CIVIL AVIATION OFFICE

CIVIL AIRCRAFT INSPECTION BOARD

BG - 198/1
SZD-59 "ACRO"
Issue 5
March 18, 2004

TYPE CERTIFICATE DATA SHEET

to Type Certificate No BG – 198/1, of 25.03.2002

This Data Sheet constitutes part of the Type Certificate No BG – 198/1.
It contains basic technical data, and defines operation conditions and limitations within which the glider, for which this document has been issued, complies with airworthiness requirements referred to in the certification basis.

A

1.	**Glider model:**	SZD-59 "ACRO"
2.	**Designer:**	Przedsiębiorstwo Doświadczalno- Produkcyjne Szybownictwa "PZL-Bielsko" 43-300 Bielsko-Biała, ul. Cieszyńska 325
3.	**Type Certificate holder:**	Allstar PZL Glider Sp. z o.o. 43-300 Bielsko-Biała, ul. Cieszyńska 325
4.	**Base for operation allowance:**	Type Certificate No **BG-198/1**, of 25.03.2002
5.	**Glider category:**	Utility „U" - wing span 15.0 m Aerobatic „A" - wing span 13.2 m
6.	**General description:**	SZD-59 is a single seat glider, originally designed in two: Aerobatic and Standard versions. All composite, glass-epoxy structure. High wing with cross tail arrangement. Wing of trapeze outline and NN8 airfoil section, constant over whole wing span, in Aerobatic version split in two-panels, in Standard version with detachable tips. These wing tips can be supplemented with winglets. Glider equipped with retractable main landing gear and Schempp-Hirth type airbrake, extending on top-, and bottom wing surface.

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7. Dimensions:

Glider version:	Aerobatic (A)	Standard (U)	
- wing span	13.20	15.00	[m]
- length	6.845	6.845	[m]
- height	1.58	1.58	[m]
- wing area	9.79	10.66	[sqm]
- horizontal tailplane area	1.332	1.332	[sqm]
- vertical tailplane area	1.213	1.213	[sqm]
- Mean Aerodynamic Chord (MAC)	0.7654	0.7424	[m]
- Root Chord (RC)	0.950	0.950	[m]

8. Equipment:

Minimum equipment contains:

- airspeed indicator
- altimeter
- accelerometer
- variometer
- compass
- safety harness (5-point)

Standard equipment, apart from the above listed, contains:

- side-slip indicator
- balancing weights

For cloud flying, the glider must be equipped with turn indicator.

C

9. Mass [kg]:

Glider version:	Aerobatic (A)	Standard (U)
- maximum take-off mass:		
- without water ballast	380	390
- with water ballast	---	540
- maximum landing mass:	380	390
- maximum load mass:		
(pilot+parachute+baggage)	116	116
- minimum load mass:	65	65
- maximum water ballast mass:	---	150
- maximum mass of all non-lifting parts:	132	132
- maximum mass in baggage compartment		
- central	20	20
- rear	8	8
- maximum mass of instrument panel	4	4

WARNING:

In case of the pilot with parachute mass **below 70 [kg]** the removable balancing weights, correcting the glider C.G. position, installed on the instrument panel column, shall be used - according to the instruction as follows:

pilot with parachute mass	balancing weights total mass
55 ÷ 60 [kg]	**10 [kg]**
60 ÷ 70 [kg]	**8 [kg]**

In case of the pilot with parachute mass **above 90 [kg]** the use of balancing weights is **forbidden**.

The glider equipment contains the following balancing weights:

mass of 4 [kg]	2 pcs.
mass of 1 [kg]	2 pcs.

10. Center of Gravity position:

C.G. position of empty glider with standard equipment:

- front limit	49.8 [cm]
- rear limit	52.2 [cm]

The in-flight allowed range of glider C.G. position:

- front limit 14.5 [cm], which corresponds to
  19 % MAC in Aerobatic version
  19.5 % MAC in Standard version
- rear limit 27.5 [cm], which corresponds to
  35 % MAC in Aerobatic version
  37 % MAC in Standard version

C.G. position measured in reference to Datum Point. The Datum Point is wing leading edge at wing/fuselage partition plane {root rib}. The MAC leading edge falls at the same coordinate along the glider longitudinal axis as Datum Point.

The weighing to be performed at such glider attitude that the trailing edge at wing root rib is 22 [mm] below the leading edge at this wing cross-section.

When determining the allowed loading conditions, the crew with back parachute has been assumed. While flying without the parachute, pilot shall use the back cushion of ~12 [cm] thickness (thickness of cushion pressed by crew member weight and shoulder belt tension).

