OPERA

USER MANUAL
V2.0
01.MAR.2020

DAVINCI GLIDERS

DAVINCI
GLIDERS

Congratulations

Congratulations!
Welcome you in our circle of TEAM DAVINCI.

The OPERA has been designed for top level competitors and expert pilots.

This glider is a unique concept. Despite of impressive AR of 7.8 and lots of cells (128) this glider is still user-friendly for its category. It has amazing stability, even in accelerated flight, and it's easy to control, allowing its pilot to concentrate on tactics. There's plenty of innovations and know-hows packed into this flying machine with impressive look and very sophisticated design.

This manual will help you to get all information about your glider. We strongly recommend that you read this manual carefully in order to be aware of any general limitations, performance characteristics, take off and flight characteristics, landing procedures, dealing with emergency situations and general maintenance.

Don’t hesitate to contact us or your local dealer, if you have any question.
You can find the latest news from our home page www.flydavinci.com

Happy flying
DAVINCI GLIDERS

DAVINCI GLIDERS

INDEX

WARNING

- This is not training manual.
- You are responsible for understanding the correct and safe use of this paragliding equipment, for its intended use, and for performing all appropriate safety procedures before and during use.
- Paragliding is a very dangerous activity, and sometimes it can be lead to severe injury or even death.
- The manufacturer, designer, distributor, wholesaler and retailer can not guarantee the safety of users when using this equipment and are not responsible for damage, injury or death resulting from the use of this equipment.
- This paragliding equipment should only be used by pilots under the direct supervision of qualified competent pilots or competent qualified paragliding instructors.
- DAVINCI GLIDERS are carefully manufactured and inspected at the factory. Please use the glider only as described in this manual.
- Do not make any modifications to the glider.
- As with any sport–without taking the necessary safety precautions, paragliding can be dangerous.
- Always wear a helmet and protective clothing when flying a paraglider.
- Do not fly in weather of rain, snow, windy, turbulent and cloudy condition

Technical Data

OPERA			XS	S	SM	M	L	XL
CELLS	NUMBER		128					
	CLOSED		12					
FLAT	AREA	m^2	19.2	21.0	22.7	23.6	25.5	27.5
	SPAN	m	12.27	12.83	13.34	13.60	14.14	14.68
	ASPECT RATIO (CCC)		7.84(7.63)					
PROJECTED	AREA	m^2	16.6	18.1	19.6	20.4	22.0	23.7
	SPAN	m	10.04	10.50	10.92	11.13	11.57	12.02
	ASPECT RATIO		6.08					
FLATTENING		%	13.66%					
CORD	MAX	m	1.953	2.043	2.124	2.166	2.251	2.34
	AVER	m	1.565	1.637	1.702	1.735	1.803	1.873
LINES	HEIGHT	m	7.60	7.96	8.27	8.43	8.77	9.10
	MAIN		1+1+1/3					
RISERS	NUMBER		A1+A2+A3/B					
	TRIMS		140					
PILOT WEIGHT (FREE FLIGHT)	MIN-MAX	KG	80-92	85-100	95-110	100-115	110-125	120-135
CERTIFICATION	8G EN926-1/2	KG	CCC	CCC	CCC	CCC	CCC	CCC
GLIDER WEIGHT		KG	5.8	6.1	6.6	6.9	7.0	7.3

Materials Data

CANOPY	FABRIC CODE	SUPPLIER
UPPER SURFACE leading Edge	30D MF	DOMINICO TEXTILE CO
UPPER SURFACE except leading Edge	SKYTEX 27	Pocher Industires
BOTTOM SURFACE	SKYTEX 27	Pocher Industires
PROFILES (supported)	70032 E4D	Pocher Industires
PROFILES (unsupported)	E91	Pocher Industires
DIAGONALS	70032 E4D	Pocher Industires
Plastic Reinforcements	2.5/2.0mm	Plastic from korea
TRAILING EDGE REINFORCEMENT	Laminated	NCV INDUSTRIES

SUSPENSION LINES	FABRIC CODE	SUPPLIER
UPPER CASCADES	8000U- 070/050/025	EDELRID
MIDDLE CASCADES	8000U-130/090/070/050	EDELRID
MAIN	8000U- 360/190/050 DSL70	EDELRID Liros
UPPER STABLE	8000U-050	EDELRID
MAIN STABLE	8000U-050 / DSL 70	EDELRID / Liros
UPPER BRAKE	8000U-025	EDELRID
MIDDLE BRAKE	8000U-070/050	EDELRID
MAIN BREAK	8000U-130 / PPSL160	EDELRID / Liros

RISERS	FABRIC CODE	SUPPLIER
MATERIAL	12MM polyester	GUTH&WOLF GMBH
THREAD	210D/3, 420D/3	COATS THREAD THAILAND
PULLEYS	Pulley	Ronstan

DAVINCI GLIDERS

Introduction/Target Pilot

The OPERA is the result of a dedicated effort of Davinci R&D team. A totally new and innovative design that has never been seen before, you can experience high stability, handling, and effective/maximum lift force in thermal, as well as glide ratio.
The OPERA was born to realize the desire of the pilot to fly faster, higher and farther.
Based on the 2 liner system, OPERA is the best glider with minimum air resistance and best glide ratio from CFD(Computational Fluid Dynamics) and FEM(Finite Element Method) technology for optimized design.
You can make a new records with your OPERA.

- CCC certification : The OPERA is certified during official testing as CCC, the glider has been type-tested for "one-seated" use only.

- Suitability for expert pilots : The OPERA is not suitable for beginner or intermediate pilots, aerobatics, training or tandem flights.

- Smart Nose Plus : The Opera has special riser system and Smart Nose Plus is very unique technology can expect high glider ratio through dramatically improved safety and natural control of the glider's pressure.

