

PRZEDSIĘBIORSTWO DOSWIADCZALNO-PRODUKCYJNE SZYBOWNICTWA

"PZL-BIELSKO"

BIELSKO-BIALA

FLIGHT MANUAL

S Z D - 5 5 - 1

Issue IV, August 1991

Factory No	
Registration No	

This is the translation of original Polish text
approved by Authority.

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4.8. Aerotowing.

On front hook (use c.g. hook only on the sailplanes having no front one).

Directions for towing aeroplane pilot :

1. Gently tension the cable, avoid the surges !
2. After airborning it is allowed to begin climb when the minimum aerotowing airspeed is gained, namely :
 - for the sailplane without water ballast
100 km/h { 54,0 kts ; 62,0 mph },
 - for the sailplane with water ballast
110 km/h { 59,4 kts ; 68,2 mph }.

Direction for the helping person :

1. Before the take-off with water ballast level the sailplane by holding the wing.

Directions for the sailplane pilot :

1. When the towing cable is tensioned the wheel should be braked. To avoid rolling over the cable. In case of surge and loosing of the cable immediately release the towing cable.
2. On the very beginning of ground run a heavy pilot should pull the stick (this makes more easy to keep the direction at the side wind). A light pilot should push the stick.
3. When taking-off at the side wind on the very beginning of ground run the air brake should be slightly extended. When the full aileron control appears, slowly retract the airbrake.
4. If the glider banks and the wingtip hits the ground immediately release the towing cable !
5. When the towing airspeed becomes steady trim the stick force (push the trimming lever and release).
6. It is not recommended to fly below the towing aeroplane due to the towing cable friction on the fuselage surface.

NOTE - IN CASE THE HOOK INSTALLED ON THE UNDERCARRIAGE FORK IS USED IT IS PROHIBITED TO RETRACT THE UNDERCARRIAGE WHEN THE SAILPLANE IS AEROTOWED. PAY A SPECIAL ATTENTION THAT THE TOWING CABLE HAS NO EXCESSIVE SAG SINCE IT MAY RESULT A SELF-RELEASING.

- DURING TAKE-OFF WITH WATER BALLAST THE GROUND RUN SHOULD BE PERFORMED WITH AIR BRAKE PARTLY EXTENDED (ABOUT 10 cm {4 in} OF COCKPIT CONTROL MOVEMENT) TILL THE LATERAL CONTROLABILITY IS GAINED. THEN RETRACT THE AIR BRAKE GENTLY.

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4.9. Free flight.

4.9.1. Stalling and characteristic airspeed IAS.

	All-up mass					
	265 kg; 584,3 lb light pilot without ballast			500 kg; 1102,5 lb heavy pilot with ballast		
	km/h	kts	mph	km/h	kts	mph
stalling in straight flight	63	34,0	39,1	84	45,4	52,1
stalling in circling with 45° bank	75	40,5	46,5	101	54,5	62,6
stalling in straight flight with airbrake extended	67	36,2	41,5	99	53,3	61,4
circling airspeed with 45° bank	79	42,7	49,0	105	56,7	65,1

The stalling is preceded by the modulated acoustic signal (see item 4.4.), which switches on when the airspeed decreases below $1,1 \div 1,05 V_{s1}$.

Just before the stalling the weak fuselage vibrations appear.

When the signal is heard the pilot should immediately push the stick. In circling the bank should be reduced.

The stalled sailplane drops down symmetrically or with the tendency to drop the wing.

The recovery after pushing the stick follows without the troubles and failless.

The height loss is lower then 40 m {130 ft} in straight flight and 80 m {260 ft} in circling.

4.9.2. Spinning.

Allowed without water ballast !

The spinning is performable in the whole range of pilot's mass (60÷100 kg {132÷220 lb}).

Introduction requires the static stalling.

Recommended aileron deflections:

- for pilots of 60÷80 kg {132÷176 lb} mass - aileron neutral or deflected accord to rotation,
- for pilots above 80 kg {176 lb} mass - aileron deflected accord to rotation.

For pilots of above 90 kg {198,5 lb} mass only 1÷2 turns of spinning are possible (aileron accord to rotation) since the airspeed increment forces to recover.

Typical recovery action - concerns also the unintended spinning with water ballast :

- rudder opposite to rotation,
- short wait,
- stick forwards (not too much),
- recover from diving.

The recovery is immediate or with a little delay.

4.9.3. Airbrake.

The efficient airbrake allows for precise adjusting the required approach angle.

The forces of control are rather high.

NOTE - THE AIRBRAKE CAN BE EXTENDED AT THE AIRSPEEDS UP TO 255 km/h {137,7 kts; 158,1 mph} (ABOVE 200 km/h {108,0 kts; 158,1 mph} EXTEND THE AIRBRAKE GENTLY - STRONG SURGE APPEARS).

The retraction is possible at the airspeeds of up to 220 km/h {118,8 kts; 136,4 mph}.

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4.10. L a n d i n g.

Before the landing the water ballast should be jettisoned with such a calculation that all the water is drained off at the altitude of no lower than 200 m {650 ft}.

In the emergency conditions the landing with full or partially jettisoned ballast is possible but on the airfield only.

Extend the undercarriage on the altitude of 200 m {650 ft}. Approach at 90 km/h {48,6 kts; 55,8 mph} airspeed (light pilot without ballast) to 105 km/h {56,7 kts; 65,1 mph} (heavy pilot with ballast). In gust conditions the airspeed should be increased by 10 km/h {5 kts; 6 mph} or more. Touch ground with main and tail wheels. The wheel brake is coupled with the airbrake. Avoid the sharp braking of the wheel.

4.11. A e r o b a t i c s.

Allowed without water ballast only.

Before performing the aerobatics check the water ballast to be jettisoned (control slider back) and locking of airbrake and undercarriage fasten the belts and trim the sailplane on 120÷150 km/h {64,8÷81,0 kts; 74,4÷93,0 mph} airspeed.

The sailplane performs correctly the following manoeuvres :

AEROBATIC MANOEUVRES	ENTRY AIRSPEEDS		
	km/h	kts	mph
- looping and stall-turn	160÷180	86,4÷97,2	99,2÷111,6
- lazy eight	170÷185	91,8÷99,9	105,4÷114,7
- chandelle	180÷195	97,2÷105,3	111,6÷120,9
- quick half-roll-half-loop	90÷100	48,6÷54,0	55,8÷62,0

Performing of the above manoeuvres is the standard one.

4.12. F l i g h t i n r a i n.

Flying in rain the decrement of performances should be taken into account. In circling and in approach increase the airspeed by about 10 km/h {5 kts; 6 mph}.

In case of the weak visibility or the moistured perspex open the window and use the air conditioning facility.