11. Airspeed limitations [km/h]:

Glider version:		**Aerobatic (A)**		**Standard (U)**	
		IAS	**CAS**	**IAS**	**CAS**
never exceed speed	V_{NE}	**285**	**275**	**265**	**258**
rough air speed	V_{RA}	**200**	**198**	**200**	**198**
manoeuvring speed	V_A	**200**	**198**	**200**	**198**
maximum aerotowing speed	V_T	**150**	**150**	**150**	**150**
maximum winch launching speed	V_W	**150**	**150**	**150**	**150**
maximum landing gear operation speed	V_{LO}	**285**	**276**	**265**	**258**

12. The verified cross wind velocity at take-off and landing: 5.0 [m/s]

13. Limit manoeuvring load factors:

Glider version:		**Aerobatic (A)**	**Standard (U)**
a) at manoeuvring speed	V_A	+7.0 g -5.0 g	+5.3 g -2.65 g
b) at maximum diving speed	V_{NE}	+7.0 g -5.0 g	+4.0 g -1.50 g

14. The allowed aerobatic manoeuvres and recommended entry speeds.

a) **Aerobatic (A) version**

Aerobatic manoeuvre	Airspeed km/h	Load factor g
Spin	69	appr. 2.8
Inverted spin	107	appr. -2.5
Loop	180 ÷ 200	3.5
Inverted loop	260 ÷ 270	-3.5
Stall turn	190 ÷ 210	3.5
Inverted stall turn	260 ÷ 270	-3.5
Climbing turn	180 ÷ 200	3.5
Flick half-roll-half-loop	90 ÷ 100	3.2
Slow half-roll-half-loop	140 ÷ 150	3.5
Half-loop-half-roll	220 ÷ 250	3.5
Slow roll	min. 180	-
Flick roll	150	4.8
Flick roll in downward angle	130	4.0
Flick roll downwards	120	3.5
Inverted flick roll	140 ÷ 150	-3.6
Inverted flick roll in downward angle	130	-3.8
Inverted flick roll downwards	120	-3.9
Slow half roll upwards and half loop	250	3.5
Cuban eight	190 ÷ 200	3.5
Inverted Cuban eight	230 ÷ 250	3.5

b) **Standard (U) version**

Aerobatic manoeuvre	Airspeed km/h	Load factor g
Spin	69	appr. 2.8
Loop	180 ÷ 200	3.5
Stall turn	190 ÷ 210	3.5
Climbing turn	180 ÷ 200	3.5
Lazy eight	160 ÷ 180	2.5
Steep turns	120	2.0

15. Safety link:

While aerotowed or winch-launched, the BZ-2 type safety link with rated strength of 690±10% [kg] (677± 10% [daN]), according to BN-65/3833-45 (branch standards) shall be used.

16. Other limitations:

The glider is allowed for normal soaring, and aerobatic flights in VFR conditions, by day.

With the turn indicator installed (see item 8) the cloud flying is allowed.

The following are forbidden:

- night flying
- flying in known icing conditions
- aerobatics in rough air
- spinning with water ballast
- aerobatics with water ballast
- aerotowed take-off using the C.G. tow hook
- winch launched take-off using the nose tow hook
- retracting the landing gear, while winch launched

Moreover, for Aerobatic version:

- the use of water ballast is forbidden

17. Control surfaces deflection:

a) Elevator

- up	$32^{o} \pm 1^{o}$
- down	$28^{o} \pm 1^{o}$

b) Rudder

- left	$34^{o} \pm 1^{o}$
- right	$34^{o} \pm 1^{o}$

c) Aileron

- up	$30^{o} \pm 1^{o}$
- down	$18^{o} \pm 1^{o}$

d) Airbrake
in reference to wing:

- top surface	122 ± 5 [mm]
- bottom surface	118 ± 5 [mm]

D

18. Certification basis:

JAR-22, Change 4, of 7.05.1987, with Amendments up to 22/94/1, inclusive.

19. Manuals:

- Flight Manual,	issue III of 10.11.1995
- Technical Service Manual,	issue II of July 1996

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20. **The glider external surfaces should have the white, not getting yellow, painting coat.**
21. **The colour markings on upper surfaces of wing and tailplane not allowed.**
22. **The ends of detachable wing tips should be painted red.**
23. **The Factory Nos covered with this Data Sheet:**
    - X-150,
    - B-2157 ÷B-2179,

    from 590A04001 up

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