Harness

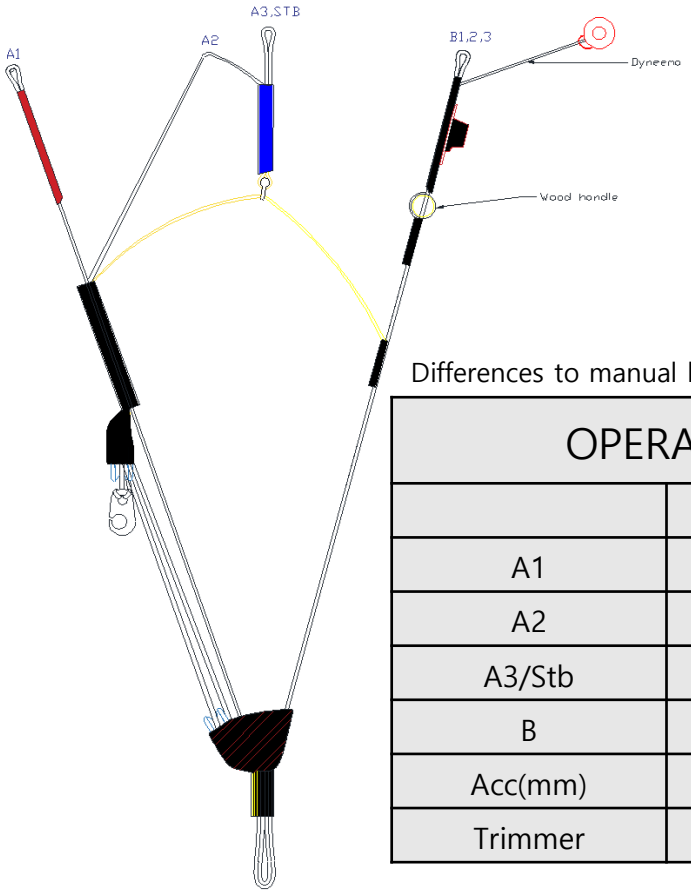
The OPERA is certified for harnesses in Group GH type.
The suspension points of the chosen harness should ideally have a caraviner distance of approximately 43cm and a height of 44cm for XS size, 46cm for S, SM, M, L, XL sizes.
We recommend adjusting the harness in a very similar way to the test adjustment. Excessive cross-bracing increases the risk of twisting the risers. A looser setting will result in a tendency to lean towards the collapsed side. Lower hang points reduce the roll-stability of your harness and can slow down the reopening of asymmetric collapses. Higher hang points (+2 up to +4 cm) have no influence on inflight safety and can therefore be tolerated.

Reserve Parachute

We recommend that you need to have two reserves within your maximum flying weight for each. when you fly with Opera. It should be installed both side of harness.

Risers

The OPERA has been designed with 2 liner system. The A1 riser is covered with RED webbing to allow for easy dentification. The A risers are split into three for the efficient acceleration performance.
A3/STB has been designed this way to make applying big ears easily. They also feature ergonomic wooden handles for efficient B-riser control.



Differences to manual lengths should not exceed ±5mm

OPERA Riser length		
	Trim	Accelerated
A1	552	286
A2	552	320
A3/Stb	552	354
B	552	426
Acc(mm)	0	140
Trimmer	n/a	

Lines

- They come in different diameters of Kevlar and lines. They must to be inspected every 100 hours or 12months maximum.
- In case of Brake lines, it was cut a little longer, so every pilot can adjust it according to his personal taste. But you must always leave 10cm before the brakes line starts acting in order to avoid trailing edge deformation when the wing is fully accelerated.
- In case the brake handle comes loose during flight or any brake lines is cut you can use the B riser softly for directional control instead of brake line.
- You have to check your brake for both to be same always.

DAVINCI GLIDERS

Accelerator System

The OPERA is equipped with a accelerator system.
Normally, CCC glider like the OPERA, it has been certified within 10cm of travel.
The profile of OPERA has been designed to fly stable through its entire speed range.
It is useful to accelerate when flying in strong winds or in extreme descending air. For fitting and positioning the speed bar consult the instructions of the harness manufacturer.
Before every flight check that the speed bar works freely and that the lines are long enough to ensure that it is not engaged permanently.
The use of the accelerator system reduces the angle of attack and the canopy may be more sensitive to collapses therefore do not use near the ground or in turbulent air and in case you are hit by turbulence remove your feet off the speed bar as quickly as possible. Always far away from the ground when using the speed bar. We therefore do not advise to use the speed bar near the ground.
You have to adjust the harness to the speed system so you can use all the speed travel.
To do so you have to be seated in the ground meanwhile you are in your harness and adjust the lines by pulling up the risers with tension. Another person help to do this is recommended. Make sure also that the speed bar is not pulling down the risers when you are not using it.
Once all the gear is rigged you have to test the whole speed travel in calm air.

Pre-flight check

To know yourself with the glider it is a good idea to perform practice inflations and ground handling in advance. You should have no difficulties flying the OPERA for the first time in suitable conditions, but as with all new equipment.
When you have the new glider, the below points should be inspected.

- Check the lines are clear and not twisted.
- Connection points between the glider and harness.
- Check that the brake handles are correctly attached and that each line runs freely through the pulley.
- All harness buckles are closed.
- The Karabiners are fully closed and not damaged.
- The sewing, condition of the lines and connection of the lines are right
- Internal demage to ribs and diagonal ribs.
- Demage to the top and bottom panels and seams between panels.

Take-Off

The OPERA has been designed as a foot launchable solo paraglider only.
To get the right wing shape for the take-off, pull the brake until the canopy shows at the perfect banana shape on the flat ground. While inflating the OPERA, you should hold both of the A2 and A2 risers on your hands. Smoothly and gradually inflate the wing with stretched.
Do not pull the riser forward or down too far, the front edge may collapse. Therefore, it is better to follow in the direction of the lower glider until the glider inflates the angle of flight.
While the glider is inflating, it is important that the center of gravity of the body stays in front of the feet to constantly load to the riser.

- Tow launch

The OPERA could be tow-launched. It is the responsibility of pilot to use the right harness and installed/release staff and to ensure that they are properly trained in the equipment and systems they use.
All tow pilots must be qualified to tow, use a qualified tow driver with appropriate certified equipment, and comply with all towing regulations. When towing, the paraglider must be completely over the head before starting. In each case, the maximum towing force should meet to the pilot's max flight weight.

