distance.

If you fly the GRAVIS 2 in the extended weight range for powered flight, it also has an increased trim speed. The associated higher take-off and landing speed is particularly noticeable when there is little wind.

Wait until the umbrella is over you and gently accelerate. If the engine is used too early, it could inhibit the wing's inflation characteristics, causing the wing tips to come up faster. Try to walk upright and accelerate until the canopy takes off. Climb calmly and avoid flying over trees, power lines or the like so that you can always land safely in the event of an engine failure. It must always be possible to get to a decent landing site, even if the engine is on strike.

Climb

Once you are in the air, you should keep going upwind to gain altitude. If the trimmers are set to their default settings, you will get the best climb.

- Do not try to climb steeper and faster with the use of the brakes, because this makes the paraglider more susceptible to interference and the pendulum effect can also become extreme.
- Do not change direction unless you have enough altitude and speed.
- Avoid low turns with the wind at low speed.

Flight behavior

The flight behavior of the GRAVIS 2 when flying with a motor is largely identical to flying without a motor with the same wing loading.

Although the GRAVIS2 is dampened in its rolling movements, you can create a "rocking movement" with a combination of propeller torque and pilot weight shift and / or use of the brakes.

To stop that

- gently remove the gas,
- Make sure you are centered with your weight and
- the brakes are free.

At full throttle, torque is what makes your wing want to make a slight turn. The best countermeasure is to adjust the trimmer.

Since a higher wing loading is possible for powered flight due to the higher take-off weight (see table), the maneuvers are more dynamic. The same applies to flying with the trimmer open and accelerating, because this reduces the angle of attack. Although the GRAVIS2 is very stable, the trimmers should remain closed when flying through turbulent air.

Avoid abruptly accelerating or taking it away, as this can cause the glider to rock. This can be stopped by applying the brakes.

Landing

Always land against the wind and always with the engine at a standstill!

On the final approach, fly your paraglider straight ahead and at trim speed until you are about three feet above the ground. Pull the brakes slowly and progressively to flare the paraglider out.

Make sure not to flair too hard or too fast, as your paraglider could rise again a little before the current breaks off. Choose an approach that suits the landing field and conditions.

In light winds you have to flair strong, long and progressive in order to reduce your speed over the ground as much as possible.

In strong winds you have to turn towards your paraglider. Then pull the brakes symmetrically and evenly to stall him.

Sample check

The GRAVIS 2 is type-tested in all sizes for the foot start EN / LTF. For powered flight, sizes M, ML and L have been certified by the French DGAC (Direction générale de l'aviation civile).

The EN / LTF type test of the GRAVIS 2 is only upright for the flight without a motor with the motor risers if the glider is attached to the lower attachment point and the trimmers are closed (The risers A, A1, B and C must be the same length).

Care instructions, repairs, inspection

Care Instructions

- A new wing supplied from the factory is often compressed hard. The compression serves to reduce shipping costs but should not be repeated once the wing has been unpacked and flown for the first time.
- Note that the glider bag should not be used as a seat.
- Even with good care and maintenance, just like any item exposed to the elements, your glider can wear out after a certain amount of use. This can change flight behavior and safety. We recommend a regular safety inspection of the canopy and all lines.
- If you clean your glider it is best to use warm water and a soft sponge.
- Store your glider in a dry and dark place, ideally between 5° and 30° Celsius and humidity between 55 and 65%. Do not store it near chemicals or petrol.
- If you will not fly for longer period, store the glider releasing all compression straps and take it out of its backpack so that the fabric is not compressed, creased or stretched.
- Avoid storing your glider for days at a time in a hot car.
- Unpack your paraglider shortly before launch and pack away immediately after landing to avoid any unnecessary UV exposure.
- When unfolding the paraglider insure that neither the canopy nor the lines become too dirty. Dirt particles can damage the material and lines.

- Never use chemical cleaning agents, brushes or hard sponges on the material, as these destroy the coating and affect the strength of the cloth. The canopy will become porous and will lose structural strength.
- Never attempt to clean your paraglider in a washing machine. Even without using detergents the simple mechanical abrasion will quickly finish the canopy and render it useless.
- If you are flying near the sea most the wing may age faster because the air is humid and salty. In this case we suggest you have it checked more often than prescribed in this manual.
- Also avoid dipping it in a swimming pool; the chlorine will damage the cloth.
- If you must rinse or clean your glider do so with fresh water. Frequent cleaning will accelerate the ageing process.
- If the glider has become wet, lay it out so that air can get to all areas of the fabric.
- After landings in trees or on water you should check the length of the lines and the canopy.
- Flying all the descent or acrobatic exercises will not normally pose a structural problem but freestyle training accelerates the ageing process dramatically.
- There is no special method packing your glider. ICARO paragliders commends the "Cell to Cell-method bag because the reinforcements of the leading edge stay flex-free on top of each other and do not fold.
- When folding your glider make sure that there are no insects inside the canopy. Many insect species contain acids that could damage the cloth. Grasshoppers gnaw their way out of a folded canopy, making it full of holes in the process.
- When you did not fly for a longer period ICARO commends to check the glider (e.g. mildew stains, splice of the lines, corrosion of the shackles and carabines). If you are not convinced of the gliders airworthiness please send your glider to an authorized ICARO dealer to check your glider. The same is commended for harnesses.

Repairs

Only use original ICARO parts for repairing your glider. If you don't you lose the warranty for your glider.

Small holes in the canopy (max. 20x20 mm) can be repaired by the pilot by using self-adhesive sailcloth on both sides of the perforation.

Damage to the lines or any other repairs should only be carried out at an authorized ICARO center.

If your glider needs to be repaired, please contact your local ICARO paragliders dealer.

Inspection

It is important to have your glider inspected by a trained ICARO technician but it is also allowed to check your glider for yourself.

In the annex you find the regulations for checks of certified gliders and items in order to perform a paraglider inspection you need.

Inspection interval

24 months or 150 operating hours, depending on what occurs sooner.

Without regular certified inspections, your glider will lose its pattern test result and warranty.

ICARO recommends having wings that are often used for training of descent exercises, acrobatics or flying in salty or sandy conditions subjected to checkups all 100 operating hours or 12 months.

It is also important, that ground handling also will be considered. All gliders, especially gliders manufactured with light and thin material are mechanically more stressed than other gliders. Therefore, ICARO recommends multiplying ground handling time with the factor 1, 5.

Not only gliders have a recurrent inspection interval. Airworthiness of harnesses and rescue systems must also be verified.

Generally, it is recommended to change aluminum snap hooks after 24 months or 200 operating hours.

According to German and Austrian aeronautical legislation the owner of a glider can check the airworthiness by his own or order a third person (for example manufacturer/importer) to do this.

To perform your own airworthiness check, ICARO paragliders must give you a briefing. Should you decide to check the wing by yourself you must make sure that our guidelines are adhered to. Failing to do so will void the certification.

ICARO paragliders highly recommend that you let the manufacturer or authorized supplier/ person do the check of airworthiness.

All inspections and repairs must be documented (manual page 2).

Terms of the warranty

ICARO warranty covers the cost of materials and workmanship on gliders accepted by ICARO paragliders to fall under the warranty.

Paragliders: **24** month or **150** operating hours, depending on what is first

Harnesses and rescue systems: **24** months

***Warranty is only valid for ICARO products
with LTF/ EN certification.***

What is covered by the warranty?

Provided that ICARO paragliders accept the fault the warranty contains all necessary spare parts related to the replacement or repair of defective parts and working time.

ICARO paragliders accept no freight costs (outbound and return transportation).

What are the conditions of the warranty?

Provided that ICARO paragliders accept the fault the warranty contains all necessary spare parts related to the replacement or repair of defective parts and working time.

- ICARO paragliders needs to be informed immediately after the discovery of a defect and the defective product must be sent to us for testing.

- The glider/ harness/ rescue system was used in normal circumstances and maintained according to the instructions. This includes in particular the careful drying, cleaning and storage.
- The glider/ harness/ rescue system were used only within the applicable guidelines and all rules have been complied with all times.
- All flights must be accounted for within the flight book.
- There were only original spare parts used and checks, exchange and / or repairs were conducted by an authorized dealer or by ICARO paragliders company / person and properly documented.
- The online form on www.icaro-paragliders.com must be sent at least 6 weeks after buying to ICARO paragliders.

What is excluded from warranty?

- Gliders and harnesses that are used for training purposes, Acro or other official competitions,
- Gliders / harnesses who were involved in an accident,
- Rescue equipment, which has been thrown for a emergency,
- Gliders / harnesses and rescue equipment, which have been changed by yourself,
- Gliders / harnesses and rescue equipment that were not purchased from an authorized dealer / flight school,
- Gliders / harnesses and rescue equipment where the required inspection intervals were not met and the verification of the glider was not conducted by a ICARO paragliders authorized operation / person
- Damage which has occurred due to improper treatment (i.e. storage in humidity, heat or direct sunlight)
- Parts that need to be replaced due to normal wear and tear,
- Discoloration of the cloth material used,
- Damage caused by solvents, salt water, insects, sun, sand, humidity or “debag-jumps”.
- Damage caused by force majeure.
- Damage caused by the motor (Oil, fuel, damage in cause of the prop) and towing by winch.

In case of a concluded claim the period of warranty carries on. The period of warranty and the connected claim are not prolonged and are only valid until the original date of expiry. The freight costs (transport to and from) are not paid by ICARO paragliders.

