DHV-Safety tests LTF A- and B- Paragliders, Part 11:

This report is based on the article published in DHV-Info 174 that can be found on the the web (www.dhv.de at Sicherheit und Technik). Information on assessment criteria, relevance for accident statistics of tested manoeuvres, the data logging technology as well as other details are listed in this article. The DHV safety and technology department team has purchased and thoroughly tested the latest LTF-A and B wings on the market. The following paragliders were tested:

Wing	Safety Class	**Pilot requirements:** More details on www.dhv.de at „Sicherheit und Technik / Safety Class“	Weight range Tested take off weight
Ozone Atom 3 M LTF A PG 922.215 & AV 2015/019	Asymmetric collapse 2 Front collapse 1 Spiral dive 2	**Pilot requirements:** Pilot skills as taught in standard training are required. Additional practice is recommended.	75-100kg 95kg Winker 100kg Kraus
Icaro Pica M LTF A DHV GS-01-2130-15	Asymmetric collapse 2 Front collapse 4 Spiral dive 2	**Pilot requirements:** Advanced piloting skills are needed to immediately recognize instability and react precisely to prevent or minimize follow-on reactions.	85-105kg 95kg Winker 100kg Kraus
Gin Bolero 5 M LTF A DHV GS-01-2126-15	Asymmetric collapse 3 Front collapse 2 Spiral dive 4	**Pilot requirements:** Advanced piloting skills are needed to immediately recognize instability and react precisely to prevent or minimize follow-on reactions.	85-105kg 95kg Winker 100kg Kraus
Swing Sensis M LTF B DHV GS-01-2133-15	Asymmetric collapse 5 Front collapse 4 Spiral dive 5	**Pilot requirements:** Ability to detect incidents immediately, to prevent them through adequate actions resp. to minimize their	90-110kg 93kg Winkler 108kg Kraus

		effects and to control critical consecutive reaction. Above average flying experience (>50h per year)	
BGD Base ML LTF B EAPR-GS-0380/15	Asymmetric collapse 5 Front collapse 3 Spiral dive 4	**Pilot requirements:** Ability to detect incidents immediately, to prevent them through adequate actions resp. to minimize their effects and to control critical consecutive reaction. Above average flying experience (>50h per year)	85-105kg 93kg Winkler 105kg Kraus

How the tests are conducted:

Two test pilots fly all manoeuvres in the test program. All tests are conducted within the certified weight range of the chosen model. Both test pilots always use their test harness to ensure comparisons between different models are as accurate as possible. Test harnesses used are standard certified harnesses where the pilot sits in an upright position (i.e. not supine or pod harnesses.)

Tests manoeuvres conducted are based on the current European Norm (EN 926-2.2103). Manoeuvres are flown at the maximum limits defined in this norm, in order to test as severely as possible within this framework. The manoeuvres asymmetric collapse, front collapse and spiral dive are evaluated and rated accordingly. Reactions to other manoeuvres are documented and described, but are not rated.

Asymmetric Collapses are performed both at trim-speed and full-speed. The canopy is collapsed to the maximum limit of the EN defined measurement field with the highest possible folding angle also within the measurement field. Only the collapses produced which fulfil these requirements are rated. Collapses which are larger than the EN measurement field are not rated. Should glider reactions to such collapses be markedly different, then these reactions are documented in the test pilots' comments. Background: real life collapses often deform the canopy with steep folding angles resulting in large collapses which include a large portion of the trailing edge. Reactions to such collapses are generally extremely severe, as often seen and recorded in accident analysis videos.

Front Collapses are performed both at trim-speed and full-speed. Collapses are performed at the EN minimum of 50% chord length (EN norm defines a minimum of 50%) and at the maximum possible with the canopy. Background: massive real life front collapses of 70-100% often produce markedly different reactions (e.g. collapse remains stable, front horseshoes or cravats) than those resulting from the EN/LTF norm tests. The “maximum possible collapse” test is designed to indicate if a glider is likely to react in this way.

