

## **The Pure M by freeX**

The new 1-2s are ever improving in performance levels. The successor to the Flair, the Pure by freeX, is also following this trend by intermediate gliders.

The Pure is, alongside the performance-intermediate Mission, the second glider manufactured by Aeroman in Hong Kong. The Pure is available in three sizes (S, M, L) and covers a lift off weight of between 55 and 130 kilogrammes. With Carrington fabric, sizes M and L have a Gütesiegel of 1-2 GH.

### Construction

As with the Mission, Christoph Kirsch and Christian Amon were responsible for the construction and testing of the Pure, with Rasso von Schlichtegroll responsible for computer design. Like its predecessor, the Flair, the Pure has no diagonal ribs. With 33 open cells the cell openings are 33cm x 6 cm in wing's centre and 35cm x 3 cm on the outside of the wing. The cell openings are typical of freeX, being lineal on the top edge for entry and cut in a semicircle on the underside in order to optimise the tension ratio between the upper and lower sail. The internally-inflated three-celled stabiliser is attached at four points to the main stabiliser line, which is marked in colour and leads to the C-Riser. The fabric used for the test equipment was Nylon N1097F (F stands for "water-repellent finish"), manufactured by Carrington with a weight of 47 grammes per square metre. N1099, the more rigid material diagonally, was used for the ribs (see table). The rigidity of the cell dividers of the leading edge is increased by additional Mylar strengthenings.

The leading and trailing edges have hems of polyester tape. The Technora aramid lines manufactured by Eulit have diameters of 0.9 mm to 2.1mm at the main lines. At first sight the Pure is hardly distinguishable in technical terms from its predecessor, the Flair. However, freeX and aerodynamics expert Frank Peer have changed a few things to the profile and wing design: the wing outline is more pointed, the external wing area is more refined and the geometry of the lines newly designed. The result of this is a larger usable range of angle of attack as well as a noticeably higher pitch stability.

A peculiarity of the Pure, taken over from the tandem paraglider Stereo, is the grip handle fixed to the A-Riser for big-earing : with a little pulley you can pull down the outermost A line and fold up the corresponding wing end. The acceleration system affecting the A B and C-Risers by a two-pulley reduction system works very efficiently.

### Take off

The take off preparations are very simple because the Technora lines are sleek and distinguishable by colour. It is only for the outer parts of the wing of levels C and D that extra care is required because here, as with the Flair, very many lines run together. With a semicircular technique of laying out the paraglider a moderately strong impulsion is sufficient to fill the Pure. The canopy comes overhead with a light but constant pull. Particularly between 70 and 80 per cent of the way up, the pilot should not, however, reduce the pressure otherwise the canopy will continue to

rise only at a much slower pace. It is here, in comparison with the Flair, that the Pure's significantly greater pitch stability becomes noticeable. When the overhead position is reached, a lighter pull on the brake lines is sufficient to stabilise the Pure. Even if the canopy is pulled back strongly, it will not shoot forward. The lift off speed is low.

### Flight

One of the main aims in designing the Pure was to increase the accessibility. Some pilots found it hard to get used to the very agile and racy control behaviour of the Flair. In addition, the designers of the Pure attempted to increase the internal damping around the pitch axis. As I had tested the Flair (see Fly and Glide 6/98), I was very interested to see whether these aims could be realised. My first flight with the Pure lasted over two hours in good thermals. I noticed immediately that the Pure's handling was not typical of freeX gliders. The control impulses were not as uncompromising in their effects as those of the Flair, and were significantly more moderate. Even the control pressure was noticeably higher. The control characteristics of the Pure figure among those usually found in DHV 1-2s. In comparison with the Flair, the Pure's control travels are longer. In spite of this, the wing can be controlled exactly and with precision in thermals, and the roll manoeuvrability is very high. The use of the outer brake is retained in tight curves or in flying out a weak thermal, and the turn behaviour is effectively supplemented by weight shifting. With a little practice, the Pure should have little competition in its class in terms of its agility and climb performance. The control pressure increases progressively throughout the flight and becomes very high when nearing the stall point. A good signal that you are approaching the stall point is the slow deflation and slight bending of the outer parts of the wing. Deflations at trim speed are hard to simulate and are not very spectacular in their effects. Moderately rapid turns of maximum 90 degrees with little loss in altitude were the most distinctive results of numerous attempts at tucks. The Pure remains more stable at a greater angle of attack than its predecessor, and in comparison with the Flair, accelerated tucks result in smaller forwards, downwards and turning movements. If the pilot does not intervene in this, he can turn a maximum of between 180 and 270 degrees without the wing diving too much. Opening again happens spontaneously and quickly. With the right reaction by the pilot, this intermediate glider will stabilise itself to some extent. The above-mentioned acceleration system can be maintained with little effort over long stretches, and in this way the increased speed of the Pure can be utilised to the full.

