Flow PARAGLIDERS

ACE

WELCOME

Thank you for flying Flow Paragliders. We hope you will be satisfied with this product and wish you many happy flights. We strongly recommend that you **read this manual before the first flight**. This manual is designed to help you to quickly familiarize with this beautiful glider.

Flow PARAGLIDERS

ACE

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General Information

User manual for Ace XS, Ace S, Ace M and Ace L

With its easy inflation and accessibility ACE is very forgiving to fly and has the easy characteristics typical of an EN-A glider. In-flight ACE has a smooth feel and is very stable in both pitch and roll, making it very comfortable and safe.

The pilots should understand the implication of flying an EN A-class wing.

Please note that any changes to the paraglider will invalidate the result of the certification. Correct usage of the glider is the pilot's responsibility. The manufacturer and distributor do not accept liability for loss or damage as a result of the misuse of this paraglider. It is the pilot's responsibility to comply with legal regulations and to maintain the airworthiness of the aircraft.

The Ace has a high level of passive safety. The Ace has been certified as EN B, having met all the requirements of EN 926-2 / 2013and LTF NFL II 91/09.

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PILOT'S PROFILE

Flow ACE is a glider dedicated to beginner pilots and those who want stress free flying. In order to accomplish maximum safety in all possible flight configurations. ACE went through strict procedures and received the EN A homologation in all sizes with excellent results.

With its easy inflation and accessibility ACE is very forgiving to fly and has the easy characteristics typical of an EN-A glider. In-flight ACE has a smooth feel and is very stable in both pitch and roll, making it very comfortable and safe.

We have trimmed the ACE to be a glider that can give the right amount of feedback, as this is vital if you want to know what the air is doing around you.

The key qualities of the ACE:

- Confidence inspiring stability and safety combined with a level of feedback that allows you to learn about the air you are flying in.
- Significant increase in brake pressure as you approach the stall point.
- Constant feedback of pleasure/ pressure.
- Colour-coded risers and lines.
- High quality and durable materials.

SPECIFICATIONS

//ACE	XS	S	M	L
FLAT AREA	21.9m2	25.4m2	27.5m2	29.8m2
PROJECTED AREA	18.9m2	21.9m2	23.7m2	25.7m2
FLAT WINGSPAN	10.2m	10.9m	11.3m	11.8m
PROJECTED SPAN	8 m	8.6 m	8.9 m	9.3 m
ASPECT RATIO	4.7	4.7	4.7	4.7
PROJECTED AR	3.38	3.38	3.38	3.38
MAX CHORD	2.8	3.0	3.1	3.3
NUMBER OF CELLS	36	36	36	36
GLIDER WEIGHT	4.3	4.6	5.3	5.4
TAKE OFF WEIGHT	55-75	70-95	85-105	95-120
CERTIFICATION	LTF/EN A	LTF/EN A	LTF/EN A	LTF/EN A

TAKE-OFF, FLIGHT, AND FLYING TECHNIQUES

The Flow Ace should be flown as a normal paraglider. However, there are several points listed below which should help you to familiarize with your new paraglider quicker.

The Ace was designed as a foot launchable solo paraglider and can also be tow-launched. It is the pilot's responsibility to use suitable harness attachments and release mechanisms and to ensure that they are correctly trained on the equipment and system employed.

Before Take-off

- Check the canopy for rips or tears. Also, inspect the internal structure (ribs, diagonals) and seams.
- Check if lines are not damaged or tangled.
- Check the quick links connection between lines to the risers are undamaged and tightened.
- Check if the risers are not damaged or twisted.
- Check if the speed system works freely and that the lines are long enough.
- Check that the brake handles are correctly attached and that each line runs freely through the pulley.

Take-off

Lay the paraglider out with the leading edge in a horseshoe shape. Hold the A risers close to the quick links and move forward until the lines get stretched. You should now be perfectly centred with your wing. With no wind or light headwind, with lines stretched, The Flow Ace inflates rapidly and rises over your head with some dynamic steps. We recommend that you do not pull risers too forward or down, which could cause a collapse of the leading edge, but simply follow them until the glider reaches its angle of flight. It is important that the centre of gravity of your body stay in front of your feet during the inflation of the glider to constantly load the risers. A controlled inflation allows you to check the canopy and lines during the last phase as it comes up and thus avoids the need to use brakes. Depending on the wind conditions or the slope, an adequate use of brakes can help you to take-off quicker.