Spiral dives: Tests are conducted in accordance with both the LTF 91-09 (reactions to a spiral dive at 14 m/s) and the EN 926-2.2103 norm (exit after two turns in a fully developed spiral dive). In addition to both these tests, exiting when the pilot remains sitting in a neutral position is tested, but the results are only documented, and not part of the glider rating. Background: Spiral dives are complex manoeuvres governed by several different parameters (entry technique, pilot reaction to G-forces, exit technique). Two different test methods and three differing exit methods are used to create a wide range of possible spirals and to indicate if the glider has any weaknesses regarding particular aspects of the tests.

Data loggers used during the test flights record pitch, roll and yaw angles and acceleration, horizontal and vertical velocities, G-force and height loss. Data is then synchronised with ground camera and on-board GoPro video footage. Analysis of all the data and video material is then performed together by the expert team. Manoeuvre ratings and overall DHV Safety-Class classification are then given by both the data analysis results, and test pilot comments.

Gliders are chosen in accordance with their market relevance, generally in the most sold size suitable for the mid weight range. Gliders are purchased from the market, and are not specially supplied or sponsored by manufacturers. Safety-Class ratings are only valid for the tested size of the glider.

Asymmetric collapses

OZONE Atom 3 M
Despite the low aspect ratio and the high chord length, the canopy can be collapsed to maximum chord length within the measurement field very easily. At trim speed, the wing reacts with a course change of less than 180°. The collapsed side opens very rapidly and partially even impulsive. Additional dynamics are not generated in this process.
At full speed, the wing collapses to maximum chord length. Thereby the wing reacts with quick, smooth course change. A deep stall is barely recognizable. No later than after 90° the wing decelerates significantly. The opening also follows mostly after 90°. The entire course change is 180° max. Despite the quick course change at the beginning, the pitch forward remains in reasonable bounds, mostly around 60°. The behavior at asymmetric collapses lies at the limits of the next higher Safety Class. Within the test, the wing had the lowest loss of height of max. 35m.

ICARO Pica M
We were unable to bring unaccerlated collapses to the upper limit of the measurement field. Even a powerful induction with both hands did not achieve a maximal chord length and big deformations. In general, the response of the wing to this deformation was very soft and slow. Pitch forward was usually around 45°. The wing opened after 90° the total course

change was around 180°. At full speed collapses in the upper limit of the measurement field and with max. chord length were possible. Also, the reactions were very benign. The wing did not pitch forward more than 50°-55°. The course change was indifferent. The wing was still open after 90°. The total course change varied between 180° and 360°. With the recommended weight range of 95kg in size M the wing demonstrated very low dynamics. At full speed, pitch forward and course change was at the lower limit of the Safety-Class. The wing always opened gently cell by cell.

GIN Bolero 5 M

At trim speed, the wing collapsed with a flat folding angle and showed a slow pitch forward and course change movement. Pitch forward was always around 55°-60°. The wing opened after 90°. The total course change movement was 180°.

At full speed, collapses with a steeper folding angle were possible. The pitch forward and course change movements happened slightly faster. The wing reopened after 180° at the latest. The total course change was usually around 270°. Pitch forward was always around 60°. The dynamic was low, but the test results for this wing regarding pitch forward and course change movement are at the limit of the next higher Safety-Class.

SWING Sensis M

The wing collapsed at full speed and at trim speed with little effort with max. chord length and steep folding angle. The canopy rather demonstrated a fracture than a deformation. The wing remained filled for a long time which caused a lot of resistance and as a result intensified the dynamic of the reaction. At deformations with little chord length and on the lower end of the measurement field, the reactions were class-typical. At collapses with max. chord length and with collapses on the upper limit of the measurement field, the reactions were dynamic. At trim speed, we saw significant pitch forward without cascades. At full speed cascades occurred. Impulsive recoveries at the moment of largest pitch forward speed generated additional dynamics and led to a repeated collapse of the canopy. At the upper limit of the weight rage, the quick and significant pitch forward led to counter collapses, cravats and twists.