### Descent aids

Big-ears As mentioned above, the Pure has a grip handle on the A Riser which, via a small pulley, shortens the outermost A line. Tucks should take place with an outward pull, since a straight pull downwards involves greater use of strength. The tucked parts of the wing do not deflate completely, and therefore holding in the ears requires greater use of strength. The sink rates are three and a half metres per second and these increase to over four metres per second by accelerating at the same time. A shift in weight allows the pilot good control over the glider when flying with the ears in. As soon as the grip handle is released the glider opens quickly and spontaneously.

B-Stall: The B-Risers, which are marked red (red= emergency descent), are in easy reach of the pilot. After overcoming the initially high traction forces, entry is rapid. The reduction in wing area during a B-Stall is very great. The sink rates are really high at between eight and ten metres per second. The canopy remains calm. After a fast release of the B Riser, the Pure will resume normal flight after a slight pause.

Spiral dive: The entry into the spiral dive takes place immediately with the Pure. After just a few turns the pilot finds himself in an effective spiral with sink rates of over 15 metres per second. In a strong spiral the pilot should apply brakes to the outer wing to stabilise this area. After releasing the brakes the wing aligns itself spontaneously, the pilot should however dampen the exit through several turns to steadily reduce the high orbital velocity typical of freeX gliders.

### Performance

The Pure ranks near the top of the DHV 1-2 class in terms of performance. In accelerated flight, I would count the Pure as one of the highest performing gliders of its class. The trim speed of 36 km/h is high, and with full acceleration I recorded a speed of 48 km/h. Even in this circumstance the canopy remained stable – and in turbulence I never felt I was approaching the stability limit. In comparison with its predecessor, the Flair, the Pure scores points particularly for its increased speed, accessibility, handling and high pitch dampening. I achieved the lowest sink rate (1.2 metres per second) at a speed of 31 km/h.

### Conclusion

The Pure is a great success for the freeX crew. The glider has well-balanced control behaviour, which will presumably appeal to a larger range of pilots than the extremely direct handling of the Flair. The control pressure and control travels have been increased. The behaviour in deflations at trim speed is noticeably unspectacular and even accelerated tucks were easy to control. The Pure's flight performance data is top ranking in its class. With acceleration, it belongs among the highest performing 1-2s and could even compete with gliders of the next highest Gütessiegel category.

*Andi Pfister*

*Technical data and fittings*

Manufacturer	FreeX Air Sports
Current Gliders	Sun, Pure, Mission, Oxygen, Stereo (tandem)
Test	Pure (M)
Area (laid out)	S: 24.2 m <sup>2</sup> M: 27.6 m <sup>2</sup> L: 30.8 m <sup>2</sup>
Span (laid out)	S: 11.1 m M: 11.8 m L: 12.5 m
Aspect Ratio (extension)	S/M/L: 5.1
No. of chambers	S: 31 + 6 M: 33 + 6 L: 35 + 6
Sail material Material / Weight	Carrington N1097F Nylon /47 g/m <sup>2</sup>
Riser divisions	A/B/C/D
Foot accelerator	Yes
Shortening per level	A – 16cm / B – 12cm / C – 6 cm
Lines Material Diameter Colour marked Main lines per side	Eulit Technora Aramide 2.1 / 1.4 / 0.9 mm Yes 3A / 3B / 3C / 3D (Stabilo)
Seams Upper sail Lower sail	Interior seams Interior seams
Accessories	Repair kit, speed system
Rucksack for equipment: Volume Comfort for wearing Durability	Good Good Quite good
Weight of glider (without harness)	S: 5.3 kg M: 6.0 kg L: 6.7 kg
Lift off weight	S: 55 – 85 kg M: 80 – 110 kg L: 100 – 130 kg
Price (including speed system)	£1450.00

*Flight Data and classification*

V-min speed	24 km/h
V-trim speed	36 km/h
V-max speed with speed system	48 km/h
Minimum sink rate	1.2 metres/second
Level of Speed (in relation to class of equipment)	High
Fast descent (Efficiency)	
- spiral dive	High
- B-stall	High
- Big Ears	Average
Lift off weight during test (in relation to lift off weight range)	Halfway between 80 kg as minimum and 110 kg as maximum lift off weight
DHV Certification Number	01-714-99
DHV Class	1-2 GH
Target pilot group as recommended by Fly & Glide	Occasional pilot and regular flyer