In flight Characteristics

The OPERA has the best stable glide performance in a normal position without any brakes. Actually we call it "Trim speed" condition.
In theory, it shows the best performance at trim speed. However, when we apply a brake of about 10 cm, it is at a minimal sink rate, such as a lower sink when we do some thermaling or apply some brake tension just before the landing.

If you want to avoid the collapse of your OPERA, you need to use active flying. For this, you need to control the pitch, keep the internal pressure of the glider by using the brake or B streering. But in case of the turbulent condition, you had better use only the brakes.

Alternative Steering : In the unlikely event, that a brake line releases from the brake handle, or breaks, or the brake-lines are tangled up, the glider is maneuverable using the B riser(rear-risers). By pulling gently on the rear-risers, it is possible to steer the glider and land safely. Don't pull the rear-risers too much, to avoid a deep stall.

Deflations

Although the OPERA has great stability of the flight, strong turbulence or piloting error may cause a portion of the wing suddenly to be a deflation. The OPERA is a CCC glider so, it is essential to do active flying in case of an asymmetric or frontal collapse. Active flying will reduce the loss of altitude and a change of direction

Asymmetric collapse

Asymmetric collapse usually happens when the pilot has not foreseen this possible reaction of the wing.
To prevent the collapse from happening, pull the brake line corresponding to the compromised side of the wing, this will increase the angle of attack. If the collapse does happen, the OPERA will not react violently, the turn tendency is very gradual and it is easily controlled. Lean your body towards the side that is still flying in order to counteract the turn and to maintain a straight course, if necessary slightly slow down the same side. During keep the course, do not use the over-braking on your pend side.
The collapse will normally open by itself but if that does not happen, you need to pull the brake lines at the collapsed side strongly and release it. You need to repeat this pumping action several times.

Symmetric collapse

Symmetric collapse usually occurs when the pilot has not predicted a possible response of the glider.
When it has been happened, the OPERA will be recovered by itself immediately and the OPERA will gain the speed again.
To avoid this situation, it needs the active flying skills.
Pull the both brakes when you may feel the less pressure and the collapse occurred. And the then release the brake right after to make the normal condition.

Full stall

Full stall can occur when you fully pull the both brakes enough long time. This means that the wing loses its forward momentum. Also weather conditions can cause a full stall. This is a serious deviation from normal flight and can be difficult to manage. If a stall occurs at less than 100 m above the ground, throw your reserve parachute.
To recover to the normal flight you must release both brakes. After this usually comes a front dive with a possible front deflation. An asymmetric recovery (one control released faster than the other) from a full-stall can cause a big dynamic collapse. The full-stall is a hazardous maneuver and as such outside the scope of this manual. You should practice and learn this maneuver only on a SIV course under professional instructor.

Deep stall

It is possible for gliders to enter a state of deep stall. This can be caused by several situations including; flying the glider when wet; very old glider; or after a front/symmetric deflation. When you meet this situation you should fully raise up the both brakes and push the A-risers forwards or use the speed bar symmetrically to regain a normal flight.

Asymmetrical stall

It can take place when you pull one of the brake too hard, or while spiraling at a small speed in turbulence you increase the angle of attack. Rotation in the asymmetrical stall is called negative spiral. This is one of the most dangerous flying situations. In order to get out of asymmetrical stall, just release the brakes. There may follow side thrust forward with a following wing collapse.

B stall

Traditional B-line stalls are not possible with 2 liners glider like the OPERA.
If you pull the B lines, it will be occurred a full stall.
We strongly do not recommend this maneuver for OPERA.

Cravat(wing Tangle)

The cravat can occur when the tip of the wing comes into the glider line due to the collapsed situation. When it's happened, the first action is to make the glider could not be lost the course where you go. For this, you need to do weight shift and pull the brake to the other side of cravat wing until the glider is stable and go straight.
Once you can control your wing to the course, you need to pull the brake lines at the cravated side strongly and release it. You need to repeat this pumping action several times.
If you lost the timing for keeping the course, the glider can be entered spiral dive.
When you pull the one of the brake too much, a asymmetrical stall may occur.
If the small cravat can be solved by pulling the stable line. The full stall maneuver is the last step of the solution to solve the cravat but you have to know about that skill very well before try it.
You have to keep in mind that if the rotation is accelerating and you can not manage the glider, you should open the reserve parachute system immediately before the low altitude.

SIV with collapse lines

The Opera is certified using the collapse lines. If you want to try the collapse maneuver during the SIV course, the Opera needs the collapse lines and attachment points on the glider. These are optional and need to be added by the pre-order.
For the SIV, we strongly recommend to be carried out by qualified instructor with safety precautions.

Landing

We recommend to land with trimmers to the normal slow position. Don't use the sharp turns or radical maneuvers. The OPERA is a high speed glider, any action on the brakes may cause significant reactions. When you are 1-2m over the ground, you should face into wind and standing upright and ready to run. Finally you may pull the brakes smoothly for minimize vertical speed. Don't hit the ground by your overtake the glider. If you in windy condition, as soon as you touch the ground you have to turn around to face the glider and move towards it during full pulling break symmetrically.

Packing your OPERA

Spread the OPERA completely out on the ground. Separate the lines to the each side. The OPERA must be folded cell to cell to keep the plastic reinforcement at the leading edge lie flat on each other and don't get bent. Try to pack your OPERA as loosely as the rucksack allows, because every fold weakens the fabric. Avoid packing the glider where it is wet or abrasive conditions(sand, asphalt pavement, concrete).
We recommend when you don't use the OPERA for a long time, store OPERA lay on the flat table or bottom without any bending plastics. Always use the protective bag to avoid direct contact with the harnesses and buckles of any friction between the blade and the rucksack.

Maintenance checks

Cleaning should be carried out with only pure water. If the glider comes in contact with salt water, clean thoroughly with fresh water. Do not use solvents of any kind, as this may remove the protective coatings and destroy the fabric.