In safety trainings, attention should be paid to a correct induction of the collapse when flying at full speed, otherwise, the dynamics of the wing could be reinforced. The collapses should be pulled with little pulling distance and with a slight movement to the inner, lower side in order to prevent a stepped collapse. The pilot should make sure that the the outer A-line is shortened to grant an even collapse and opening and to prevent cravats in the outer wing tip.

BRUCE GOLDSMITH DESIGN Base ML

The wing collapsed always with max. chord length and steep folding angle. The reactions were extremely dynamic. The reacted with a smooth course change at full speed and at trim speed and pitched forward significantly. The response time for pilots was very low. Massive counter collapses, repeated collapses of the entire canopy as well as twists and cravats were to be expected. The opening partly happened cell by cell, partly impulsive with a significant increase in dynamic. At impulsive recoveries, strong pitch forward with repeated collapses of

the entire canopy were possible. We also saw counter collapses with rapid change of direction.
In safety trainings, attention should be paid to a correct induction of the collapse when flying at full speed, otherwise, the dynamics of the wing could be reinforced. The collapses should be pulled with little pulling distance and with a slight movement to the inner, lower side in order to prevent a stepped collapse. The pilot should make sure that the the outer A-line is shortened to grant an even collapse and opening and to prevent cravats in the outer wing tip.

Asymmetric collapse

Wing	Loss of height in m	Angle of pitch	Max. angle of pitch speed in °/sec	G-Force in G	Total course change in °	Max. descent rate in m/sec	Comments
LTF A							
Ozone Atom 3 M	30-39m	45-60°	70-90°	2-2.5 G	90-180°	-14m/sec	Unaccerlerated the wing had a course change of max. 90° and pitched forward between 45° and 50°. The dynamic vanished immediately. The wing had a course change of 180° at max and pitched forward 60° at max. Loss of height was mostly under 35m.
Icaro Pica M	40-49m	45-60°	80-100°	2-2.5 G	180-270°	-15m/sec	The wings reaction to deformations was very benign and slow. Pitch forward at at trim speed deformations was approx. 45°. The wing

							reopened after 90° and had a course change of no more than 180°. Reactions to at full speed collapses were also benign. The wing mostly pitched forward no more than 50-55°. Course change movement was indifferent. The wing always opened after 90° at the latest. Total course change movement varied between 180 and 360°.
Gin Bolero 5	40-49m	55-60°	65-80°	2-2.5 G	90-270°	-15- -19m/sec	At trim speed: Pitch forward was always around 55-60°. The wing opened after 90°. Total course change was 180°. At full speed: Pitch forward and nick movements happened a bit faster. The wing reopened after 180° at the latest. Total course change movement was mostly at 270°.

							Pitch forward was always around 60°. In general the wing showed a behavior that was at the limit to the next higher Safety Class.
LTF B							
Swing Sensis M	50-59m	75-90°	125-140°	3-3.5 G	270-360° mostly 270°	- 18m/sec	Max. chord length collapses with steep folding angle and as a consequence dynamic reactions. Tendency to create cravats on the collapsed side and at counter collapses. Risk of twists at at full speed collapses. Impulsive recoveries right at the moment of highest pitch angle speed partly resulted in a repeated collapse of the entire canopy.
BGD Base ML	40-49m	75-90°	130-155°	2.5-3 G	180-270°	- 24m/sec	At full speed and at trim speed very dynamic reactions with very rapid course change and high angle of pitch. Very short response

							time for pilots after the deformation occurs. Big, max. chord length collapses let to cascades.

Front collapses

OZONE Atom 3 M

Exemplary behaviour at frontal collapses. Despite the low aspect ratio and the high chord length, the canopy can be collapsed to maximum chord length within the measurement field. Re-inflation and recovery was rapid. Loss in height was moderate.