Annex

Warranty Card

Please fill in the guarantee card which you find on our homepage www.icaro-paragliders.com and send it.

Users needs for Inspections

You will need the following items in order to perform a paraglider inspection:

- Standardized inspection report
- Porosity meter
- Spring scale
- Equipment for measuring line lengths
- Equipment for line strength testing
- Sewing machine
- Big, clean and bright room

Technical specifications about your glider (type, serial number, size and year of production). Please call ICARO Paragliders for information.

A three-week course at ICARO Paragliders, specified to a glider type together with a legal flight license is the necessary prerequisites for permission to inspect ICARO Paragliders.

Inspection Instructions

Record Information

Spread out your paraglider in a big bright room and make a note of information such as model, type and serial number.

Porosity Test

Use your porosity meter to perform porosity checks at 4 different places of the canopy. The results are recorded in the inspection protocol and are to be evaluated according to the internal guidelines of the workshop.

Visual Control of the Canopy

Hang up the canopy so that you can do a visual check of your canopy. Check for perforations in the upper and lower sailcloth, damaged stitching between the cells, and damage to the leading/trailing edge reinforcements.

Each cell must be checked.

Visual Control of the Risers and Lines

Check the risers, the trimmers, the stitching at each line loop, the brake lines, all seams and line contact points. Each line must be measured and inspected for kinks.

Strength test of the lines

One complete A-and B- line must be removed, measured and submitted to a strength test. The measured value of each individual line must be noted in the inspection protocol.

Measurement of the lines

Measure every single line while stressing it with defined tractive force (5daN). The results are recorded in the inspection protocol and are to be evaluated according to the internal guidelines of the workshop. For all information about the lines (single length, total length, mechanical strength) please call ICARO paragliders, office@icaro-paragliders.com

Assessment

The measurements of all procedures are noted in the inspection protocol. When all facts have been recorded, the technician must make a general assessment. Check the backpack for damage to the zips, seams and straps and repair if necessary with a sewing machine.

General Remarks

Any other repairs, corrections etc. to the general condition of the paraglider must be evaluated. A copy of the results of each inspection must be sent on to ICARO Paragliders. The technician must report any unusual faults to ICARO Paragliders within 3 days.

Inspection Reference

Only an authorized technician who has been trained by ICARO Paragliders is authorized to sign and date the glider type label and sign the manual.

Part list

STÜCKLISTE alle Größen

GRAVIS2

| BEZEICHNUNG | TYPE | WERKSTOFF | OBERFLÄCHE | ABMESSUNG | HERSTELLER |
|---------------------|--|------------|-------------|---|---------------|
| STAMMLEINEN | PPSL 275 / PPSL 200 | Dyneema | ummantelt | Ø 1,9 mm / 1,42 mm | Liros |
| MITTELLEINEN | PPSL 200 / PPSL 160 PPSL 120 / DSL 70 | Dyneema | ummantelt | Ø 1,42 mm / 1,4 mm 1,15 mm / 0,95 mm | Liros |
| GALLERIELEINEN | DSL 70 | Dyneema | ummantelt | Ø 0,95 mm | Liros |
| HAUPTBREMSLEINE | DSL 350 | Dyneema | ummantelt | Ø 2 mm | Liros |
| BREMSMITTELLEINEN | TSL 140 / DSL 70 | Aramid | ummantelt | Ø 1,3 mm / 0,95 mm | Liros |
| BREMSGALLERIELEINEN | DSL 70 | Dyneema | ummantelt | Ø 0,95 mm | Liros |
| LEINENSCHLÖSSER | Triangle | Edelstahl | Edelstahl | Ø 3,5 mm | Maillon |
| LEINENSAMMLER | Clip | Kunststoff | | | |
| TRAGEGURTE | Schiffchenware | Nylon | | 12,5 mm | Schmahl |
| FADEN TRAGEGURTE | Tex 138 | | | | A&E |
| TUCH OBERSEGEL | STA 15 | Nylon | beschichtet | | Techfiber |
| TUCH UNTERSEGEL | STA 15 | Nylon | beschichtet | | Techfiber |
| TUCH INNENAUFBAU | Skytex 32 hard | Nylon | beschichtet | | Porcher Sport |
| PROFILVERSTÄRKUNG | Nylon Webbing | Nylon | | Ø 2,7 mm | |
| FADEN SEGEL | Tex 45 | | | | A&E |
| EINFASSBAND | NCV 20 mmm Mylar Tape | Mylar | 90 g | 20 mm | Porcher Sport |

ICARO Paragliders
83126 Flintsbach, Hochriesstraße 1
GERMANY

Flintsbach, 05.01.2020

Wolfgang KAISER, e.h.

DGAC homologation for motorized ICARO paragliders GRAVIS 2, sizes M, ML and L



FICHE D'IDENTIFICATION ULM DE CLASSE 1

(à joindre à la carte d'identification)

| a | b | c | | d | | e | | | | | f | Rév n° |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| B | 1 | 0 | 1 | S | F | 0 | 3 | 6 | 8 | 6 | E | - |

a) Construction en série : B - autres cas : A

b) Monoplace : 1 - Biplace : 2

c) Paramoteur : 01 - Pendulaire : 02 - Multiaxe : 03 - Autogire : 04 - Aérostat : 05 - ULM à motorisation auxiliaire : 1A - 2A - 3A - Hélicoptère : 06

d) Code de l'autorité aéronautique

e) Numéro d'ordre

f) Utilisation : Loisir : L - Activité particulière : T - Loisir et activité particulière : E

| | |
|---------------------------|--|
| Appellation ou type d'ULM | GRAVIS 2 - M |
| Constructeur | ICARO PARAGLIDERS |
| Adresse | Hochriesstrabe 1 D-83126 FLINTSBACH - ALLEMAGNE |

DESCRIPTION DE L'ULM

| Activités particulières prévues | n/a | | |
|---|----------------|---|--|
| Options prévues | n/a | | |
| Masse minimale | Masse maximale | Voilure | |
| | | Fabricant | Modèle/Référence |
| 80 kg | 110 kg | ICARO PARAGLIDERS | GRAVIS 2 - M |
| Référence manuel d'utilisation | | Référence manuel d'entretien | Surface à plat |
| MANUEL D'UTILISATION ET D'ENTRETIEN GRAVIS 2 | | MANUEL D'UTILISATION ET D'ENTRETIEN GRAVIS 2 | 26 m² |
| Limitations du constructeur de la voile vis-à-vis des GMP | | Puissance maximum : 30 kW | |
| | | | Résistance minimale d'ancrage 918 daN |

Pour le Ministre chargé de l'Aviation Civile

Document établi le : 19 Octobre 2020

Benoît PINON
DSAC/NO

Visa de l'autorité Chef du pôle navigabilité



FICHE D'IDENTIFICATION ULM DE CLASSE 1

(à joindre à la carte d'identification)

| a | b | c | d | e | f | Rév n° |
|----------|----------|------------|------------|------------------|----------|----------|
| B | 1 | 0 1 | S F | 0 3 6 8 7 | E | - |

a) Construction en série : B - autres cas : A

b) Monoplace : 1 - Biplane : 2

c) Paramoteur : 01 - Pendulaire : 02 - Multiaxe : 03 - Autogire : 04 - Aérostat : 05 - ULM à motorisation auxiliaire : 1A - 2A - 3A - Hélicoptère : 06

d) Code de l'autorité aéronautique

e) Numéro d'ordre

f) Utilisation : Loisir : L - Activité particulière : T - Loisir et activité particulière : E

| | |
|---------------------------|--|
| Appellation ou type d'ULM | GRAVIS 2 - ML |
| Constructeur | ICARO PARAGLIDERS |
| Adresse | Hochriesstrabe 1 D-83126 FLINTSBACH - ALLEMAGNE |

DESCRIPTION DE L'ULM

| Activités particulières prévues | n/a | | |
|---|----------------|---|------------------|
| Options prévues | n/a | | |
| Masse minimale | Masse maximale | Voilure | |
| | | Fabricant | Modèle/Référence |
| 90 kg | 120 kg | ICARO PARAGLIDERS | GRAVIS 2 - ML |
| Référence manuel d'utilisation | | Référence manuel d'entretien | Surface à plat |
| MANUEL D'UTILISATION ET D'ENTRETIEN GRAVIS 2 | | MANUEL D'UTILISATION ET D'ENTRETIEN GRAVIS 2 | 28 m² |
| Limitations du constructeur de la voile vis-à-vis des GMP | | Puissance maximum : 30 kW | |
| | | Résistance minimale d'ancrage | |
| | | 918 daN | |

Pour le Ministre chargé de l'Aviation Civile

Document établi le : 19 Octobre 2020


 Benoit PINON
 DSAC/NO
 Visa de l'autorité Chef du pôle navigabilité



FICHE D'IDENTIFICATION ULM DE CLASSE 1

(à joindre à la carte d'identification)

| a | b | c | d | e | f | Rév n° |
|----------|----------|------------|------------|------------------|----------|----------|
| B | 1 | 0 1 | S F | 0 3 6 8 8 | E | - |

a) Construction en série : B - autres cas : A

b) Monoplace : 1 - Biplace : 2

c) Paramoteur : 01 - Pendulaire : 02 - Multiaxe : 03 - Autogire : 04 - Aérostat : 05 - ULM à motorisation auxiliaire : 1A - 2A - 3A - Hélicoptère : 06

d) Code de l'autorité aéronautique

e) Numéro d'ordre

f) Utilisation : Loisir : L - Activité particulière : T - Loisir et activité particulière : E

| | |
|---------------------------|--|
| Appellation ou type d'ULM | GRAVIS 2 - L |
| Constructeur | ICARO PARAGLIDERS |
| Adresse | Hochriesstrabe 1 D-83126 FLINTSBACH - ALLEMAGNE |