Caring Tips

- Do not expose your glider to the sun any longer than necessary
- Keep it away from water and other liquids
- Do not let the front edge hit the ground
- Keep your glider away from fire
- Do not put anything heavy on your glider, do not pack it in a rucksack too tightly.
- Regularly inspect the canopy, lines, risers and harness. If you find any defects, contact your dealer or the manufacturer. Do not attempt to repair the paraglider by yourselves.
- If you detect a damaged line, inform the dealer or manufacturer about the line number according to the line plan
- Keep your OPERA in a bag in a dry well-ventilated place under neutral temperature and humidity conditions
- If you do not use the glider, then once a month you should unpack it, ventilate it well, and then pack it back in the bag

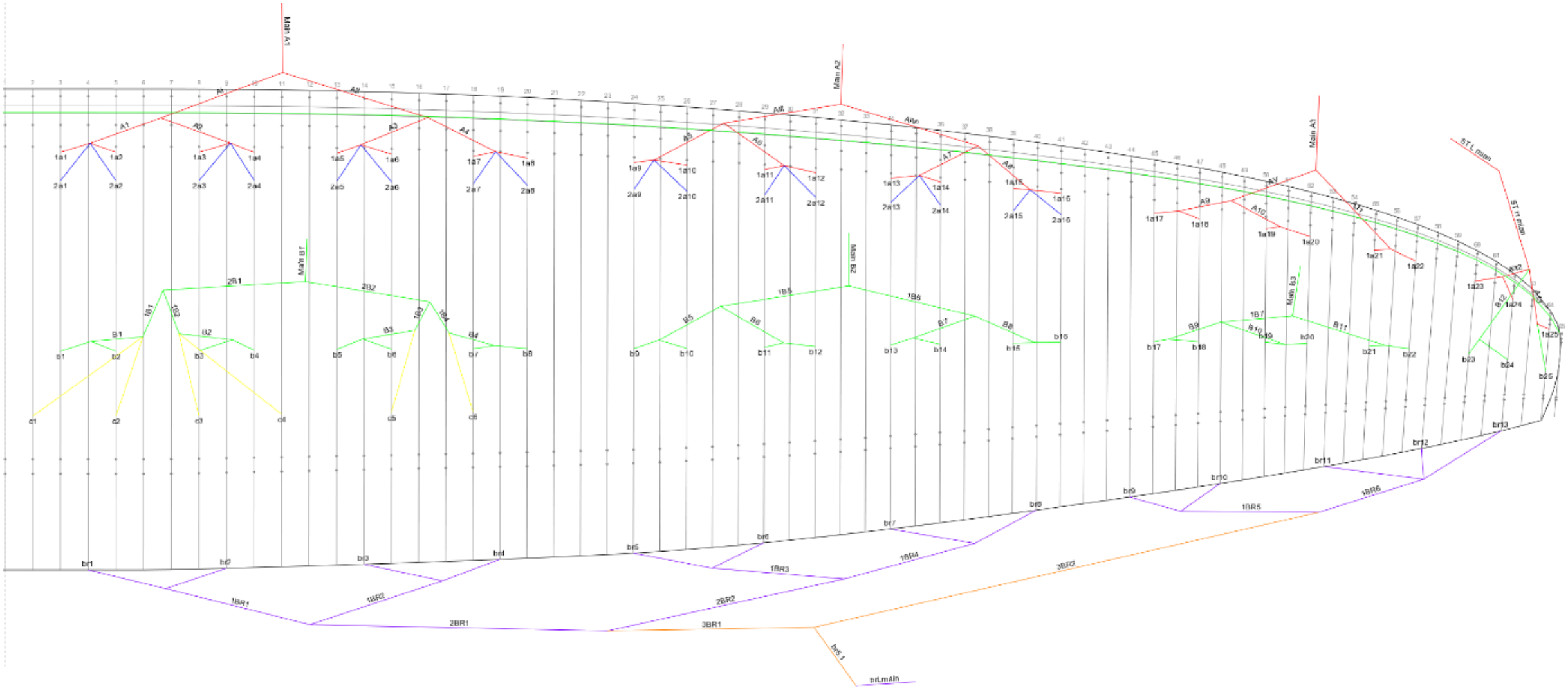
Warrantee

The production guarantees the correctness of the declared characteristics and the paraglider's normal performance for two years or 250 hours flying time after the purchase date. The producer conducts special, and after warranty repairs and maintenance at the owners' request for an extra price. We recommend to inspect your paraglider (including checking suspension line strength, line geometry, riser geometry and permeability of the canopy material) one time at one years, or every 100 hours of flying time (whichever comes first); Those inspection must be made by manufacturer, importer, distributor, dealer or other authorised persons. The checking must be proven by a stamp on the certification sticker on the glider as well in the manual book.

The warrantee does not cover

- Damage caused by misuse
- Neglecting the regular maintenance
- Overloading of the glider
- Damage caused by inappropriate landings
- Ignored Caring tips

Line Plan



DAVINCI GLIDERS

Lines material

Lines material - Opera XS, S, SM, M

A1			A2			B			C			BR		
1	Edlerid	8000U-070	1	Edlerid	8000U-070	1	Edelrid	8000U-050	1	Edelrid	8000U-025	1	Edelrid	8000U-025
2			2			2			2			2		
3	Edelrid	8000U-050	3	Edelrid	8000U-050	3			3			3		
4			4			4			4			4		
5			5			5			5			5		
6			6			6			6			6		
7			7			7						7		
8			8			8						8		
9			9			9						9		
10			10			10						10		
11			11			11						11		
12			12			12						12		
13			13			13	Edelrid	8000U-025				13		
14			14			14								
15			15			15								
16			16			16								
17						17								
18						18								
19						19								
20						20								
21						21								
22						22								
23						23								
24						24								
25						25								

H / Middle line

A			B			BR H/Mid		
1	Edelrid	8000U-130	1	Edelrid	8000U-050	1	Edelrid	8000U-025
2		8000U-090	2			2		
3			3			3		
4		8000U-130	4			4		
5		8000U-090	5			5		
6			6			6		
7		8000U-070	7					
8			8			BR Mid		
9			9			1	Edelrid	8000U-050
10		8000U-050	10			2		
11			11					
12			12					
13								

Middle line

A			B		
1	Edelrid	8000U-190	1	Edlerid	8000U-090
2			2		
3		8000U-130	3		8000U-070
4			4		8000U-090
5			5		8000U-050
			6		
			7		