ICARO PARAGLIDERS Pica M

The Pica M reacted very benignly to collapses. At trim speed, re-inflation and recovery was slightly delayed. The canopy always re-inflated from the middle leaving wing-tips collapsed for longer and delaying the return to normal flight for a little. This resulted in a loss of height of >50m which led to a higher rating in Safety-Class. At full speed, re-inflation was a lot more rapid, due to a much higher pitch movement wit a max. loss of height of approx. 40m.

GIN GLIDERS Bolero 5 M

At trim speed, the Bolero 5 M requires a large amount of force to collapse with a rather low chord length. At full speed, collapses with 80% chord length were possible. Re-inflation and recovery was always rapid and with little dynamics. Loss of height was minimal. The canopy re-inflated symmetrically. Asymmetric re-inflations that happened independently of induction resulted in course change movements <90°.

SWING Sensis M

The Sensis M required a large amount of force to collapse. At trim as well as at full speed, the canopy collapsed to maximum chord length. At trim speed, re-inflation and recovery was slightly delayed. At full speed, the canopy re-inflated rapidly, cell by cell, starting from the middle. Wing tips had to be actively re-inflated. In some cases, collapses resulted in front horsehoes with a tendency to create a cravat.

BRUCE GOLDSMITH DESIGN Base ML

At trim as well as at full speed, the canopy collapsed to maximum chord length. Pitch back movement was quite significant. The canopy re-inflated rapidly, starting from the middle. Wing-tips re-inflated with a delay and limited the pitch forward movement which resulted in the loss of height being quite moderate. Even with slightly asymmetric re-inflations, there was little course change movement. For this Safety Class and under consideration of the very dynamic reaction with asymmetric collapses, the wing showed a very benign reaction.

Front collapse

Glider	Height-loss in m	Pitch-back angle in °	Pitch forward angle in °	Rotation	V/sink max. in m/sec	Notes

Ozone Atom 3 M						Despite the low aspect ratio and the high chord length, the canopy can be collapsed to maximum chord length within the measurement field. Re-inflation and recovery was rapid. Loss in height was moderate.
Icaro Pica M						The canopy always re-inflated from the middle leaving wing-tips collapsed for longer and delaying the return to normal flight for a little. This resulted in a loss of height of >50m which led to a higher rating in Safety-Class.
GIN Bolero 5 M						At trim speed the Bolero 5 M collapses with a rather low chord length. At full speed, collapses with 80% chord length were possible. Re-inflation and recovery was

						always rapid and with little dynamics. The canopy re-inflated symmetrically. Asymmetric re-inflations that happened independently of induction resulted in course change movements <90°.
SWING Sensis M						The canopy can easily be collapsed to maximum chord length. The canopy re-inflated rapidly starting from the middle. We noticed a tendency to create a cravat.
BGD Base M						At trim as well as at full speed, the canopy collapsed to maximum chord length. Pitch back movement was quite significant. The canopy re-inflated rapidly, starting from the middle. Wing-tips re-

						inflated with a delay and limited the pitch forward movement.

Spiral dive
The OZONE Atom 3 M could be quickly brought into rotations with increased descent due to the very agile handling. In order to achieve a spiral dive, it required a determined initiation. The spiral behavior was good-natured and within the limits of Safety Class 2. With a deliberate neutral seat position, the wing may spiral steadily. A small adjustment of the pilot weight to the outer side caused the wing to exit the spiral within 270°.

With the ICARO Pica M, the spiral should be entered gently. Rapid initiation with one steering line with neutral weight shift led to a spin. Also, the hardly changing brake pressure needs to be considered and the timely reduction of the brake travel needs to be obeyed when entering the spiral. It is important to use a correct steering technique. When spiraling, the wing showed very good-natured reactions and could be controlled easily. After releasing the brakes, the descent rate at full speed for half a rotation to a max of 3m/s. Exiting the spiral happened autonomously with a max. further rotation of 360° after releasing the brakes.

