ADVANCE SIGMA 9

Product presentation

Product presentation contents

SIGMA 9 – Compact Power

Less aspect ratio and weight, more performance and precision – that is the SIGMA 9. The newest version of the long SIGMA tradition has the smallest aspect ratio of the current EN C class, yet is a winner with maximal performance despite its marked compactness. To perfectly coordinate these opposites was a great challenge for our development and test team. Countless test and comparison flights were made with competitors' products to make sure that the new SIGMA 9 would be the most comprehensive wing in the C class. In our opinion it's the best package for ambitious cross country pilots who put value on sporty and dynamic handling. You can read about this and more in this product presentation. As a dealer it should give you some convincing arguments for a successful sales pitch.

QUICK FACTS SIGMA 9

- Lowest aspect ratio in the C class (Compact)
- Performance of the best C wing (Power)
- Direct and precise
- Lower steering loads than the SIGMA 8
- Lightest product of its class: 25 size only 4.9 kg
- Piloting demands the same as the SIGMA 8
- With the new COMFORTPACK 2

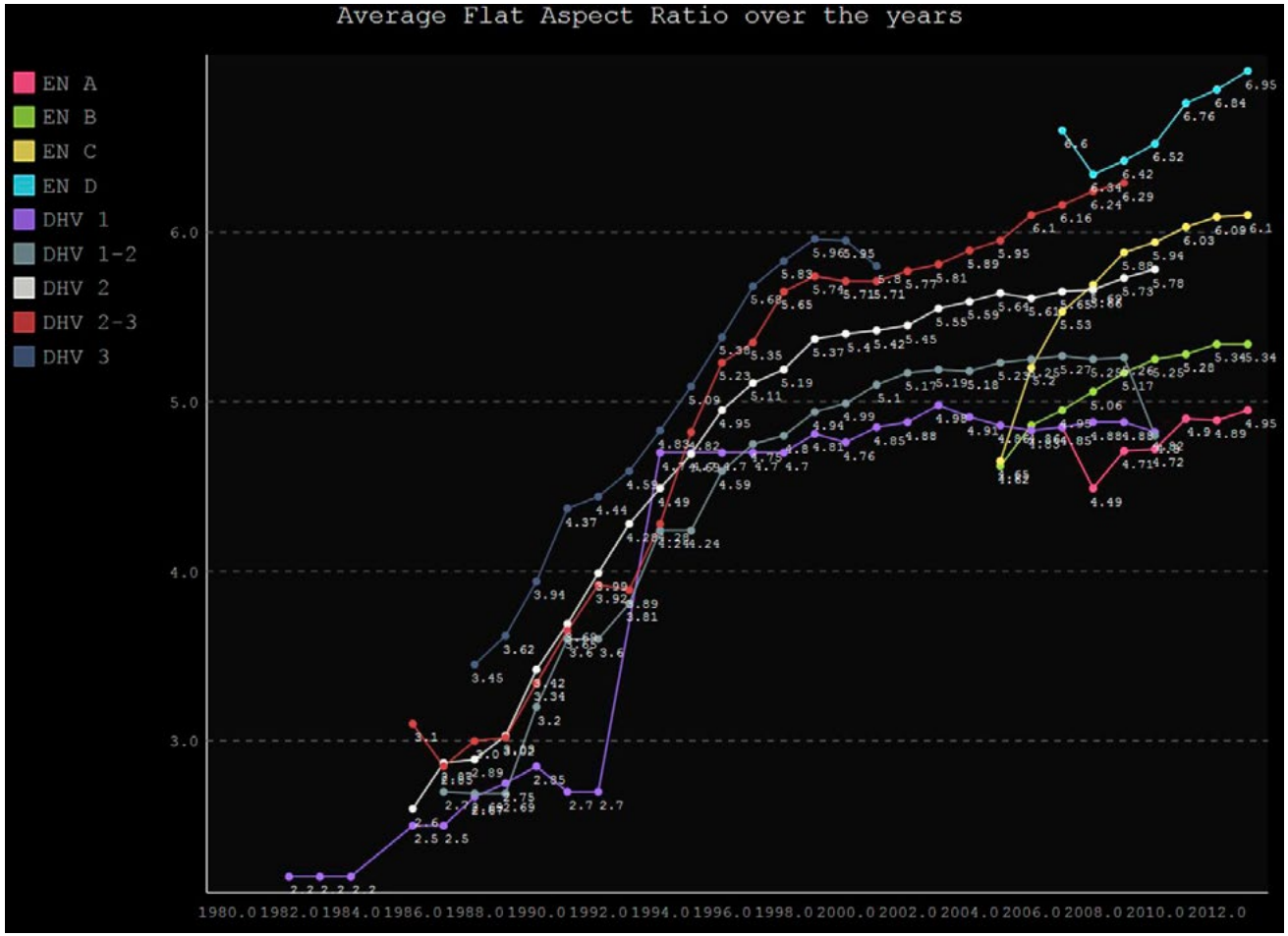
Comparison with the SIGMA 8

	same	better	much better
Precision			
Steering loads			
Brake travel			
Performance			
Weight			
Stability			
Takeoff			
Simplicity & Compactness			
Max. Speed			
Climb performance			
Robustness			

Continuing the legendary SIGMA series

For 25 years the legendary SIGMA line has embodied both tradition and progress. The SIGMA is designed for the experienced and ambitious cross country pilot who values sporty and lively handling. The SIGMA series founded its own class, and, to remain true to this principle the SIGMA 9 makes the same demands of its pilot as its predecessor. Within the current EN standard it is a low end C, corresponding to the previous DHV 2 class. The SIGMA 9 follows on seamlessly from the EPSILON 7.

Bucking the sport class trend