Landing

Because of the exceptional glide for this type of glider, high caution is recommended in the stages of approaching and landing. The Flow Ace is a fast glider, any action on the brakes may cause significant reactions. It is therefore recommended to execute the first flights in a familiar environment and under easy conditions. With negative steering, there is more time for the manoeuvres to be performed steadily, which results in reducing the pendulum movements of the paraglider. Reminder: Negative steering involves applying the brakes symmetrically by about 30% of the maximum range to slow the paraglider and a simultaneous turning by means of releasing the outside brake. Speeding up just prior to landing allows a more effective flare and therefore a gentler landing.

Turning

Flow Ace was designed to perform well in turns. Negative steering (see above) on one hand slows the paraglider in certain phases of the flight and on the other hand reduces excessive rolling during turn reversals. It is not only designed to turn (with approx. 30% brake) but also to fly slowly in order to help identify the areas of lift and to keep the paraglider flatter to minimize the sink rate in a turn (with 15% brake). Symmetrical brake-input at 20-30 % enables you to keep your wing under control – to brake further when pitching and to release when the canopy banks up.

RAPID DESCEND

Techniques

In order to descend, the paraglider must fly away from the areas of lift. In case any problems occur, the following techniques might be used to increase the sink rate.

- *Spiral Drive*: The Flow Ace is a manoeuvrable wing which responds to any input easily. To initiate the spiral, apply one brake progressively to about 35% and hold it in its position. The speed of rotation will increase progressively as well as the pressure on the brake and the centrifugal force that is perceived. The angle or the speed of rotation can be decreased or increased by releasing or pulling the brake by several centimetres. Once mastered the spiral allows you to descend by more than 10 m/s. Movements which are extremely abrupt or badly synchronized or very quick initiation of the spiral can result in an asymmetrical collapse or a spin. CAUTION: A deep spiral is no harmless manoeuvre. The kinetic energy obtained must be reduced by slow releasing of the inside brake.

- *B-line Stall:* B-line Stall Grasp the B risers at the quick links and pull them down symmetrically. The paraglider will enter a B-line stall and drop backwards before stabilizing overhead. The descent rate increases to 6 - 8 m/s. To exit the B-line stall raise both hands together in a single, positive movement so that the risers are at full extension. On releasing the B-risers, your Ace should return immediately to normal flight.

- *Big Ears*: Big ears is a moderate descent method, reaching -3 or -4 m/s, speed reduces slightly between 3 and 5 km/h and piloting becomes limited. The angle of attack and the wing loading also increases.

  Push on the accelerator to restore the wing's horizontal speed and the angle of attack. To activate ears, take the line *amain3* and simultaneously, smoothly pull them outward and downward. The wingtips will fold in. Let go of the lines and the ears will re-inflate automatically. If they do not re-inflate, gently pull on one of the brake lines first and then on the opposite side. For directional control while using the Big Ears, use weight shift.

  We recommend the pilot to re-inflate asymmetrically, to avoid unnecessary change on the angle of attack, more so if you are flying near the ground or flying in turbulence.

PERFORMANCE & USE OF BRAKES

Use of Brakes

Flow Ace's best glide is at a trim speed (no brakes) – about 38 km/h. The minimum sink rate is achieved by applying approx. 15% of the brakes. When using more than 30% of the brakes, the aerodynamics and the performance of the glider are likely to deteriorate and the effort to manoeuvre will increase quickly. In case of extremely high brake pressure there is a great risk of a stall. Which occurs at a full brake travel (100% of the brakes) 65cm. In normal flying conditions the optimal position for the brakes, in terms of performance and safety, is within the top third level of the braking range.

Use of Speed Bar

Flow Ace is equipped with a speed system. The profile of Ace 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. Use of the speed bar increases the maximum speed of the paraglider by up to 30% of the trim speed. However, it does reduce the angle of attack and therefore there is a risk of a frontal (or asymmetric) collapse. We therefore do not advise to use the speed bar near the ground.

ASSYMETRIC & FRONTAL COLLAPSES

Despite the tests proving Ace recovers on its own after collapses, it is a EN B glider therefore active piloting is recommended in case of an asymmetric or frontal collapse. Active piloting will reduce the loss of altitude and a change of direction.

Asymmetric Collapse

Despite the great stability of the profile of the Ace, heavy turbulent conditions may cause part of the wing to collapse asymmetrically. This 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 incidence. If the collapse does happen, the Ace 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. The collapse will normally open by itself but if that does not happen, pull completely on the brake line on the side, which has collapsed (100%). Do this with a firm movement. You may have to repeat this operation to provoke the re-opening. Take care not to over-brake on the side that is still flying (turn control) and when the collapse has been solved; remember to let the wing recover its flying speed.
Bring both brakes down symmetrically to speed up the reopening of the paraglider, and then raise your hands back up immediately.