The GIN Bolero 5 M was exemplary when entering a spiral. A determined induction of the spiral was required do to the significant increase in brake pressure. Achieving too high descent rates that could overexert beginners is hardly possible. After releasing the brakes, we saw a significant increase of Vsink from slightly under 10m/sec and within a rotation to 22m/sec. This behavior is considered quite dynamic for a wing of this class. Exiting the spiral happened autonomously, slightly delayed with the rotation carrying on for approx. 540°. Max. rotation after spiral exit was approx. 700°.

The SWING Sensis M was easy to induce a spiral in spite of it's dampened handling. After releasing the brakes, the wing at full speed to maximal sink velocity and kept rotating autonomously. Even with a max. weight shift to the outer side, the spiral remained stable on EN standards. Exiting the spiral through active pilot input with a definite pull on the outer brake was possible at any time and immediately. G-Force were rather high during the spiral phase.

Due to the agile handling, the BGD Base ML could be swiftly piloted into the spiral. We noticed a quick increase in sink velocity. After releasing the brakes, the wing at full speed by approx. 6 m/sec. Max. sink velocity during our test was 25 m/sec. If, during the spiral exit, the pilot let his weight shift neatly to the outer side, the wing autonomously exited the spiral within a rotation of max. 540°. When the weight remained in a neutral position, the wing kept rotating steadily and at full speed to max. sink velocity. Active exit through a brake impulse was easy. The generated energy during the spiral phase should be cut down through several rotations. If the pilot let the wing bounce out of the spiral, the canopy disappeared behind the pilot and transfers energy into height gain. Thereby the wing disappeared up to

70° behind the pilot and pitched forward in a very dynamic and symmetric way. This reaction needed to actively be stopped by the pilot to prevent cascades.

Spiral dive

Wing	Vsink in m/sec after 360° 720° max.	G-Force in G after 360° 720° max.	Loss in height after 360° 720°	Loss in height after brake release until normal flight	Behavior after brake release	Comments
LTF A						
Ozone Atom 3 M	6 m/sec 10 m/sec 18 m/sec	1.6 G 2.4 G 3.5 G	25m 55m	40m	Sink velocity increase of max. 5m/sec within 90°. Autonomous spiral exit between 180° and 360° (mostly 270°)	In total good-natured behavior. A tendency to keep rotating after exiting the spiral only happened if the pilot actively remained in a neutral position
Icaro Pica M	6 m/sec 13 m/sec 18 m/sec	1.9 G 2.8 G 4 G	25m 60m	50m	Little sink velocity increase of max. 3m/sec within 180°. Exit within 360° after brake release.	Tendency to tailspin when entering the spiral. Wing needs careful induction into the spiral. Behavior during spiral very good-natured.
Gin Bolero 5	8 m/sec 15 m/sec 22 m/sec	2.2 G 3 G 4.5 G	27m 65m	85m	Sink velocity increase of 9 m/sec within 360° and further rotation of 180-300°. Max. rotation after brake release was 700°.	A strong increase in brake pressure makes it difficult for the pilot to unintentionally enter a spiral dive and to achieve high sink rates. Spiral exit with significant rotation after the exit and considerable loss in height.
LTF B						
Swing Sensis M	8 m/sec 18 m/sec 22 m/sec	2.3 G 2.8 G 4 - 4.5 G	30m 70m	>100m until active exit	Sink velocity increase from 6 m/sec to max. sink	The wing remained in a stable rotation even though the pilot shifted his

					velocity. After that, stable rotation until pilot actively exits the spiral.	weight to the outer side significantly. A strong brake input on the outer side ended the stable spiral immediately.
BGD Base ML	8 m/sec 19 m/sec 25 m/sec	2 G 3.5 G 4.5 - 5 G	30m 70m	90m	Sink velocity increase from 6 m/sec to 25 m/sec within 360°. Thereafter, autonomous exit within a further 180°	A quick spiral induction is possible. Rapid increase in sink velocity. During autonomous exit with passive pilot behavior, speed transfers into gain in height which leads to extreme pitch movements that need to be ended actively through pilot input. With slightly neutral position, the wing spiraled steadily.