For years paraglider aspect ratio has been going up. Higher aspect ratio demands more of the pilot. This contradicts our philosophy of straightforward and accessible products which are comfortable to fly. That is why we gave ourselves a big challenge with the SIGMA 9 – to achieve the best possible EN C performance with the smallest possible aspect ratio. This meant developing a compact and stable wing, under which the pilot feels comfortable all the time, and has full control over the glider - especially when accelerated, so that the great potential of this product can be fully enjoyed. The SIGMA 9 convincingly demonstrates that high aspect ratio is not the only way to achieve more performance.

←
Magnus Auvinen
http://www.lu-glidz.blogspot.ch/2014/01/wie-die-klassen-sich-strecken.html

Total performance package

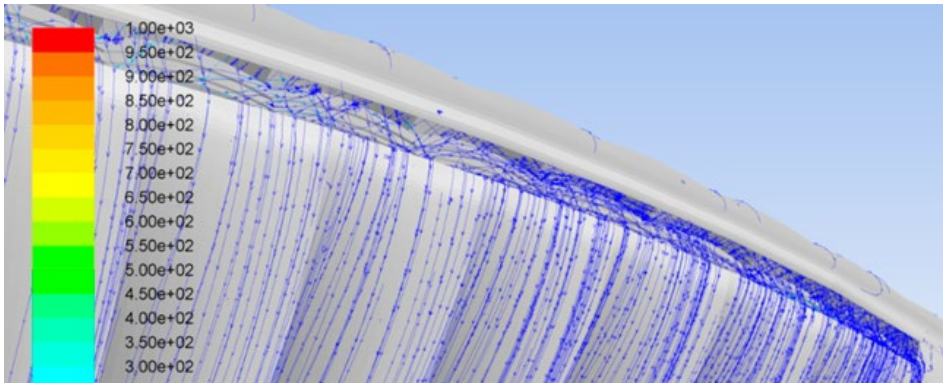
During development we devoted a lot of attention on the many factors that combine to produce the SIGMA 9's exceptional performance. These are the most important:

Analytical technology to achieve the perfect setup Last year our development engineer Silas Bosco created and analysed more than 200 prototypes using Hannes Papesh leading software. 25 of these were built and tested. In a repetitive process a vast number of possible configurations involving performance, structural analysis and stressing were compared, with the aim of finding and evaluating the perfect setup. To date, an analytical process at this level of sophistication is practically unique in paraglider development. The latest SIGMA is the result of an extremely complex analysing and selecting procedure.

Improved finish A high quality finish conveys the idea that the theoretical potential of the final design has actually been created in the real world. We were able to again improve this "Finishing Factor" with the SIGMA 9. Examples could be the precisely computed 3D shaping at the leading edge, or the optimal panel shaping achieved in general; on the other hand the extremely accurate assembly work in our own factory plays a significant part. This all means that the analysed stress distribution in the sail could be made a crease-free-as-possible reality.

Uncovered Edelrid lines With the SIGMA 9 we are, for the first time, using exclusively low-stretch uncovered Aramid Edelrid lines. This made it possible to further reduce line drag. Our very positive experiences of long life and robustness with this high quality product encouraged us to take this step.