DESCRIPTION DE L'ULM

| Activités particulières prévues | n/a | | |
|--|---|-------------------|----------------------------------|
| Options prévues | n/a | | |
| Masse minimale | Masse maximale | Voilure | |
| | | Fabricant | Modèle/Référence |
| 100 kg | 140 kg | ICARO PARAGLIDERS | GRAVIS 2 - L |
| Référence manuel d'utilisation | Référence manuel d'entretien | | Surface à plat |
| MANUEL D'UTILISATION ET D'ENTRETIEN GRAVIS 2 | MANUEL D'UTILISATION ET D'ENTRETIEN GRAVIS 2 | | Résistance minimale d'ancrage |
| | | 30 m² | 918 daN |
| Limitations du constructeur de la voile vis-à-vis des GMP | Puissance maximum : 30 kW | | |

Pour le Ministre chargé de l'Aviation Civile

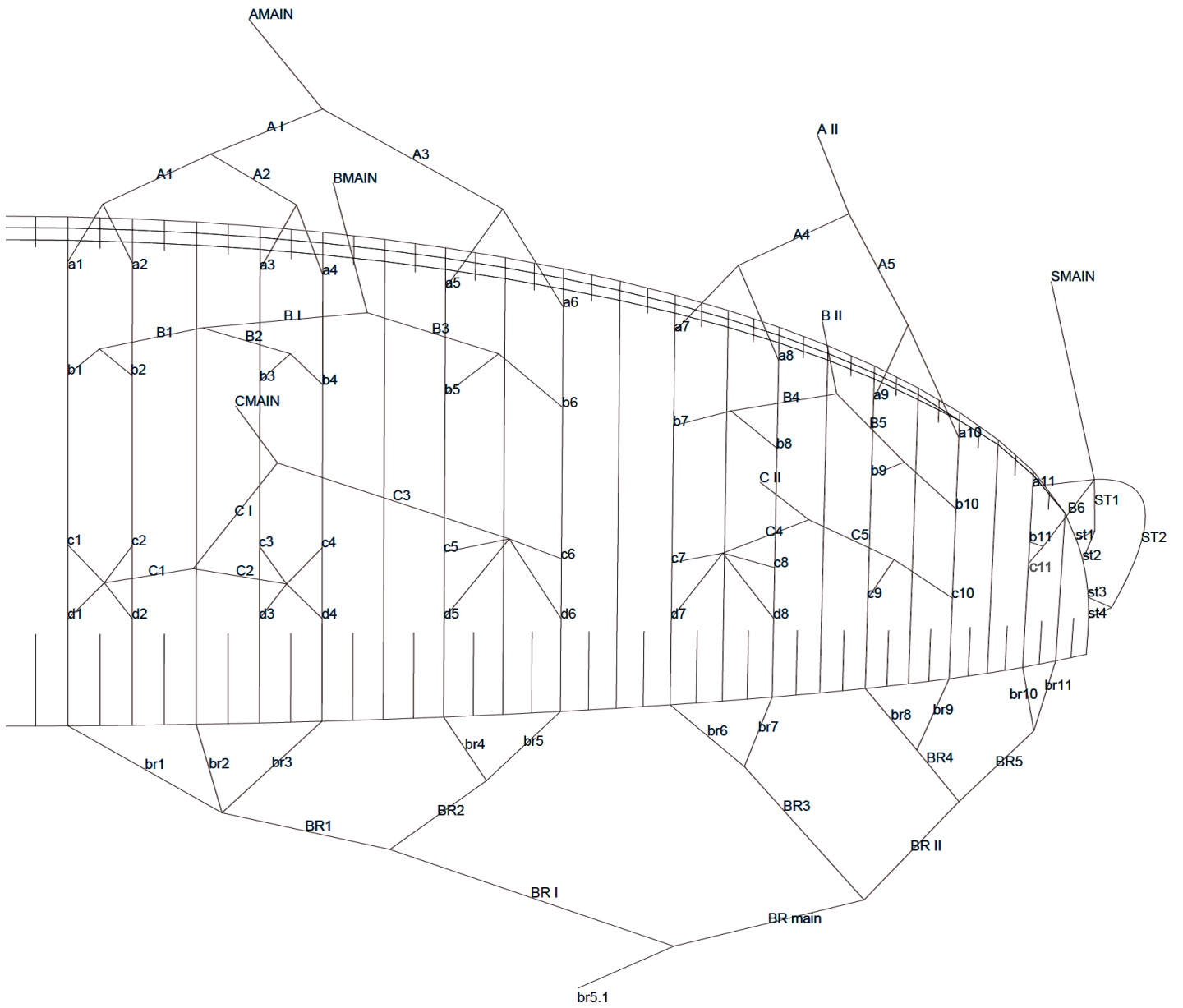
Document établi le : 19 Octobre 2020

Benoît PINON
DSAC/NO

Visa de l'autorité Chef du pôle navigabilité



Line plan all over (all sizes)



Description of the risers



Riser length not accelerated (mm) 520

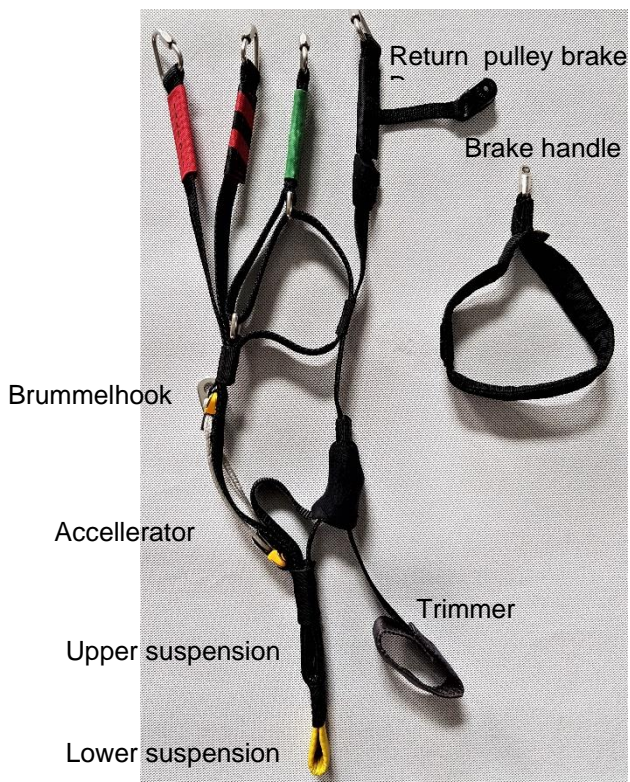
Riser length accelerated (mm)

| | A1 | A2 | B | C |
|------------|-----|-----|-----|-----|
| XS: | 385 | 385 | 430 | 520 |
| S: | 385 | 385 | 430 | 520 |
| M: | 385 | 385 | 430 | 520 |
| ML: | 375 | 375 | 420 | 520 |
| L: | 370 | 370 | 415 | 520 |

- 1 Brummel hook
- 2 Return pulley brake
- 3 Brake
- 4 Return pulley accelerator
- 5 central suspension

Description of the motorrisers

A1 A2 B C- riser



Riser length not accelerated (mm) 520

Riser length open trimmer (mm)