B-STALL

The 3 tested A-wings behaved unproblematic during the B-Stall. Only the GIN Bolero 5 M showed a higher initiation resistance. The B-wing SWING Sensis M was also trouble-free. When the B-risers were pulled to the max. physical limit, the canopy became a little nervous, however, exiting the manoeuvre was not necessary. With normal induction and slightly lower pull, the BGD Base ML created a front rosette, that actively opened through the brakes. If the B-risers are pulled from the inner side to below and on the inside, the wing remains quiet and stable. Even with little pull, the Base went into a front rosette after a short time. After releasing the B-risers, the wing tips were actively slowed down to stop the front rosette. By actively pulling the B-risers to the middle and downwards, the descent method is stable and easy to use.

B-Stall

Wing	Sink velocity in stable B-stall	Pitching back during induction	Loss in height from releasing B-	Comments

	Tendency to deform Rotation	Pitching forward during release	risers until normal flight	
Ozone Atom 3 M	8 m/sec no no	<15° <15°	<35m	Little pitching back and pitching forward during induction and exit. Stable sink phase.
Icaro Pica M	7.5 m/sec no no	<15° <15°	<30m	Little pitching back and very little pitching forward when exiting. Stable sink phase.
Gin Bolero 5	8 m/sec no no	<15° <15°	<20m	Very significant induction resistance. Little pitching back and pitching forward during induction and exit. Stable sink phase.
Swing Sensis M	7.5 m/sec no no	15°- 30° <15°	<20m	When pulling B-risers to the max and during longer B-stalls, the canopy became nervous. With a little variation of the pulling distance, a nice and easy B-stall with stable sink rate was possible.

BGD Base ML	8 m/sec yes no	15°- 30° 15°- 30°	<35m	With a normal induction, a front rosette appeared after a short time, which actively opened through the brakes. By pulling the B-risers downwards to the inner side, the B-stall remained stable and calm.

Big Ears:
This manoeuvre was very easy for all wings during induction as well as during the manoeuvre. When exiting the manoeuvre, ear opening of the SWING Sensis was significantly delayed or only after active pilot input. This pilot input is easily executed. All other models opened autonomously and quickly.

Big Ears

Wing	Induction	Exit	Vsink Vsink At full speed	Change in velocity - At full speed - At trim speed	Comments
Ozone Atom 3 M	Easy	Autonomously, quickly	3.5 m/sec 4.5 m/sec	Approx. 0 - 3 km/h slower than trim speed Approx. 3 - 5 km/h faster than trim speed	No issues
Icaro Pica M	Easy	Autonomously, quickly	2.5 - 3 m/sec 3 - 3.5 m/sec	Approx. 0 - 3 km/h slower than trim speed Approx. 3 - 5 km/h faster than trim speed	No issues
Gin Bolero 5	Easy	Autonomously, quickly	3.5 m/sec 4 m/sec	Approx. 0 - 3 km/h slower than trim speed	No issues

				Approx. 3 - 5 km/h faster than trim speed	
Swing Sensis M	Easy	Partially marked delayed recovery, partially active pilot action required	2.5 - 3 m/sec 3.5 m/sec	Approx. 0 - 3 km/h slower than trim speed Approx. 3 - 5 km/h faster than trim speed	Partial active pilot input required to open
BGD Base ML	Easy	Autonomously, quickly	2.8 m/sec 3.5 m/sec	Approx. 0 - 3 km/h slower than trim speed Approx. 5 - 8 km/h faster than trim speed	No issues