L / Middle line

B			BR L/Mid		
1	Edelrid	8000U-90	1	Edelrid	8000U-070
2			2		

Main line

A			B			BR Main		
1	Edelrid	8000U-360	1	Edelrid	8000U-190	1	Edelrid	8000U-070
2		8000U-360	2			2	Liros	PPSL160
3		8000U-190	3		8000U-050			
ST H		8000U-050						
ST L	Liros	DSL 70						

DAVINCI GLIDERS

Lines material

Lines material - Opera for L, XL

A1			A2			B			C			BR		
1	Edlerid	8000U-070	1	Edlerid	8000U-070	1	Edelrid	8000U-050	1	Edelrid	8000U-025	1	Edelrid	8000U-025
2			2			2			2			2		
3	Edelrid	8000U-050	3	Edelrid	8000U-050	3			3			3		
4			4			4			4			4		
5			5			5			5			5		
6			6			6			6			6		
7			7			7						7		
8			8			8						8		
9			9			9						9		
10			10			10						10		
11			11			11						11		
12			12			12						12		
13			13			13	Edelrid	8000U-025				13		
14			14			14								
15			15			15								
16			16			16								
17						17								
18						18								
19						19								
20						20								
21						21								
22						22								
23						23								
24						24								
25						25								

H / Middle line

A				B				BR H/Mid		
1	Edelrid	8000U-130		1	Edelrid	8000U-050		1	Edelrid	8000U-025
2		8000U-090		2				2		
3				3				3		
4		8000U-130		4				4		
5		8000U-090		5				5		
6				6				6		
7		8000U-070		7						
8				8				BR Mid		
9				9				1	Edelrid	8000U-050
10		8000U-050		10				2		
11				11						
12				12						
13										

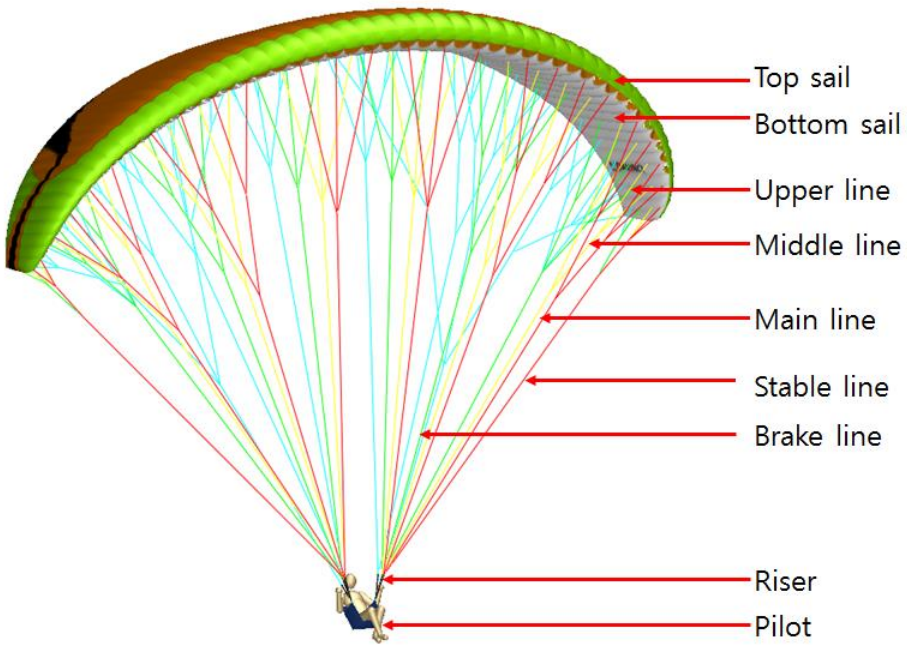
Middle line

A			B			L / Middle line					
						B			BR L/Mid		
1	Edelrid	8000U-230	1	Edlerid	8000U-090	1	Edelrid	8000U-90	1	Edelrid	8000U-070
2			2			2			2		
3		8000U-190	3								
4			4		8000U-070						
5		8000U-130	5								
			6		8000U-090						
			7		8000U-050						

Main line

A			B				BR Main		
1	Edelrid	8000U-470	1	Edelrid	8000U-190		1	Edelrid	8000U-070
2		8000U-360	2				2	Liros	PPSL160
3		8000U-230	3		8000U-050				
ST H		8000U-050							
ST L	Liros	DSL 70							

Overview



CCC Certification

The Opera has been certified by the CIVL competition Class(CCC) 2018 (rev 1.9)
The XS flight test has been tested by the DHV at the maximum weight in 92kg. The load test had been carried out max. 135kg for XL size.
For the certification flight tests of all sizes have been carried out with using the collapse lines.

DAVINCI GLIDERS

Total line length

The measured values at the lower surface of the tailing edge, all depth and spacing of the articulation points were determined under tensile load of 50N.
The length difference is not more than ±10 mm

XS (Scale factor : 1)

	A			A2			B			C		
	Manual	Sample Glider	Dif	Manual	Sample Glider	Dif	Manual	Sample Glider	Dif	Manual	Sample Glider	Dif
1	7716	7719	-3	7703	7708	-5	7707	7711	-4	7852	7852	0
2	7646	7651	-5	7624	7626	-2	7621	7628	-7	7712	7714	-2
3	7579	7585	-6	7560	7566	-6	7553	7559	-6	7643	7646	-3
4	7576	7583	-7	7558	7564	-6	7549	7553	-4	7660	7660	0
5	7556	7562	-6	7537	7542	-5	7529	7523	6	7597	7592	5
6	7535	7546	-11	7517	7521	-4	7510	7503	7	7628	7623	5
7	7566	7569	-3	7546	7545	1	7542	7541	1			
8	7614	7620	-6	7601	7600	1	7599	7594	5			
9	7546	7549	-3	7531	7534	-3	7538	7532	6			
10	7470	7474	-4	7454	7455	-1	7457	7453	4			
11	7400	7407	-7	7384	7390	-6	7386	7384	2			
12	7391	7400	-9	7380	7384	-4	7378	7373	5			
13	7358	7355	3	7344	7341	3	7346	7341	5			
14	7332	7334	-2	7322	7319	3	7325	7319	6			
15	7351	7356	-5	7337	7337	0	7343	7342	1			
16	7385	7386	-1	7380	7377	3	7390	7386	4			
17	7221	7223	-2				7211	7211	0			
18	7155	7159	-4				7147	7148	-1			
19	7094	7100	-6				7086	7088	-2			
20	7086	7090	-4				7083	7083	0			
21	7021	7024	-3				7028	7026	2			
22	7020	7016	4				7024	7018	6			
23	6891	6887	4				6917	6912	5			
24	6844	6837	7				6877	6871	6			
25	6818	6810	8				6849	6846	3			