| | |
|--------|-----|
| A1, A2 | 520 |
| B | 560 |
| C | 620 |

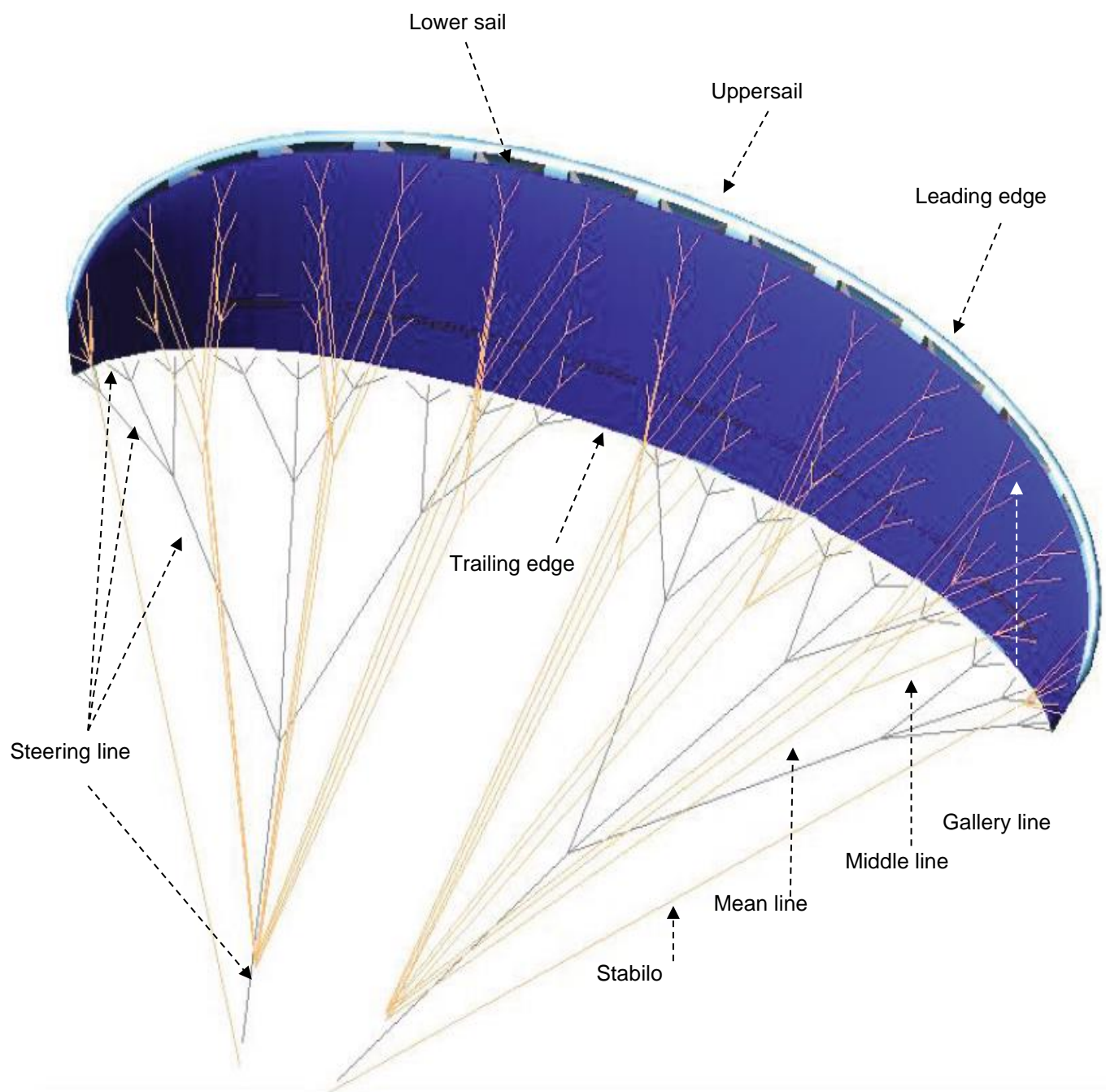
Rise length accelerated (mm)

| | |
|--------|-----|
| A1, A2 | 440 |
| B | 460 |
| C | 520 |

Riser length accelerated and open trimmer (mm)

| | |
|--------|-----|
| A1, A2 | 450 |
| B | 480 |
| C | 550 |

Description of the canopy



Linlength, type and notation

Size XS

| Line LENGTH | | | | |
|-------------|-------|-------|-------|-------|
| A - LINES | | | | |
| Rib | Total | Total | Total | Total |
| 1 | 2 | 612 | | |
| 2 | 3 | 565 | 1647 | 1978 |
| 3 | 5 | 562 | | |
| 4 | 6 | 591 | 1602 | |
| 5 | 8 | 1380 | 2728 | |
| 6 | 10 | 1412 | | |
| 7 | 12 | 1304 | 1975 | |
| 8 | 14 | 1221 | | 3104 |
| 9 | 16 | 1065 | 2024 | |
| 10 | 18 | 990 | | |
| 11 | 20 | 1279 | | |
| 12 | 22 | 188 | 965 | |

| Line TYPE | | | | |
|-----------|-----------|----------|----------|----------|
| Rib | A - LINES | | | |
| 2 | DSL 70 | | | |
| 3 | DSL 70 | PPSL 120 | PPSL 160 | |
| 5 | DSL 70 | | | |
| 6 | DSL 70 | PPSL 120 | | PPSL 275 |
| 8 | DSL 70 | PPSL 120 | | |
| 10 | DSL 70 | | | |
| 12 | DSL 70 | PPSL 120 | | |
| 14 | DSL 70 | | PPSL 200 | |
| 16 | DSL 70 | PPSL 120 | | |
| 18 | DSL 70 | | | |
| 20 | DSL 70 | | | |
| 22 | DSL 70 | DSL 70 | | |

| Line Name | | | | |
|-----------|-----------|-----|----|-------|
| Rib | A - LINES | | | |
| 2 | a1 | | | |
| 3 | a2 | A1 | AI | |
| 5 | a3 | | | |
| 6 | a4 | A2 | | amain |
| 8 | a5 | A3 | | |
| 10 | a6 | | | |
| 12 | a7 | A4 | | |
| 14 | a8 | | AI | |
| 16 | a9 | A5 | | |
| 18 | a10 | | | |
| 20 | a11 | | | |
| 22 | st1 | ST1 | | |

| B - LINES | | | | |
|-----------|-------|-------|-------|-------|
| Rib | Total | Total | Total | Total |
| 1 | 2 | 543 | | |
| 2 | 3 | 496 | 1647 | 1978 |
| 3 | 5 | 492 | | |
| 4 | 6 | 523 | 1602 | |
| 5 | 8 | 1312 | 2728 | |
| 6 | 10 | 1351 | | |
| 7 | 12 | 1252 | 1975 | |
| 8 | 14 | 1183 | | 3104 |
| 9 | 16 | 1046 | 2024 | |
| 10 | 18 | 978 | | |
| 11 | 20 | 143 | 1130 | 4610 |
| 12 | 22 | 180 | | |

| B - LINES | | | | |
|-----------|-----------|----------|----------|----------|
| Rib | B - LINES | | | |
| 2 | DSL 70 | | | |
| 3 | DSL 70 | PPSL 120 | PPSL 120 | |
| 5 | DSL 70 | | | |
| 6 | DSL 70 | PPSL 120 | | PPSL 200 |
| 8 | DSL 70 | PPSL 120 | | |
| 10 | DSL 70 | | | |
| 12 | DSL 70 | PPSL 120 | | |
| 14 | DSL 70 | | PPSL 200 | |
| 16 | DSL 70 | PPSL 120 | | |
| 18 | DSL 70 | | | |
| 20 | DSL 70 | DSL 70 | PPSL 120 | |
| 22 | DSL 70 | | | |

| B - LINES | | | | |
|-----------|-----------|----|-----|-------|
| Rib | B - LINES | | | |
| 2 | b1 | | | |
| 3 | b2 | B1 | BI | |
| 5 | b3 | | | |
| 6 | b4 | B2 | | bmain |
| 8 | b5 | B3 | | |
| 10 | b6 | | | |
| 12 | b7 | B4 | | |
| 14 | b8 | | BII | |
| 16 | b9 | B5 | | |
| 18 | b10 | | | |
| 20 | b11 | B6 | STI | |
| 22 | st2 | | | |

| C - LINES | | | | |
|-----------|-------|-------|-------|-------|
| Rib | Total | Total | Total | Total |
| 1 | 2 | 781 | | |
| 2 | 3 | 724 | 1508 | 1970 |
| 3 | 5 | 699 | | |
| 4 | 6 | 725 | 1480 | |
| 5 | 8 | 995 | 3132 | |
| 6 | 10 | 1029 | | |
| 7 | 12 | 963 | 2324 | |
| 8 | 14 | 901 | | 3104 |
| 9 | 16 | 910 | 2236 | |
| 10 | 18 | 831 | | |
| 11 | 20 | 156 | | |
| 12 | 22 | 128 | 1039 | |

| C - LINES | | | | |
|-----------|-----------|----------|----------|----------|
| Rib | C - LINES | | | |
| 2 | DSL 70 | | | |
| 3 | DSL 70 | PPSL 120 | PPSL 120 | |
| 5 | DSL 70 | | | |
| 6 | DSL 70 | PPSL 120 | | PPSL 200 |
| 8 | DSL 70 | PPSL 120 | | |
| 10 | DSL 70 | | | |
| 12 | DSL 70 | PPSL 120 | | |
| 14 | DSL 70 | | PPSL 200 | |
| 16 | DSL 70 | PPSL 120 | | |
| 18 | DSL 70 | | | |
| 20 | DSL 70 | | | |
| 22 | DSL 70 | DSL 70 | | |

| C - LINES | | | | |
|-----------|-----------|-----|-----|-------|
| Rib | C - LINES | | | |
| 2 | c1 | | | |
| 3 | c2 | C1 | CI | |
| 5 | c3 | | | |
| 6 | c4 | C2 | | cmain |
| 8 | c5 | C3 | | |
| 10 | c6 | | | |
| 12 | c7 | C4 | | |
| 14 | c8 | | CII | |
| 16 | c9 | C5 | | |
| 18 | c10 | | | |
| 20 | c11 | | | |
| 22 | st3 | ST2 | | |

| D - LINES | | | | |
|-----------|-------|-------|-------|-------|
| Rib | Total | Total | Total | Total |
| 1 | 2 | 864 | | |
| 2 | 3 | 811 | | |
| 3 | 5 | 781 | | |
| 4 | 6 | 803 | | |
| 5 | 8 | 1067 | | |
| 6 | 10 | 1095 | | |
| 7 | 12 | 1021 | | |
| 8 | 14 | 957 | | |
| 9 | 22 | 162 | | |

| D - LINES | | | | |
|-----------|-----------|--|--|--|
| Rib | D - LINES | | | |
| 2 | DSL 70 | | | |
| 3 | DSL 70 | | | |
| 5 | DSL 70 | | | |
| 6 | DSL 70 | | | |
| 8 | DSL 70 | | | |
| 10 | DSL 70 | | | |
| 12 | DSL 70 | | | |
| 14 | DSL 70 | | | |
| 22 | DSL 70 | | | |