Frontal (Symmetric) Collapse

The profile of the Ace has been designed to widely tolerate extreme changes in the angle of attack. A symmetric collapse may occur in heavy turbulent conditions, on entry or exit of strong thermals or lack of adapting the use of the accelerator to the prevailing air conditions. Symmetrical

collapses usually re-inflate without the glider turning, but you can symmetrically apply the brake lines with a quick deep pump to quicken the re-inflation. Release the brake lines immediately to recover optimum flight speed.

FULL STALL

Certain behaviour or 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. Main causes of a full stall:

- A poorly timed or an extensive use of brakes when the air speed of the wing is reduced.
- Soaked or heavily drenched leading edge (from rain or a cloud) can result in a stall due to an uneven airflow over the leading edge.

Whatever the cause, a full stall can be either symmetrical or a in a configuration of a spin.

Your first reaction should be to fully raise both hands. This normally allows the glider to return to normal flight but If nothing happens after a few seconds, apply the speed bar to encourage the wing to regain normal flight. Ensure the glider has returned to normal flight (check your airspeed) before using the brakes again.

FLYING WITHOUT BRAKES

If a brake line or pulley breaks, it is possible to fly the Ace using the C-risers (rear riser). The movements must be well controlled as the deformation of the wing, due to the traction on the B-risers, is greater than that produced by using the brakes.

CRAVATS

If the tip of your wing gets stuck in the lines, this is called a cravat. Due to the large amount of drag, cravats can turn your wing into a spiral dive very quickly. This can be disorientating and difficult to control if allowed to develop. To recover from a cravat immediately, anticipate the movement of the wing, first stabilise the direction of your wing with outside brake and weight shift. Once you have control of the rotation and sink rate, apply strong deep pumps of the brake on the cravated side whilst weight shifting away from the cravat. It is important to lean away

from the cravat otherwise you risk spinning or deepening the spiral. The aim is to empty the air out of the wing tip whilst it is unloaded. Correctly done, this action will clear the cravat. If it is a very large cravat and the above options have not worked, then a full stall is another option. This should not be attempted unless you know what you are doing and have a large amount of altitude. Remember, if the rotation is accelerating and you are unable to re-open the wing or control the decent rate, you should throw your reserve parachute whilst you still have enough altitude.

SIV

All manoeuvres should be carried out under supervision of experienced paragliding instructors, above water and with a rescue boat.

ADJUSTMENT OF THE HARNESS

For test flights, the pilots used ABS harnesses with the following set-up:

SIZE	Distance from seat board	Distance between hang points
ACE XS	42-48cm	45cm
ACE S	42-48cm	45cm
ACE M	42-48cm	45cm
ACE L	42-48cm	45cm

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.

MAINTENANCE & CHECKS

The Flow Ace is a robust piece of equipment but as any flying aircraft it should be technically periodically checked to ensure proper airworthiness.

Maintenance Tips

The life of your paraglider therefore depends largely on the care which you maintain and use it. To maximize life span of your wing, respect the following rules:

- Avoid dropping the canopy on its top surface or on its leading edge during inflation or landing.
- Avoid dragging it across the ground when moving it.
- Don‘t expose it unnecessarily to sunlight.
- Choose a packing technique that doesn‘t damage the plastic rods and that doesn‘t crease the internal structure excessively.

Always use the protective bag to avoid direct contact with the harnesses and buckles of any friction between the blade and the rucksack.
Never store your paraglider when it is damp.
If immersed in sea water rinse immediately with fresh water. Do not use any detergents. Dry your paraglider away from direct light in a dry and well-aired place.
Empty any foreign bodies from your paraglider regularly, for example sand, stones or animal or vegetable matter which may eventually decay. Twigs, sand, pebbles, etc. damage tissue in successive folds and organic debris of vegetable or animal origin (insects) can promote mould growth.

Periodic Inspections

The paraglider has undergone a series of tests during the production process and consequent flight tests before the delivery. It is delivered with a standard brake setting same to the one used during the testing. Periodic Checks & Repairs: for safety reasons, it is recommended that the paraglider is checked at least once a year, or after 100 hours and anytime there is a change in its behaviour. However, if you are a frequent flyer (more than 100 hrs per year), then we recommend that you get your glider every 100 hours. The checker should inform you about the condition of your glider and if some parts will need to be checked or changed before the next normal service check period.