S (Scale factor : 1.0444)

	A			A2			B			C		
	Manual	Sample Glider	Dif	Manual	Sample Glider	Dif	Manual	Sample Glider	Dif	Manual	Sample Glider	Dif
1	8067	8067	0	8052	8053	-1	8046	8046	0	8196	8192	4
2	7994	7992	2	7971	7964	7	7957	7960	-3	8051	8050	1
3	7925	7931	-6	7905	7903	2	7888	7891	-3	7981	7982	-1
4	7923	7925	-2	7904	7905	-1	7883	7883	0	7999	8004	-5
5	7902	7904	-2	7882	7880	2	7863	7860	3	7934	7934	0
6	7881	7882	-1	7861	7860	1	7844	7844	0	7966	7968	-2
7	7914	7911	3	7893	7892	1	7877	7876	1			
8	7965	7966	-1	7951	7946	5	7936	7933	3			
9	7894	7900	-6	7879	7882	-3	7874	7876	-2			
10	7816	7821	-5	7798	7799	-1	7790	7791	-1			
11	7742	7746	-4	7725	7728	-3	7716	7713	3			
12	7733	7733	0	7721	7719	2	7708	7705	3			
13	7700	7701	-1	7684	7679	5	7676	7677	-1			
14	7672	7671	1	7662	7658	4	7654	7653	1			
15	7692	7689	3	7677	7671	6	7672	7672	0			
16	7728	7725	3	7722	7713	9	7721	7717	4			
17	7565	7562	3				7533	7537	-4			
18	7496	7493	3				7465	7468	-3			
19	7432	7432	0				7402	7404	-2			
20	7424	7423	1				7399	7396	3			
21	7355	7353	2				7336	7335	1			
22	7349	7344	5				7337	7340	-3			
23	7204	7208	-4				7236	7236	0			
24	7155	7158	-3				7194	7195	-1			
25	7128	7131	-3				7166	7164	2			

Total line length

The measured values at the lower surface of the tailing edge, all depth and spacing of the articulation points were determined under tensile load of 50N.
The length difference is not more than ±10 mm

SM (Scale factor : 1.0888)

	A			A2			B			C		
	Manual	Sample Glider	Dif	Manual	Sample Glider	Dif	Manual	Sample Glider	Dif	Manual	Sample Glider	Dif
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												

M (Scale factor : 1.1111)

	A			A2			B			C		
	Manual	Sample Glider	Dif	Manual	Sample Glider	Dif	Manual	Sample Glider	Dif	Manual	Sample Glider	Dif
1	8543	8535	8	8522	8522	0	8532	8532	0	8689	8686	3
2	8466	8462	4	8436	8431	5	8438	8436	2	8536	8535	1
3	8394	8391	3	8368	8369	-1	8365	8364	1	8462	8458	4
4	8393	8390	3	8367	8373	-6	8361	8358	3	8482	8482	0
5	8371	8372	-1	8345	8353	-8	8341	8342	-1	8415	8412	3
6	8350	8349	1	8324	8329	-5	8321	8322	-1	8450	8448	2
7	8386	8384	2	8357	8362	-5	8358	8357	1			
8	8439	8435	4	8419	8422	-3	8421	8418	3			
9	8365	8364	1	8343	8349	-6	8355	8360	-5			
10	8282	8282	0	8258	8268	-10	8267	8269	-2			
11	8205	8206	-1	8182	8191	-9	8188	8189	-1			
12	8195	8196	-1	8178	8184	-6	8180	8181	-1			
13	8161	8155	6	8139	8137	2	8145	8145	0			
14	8132	8127	5	8116	8111	5	8122	8123	-1			
15	8153	8145	8	8132	8129	3	8142	8136	6			
16	8191	8176	15	8179	8169	10	8193	8190	3			
17	8014	8014	0				8006	8000	6			
18	7942	7943	-1				7934	7934	0			
19	7874	7875	-1				7868	7867	1			
20	7865	7868	-3				7864	7863	1			
21	7791	7793	-2				7793	7797	-4			
22	7784	7781	3				7788	7778	10			
23	7641	7640	1				7676	7678	-2			
24	7590	7591	-1				7631	7633	-2			
25	7561	7563	-2				7601	7605	-4			

Total line length

The measured values at the lower surface of the tailing edge, all depth and spacing of the articulation points were determined under tensile load of 50N.
The length difference is not more than ±10 mm

L (Scale factor : 1.1555)

	A			A2			B			C		
	Manual	Sample Glider	Dif	Manual	Sample Glider	Dif	Manual	Sample Glider	Dif	Manual	Sample Glider	Dif
1	8889	8892	-3	8867	8870	-3	8867	8866	1	9023	9020	3
2	8810	8812	-2	8779	8784	-5	8770	8769	1	8865	8867	-2
3	8735	8744	-9	8708	8719	-11	8697	8695	2	8790	8793	-3
4	8734	8740	-6	8707	8714	-7	8693	8693	0	8811	8812	-1
5	8712	8716	-4	8685	8690	-5	8671	8672	-1	8742	8740	2
6	8690	8694	-4	8663	8669	-6	8651	8649	2	8778	8774	4
7	8727	8729	-2	8698	8697	1	8689	8688	1			
8	8783	8779	4	8762	8761	1	8754	8748	6			
9	8708	8715	-7	8685	8691	-6	8686	8688	-2			
10	8622	8628	-6	8597	8603	-6	8594	8598	-4			
11	8541	8547	-6	8517	8522	-5	8515	8519	-4			
12	8532	8533	-1	8513	8519	-6	8506	8512	-6			
13	8496	8497	-1	8473	8472	1	8470	8469	1			
14	8466	8467	-1	8449	8449	0	8446	8449	-3			
15	8488	8489	-1	8466	8468	-2	8467	8467	0			
16	8527	8522	5	8515	8511	4	8520	8520	0			
17	8344	8350	-6				8325	8325	0			
18	8268	8275	-7				8251	8250	1			
19	8197	8205	-8				8182	8177	5			
20	8188	8193	-5				8178	8175	3			
21	8111	8114	-3				8113	8104	9			
22	8103	8105	-2				8098	8096	2			
23	7951	7952	-1				7987	7983	4			
24	7897	7898	-1				7940	7936	4			
25	7868	7866	2				7909	7909	0			