| D - LINES | | | | |
|-----------|-----------|--|--|--|
| Rib | D - LINES | | | |
| 2 | d1 | | | |
| 3 | d2 | | | |
| 5 | d3 | | | |
| 6 | d4 | | | |
| 8 | d5 | | | |
| 10 | d6 | | | |
| 12 | d7 | | | |
| 14 | d8 | | | |
| 22 | st4 | | | |

| BR - LINES | | | | |
|------------|-------|-------|-------|-------|
| Rib | Total | Total | Total | Total |
| r2 | 50 | 1699 | | |
| r4 | 50 | 1413 | 1411 | |
| r6 | 50 | 1360 | | |
| r8 | 50 | 1085 | 1538 | |
| r10 | 50 | 1133 | | |
| r12 | 50 | 936 | 1985 | |
| r14 | 50 | 899 | | |
| r16 | 50 | 877 | 735 | |
| r18 | 35 | 819 | | 1214 |
| r20 | | 193 | | |
| r21 | | 176 | 1306 | |

| BR - LINES | | | | |
|------------|------------|--------|---------|---------|
| Rib | BR - LINES | | | |
| r2 | DSL 70 | | | |
| r4 | DSL 70 | DSL 70 | | |
| r6 | DSL 70 | | DSL 140 | |
| r8 | DSL 70 | DSL 70 | | |
| r10 | DSL 70 | | | |
| r12 | DSL 70 | DSL 70 | | DSL 300 |
| r14 | DSL 70 | | | |
| r16 | DSL 70 | DSL 70 | | DSL 140 |
| r18 | DSL 70 | | DSL 70 | |
| r20 | DSL 70 | | | |
| r21 | DSL 70 | DSL 70 | | |

| BR - LINES | | | | |
|------------|------------|-----|------|-------|
| Rib | BR - LINES | | | |
| r2 | br1 | | | |
| r4 | br2 | BR1 | BRI | |
| r6 | br3 | | | |
| r8 | br4 | BR2 | | |
| r10 | br5 | | | |
| r12 | br6 | BR3 | | br5.1 |
| r14 | br7 | | | |
| r16 | br8 | BR4 | | |
| r18 | br9 | | BRII | bmain |
| r20 | br10 | | | |
| r21 | br11 | BR5 | | |

Size S

Line LENGTH

| A - LINES | | | | |
|-----------|-------|-------|-------|-------|
| Rib | Total | Total | Total | Total |
| 1 | 2 | 860 | | |
| 2 | 3 | 811 | 1720 | 2068 |
| 3 | 5 | 610 | | |
| 4 | 6 | 640 | 1673 | 2471 |
| 5 | 8 | 1466 | 2849 | |
| 6 | 10 | 1499 | | |
| 7 | 12 | 1389 | 2063 | |
| 8 | 14 | 1302 | | 3242 |
| 9 | 16 | 1139 | 2114 | |
| 10 | 18 | 1059 | | |
| 11 | 20 | 1362 | | |
| 12 | 22 | 222 | 1008 | |

Checking

6882
6831
6783
6811
6756
6787
6870
6581
6469
6387
6162
6025

| B - LINES | | | | |
|-----------|-------|-------|-------|-------|
| Rib | Total | Total | Total | Total |
| 1 | 2 | 588 | | |
| 2 | 3 | 539 | 1720 | 2068 |
| 3 | 5 | 536 | | |
| 4 | 6 | 509 | 1673 | 2468 |
| 5 | 8 | 1395 | 2849 | |
| 6 | 10 | 1436 | | |
| 7 | 12 | 1334 | 2063 | |
| 8 | 14 | 1261 | | 3242 |
| 9 | 16 | 1118 | 2114 | |
| 10 | 18 | 1047 | | |
| 11 | 20 | 174 | 1180 | 4815 |
| 12 | 22 | 213 | | |

Checking

6810
6759
6709
6740
6685
6724
6615
6540
6448
6375
6150
6014

| C - LINES | | | | |
|-----------|-------|-------|-------|-------|
| Rib | Total | Total | Total | Total |
| 1 | 2 | 831 | | |
| 2 | 3 | 773 | 1573 | 2058 |
| 3 | 5 | 748 | | |
| 4 | 6 | 775 | 1545 | 2468 |
| 5 | 8 | 1059 | 3271 | |
| 6 | 10 | 1064 | | |
| 7 | 12 | 1021 | 2427 | |
| 8 | 14 | 956 | | 3242 |
| 9 | 16 | 967 | 2338 | |
| 10 | 18 | 882 | | |
| 11 | 20 | 188 | | |
| 12 | 22 | 156 | 1085 | |

Checking

6906
6846
6793
6818
6771
6804
6666
6599
6518
6431
6164
6034

| D - LINES | | | | |
|-----------|-------|-------|-------|-------|
| Rib | Total | Total | Total | Total |
| 1 | 2 | 918 | | |
| 2 | 3 | 863 | | |
| 3 | 5 | 834 | | |
| 4 | 6 | 857 | | |
| 5 | 8 | 1134 | | |
| 6 | 10 | 1163 | | |
| 7 | 12 | 1081 | | |
| 8 | 14 | 1015 | | |
| 9 | 22 | 191 | | |

Checking

6989
6932
6875
6896
6842
6869
6722
6654
6067

| JR - LINES | | | | |
|------------|-------|-------|-------|-------|
| Rib | Total | Total | Total | Total |
| r2 | 50 | 1790 | | |
| r4 | 50 | 1494 | 1474 | 2388 |
| r6 | 50 | 1437 | | |
| r8 | 50 | 1153 | 1606 | |
| r10 | 50 | 1202 | | |
| r12 | 50 | 998 | 2052 | |
| r14 | 50 | 960 | | |
| r16 | 50 | 938 | 768 | |
| r18 | 35 | 876 | | 1268 |
| r20 | | 220 | | |
| r21 | | 200 | 1364 | 1975 |

Checking

7618
7320
7261
7111
7158
6981
6941
6898
6834
6774
6752

Line TYPE

| A - LINES | | | | |
|-----------|--------|----------|----------|----------|
| Rib | DSL 70 | PPSL 120 | PPSL 160 | PPSL 275 |
| 2 | DSL 70 | | | |
| 3 | DSL 70 | PPSL 120 | PPSL 160 | |
| 5 | DSL 70 | | | |
| 6 | DSL 70 | PPSL 120 | | PPSL 275 |
| 8 | DSL 70 | PPSL 120 | | |
| 10 | DSL 70 | | | |
| 12 | DSL 70 | PPSL 120 | | |
| 14 | DSL 70 | | PPSL 200 | |
| 16 | DSL 70 | PPSL 120 | | |
| 18 | DSL 70 | | | |
| 20 | DSL 70 | | | |
| 22 | DSL 70 | DSL 70 | | |

| B - LINES | | | | |
|-----------|--------|----------|----------|----------|
| Rib | DSL 70 | PPSL 120 | PPSL 120 | PPSL 200 |
| 2 | DSL 70 | | | |
| 3 | DSL 70 | PPSL 120 | PPSL 120 | |
| 5 | DSL 70 | | | |
| 6 | DSL 70 | PPSL 120 | | PPSL 200 |
| 8 | DSL 70 | PPSL 120 | | |
| 10 | DSL 70 | | | |
| 12 | DSL 70 | PPSL 120 | | PPSL 200 |
| 14 | DSL 70 | | | |
| 16 | DSL 70 | PPSL 120 | | |
| 18 | DSL 70 | | | |
| 20 | DSL 70 | DSL 70 | PPSL 120 | |
| 22 | DSL 70 | | | |

| C - LINES | | | | |
|-----------|--------|----------|----------|----------|
| Rib | DSL 70 | PPSL 120 | PPSL 120 | PPSL 200 |
| 2 | DSL 70 | | | |
| 3 | DSL 70 | PPSL 120 | PPSL 120 | |
| 5 | DSL 70 | | | |
| 6 | DSL 70 | PPSL 120 | | PPSL 200 |
| 8 | DSL 70 | PPSL 120 | | |
| 10 | DSL 70 | | | |
| 12 | DSL 70 | PPSL 120 | | PPSL 200 |
| 14 | DSL 70 | | | |
| 16 | DSL 70 | PPSL 120 | | |
| 18 | DSL 70 | | | |
| 20 | DSL 70 | | | |
| 22 | DSL 70 | DSL 70 | | |

| D - LINES | | | | |
|-----------|--------|--|--|--|
| Rib | DSL 70 | | | |
| 2 | DSL 70 | | | |
| 3 | DSL 70 | | | |
| 5 | DSL 70 | | | |
| 6 | DSL 70 | | | |
| 8 | DSL 70 | | | |
| 10 | DSL 70 | | | |
| 12 | DSL 70 | | | |
| 14 | DSL 70 | | | |
| 22 | DSL 70 | | | |

| BR - LINES | | | | |
|------------|--------|--------|---------|---------|
| Rib | DSL 70 | DSL 70 | DSL 140 | DSL 360 |
| r2 | DSL 70 | | | |
| r4 | DSL 70 | DSL 70 | | |
| r6 | DSL 70 | | DSL 140 | |
| r8 | DSL 70 | DSL 70 | | |
| r10 | DSL 70 | | | |
| r12 | DSL 70 | DSL 70 | | DSL 360 |
| r14 | DSL 70 | | | |
| r16 | DSL 70 | DSL 70 | | |
| r18 | DSL 70 | | DSL 140 | |
| r20 | DSL 70 | | | |
| r21 | DSL 70 | DSL 70 | | |