WARRANTY

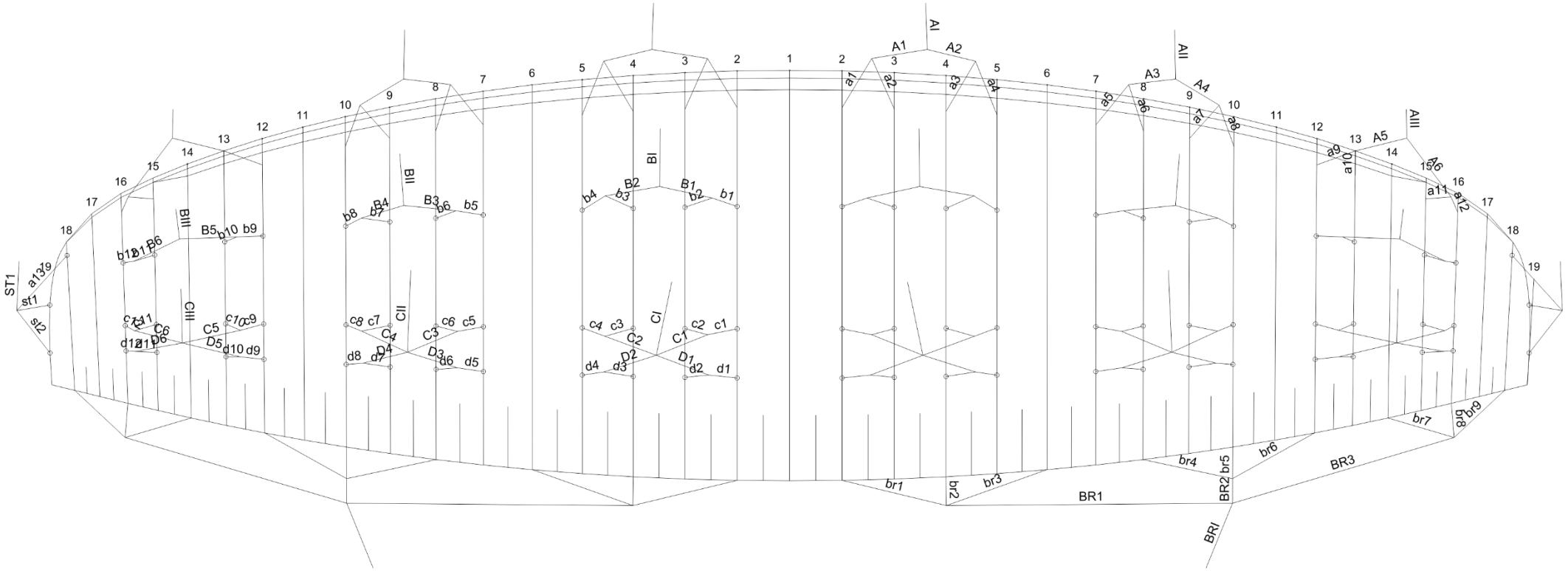
The Flow Ace is guaranteed for two years or 250 hours against any production fault since the date of purchase.
The guarantee does not cover:

- Damage caused by misuse
- Neglecting the regular maintenance
- Overloading or misuse of the glider
- Damage caused by inappropriate landings

SUMMARY

Safety is the single most important thing in our sport. We recommend to always be alert of the weather, fly as regularly as you can and ground handle as much as possible. Practicing ground handling will keep your skills alive and will support you especially when conditions at launch aren't perfect or the site is difficult.
Please always respect the weather! Monitor the conditions and the forecast closely and understand which conditions are right for your level of flying or for flying in general. Lots of pilots get hurt due to misjudging weather conditions and we don't want you to be one of them.
We would also like to emphasise respecting our beautiful nature and looking after your flying sites. If you need to dispose the wing, please don't dispose of it in the normal household waste but in an environmentally responsible way. If you are unsure, please contact your council.