Usable performance Analytically derived performance is only of use if it can actually be used under real conditions, especially when in accelerated flight – and in turbulence. The SIGMA 9 has a very pitch stable profile and a high degree of canopy structural stability. This last results from the scoop in the leading edge. For more about this see the FAQs.



SIGMA as the handling bench mark

SIGMA 1, 1989

SIGMA 9, 2014

SIGMA 1 was the first ADVANCE serial wing dating from 1989. Since then the SIGMA line has continued to set the standard for Sport class handling, so we have invested an enormous amount of time refining this feature. Alongside comfortable brake pressure and high precision we have once again given a lot of attention to SIGMA 9 bank control at high angle of attack, as is necessary for re-centering thermals.

Reduced brake load Compared with the SIGMA 8 the SIGMA 9 brake pressure is lighter and more comfortable. This has been achieved through a reworked brake differential effect, and the new profile. This makes the glider more relaxing to fly on long flights.

More precise brake travel SIGMA 9 brake travel is somewhat shorter and therefore more direct. Handling in general is therefore more precise. The scoop in the leading edge contributes to the oval intakes' ability to contain the stagnation point at high angles of attack. This leads to considerably more of the brake travel where loading increases progressively. This, from the pilot's point of view, results in a significantly later stall onset, and a greater safety margin when top landing (for example).

Legendary re-centering The possibility, even at high alphas, to make this glider turn precisely makes the pilot feel more secure when turning near the hillside, and this promotes realistic confidence. This SIGMA 9's marked ability to adjust the turn as desired results from a complex interaction of a number of parameters, that have to elaborately complement each other.

The lightest in its class

The SIGMA 9/25 weighs 4.9 kg, absolutely the lightest wing in its class. It is all of 700gm lighter than the Sigma 8. The SIGMA 9 weight lies between a light wing and a normal wing. For this SIGMA we are exclusively using high quality European Porcher cloth, which has a very long lifespan. A light paraglider can be packed small and is light to carry, but the low canopy mass also has a beneficial effect on take off behaviour, handling and passive safety. Lower canopy momentum means that the wing tends to shoot forward less in flight, and requires lower brake forces to control it.

Advantages of lower mass:

- better takeoff behaviour
- lower packed volume – less weight to carry
- better handling
- better extreme flight behaviour.

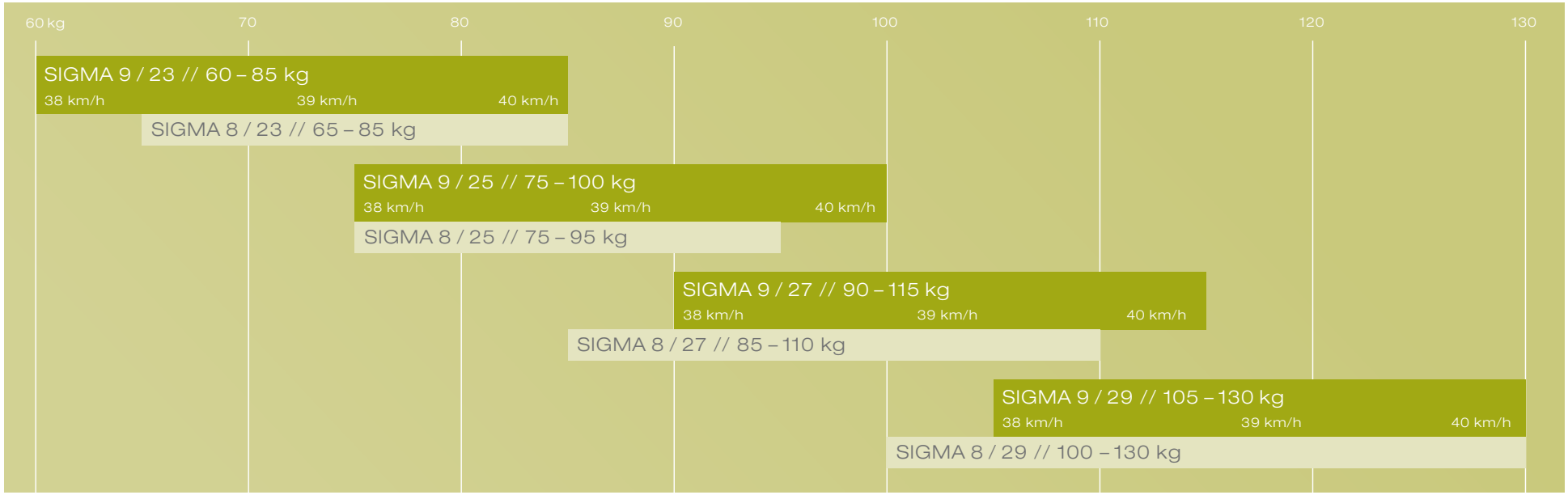
Size	23	25	27	29
Weight in kg	4.55	4.9	5.25	5.55