Line NAME

| A - LINES | | | | |
|-----------|-----|-----|----|-------|
| Rib | A1 | A2 | A3 | A4 |
| 2 | a1 | | | |
| 3 | a2 | A1 | | AI |
| 5 | a3 | | | |
| 6 | a4 | A2 | | amain |
| 8 | a5 | A3 | | |
| 10 | a6 | | | |
| 12 | a7 | A4 | | |
| 14 | a8 | | | AI |
| 16 | a9 | A5 | | |
| 18 | a10 | | | |
| 20 | a11 | | | |
| 22 | st1 | ST1 | | |

| B - LINES | | | | |
|-----------|-----|----|-----|-------|
| Rib | b1 | b2 | B1 | B2 |
| 2 | b1 | | | |
| 3 | b2 | | BI | |
| 5 | b3 | | | |
| 6 | b4 | B2 | | bmain |
| 8 | b5 | B3 | | |
| 10 | b6 | | | |
| 12 | b7 | B4 | | |
| 14 | b8 | | BI | |
| 16 | b9 | B5 | | |
| 18 | b10 | | | |
| 20 | b11 | B6 | ST1 | |
| 22 | st2 | | | |

| C - LINES | | | | |
|-----------|-----|-----|-----|-------|
| Rib | c1 | c2 | C1 | C2 |
| 2 | c1 | | | |
| 3 | c2 | | CI | |
| 5 | c3 | | | |
| 6 | c4 | C2 | | cmain |
| 8 | c5 | C3 | | |
| 10 | c6 | | | |
| 12 | c7 | C4 | | |
| 14 | c8 | | CII | |
| 16 | c9 | C5 | | |
| 18 | c10 | | | |
| 20 | c11 | | | |
| 22 | st3 | ST2 | | |

| D - LINES | | | | |
|-----------|-----|----|----|----|
| Rib | d1 | d2 | d3 | d4 |
| 2 | d1 | | | |
| 3 | d2 | | | |
| 5 | d3 | | | |
| 6 | d4 | | | |
| 8 | d5 | | | |
| 10 | d6 | | | |
| 12 | d7 | | | |
| 14 | d8 | | | |
| 22 | st4 | | | |

| BR - LINES | | | | |
|------------|------|-----|------|-------|
| Rib | br1 | br2 | BR1 | BR2 |
| r2 | br1 | | | |
| r4 | br2 | | BR1 | |
| r6 | br3 | | | |
| r8 | br4 | BR2 | | |
| r10 | br5 | | | |
| r12 | br6 | BR3 | | br5.1 |
| r14 | br7 | | | |
| r16 | br8 | BR4 | | |
| r18 | br9 | | BRII | bmain |
| r20 | br10 | | | |
| r21 | br11 | BR5 | | |

Size M

| Line LENGTH | | | | | |
|-------------|-------|-------|-------|-------|------|
| A - LINES | | | | | |
| Rib | Total | Total | Total | Total | |
| 1 | 2 | 708 | | | |
| 2 | 3 | 656 | 1790 | 2150 | |
| 3 | 5 | 656 | | | |
| 4 | 6 | 687 | 1741 | | 2572 |
| 5 | 8 | 1540 | 2985 | | |
| 6 | 10 | 1583 | | | |
| 7 | 12 | 1469 | 2147 | | |
| 8 | 14 | 1380 | | 3373 | |
| 9 | 16 | 1210 | 2200 | | |
| 10 | 18 | 1126 | | | |
| 11 | 20 | 1441 | | | |
| 12 | 22 | 254 | 1049 | | |
| B - LINES | | | | | |
| 1 | 2 | 831 | | | |
| 2 | 3 | 581 | 1790 | 2150 | |
| 3 | 5 | 579 | | | |
| 4 | 6 | 612 | 1741 | | 2569 |
| 5 | 8 | 1474 | 2985 | | |
| 6 | 10 | 1517 | | | |
| 7 | 12 | 1412 | 2147 | | |
| 8 | 14 | 1337 | | 3373 | |
| 9 | 16 | 1188 | 2200 | | |
| 10 | 18 | 1112 | | | |
| 11 | 20 | 204 | 1228 | 5011 | |
| 12 | 22 | 245 | | | |
| C - LINES | | | | | |
| 1 | 2 | 887 | | | |
| 2 | 3 | 827 | 1637 | 2142 | |
| 3 | 5 | 803 | | | |
| 4 | 6 | 831 | 1608 | | 2569 |
| 5 | 8 | 1127 | 3404 | | |
| 6 | 10 | 1165 | | | |
| 7 | 12 | 1096 | 2528 | | |
| 8 | 14 | 1029 | | 3373 | |
| 9 | 16 | 1041 | 2430 | | |
| 10 | 18 | 952 | | | |
| 11 | 20 | 218 | | | |
| 12 | 22 | 184 | 1129 | | |
| D - LINES | | | | | |
| 1 | 2 | 978 | | | |
| 2 | 3 | 921 | | | |
| 3 | 5 | 892 | | | |
| 4 | 6 | 916 | | | |
| 5 | 8 | 1208 | | | |
| 6 | 10 | 1236 | | | |
| 7 | 12 | 1159 | | | |
| 8 | 14 | 1089 | | | |
| 9 | 22 | 220 | | | |
| BR - LINES | | | | | |
| r2 | 50 | 1847 | | | |
| r4 | 50 | 1610 | 1534 | 2485 | |
| r6 | 50 | 1524 | | | |
| r8 | 50 | 1220 | 1672 | | |
| r10 | 50 | 1268 | | | |
| r12 | 50 | 1058 | 2138 | | 2015 |
| r14 | 50 | 1022 | | | |
| r16 | 50 | 991 | 799 | | 2047 |
| r18 | 35 | 939 | | 1319 | |
| r20 | | 269 | | | |
| r21 | | 250 | 1419 | | |

| Line TYPE | | | | | |
|-----------|------------|----------|----------|----------|---------|
| Rib | A - LINES | | | | |
| 2 | DSL 70 | | | | |
| 3 | DSL 70 | PPSL 120 | PPSL 180 | | |
| 5 | DSL 70 | | | | |
| 6 | DSL 70 | PPSL 120 | | PPSL 275 | |
| 8 | DSL 70 | PPSL 120 | | | |
| 10 | DSL 70 | | | | |
| 12 | DSL 70 | PPSL 120 | | | |
| 14 | DSL 70 | | PPSL 200 | | |
| 16 | DSL 70 | PPSL 120 | | | |
| 18 | DSL 70 | | | | |
| 20 | DSL 70 | | | | |
| 22 | DSL 70 | DSL 70 | | | |
| Rib | B - LINES | | | | |
| 2 | DSL 70 | | | | |
| 3 | DSL 70 | PPSL 120 | PPSL 120 | | |
| 5 | DSL 70 | | | | |
| 6 | DSL 70 | PPSL 120 | | PPSL 200 | |
| 8 | DSL 70 | PPSL 120 | | | |
| 10 | DSL 70 | | | | |
| 12 | DSL 70 | PPSL 120 | | | |
| 14 | DSL 70 | | PPSL 200 | | |
| 16 | DSL 70 | PPSL 120 | | | |
| 18 | DSL 70 | | | | |
| 20 | DSL 70 | DSL 70 | PPSL 120 | | |
| 22 | DSL 70 | | | | |
| Rib | C - LINES | | | | |
| 2 | DSL 70 | | | | |
| 3 | DSL 70 | PPSL 120 | PPSL 120 | | |
| 5 | DSL 70 | | | | |
| 6 | DSL 70 | PPSL 120 | | PPSL 200 | |
| 8 | DSL 70 | PPSL 120 | | | |
| 10 | DSL 70 | | | | |
| 12 | DSL 70 | PPSL 120 | | | |
| 14 | DSL 70 | | PPSL 200 | | |
| 16 | DSL 70 | PPSL 120 | | | |
| 18 | DSL 70 | | | | |
| 20 | DSL 70 | | | | |
| 22 | DSL 70 | DSL 70 | | | |
| Rib | D - LINES | | | | |
| 2 | DSL 70 | | | | |
| 3 | DSL 70 | | | | |
| 5 | DSL 70 | | | | |
| 6 | DSL 70 | | | | |
| 8 | DSL 70 | | | | |
| 10 | DSL 70 | | | | |
| 12 | DSL 70 | | | | |
| 14 | DSL 70 | | | | |
| 22 | DSL 70 | | | | |
| Rib | BR - LINES | | | | |
| r2 | DSL 70 | | | | |
| r4 | DSL 70 | DSL 70 | | | |
| r6 | DSL 70 | | TSL 140 | | |
| r8 | DSL 70 | DSL 70 | | | |
| r10 | DSL 70 | | | | |
| r12 | DSL 70 | DSL 70 | | | DSL 398 |
| r14 | DSL 70 | | | | |
| r16 | DSL 70 | DSL 70 | | TSL 140 | |
| r18 | DSL 70 | | DSL 70 | | |
| r20 | DSL 70 | | | | |
| r21 | DSL 70 | DSL 70 | | | |