LINE PLAN



Flow PARAGLIDERS

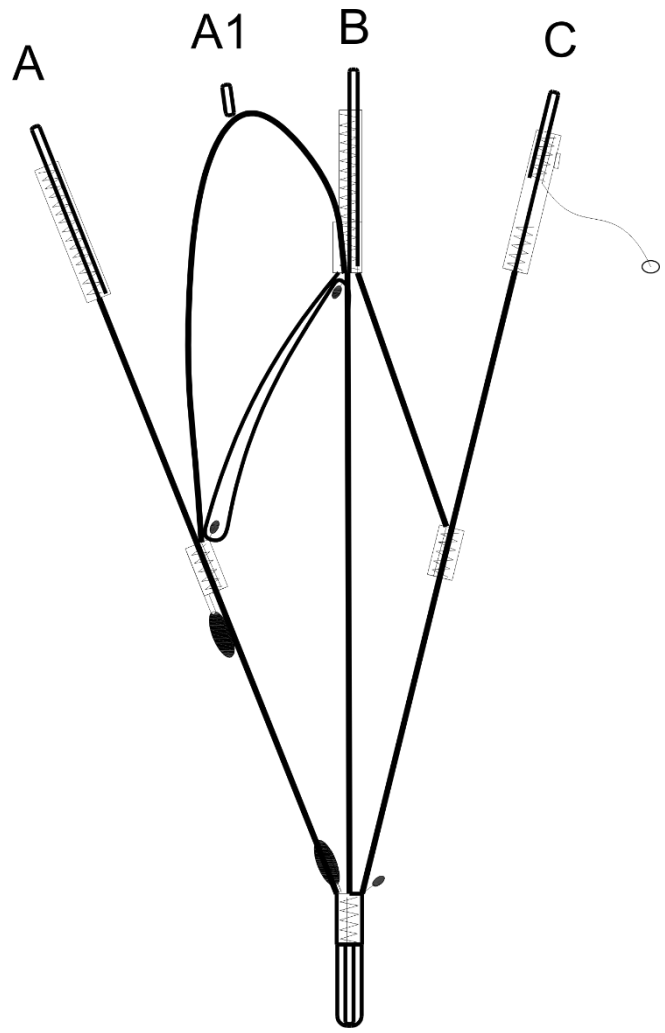
ACE

RISER DIAGRAM

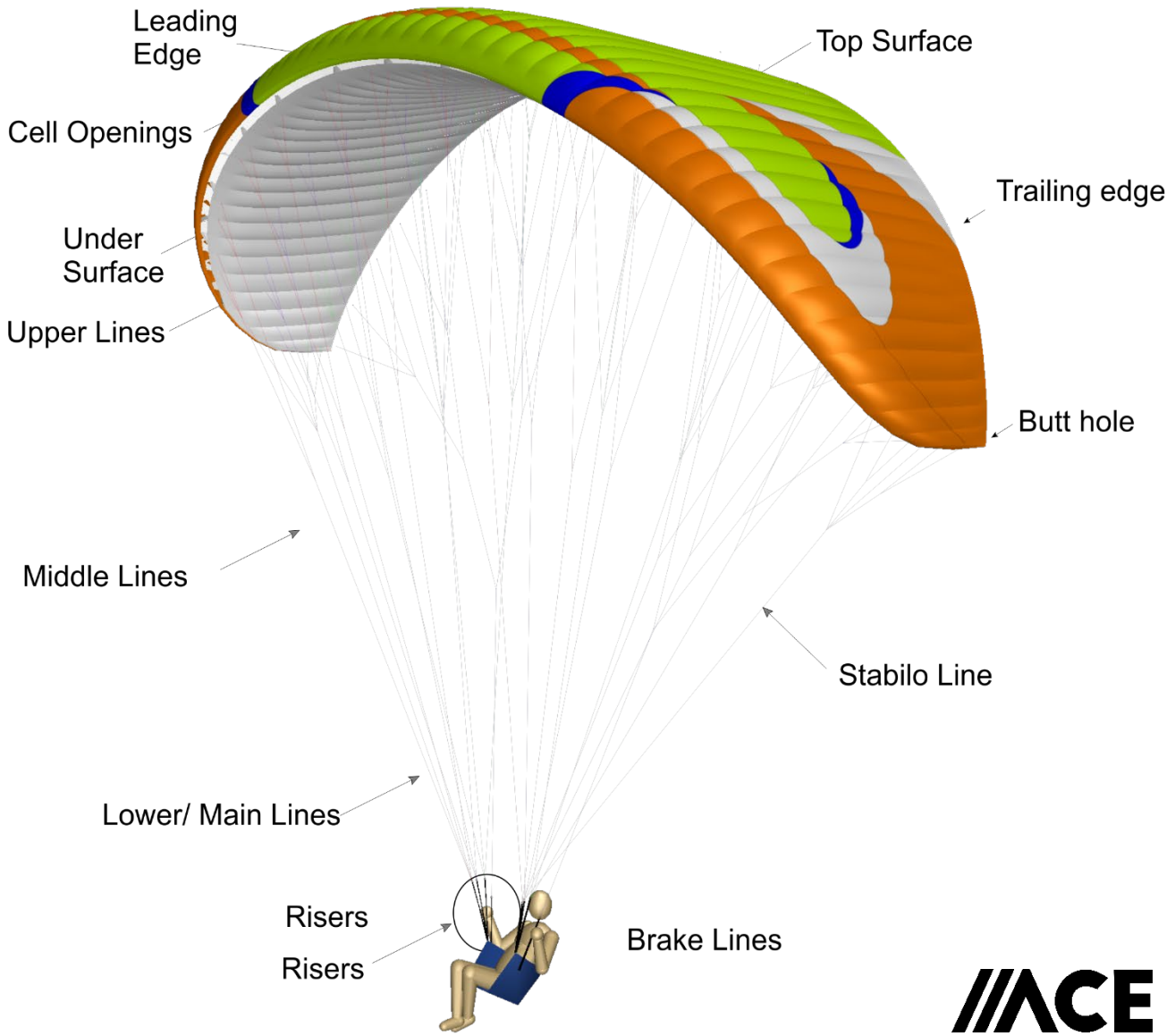
Sizes XS, S, M and L

NON ACCELERATED		*ACCELERATED*	
A	500mm	A	500mm
A1	500mm	A1	500mm
B	500mm	B	440mm
C	500mm	C	380mm

*Difference should not be more than +/- 5mm



OVERALL ILLUSTRATION



MATERIALS

CANOPY	FABRIC CODE	SUPPLIER
Upper surface	Dominico DOKDO 30D MF	Dominico tech Corp. - Korea
Bottom Surface	Dominico DOKDO 30D MF	Dominico tech Corp. - Korea
Supported Ribs	Dominico DOKDO 30D FM(NON WR)	Dominico tech Corp. - Korea
Unsupported Ribs	Dominico DOKDO 30D FM(NON WR)	Dominico tech Corp. - Korea
Leading Edge Reinforcement	2.5/1.8/ Plastic pipe	Porcher Industries - France
Thread	210D/3, 420D/3	Coats Thread - Thailand
SUSPENTION LINES	**FABRIC CODE**	**SUPPLIER**
Upper Cascades	DSL-70	LIROS GmbH - Germany
Middle Cascades	PPSL-120	LIROS GmbH - Germany
Main Lines	7343-160	EDELRID - Germany
Upper Stable	DSL-70	LIROS GmbH - Germany
Main Stable	6843-160	EDELRID - Germany
Upper Brake	DSL-70	LIROS GmbH - Germany
Middle Brake	PPSL-120	LIROS GmbH - Germany
Main Brake	10N-200	EDELRID - Germany
RISERS	**FABRIC CODE**	**SUPPLIER**
Shackles	Maillon Rapide	ANSUNG PRECISION - Korea
Riser Webbing	20mm webbing	GUTH & WOLF GmbH - Germany
Pulleys	RILEY	LW RILEY PTY LTD

In case of any doubts regarding the information in the manual contact your FLOW PARAGLIDERS dealer.

For spare parts or information in how to obtain them get in contact with us directly or with your local dealer.

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LINE MEASUREMENTS