XL (Scale factor : 1.2000)

	A			A2			B			C		
	Manual	Sample Glider	Dif	Manual	Sample Glider	Dif	Manual	Sample Glider	Dif	Manual	Sample Glider	Dif
1	9218	9209	9	9195	9185	10	9205	9192	13	9371	9358	13
2	9136	9126	10	9104	9094	10	9105	9097	8	9208	9203	5
3	9060	9054	6	9031	9027	4	9029	9011	18	9130	9114	16
4	9059	9054	5	9031	9022	9	9026	9007	19	9153	9134	19
5	9037	9036	1	9008	9007	1	9004	8990	14	9082	9070	12
6	9014	9012	2	8986	8984	2	8983	8968	15	9120	9110	10
7	9053	9046	7	9022	9021	1	9023	9007	16			
8	9111	9102	9	9089	9079	10	9091	9075	16			
9	9034	9026	8	9011	9006	5	9027	9016	11			
10	8946	8937	9	8920	8915	5	8932	8923	9			
11	8862	8858	4	8837	8834	3	8848	8841	7			
12	8852	8844	8	8833	8828	5	8840	8829	11			
13	8815	8809	6	8791	8788	3	8803	8792	11			
14	8784	8774	10	8766	8760	6	8779	8770	9			
15	8806	8796	10	8783	8773	10	8799	8790	9			
16	8847	8833	14	8834	8823	11	8855	8843	12			
17	8657	8653	4				8656	8651	5			
18	8579	8579	0				8579	8574	5			
19	8504	8502	2				8507	8501	6			
20	8495	8494	1				8503	8500	3			
21	8417	8418	-1				8436	8432	4			
22	8408	8408	0				8430	8417	13			
23	8264	8253	11				8302	8293	9			
24	8208	8198	10				8253	8244	9			
25	8178	8169	9				8221	8208	13			

Canopy measurement

The measured values at the lower surface of the tailing edge, all depth and spacing of the articulation points were determined under tensile load of 50N.
The length difference is not more than ±10 mm

XS

Position	Rib # from center	Distance [mm]	Tension [daN]	Manual tolerances	Aspect ratio 4*span / (chord A+2.5*Chord B)
Full Span	x	12090	5	+/-2%	7.63
1/2 Trailing Edge	x	6150	5	+/-1%	
Chord A	1	1972	1	+/-1%	
Chord B	29	1745	1	+/-1%	

On first lined rib (from center)	Rib n° from center	Distance [mm]	Tension [daN]	Manual tolerances
Chord	5	1972	1	+/-1%
Top of inlet	5	1898	5	+/-1%
Bottom of inlet	5	1862	5	+/-1%
Tab Aa*	5	1720	5	+/-10mm
Tab Ab*	5	1590	5	+/-10mm
Tab B*	5	900	5	+/-10mm
Tab C*	5	628	5	+/-10mm

On last lined rib of Group 2 (from center)	Rib n° from center	Distance [mm]	Tension [daN]	Manual tolerances
Chord	24	1834	1	+/-1%
Top of inlet	24	1774	5	+/-1%
Bottom of inlet	24	1740	5	+/-1%
Tab Aa*	24	1580	5	+/-10mm
Tab Ab*	24	1475	5	+/-10mm
Tab B*	24	835	5	+/-10mm
Tab C*				+/-10mm

On last lined rib (stabilo, from center)	Rib n° from center	Distance [mm]	Tension [daN]	Manual tolerances
Chord	64	445	1	+/-1%
Tab A*	64	375	5	+/-10mm
Tab B*	64	207	5	+/-10mm

S

Position	Rib # from center	Distance [mm]	Tension [daN]	Manual tolerances	Aspect ratio 4*span / (chord A+2.5*Chord B)
Full Span	x	12600	5	+/-2%	7.60
1/2 Trailing Edge	x	6290	5	+/-1%	
Chord A	1	2069	1	+/-1%	
Chord B	29	1825	1	+/-1%	

On first lined rib (from center)	Rib n° from center	Distance [mm]	Tension [daN]	Manual tolerances
Chord	5	2057	1	+/-1%
Top of inlet	5	1983	5	+/-1%
Bottom of inlet	5	1947	5	+/-1%
Tab Aa*	5	1767	5	+/-10mm
Tab Ab*	5	1644	5	+/-10mm
Tab B*	5	932	5	+/-10mm
Tab C*	5	657	5	+/-10mm

On last lined rib of Group 2 (from center)	Rib n° from center	Distance [mm]	Tension [daN]	Manual tolerances
Chord	24	1908	1	+/-1%
Top of inlet	24	1845	5	+/-1%
Bottom of inlet	24	1811	5	+/-1%
Tab Aa*	24	1644	5	+/-10mm
Tab Ab*	24	1532	5	+/-10mm
Tab B*	24	866	5	+/-10mm
Tab C*				+/-10mm

On last lined rib (stabilo, from center)	Rib n° from center	Distance [mm]	Tension [daN]	Manual tolerances
Chord	64	465	1	+/-1%
Tab A*	64	389	5	+/-10mm
Tab B*	64	215	5	+/-10mm

Canopy measurement

The measured values at the lower surface of the tailing edge, all depth and spacing of the articulation points were determined under tensile load of 50N.
The length difference is not more than ±10 mm