| Line Name | | | | | |
|-----------|------------|-----|--|------|-------|
| Rib | A - LINES | | | | |
| 2 | a1 | | | | |
| 3 | a2 | A1 | | AI | |
| 5 | a3 | | | | |
| 6 | a4 | A2 | | | amain |
| 8 | a5 | A3 | | | |
| 10 | a6 | | | | |
| 12 | a7 | A4 | | | |
| 14 | a8 | | | AI | |
| 16 | a9 | A5 | | | |
| 18 | a10 | | | | |
| 20 | a11 | | | | |
| 22 | st1 | ST1 | | | |
| Rib | B - LINES | | | | |
| 2 | b1 | | | | |
| 3 | b2 | B1 | | BI | |
| 5 | b3 | | | | |
| 6 | b4 | B2 | | | bmain |
| 8 | b5 | B3 | | | |
| 10 | b6 | | | | |
| 12 | b7 | B4 | | | |
| 14 | b8 | | | BII | |
| 16 | b9 | B5 | | | |
| 18 | b10 | | | | |
| 20 | b11 | B6 | | STI | |
| 22 | st2 | | | | |
| Rib | C - LINES | | | | |
| 2 | c1 | | | | |
| 3 | c2 | C1 | | CI | |
| 5 | c3 | | | | |
| 6 | c4 | C2 | | | cmain |
| 8 | c5 | C3 | | | |
| 10 | c6 | | | | |
| 12 | c7 | C4 | | | |
| 14 | c8 | | | CII | |
| 16 | c9 | C5 | | | |
| 18 | c10 | | | | |
| 20 | c11 | | | | |
| 22 | st3 | ST2 | | | |
| Rib | D - LINES | | | | |
| 2 | d1 | | | | |
| 3 | d2 | | | | |
| 5 | d3 | | | | |
| 6 | d4 | | | | |
| 8 | d5 | | | | |
| 10 | d6 | | | | |
| 12 | d7 | | | | |
| 14 | d8 | | | | |
| 22 | st4 | | | | |
| Rib | BR - LINES | | | | |
| r2 | br1 | | | | |
| r4 | br2 | BR1 | | BRI | |
| r6 | br3 | | | | |
| r8 | br4 | BR2 | | | |
| r10 | br5 | | | | |
| r12 | br6 | BR3 | | | br5.1 |
| r14 | br7 | | | | |
| r16 | br8 | BR4 | | | |
| r18 | br9 | | | BRII | bmain |
| r20 | br10 | | | | |
| r21 | br11 | BR5 | | | |

Size ML

| Line LENGTH | | | | |
|-------------|-------|-------|-------|-------|
| A - LINES | | | | |
| Rib | Total | Total | Total | Total |
| 1 | | | | |
| 2 | 750 | | | |
| 3 | 698 | 1857 | 2230 | |
| 5 | 700 | | | |
| 6 | 732 | 1806 | | 2668 |
| 8 | 1629 | 3077 | | |
| 10 | 1664 | | | |
| 12 | 1547 | 2227 | | |
| 14 | 1454 | | 3500 | |
| 16 | 1275 | 2282 | | |
| 18 | 1191 | | | |
| 20 | 1515 | | | |
| 22 | 285 | 1088 | | |
| B - LINES | | | | |
| 1 | | | | |
| 2 | 673 | | | |
| 3 | 621 | 1857 | 2230 | |
| 5 | 620 | | | |
| 6 | 655 | 1806 | | 2665 |
| 8 | 1551 | 3077 | | |
| 10 | 1595 | | | |
| 12 | 1487 | 2227 | | |
| 14 | 1409 | | 3500 | |
| 16 | 1255 | 2282 | | |
| 18 | 1176 | | | |
| 20 | 234 | 1274 | 5199 | |
| 22 | 275 | | | |
| C - LINES | | | | |
| 1 | | | | |
| 2 | 937 | | | |
| 3 | 876 | 1898 | 2222 | |
| 5 | 852 | | | |
| 6 | 881 | 1869 | | 2665 |
| 8 | 1190 | 3532 | | |
| 10 | 1225 | | | |
| 12 | 1159 | 2621 | | |
| 14 | 1090 | | 3500 | |
| 16 | 1102 | 2522 | | |
| 18 | 1009 | | | |
| 20 | 248 | | | |
| 22 | 211 | 1171 | | |
| D - LINES | | | | |
| 1 | | | | |
| 2 | 1032 | | | |
| 3 | 973 | | | |
| 5 | 944 | | | |
| 6 | 969 | | | |
| 8 | 1271 | | | |
| 10 | 1302 | | | |
| 12 | 1224 | | | |
| 14 | 1152 | | | |
| 22 | 248 | | | |
| BR - LINES | | | | |
| r2 | 50 | 2033 | | |
| r4 | 50 | 1685 | 1591 | |
| r6 | 50 | 1596 | | 2578 |
| r8 | 50 | 1283 | 1735 | |
| r10 | 50 | 1332 | | |
| r12 | 50 | 1100 | 2217 | |
| r14 | 50 | 1063 | | |
| r16 | 50 | 1032 | 829 | |
| r18 | 35 | 977 | | 1369 |
| r20 | | 282 | | |
| r21 | | 280 | 1472 | 2124 |
| | | | | 2095 |

| Line TYPE | | | | |
|------------|-----------|----------|----------|----------|
| Rib | A - LINES | | | |
| 2 | DSL 70 | | | |
| 3 | DSL 70 | PPSL 120 | PPSL 160 | |
| 5 | DSL 70 | | | |
| 6 | DSL 70 | PPSL 120 | | PPSL 275 |
| 8 | DSL 70 | PPSL 120 | | |
| 10 | DSL 70 | | | |
| 12 | DSL 70 | PPSL 120 | | |
| 14 | DSL 70 | | PPSL 200 | |
| 16 | DSL 70 | PPSL 120 | | |
| 18 | DSL 70 | | | |
| 20 | DSL 70 | | | |
| 22 | DSL 70 | DSL 70 | | |
| B - LINES | | | | |
| 1 | | | | |
| 2 | DSL 70 | | | |
| 3 | DSL 70 | PPSL 120 | PPSL 120 | |
| 5 | DSL 70 | | | |
| 6 | DSL 70 | PPSL 120 | | PPSL 200 |
| 8 | DSL 70 | PPSL 120 | | |
| 10 | DSL 70 | | | |
| 12 | DSL 70 | PPSL 120 | | |
| 14 | DSL 70 | | PPSL 200 | |
| 16 | DSL 70 | PPSL 120 | | |
| 18 | DSL 70 | | | |
| 20 | DSL 70 | DSL 70 | PPSL 120 | |
| 22 | DSL 70 | | | |
| C - LINES | | | | |
| 1 | | | | |
| 2 | DSL 70 | | | |
| 3 | DSL 70 | PPSL 120 | PPSL 120 | |
| 5 | DSL 70 | | | |
| 6 | DSL 70 | PPSL 120 | | PPSL 200 |
| 8 | DSL 70 | PPSL 120 | | |
| 10 | DSL 70 | | | |
| 12 | DSL 70 | PPSL 120 | | |
| 14 | DSL 70 | | PPSL 200 | |
| 16 | DSL 70 | PPSL 120 | | |
| 18 | DSL 70 | | | |
| 20 | DSL 70 | | | |
| 22 | DSL 70 | DSL 70 | | |
| D - LINES | | | | |
| 1 | | | | |
| 2 | DSL 70 | | | |
| 3 | DSL 70 | | | |
| 5 | DSL 70 | | | |
| 6 | DSL 70 | | | |
| 8 | DSL 70 | | | |
| 10 | DSL 70 | | | |
| 12 | DSL 70 | | | |
| 14 | DSL 70 | | | |
| 22 | DSL 70 | | | |
| BR - LINES | | | | |
| r2 | DSL 70 | | | |
| r4 | DSL 70 | DSL 70 | | |
| r6 | DSL 70 | | DSL 140 | |
| r8 | DSL 70 | DSL 70 | | |
| r10 | DSL 70 | | | |
| r12 | DSL 70 | DSL 70 | | DSL 350 |
| r14 | DSL 70 | | | |
| r16 | DSL 70 | DSL 70 | DSL 140 | |
| r18 | DSL 70 | | DSL 70 | |
| r20 | DSL 70 | | | |
| r21 | DSL 70 | DSL 70 | | |

| Line Name | | | | |
|------------|-----------|-----|------|-------|
| Rib | A - LINES | | | |
| 2 | a1 | | | |
| 3 | a2 | A1 | AI | |
| 5 | a3 | | | |
| 6 | a4 | A2 | | amain |
| 8 | a5 | A3 | | |
| 10 | a6 | | | |
| 12 | a7 | A4 | | |
| 14 | a8 | | AI | |
| 16 | a9 | A5 | | |
| 18 | a10 | | | |
| 20 | a11 | | | |
| 22 | st1 | ST1 | | |
| B - LINES | | | | |
| 1 | | | | |
| 2 | b1 | | | |
| 3 | b2 | B1 | BI | |
| 5 | b3 | | | |
| 6 | b4 | B2 | | bmain |
| 8 | b5 | B3 | | |
| 10 | b6 | | | |
| 12 | b7 | B4 | | |
| 14 | b8 | | BII | |
| 16 | b9 | B5 | | |
| 18 | b10 | | | |
| 20 | b11 | B6 | STI | |
| 22 | st2 | | | |
| C - LINES | | | | |
| 1 | | | | |
| 2 | c1 | | | |
| 3 | c2 | C1 | CI | |
| 5 | c3 | | | |
| 6 | c4 | C2 | | cmain |
| 8 | c5 | C3 | | |
| 10 | c6 | | | |
| 12 | c7 | C4 | | |
| 14 | c8 | | CII | |
| 16 | c9 | C5 | | |
| 18 | c10 | | | |
| 20 | c11 | | | |
| 22 | st3 | ST2 | | |
| D - LINES | | | | |
| 1 | | | | |
| 2 | d1 | | | |
| 3 | d2 | | | |
| 5 | d3 | | | |
| 6 | d4 | | | |
| 8 | d5 | | | |
| 10 | d6 | | | |
| 12 | d7 | | | |
| 14 | d8 | | | |
| 22 | st4 | | | |
| BR - LINES | | | | |
| r2 | br1 | | | |
| r4 | br2 | BR1 | BRI | |
| r6 | br3 | | | |
| r8 | br4 | BR2 | | |
| r10 | br5 | | | |
| r12 | br6 | BR3 | | br5.1 |
| r14 | br7 | | | |
| r16 | br8 | BR4 | | |
| r18 | br9 | | BRII | bmain |
| r20 | br10 | | | |
| r21 | br11 | BR5 | | |