The overall length (riser lines + mid lines + upper lines) has to be checked under 5Kgs of tension. The difference between the measured length and the original length should not exceed +/- 10mm. The changes that could appear are a slight shrink on the C's and/or a slight stretch on the A's and B'S The consequences of these changes can include a slower trim speed, difficult inflation etc.

Dimensions given in the user's manual was checked by the testing laboratory

BRIDLE CHECK LENGHTS:

ACE XS

	A	B	C	D	Brake
1	6362	6258	6279	6358	6881
2	6336	6234	6255	6332	6444
3	6341	6241	6261	6337	6284
4	6362	6265	6285	6358	6240
5	6338	6250	6267	6333	6120
6	6323	6241	6257	6319	6223
7	6314	6238	6253	6310	6090
8	6324	6254	6267	6319	5941
9	6242	6197	6207	6247	5980
10	6186	6149	6158	6195	
11	6081	6054	6060	6089	
12	6016	5987	5991	6013	
13(STABLE)	5774	5713	5773		

Name	Length	Name	Length	Name	Length	Name	Length	Name	Length	Name	Length
a1	812	b1	788	c1	809	d1	888	st1	854	br1	1641
a2	786	b2	764	c2	785	d2	862	st2	793	br2	1204
a3	791	b3	771	c3	791	d3	867	st3	853	br3	1044
a4	812	b4	795	c4	815	d4	888			br4	970
a5	778	b5	780	c5	797	d5	863	ST1	4440	br5	850
a6	763	b6	771	c6	787	d6	849			br6	953
a7	754	b7	768	c7	783	d7	840			br7	850
a8	764	b8	784	c8	797	d8	849			br8	701
a9	792	b9	777	c9	787	d9	827			br9	740
a10	736	b10	729	c10	738	d10	775				
a11	631	b11	634	c11	640	d11	669			BR1	2270
a12	566	b12	567	c12	571	d12	593			BR2	2300
										BR3	2270
A1	1590	B1	1590	C1	1590	D1	1590				
A2	1590	B2	1590	C2	1590	D2	1590			BRI	2970
A3	1550	B3	1550	C3	1550	D3	1550				
A4	1550	B4	1550	C4	1550	D4	1550				
A5	1410	B5	1500	C5	1500	D5	1500				
A6	1410	B6	1500	C6	1500	D6	1500				
AI	3490	BI	3410	CI	3410						
AII	3540	BII	3450	CII	3450						
AIII	3570	BIII	3450	CIII	3450						