SM

Position	Rib # from center	Distance [mm]	Tension [daN]	Manual tolerances	Aspect ratio 4*span / (chord A+2.5*Chord B)
Full Span	x		5	+/-2%	7.63
1/2 Trailing Edge	x		5	+/-1%	
Chord A	1		1	+/-1%	
Chord B	29		1	+/-1%	

On first lined rib (from center)	Rib n° from center	Distance [mm]	Tension [daN]	Manual tolerances
Chord	5		1	+/-1%
Top of inlet	5		5	+/-1%
Bottom of inlet	5		5	+/-1%
Tab Aa*	5		5	+/-10mm
Tab Ab*	5		5	+/-10mm
Tab B*	5		5	+/-10mm
Tab C*	5		5	+/-10mm

On last lined rib of Group 2 (from center)	Rib n° from center	Distance [mm]	Tension [daN]	Manual tolerances
Chord	24		1	+/-1%
Top of inlet	24		5	+/-1%
Bottom of inlet	24		5	+/-1%
Tab Aa*	24		5	+/-10mm
Tab Ab*	24		5	+/-10mm
Tab B*	24		5	+/-10mm
Tab C*				+/-10mm

On last lined rib (stabilo, from center)	Rib n° from center	Distance [mm]	Tension [daN]	Manual tolerances
Chord	64		1	+/-1%
Tab A*	64		5	+/-10mm
Tab B*	64		5	+/-10mm

M

Position	Rib # from center	Distance [mm]	Tension [daN]	Manual tolerances	Aspect ratio 4*span / (chord A+2.5*Chord B)
Full Span	x	13300	5	+/-2%	7.62
1/2 Trailing Edge	x	6805	5	+/-1%	
Chord A	1	2180	1	+/-1%	
Chord B	29	1927	1	+/-1%	

On first lined rib (from center)	Rib n° from center	Distance [mm]	Tension [daN]	Manual tolerances
Chord	5	2175	1	+/-1%
Top of inlet	5	2105	5	+/-1%
Bottom of inlet	5	2066	5	+/-1%
Tab Aa*	5	1880	5	+/-10mm
Tab Ab*	5	1754	5	+/-10mm
Tab B*	5	990	5	+/-10mm
Tab C*	5	698	5	+/-10mm

On last lined rib of Group 2 (from center)	Rib n° from center	Distance [mm]	Tension [daN]	Manual tolerances
Chord	24	2020	1	+/-1%
Top of inlet	24	1950	5	+/-1%
Bottom of inlet	24	1920	5	+/-1%
Tab Aa*	24	1746	5	+/-10mm
Tab Ab*	24	1630	5	+/-10mm
Tab B*	24	917	5	+/-10mm
Tab C*				+/-10mm

On last lined rib (stabilo, from center)	Rib n° from center	Distance [mm]	Tension [daN]	Manual tolerances
Chord	64	490	1	+/-1%
Tab A*	64	413	5	+/-10mm
Tab B*	64	224	5	+/-10mm

Canopy measurement

The measured values at the lower surface of the tailing edge, all depth and spacing of the articulation points were determined under tensile load of 50N.
The length difference is not more than ±10 mm

L

Position	Rib # from center	Distance [mm]	Tension [daN]	Manual tolerances	Aspect ratio 4*span / (chord A+2.5*Chord B)
Full Span	x	14000	5	+/-2%	7.63
1/2 Trailing Edge	x	7105	5	+/-1%	
Chord A	1	2278	1	+/-1%	
Chord B	29	2007	1	+/-1%	

On first lined rib (from center)	Rib n° from center	Distance [mm]	Tension [daN]	Manual tolerances
Chord	5	2275	1	+/-1%
Top of inlet	5	2202	5	+/-1%
Bottom of inlet	5	2160	5	+/-1%
Tab Aa*	5	1965	5	+/-10mm
Tab Ab*	5	1832	5	+/-10mm
Tab B*	5	1030	5	+/-10mm
Tab C*	5	725	5	+/-10mm

On last lined rib of Group 2 (from center)	Rib n° from center	Distance [mm]	Tension [daN]	Manual tolerances
Chord	24	2110	1	+/-1%
Top of inlet	24	2040	5	+/-1%
Bottom of inlet	24	2005	5	+/-1%
Tab Aa*	24	1820	5	+/-10mm
Tab Ab*	24	1694	5	+/-10mm
Tab B*	24	958	5	+/-10mm
Tab C*				+/-10mm

On last lined rib (stabilo, from center)	Rib n° from center	Distance [mm]	Tension [daN]	Manual tolerances
Chord	64	510	1	+/-1%
Tab A*	64	428	5	+/-10mm
Tab B*	64	232	5	+/-10mm

XL

Position	Rib # from center	Distance [mm]	Tension [daN]	Manual tolerances	Aspect ratio 4*span / (chord A+2.5*Chord B)
Full Span	x	14420	5	+/-2%	7.60
1/2 Trailing Edge	x	7350	5	+/-1%	
Chord A	1	2370	1	+/-1%	
Chord B	29	2079	1	+/-1%	

On first lined rib (from center)	Rib n° from center	Distance [mm]	Tension [daN]	Manual tolerances
Chord	5	2350	1	+/-1%
Top of inlet	5	2263	5	+/-1%
Bottom of inlet	5	2230	5	+/-1%
Tab Aa*	5	2030	5	+/-10mm
Tab Ab*	5	1890	5	+/-10mm
Tab B*	5	1070	5	+/-10mm
Tab C*	5	750	5	+/-10mm

On last lined rib of Group 2 (from center)	Rib n° from center	Distance [mm]	Tension [daN]	Manual tolerances
Chord	24	2179	1	+/-1%
Top of inlet	24	2100	5	+/-1%
Bottom of inlet	24	2065	5	+/-1%
Tab Aa*	24	1880	5	+/-10mm
Tab Ab*	24	1757	5	+/-10mm
Tab B*	24	992	5	+/-10mm
Tab C*				+/-10mm

On last lined rib (stabilo, from center)	Rib n° from center	Distance [mm]	Tension [daN]	Manual tolerances
Chord	64	510	1	+/-1%
Tab A*	64	428	5	+/-10mm
Tab B*	64	232	5	+/-10mm

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