Best weight range and loading

The SIGMA 9 weight ranges have been slightly altered from that of the SIGMA 8, and tend to be enlarged. You can load up the SIGMA 9 more, but you don't have to. A new profile generation made this possible because it is very tolerant of different wing loadings. The SIGMA 9 climbs very well when heavily loaded, and turns beautifully at the lower limit. In addition extreme manoeuvre behaviour at maximum wing loading is not more demanding. That is a real plus point for the SIGMA 9!

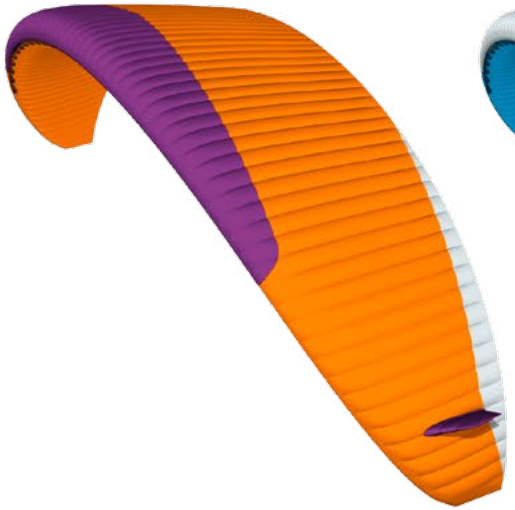
Important for SIGMA 8 pilots: the same size SIGMA 9 can be chosen for the same weight.

Tip: ADVANCE recommend that the SIGMA 9 is flown in the middle to upper weight range.

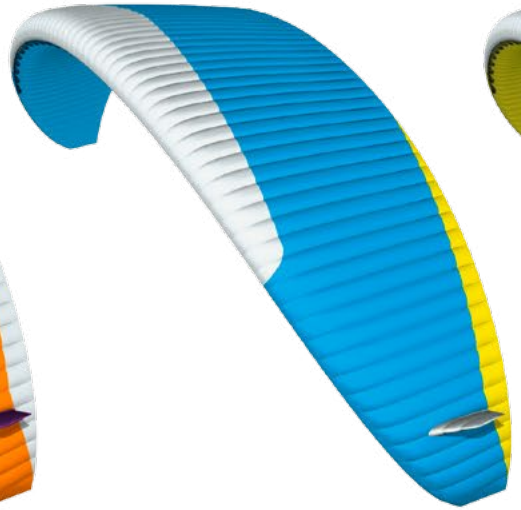


Elegant look, classy colours

The SIGMA 9 appears in the new and elegant ADVANCE colour scheme. This design concept stands out from the crowd due to its reductionist and independent stylistic elements, clearly distancing itself from current paraglider fashion. The underside of the wing is produced in the same colours as the top. White underneath is available as a special order.



orange



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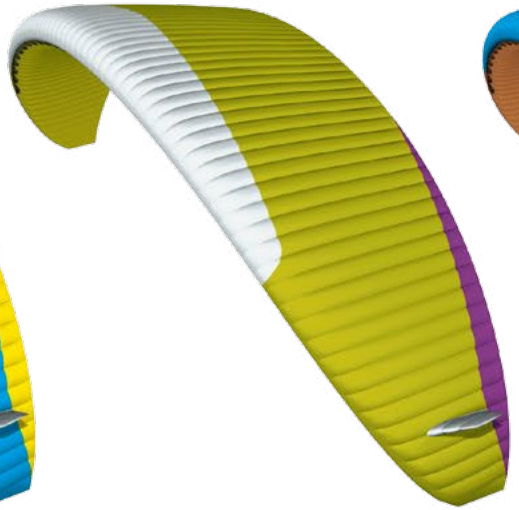
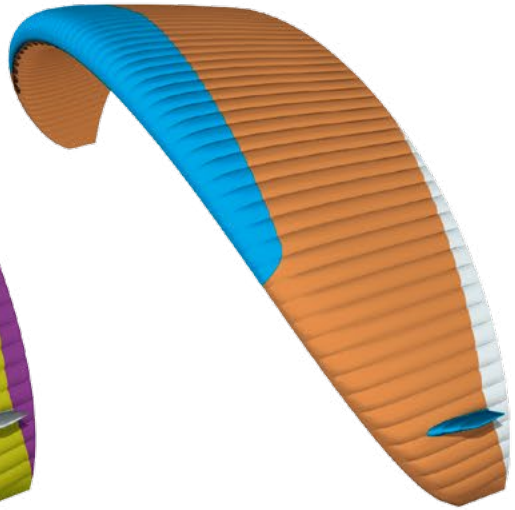