ACE S

	A	B	C	D	Brake
1	6799	6677	6700	6784	7367
2	6773	6653	6675	6758	6906
3	6778	6661	6683	6764	6739
4	6802	6688	6709	6787	6696
5	6777	6673	6691	6762	6578
6	6761	6665	6682	6747	6680
7	6752	6662	6677	6738	6535
8	6763	6679	6692	6748	6416
9	6677	6629	6629	6672	6426
10	6617	6578	6577	6616	
11	6505	6476	6473	6503	
12	6435	6405	6398	6422	
13(STABLE)	6166	6098	6162		

Name	Length	Name	Length	Name	Length	Name	Length	Name	Length	Name	Length
a1	859	b1	847	c1	870	d1	954	st1	916	br1	1747
a2	833	b2	823	c2	845	d2	928	st2	848	br2	1286
a3	838	b3	831	c3	853	d3	934	st3	912	br3	1119
a4	862	b4	858	c4	879	d4	957			br4	1026
a5	837	b5	833	c5	851	d5	922	ST1	4750	br5	908
a6	821	b6	825	c6	842	d6	907			br6	1010
a7	812	b7	822	c7	837	d7	898			br7	915
a8	823	b8	839	c8	852	d8	908			br8	796
a9	847	b9	829	c9	839	d9	882			br9	806
a10	787	b10	778	c10	787	d10	826				
a11	675	b11	676	c11	683	d11	713			BR1	2420

a12	605	b12	605	c12	608	d12	632		BR2	2470
									BR3	2420
A1	1700	B1	1700	C1	1700	D1	1700			
A2	1700	B2	1700	C2	1700	D2	1700		BRI	3200
A3	1660	B3	1660	C3	1660	D3	1660			
A4	1660	B4	1660	C4	1660	D4	1660			
A5	1510	B5	1610	C5	1610	D5	1610			
A6	1510	B6	1610	C6	1610	D6	1610			
AI	3740	BI	3630	CI	3655					
AII	3780	BII	3680	CII	3705					
AIII	3830	BIII	3690	CIII	3680					

ACE M

	A	B	C	D	Brake
1	7137	7020	7124	7213	7651
2	7111	6996	7099	7186	7168
3	7118	7005	7108	7193	6994
4	7143	7034	7136	7218	6989
5	7118	7019	7039	7113	6814
6	7102	7011	7029	7097	6973
7	7093	7008	7024	7089	6784
8	7105	7026	7040	7099	6674
9	7025	6963	6893	6939	6658
10	6961	6909	6839	6880	
11	6843	6802	6729	6761	
12	6769	6727	6651	6676	
13(STABLE)	6493	6420	6488		

Name	Length	Name	Length	Name	Length	Name	Length	Name	Length	Name	Length
a1	907	b1	890	c1	914	d1	1003	st1	973	br1	1841
a2	881	b2	866	c2	889	d2	976	st2	900	br2	1358
a3	888	b3	875	c3	898	d3	983	st3	968	br3	1184
a4	913	b4	904	c4	926	d4	1008			br4	1089
a5	888	b5	889	c5	909	d5	983	ST1	5020	br5	914
a6	872	b6	881	c6	899	d6	967			br6	1073
a7	863	b7	878	c7	894	d7	959			br7	934
a8	875	b8	896	c8	910	d8	969			br8	824
a9	895	b9	883	c9	893	d9	939			br9	808
a10	831	b10	829	c10	839	d10	880				
a11	713	b11	722	c11	729	d11	761			BR1	2510
a12	639	b12	647	c12	651	d12	676			BR2	2600
										BR3	2550
A1	1800	B1	1800	C1	1800	D1	1830				
A2	1800	B2	1800	C2	1800	D2	1830			BRI	3300
A3	1750	B3	1750	C3	1750	D3	1750				
A4	1750	B4	1750	C4	1750	D4	1750				
A5	1600	B5	1700	C5	1700	D5	1670				
A6	1600	B6	1700	C6	1700	D6	1670				
AI	3950	BI	3850	CI	3900						
AII	4000	BII	3900	CII	3900						
AIII	4050	BIII	3900	CIII	3850						