Launch behavior	Flight characteristics
Ozone Atom M	
Launch preparation: Getting ready to launch with the Atom is very easy. The risers are very manageable and the lines can be sorted easily and very well. Launch: Exemplary. After the initial impulse the wing climbs without any further action required from the pilot. The wing slows down autonomously at the zenith with no need to be intercepted. The take-off distance required is remarkably short.	The very compact canopy gives a very stable impression. In flight, the high trim speed as well as the low roll damping is striking. Handling through brakes is very agile. Beginners may be struggling with these flight characteristics. Exhausting the weight limits to the max is not recommended for new pilots.
Steering behavior: Agile, brake range approx. 85cm. Increase in brake pressure is obvious, stall occurs after long and clearly felt notice.	
Icaro Pica M	
Launch preparation: Launch preparation is very easy. The risers are very manageable and lines are in different colors. The line configuration is very clear. Launch: After the initial impulse, actively guiding the canopy through the A-risers helps. At the zenith, the canopy slows down autonomously and remains properly over the pilot. The canopy has a tendency to pitch back behind the pilot during the acceleration phase (even with linear acceleration) and extend the take-off distance.	Flight characteristics: The wing gives a dampened impression and shows air movements clearly through brakes and risers. Brake pressure is low. Strikingly, brake pressure does not increase on a linear base but remains low and just slightly increases just before stall. Both sided brake travel is long, one sided brake travel is too short for an A-wing. It is required that the pilot sensitively deals with the brakes, reference oriented to the risers to prevent unintended, asymmetric stalls. A correct steering technique with weight shift and use of both brakes is recommended. If the weight shift remains passive and steering is

	done with brakes only, there is a tendency to stall in quick curves. Especially when entering a spiral, special care is required.
Steering behavior: Balanced to agile. Brake travel is approx. 85cm. Increase in brake pressure is not very significant. Stall without significant notice.	
Gin Gliders Bolero M	
Launch behavior: Launch preparation is average. Sorting lines is a bit confusing in the gallery level. The riser is simple and clear; line levels are marked in different colors. Launch: Very easy launch behavior. After the initial impulse, the wing climbs with good directional stability and without any further guidance required and slows down autonomously at the zenith. Control with applying a little brake is easy. Take off velocity is low.	The wing has a balanced handling with good dampening. Increase in brake pressure until stall is very easy to feel. Before stall, brake pressure increases dramatically. This also shows in the spiral. Unintended falling into a spiral dive is hardly possible due to the significant increase in brake pressure.
Steering behavior: Balanced. Brake travel is approx. 80cm. Increase in brake pressure is very significant. Increase in brake pressure is obvious, stall occurs after long and clearly felt notice.	
Swing Sensis M	
Launch behavior: Launch preparation is easy. Line levels are clear and can easily be separated. The riser is also very clear. Launch: After the initial impulse, the wing climbs with good directional stability and without any further guidance required and slows down autonomously at the zenith. Control with applying a little brake is easy. Take off velocity is moderate and average.	Flight characteristics: The canopy is very stable and gives a dampened impression. Upwinds and turbulences are rather communicated through the risers than through the brakes. At the top of the weight range, the behavior is well-balanced, on the lower end of the weight range, it's rather dampened and sluggish. The wing should be manoeuvred into curves with a lot of weight shift. At the lower end of the weight shift, the pilot should actively react to changes in brake pressure to prevent unintended stalls in moving air.
Steering behavior: Dampened to balanced, brake travel approx. 75cm. Increase in brake pressure is very significant. Increase in brake pressure is obvious, stall occurs after brief and clearly felt notice.	
BGD Base ML	
Launch behavior: Considering the class, launch of this wing is very easy. Launch: After the initial impulse, the wing climbs dynamically, then slows down but still braking required at the zenith. All other take-off phases are class-typical.	Flight characteristics: For it's class, the wing has a rather high trim speed and gives a very solid impression in the air. Handling is very fun-oriented which is boosted by the little roll and pitch dampening. Increase in brake pressure is very significant.
Steering behavior: Dynamic, brake travel is approx. 80cm. Increase in brake pressure is very obvious, stall occurs after long and clearly felt notice.	