Size L

| Line LENGTH | | | | |
|-------------|-------|-------|-------|-------|
| A - LINES | | | | |
| Rib | Total | Total | Total | Total |
| 1 | 2 | 794 | | |
| 2 | 3 | 741 | 1920 | 2308 |
| 3 | 5 | 744 | | |
| 4 | 6 | 777 | 1867 | |
| 5 | 8 | 1708 | 3183 | |
| 6 | 10 | 1742 | | |
| 7 | 12 | 1625 | 2305 | |
| 8 | 14 | 1529 | | 3619 |
| 9 | 16 | 1348 | 2362 | |
| 10 | 18 | 1256 | | |
| 11 | 20 | 1583 | | |
| 12 | 22 | 318 | 1125 | |

| Line TYPE | | | | |
|-----------|-----------|----------|----------|----------|
| Rib | A - LINES | | | |
| 2 | DSL 70 | | | |
| 3 | DSL 70 | PPSL 120 | PPSL 160 | |
| 5 | DSL 70 | | | PPSL 275 |
| 6 | DSL 70 | PPSL 120 | | |
| 8 | DSL 70 | PPSL 160 | | |
| 10 | DSL 70 | | | |
| 12 | DSL 70 | PPSL 160 | | |
| 14 | DSL 70 | | PPSL 275 | |
| 16 | DSL 70 | PPSL 160 | | |
| 18 | DSL 70 | | | |
| 20 | DSL 70 | | | |
| 22 | DSL 70 | DSL 70 | | |

| Line Name | | | | |
|-----------|-----------|-----|----|-------|
| Rib | A - LINES | | | |
| 2 | a1 | | | |
| 3 | a2 | A1 | AI | |
| 5 | a3 | | | amain |
| 6 | a4 | A2 | | |
| 8 | a5 | A3 | | |
| 10 | a6 | | | |
| 12 | a7 | A4 | AI | |
| 14 | a8 | | | |
| 16 | a9 | A5 | | |
| 18 | a10 | | | |
| 20 | a11 | | | |
| 22 | st1 | ST1 | | |

| B - LINES | | | | |
|-----------|-------|-------|-------|-------|
| Rib | Total | Total | Total | Total |
| 1 | 2 | 714 | | |
| 2 | 3 | 660 | 1920 | 2308 |
| 3 | 5 | 661 | | |
| 4 | 6 | 697 | 1867 | |
| 5 | 8 | 1625 | 3183 | |
| 6 | 10 | 1671 | | |
| 7 | 12 | 1583 | 2305 | |
| 8 | 14 | 1483 | | 3619 |
| 9 | 16 | 1323 | 2362 | |
| 10 | 18 | 1240 | | |
| 11 | 20 | 263 | 1319 | 5380 |
| 12 | 22 | 307 | | |

| B - LINES | | | | |
|-----------|-----------|----------|----------|----------|
| Rib | B - LINES | | | |
| 2 | DSL 70 | | | |
| 3 | DSL 70 | PPSL 120 | PPSL 160 | |
| 5 | DSL 70 | | | PPSL 275 |
| 6 | DSL 70 | PPSL 120 | | |
| 8 | DSL 70 | PPSL 160 | | |
| 10 | DSL 70 | | | |
| 12 | DSL 70 | PPSL 160 | | |
| 14 | DSL 70 | | PPSL 275 | |
| 16 | DSL 70 | PPSL 160 | | |
| 18 | DSL 70 | | | |
| 20 | DSL 70 | DSL 70 | PPSL 120 | |
| 22 | DSL 70 | | | |

| B - LINES | | | | |
|-----------|-----------|----|-----|-------|
| Rib | B - LINES | | | |
| 2 | b1 | | | |
| 3 | b2 | B1 | BI | |
| 5 | b3 | | | bmain |
| 6 | b4 | B2 | | |
| 8 | b5 | B3 | | |
| 10 | b6 | | | |
| 12 | b7 | B4 | BI | |
| 14 | b8 | | | |
| 16 | b9 | B5 | | |
| 18 | b10 | | | |
| 20 | b11 | B6 | STI | |
| 22 | st2 | | | |

| C - LINES | | | | |
|-----------|-------|-------|-------|-------|
| Rib | Total | Total | Total | Total |
| 1 | 2 | 988 | | |
| 2 | 3 | 924 | 1755 | 2300 |
| 3 | 5 | 898 | | |
| 4 | 6 | 928 | 1727 | |
| 5 | 8 | 1247 | 3658 | |
| 6 | 10 | 1287 | | |
| 7 | 12 | 1220 | 2715 | |
| 8 | 14 | 1149 | | 3619 |
| 9 | 16 | 1163 | 2612 | |
| 10 | 18 | 1065 | | |
| 11 | 20 | 278 | | |
| 12 | 22 | 238 | 1212 | |

| C - LINES | | | | |
|-----------|-----------|----------|----------|----------|
| Rib | C - LINES | | | |
| 2 | DSL 70 | | | |
| 3 | DSL 70 | PPSL 120 | PPSL 160 | |
| 5 | DSL 70 | | | PPSL 275 |
| 6 | DSL 70 | PPSL 120 | | |
| 8 | DSL 70 | PPSL 160 | | |
| 10 | DSL 70 | | | |
| 12 | DSL 70 | PPSL 160 | | |
| 14 | DSL 70 | | PPSL 275 | |
| 16 | DSL 70 | PPSL 160 | | |
| 18 | DSL 70 | | | |
| 20 | DSL 70 | | | |
| 22 | DSL 70 | DSL 70 | | |

| C - LINES | | | | |
|-----------|-----------|-----|-----|-------|
| Rib | C - LINES | | | |
| 2 | c1 | | | |
| 3 | c2 | C1 | CI | |
| 5 | c3 | | | omain |
| 6 | c4 | C2 | | |
| 8 | c5 | C3 | | |
| 10 | c6 | | | |
| 12 | c7 | C4 | CII | |
| 14 | c8 | | | |
| 16 | c9 | C5 | | |
| 18 | c10 | | | |
| 20 | c11 | | | |
| 22 | st3 | ST2 | | |

| D - LINES | | | | |
|-----------|-----------|--|--|--|
| Rib | D - LINES | | | |
| 2 | DSL 70 | | | |
| 3 | DSL 70 | | | |
| 5 | DSL 70 | | | |
| 6 | DSL 70 | | | |
| 8 | DSL 70 | | | |
| 10 | DSL 70 | | | |
| 12 | DSL 70 | | | |
| 14 | DSL 70 | | | |
| 22 | DSL 70 | | | |

| D - LINES | | | | |
|-----------|-----------|--|--|--|
| Rib | D - LINES | | | |
| 2 | d1 | | | |
| 3 | d2 | | | |
| 5 | d3 | | | |
| 6 | d4 | | | |
| 8 | d5 | | | |
| 10 | d6 | | | |
| 12 | d7 | | | |
| 14 | d8 | | | |
| 22 | st4 | | | |

| BR - LINES | | | | |
|------------|------------|------|------|------|
| Rib | BR - LINES | | | |
| r2 | 50 | 2119 | | |
| r4 | 50 | 1761 | 1649 | 2665 |
| r6 | 50 | 1668 | | |
| r8 | 50 | 1348 | 1798 | |
| r10 | 50 | 1396 | | |
| r12 | 50 | 1157 | 2294 | |
| r14 | 50 | 1119 | | |
| r16 | 50 | 1086 | 859 | |
| r18 | 35 | 1029 | | 1417 |
| r20 | | 307 | | |
| r21 | | 283 | 1521 | |

| BR - LINES | | | | |
|------------|------------|--------|---------|---------|
| Rib | BR - LINES | | | |
| r2 | DSL 70 | | | |
| r4 | DSL 70 | DSL 70 | | |
| r6 | DSL 70 | | DSL 140 | |
| r8 | DSL 70 | DSL 70 | | |
| r10 | DSL 70 | | | |
| r12 | DSL 70 | DSL 70 | | DSL 350 |
| r14 | DSL 70 | | | |
| r16 | DSL 70 | DSL 70 | | |
| r18 | DSL 70 | | DSL 140 | |
| r20 | DSL 70 | | | |
| r21 | DSL 70 | DSL 70 | | |

| BR - LINES | | | | |
|------------|------------|-----|--------|-------|
| Rib | BR - LINES | | | |
| r2 | br1 | | | |
| r4 | br2 | BR1 | BRI | |
| r6 | br3 | | | |
| r8 | br4 | BR2 | | |
| r10 | br5 | | | |
| r12 | br6 | BR3 | | br5.1 |
| r14 | br7 | | | |
| r16 | br8 | BR4 | brmain | |
| r18 | br9 | | | |
| r20 | br10 | | | |
| r21 | br11 | BR5 | | |