ACE L

	A	B	C	D	Brake
1	7424	7302	7327	7419	8024
2	7398	7278	7302	7393	7523
3	7405	7288	7312	7400	7344
4	7432	7319	7341	7427	7297
5	7407	7304	7324	7402	7118
6	7391	7296	7314	7386	7281
7	7381	7293	7310	7377	7094
8	7393	7312	7326	7387	6990
9	7310	7246	7257	7304	6950
10	7245	7190	7201	7243	
11	7121	7079	7086	7119	
12	7044	7000	7004	7030	
13(STABLE)	6755	6677	6749		

Name	Length	Name	Length	Name	Length	Name	Length	Name	Length	Name	Length
a1	944	b1	922	c1	947	d1	1039	st1	1015	br1	1914
a2	918	b2	898	c2	922	d2	1013	st2	937	br2	1413
a3	925	b3	908	c3	932	d3	1020	st3	1009	br3	1234
a4	952	b4	939	c4	961	d4	1047			br4	1137
a5	927	b5	924	c5	944	d5	1022	ST1	5240	br5	958
a6	911	b6	916	c6	934	d6	1006			br6	1121
a7	901	b7	913	c7	930	d7	997			br7	984
a8	913	b8	932	c8	946	d8	1007			br8	880
a9	930	b9	926	c9	937	d9	984			br9	840
a10	865	b10	870	c10	881	d10	923				
a11	741	b11	759	c11	766	d11	799			BR1	2660
a12	664	b12	680	c12	684	d12	710			BR2	2710
										BR3	2660

A1	1880	B1	1880	C1	1880	D1	1880				
A2	1880	B2	1880	C2	1880	D2	1880			BRI	3450
A3	1830	B3	1830	C3	1830	D3	1830				
A4	1830	B4	1830	C4	1830	D4	1830				
A5	1670	B5	1770	C5	1770	D5	1770				
A6	1670	B6	1770	C6	1770	D6	1770				
AI	4120	BI	4020	CI	4020						
AII	4170	BII	4070	CII	4070						
AIII	4230	BIII	4070	CIII	4070						

LINE TYPES

Name	Manufacturer	Name	Manufacturer	Name	Manufacturer	Name	Manufacturer	Name	Manufacturer	Name	Manufacturer
a1	DSL70	b1	DSL70	c1	DSL70	d1	DSL70	st1	DSL70	br1	DSL70
a2	DSL70	b2	DSL70	c2	DSL70	d2	DSL70	st2	DSL70	br2	DSL70
a3	DSL70	b3	DSL70	c3	DSL70	d3	DSL70	st3	DSL70	br3	DSL70
a4	DSL70	b4	DSL70	c4	DSL70	d4	DSL70			br4	DSL70
a5	DSL70	b5	DSL70	c5	DSL70	d5	DSL70	ST1	6843-160	br5	DSL70
a6	DSL70	b6	DSL70	c6	DSL70	d6	DSL70			br6	DSL70
a7	DSL70	b7	DSL70	c7	DSL70	d7	DSL70			br7	DSL70
a8	DSL70	b8	DSL70	c8	DSL70	d8	DSL70			br8	DSL70
a9	DSL70	b9	DSL70	c9	DSL70	d9	DSL70			br9	DSL70
a10	DSL70	b10	DSL70	c10	DSL70	d10	DSL70				
a11	DSL70	b11	DSL70	c11	DSL70	d11	DSL70			BR1	PPSL120
a12	DSL70	b12	DSL70	c12	DSL70	d12	DSL70			BR2	PPSL120
										BR3	PPSL120
A1	PPSL120	B1	PPSL120	C1	PPSL120	D1	PPSL120				
A2	PPSL120	B2	PPSL120	C2	PPSL120	D2	PPSL120			BRI	10N-200
A3	PPSL120	B3	PPSL120	C3	PPSL120	D3	PPSL120				
A4	PPSL120	B4	PPSL120	C4	PPSL120	D4	PPSL120				
A5	PPSL120	B5	PPSL120	C5	PPSL120	D5	PPSL120				
A6	PPSL120	B6	PPSL120	C6	PPSL120	D6	PPSL120				
AI	7343-280	BI	7343-280	CI	7343-280						
AII	7343-280	BII	7343-280	CII	7343-280						
AIII	7343-280	BIII	7343-280	CIII	7343-280						