palm



bronze

High quality risers

New for a SIGMA, the outer A lines have their own risers, and are marked red at the base; this makes it easier to apply big ears. The SIGMA 9 is best pulled up using all A risers (marked blue). The split in the A risers is quite high up, so that, even without the magnets, they stay close together and are easy to hold together for takeoff.

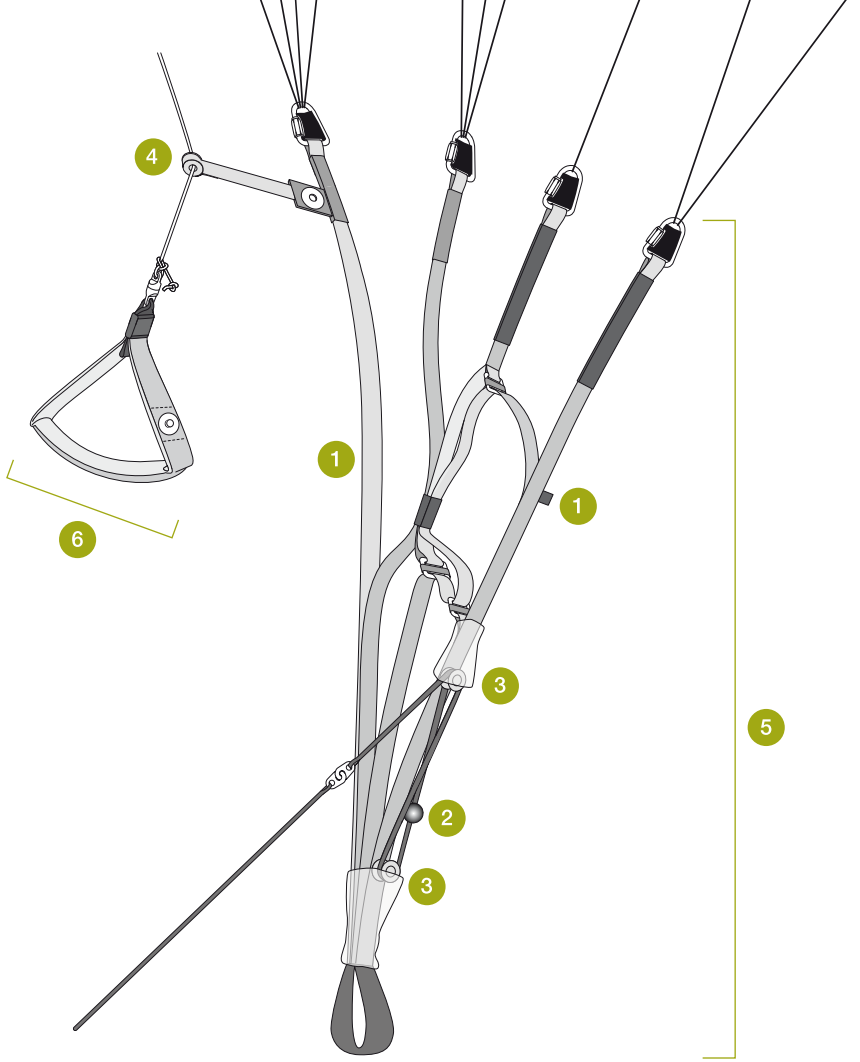
More features of these refined and elegant risers:

1. **SPI (Speed-Performance-Indicator) with three indications:** The SPI is not just a simple aid for the choice of the best speed to fly. It helps the pilot to find the best speed system setting in the ADVANCE harness hanger.

2. **Two-geared speed system:** By moving the ball you can alter the position for the pulley gearing change from 3:1 to 2:1. This is how you adapt the travel and load to suit individual height and leg length.

3. **Harken ball bearing pulleys for the speed lines:** These high quality pulleys reduce the speed system forces and make the speedbar or speed loop easier to push.

4. **Ceramic brake rings replace pulleys:** lighter and low-friction for easier brake application.



5. **Different riser lengths:** The smaller the wing the shorter the risers: smaller people with shorter arms tend to fly smaller gliders – so this idea suits their heights and ideal hand positions for braking.

6. **Different brake handle sizes:** same principle as the riser lengths – smaller brake handles for smaller wings and hands.

New COMFORTPACK 2 is easy to carry

The SIGMA 9 comes with the COMFORTPACK 2. Paragliders and harnesses are becoming more compact and lighter, and we want to offer pilots suitable rucksacks. We've remodelled the successful COMFORTPACK to match our complete selection of paragliders and harnesses. The result is the COMFORTPACK 2; now in 4 sizes - 100 litres, 115 litres, 130 litres and 145 litres. The new COMFORTPACK comes in one colour scheme: chocolate/vivid blue.

This table gives you an idea of which size COMFORTPACK 2 will come with which SIGMA, unless something different is ordered.

	COMFORTPACK 2			
	100 l	115 l	130 l	145 l (Tandem)
SIGMA 9 23		■		
SIGMA 9 25		■		
SIGMA 9 27			■	
SIGMA 9 29			■	

Remarks: The choice of harness affects the choice of rucksack size a lot, especially when you consider individual requirements. If the pilot prefers compactness & maximum carrying comfort, he will probably choose a smaller rucksack. If he wants a lot of space and easy packing, a larger size would be more suitable. You can find a relevant table on our homepage.

Technical details

SIGMA 9		23	25	27	29
Flat surface	m^2	22.5	25	27	29
Projected surface	m^2	18.8	20.9	22.5	24.2
Recommanded takeoff weight	kg	60 – 85	75 – 100	90 – 115	105 – 130
Glider weight	kg	4.55	4.9	5.25	5.55
Aspect ratio		5.8	5.8	5.8	5.8
Projected aspect ratio		4.1	4.1	4.1	4.1
Span	m	8.8	9.3	9.6	9.9
Trim speed	km/h	39 (+/- 1)	39 (+/- 1)	39 (+/- 1)	39 (+/- 1)
Max. speed	km/h	55 (+/- 2)	55 (+/- 2)	55 (+/- 2)	55 (+/- 2)
Number of cells		59	59	59	59
Number of risers		3+1	3+1	3+1	3+1
Certification		EN/LTF C	EN/LTF C	EN/LTF C	EN/LTF C

Frequently Asked Questions

Why did this SIGMA take so long to develop?

SIGMA 9 development could well be one of the most extensive in paraglider history. It is always time-consuming to launch a new product; one that is clearly better than its forerunner in every respect and, at the same time, sets a new benchmark for the market. Even more so if the new product is to impress as a coherent total package, and not only stand out in single areas. That is our requirement in ADVANCE. Over the course of a year our development team have developed and virtually analysed more than 200 SIGMA 9 prototypes on the PC. Of those 200 25 real wings were built and extensively tested. These were routinely compared with three benchmark examples of our competitors. Development was only complete when the SIGMA 9 protos exceeded the other wings in all the criteria we had defined.

Who has developed the SIGMA 9?

We are often asked who is the actual designer of an ADVANCE product. ADVANCE don't like to reduce this to a single name; to us, paraglider and harness development has always been teamwork between engineers, test pilots, software developers and production colleagues. Development strategies are defined in the team and implemented, until the specified goals have been reached. Our test team consists of Kari Eisenhut, Greg Blondeau, Michi Maurer and other freelance test pilots. The development and design team are Silas Bosco, Patrick Bieri, Will Anderson and Christian Proschek. Hannes Papesh is responsible for the software.

Why does the Sigma 9 not have Mini Ribs?

We did a lot of work with Mini Ribs during SIGMA 9 development. Several SIGMA 9 prototypes were built with Mini Ribs. Countless comparisons showed no advantages for the SIGMA 9 concept with Mini Ribs. Following our philosophy of a simple and light product we have dispensed with Mini Ribs.

What is scoop and since when have such things been part of a paraglider?

A scoop is an offset air intake in the profile. This idea comes from von Gernot Leibe. He first tested scoops in paraglider construction in 1989 under the name "Shark mouth", and patented it. Since then several paraglider manufacturers have included this feature under various names. The SIGMA 9 also has a scoop in the profile nose. Together with the oval intakes these contain the stagnation point better at different angles of attack. This results in definitely longer brake travel and more precise handling at high angles of attack.

There's detailed information about this on: http://lu-glidz.blogspot.ch/