Flight Test Guide
Glider Pilot License

Supplement for Ex 1

First Edition
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EXERCISE 1 SUPPLEMENT

This reference outlines the required knowledge for Exercise 1, A thru E, of the SOSA the flight test for the Glider Pilot License. It is intended for the use of flight test candidates, flight instructors, and flight test examiners. Questions used in actual flight tests during Exercise 1 will be limited to the information contained in this guide.

EX 1 GLIDER FAMILIARIZATION AND PREPARATION FOR FLIGHT

A. Documents and Airworthiness

Aim

To determine that the candidate can correctly assess the validity of documents required to be carried on board and, from these documents, determine that the aircraft is airworthy.

Description

The candidate must determine the validity of all documents required to be carried on board the glider and determine that required maintenance certifications have been completed.

Performance Criteria

The candidate will:

1. determine that the required documents on board are valid;
2. determine that the maintenance release ensures glider serviceability and currency of inspection for the proposed period of flight;
3. determine the number of flying hours before the next service or maintenance task is due;
4. ensure that any conditions or limitations in the Daily Inspection Log can be complied with;
5. determine the impact on glider operations of unserviceabilities or equipment configuration changes for the proposed flight.

Required knowledge:

The candidate will be asked some subset of the following questions.

- What documents are required to be on board?

A: Certificate of Airworthiness, Certificate of Registration, Pilot Operating Handbook. Weight and Balance, Journey Log, Intercept Orders, Crew Licenses, Proof of Insurance.

Certificate of Airworthiness Questions:

- How long is the C of A valid?

A: Indefinitely as long as the aircraft is maintained in accordance with TC requirements.

- When is C of A not valid?

A: The C of A is NOT valid if:
i) required maintenance not done (annual or 100 hr inspection, compass swing)
ii) outstanding ADs
iii) damage to aircraft rendering it unflyable
iv) some action performed that violates the POH (i.e. operation outside W&B limits)
v) Any "snag" entered in JL (not DI book)

- "Show that the C of A is valid"

A: using the JL of the glider find and verify the following:
i) check last inspection against current air time or calendar date
ii) check last compass swing (annual)
iii) verify no snags written in the JL

- Is it legal to fly an aircraft that doesn't have a C of A?

A: Yes if it has a valid Flight Permit or Ferry Permit.

Certificate of Registration Questions:

- How long is the C of R valid for?

A: Until the aircraft is sold or permanently removed from service or until the owner changes address.

- How long do you have to notify TC of a change of ownership?

A: 7 days from date of sale

- How do you notify them?

A: By completing and mailing in the appropriate par of the C of R.

- How long do you have to notify TC of a change of address?

A: 7 days

- Can the new owner fly an aircraft before the new C of R arrives?

A: Yes, using a properly completed interim C of R .

- How long is the interim C of R valid for?

A: The Interim Certificate of Registration is valid until:

i) the last day of the three month period following the sale of the aircraft by the last registered owner;

ii) the day on which there is a further transfer of custody and control;

iii) the day on which the continuing Certificate of Registration is received.

Weight and Balance Questions:

- What is the empty weight of the glider?

A: Candidate must be able to find on W&B

- What is the maximum takeoff weight?

A: Candidate must be able to find on W&B

- How long is the W & B valid for?

A: Until a permanent piece of equipment is added or removed from the aircraft at which point an AME must make up a new weight and balance report.

- When must the aircraft be reweighed?

A: ~~If the empty weight is changed by more than 2%.~~ Incorrect, it only requires a reweighing when requested by the Minister. Practically, a reweighing is done when a paper re-calculation is not accurate

Journey Log Questions:

- Can the aircraft be flown without the JL on board?

A: The JL must be on board unless it is not planned that the aircraft will land at any location other than the point of departure.

- How long do you have to enter the flights in the JL?

A: Flights must be entered daily upon the completion of each flight or series of flights.

Pilot Operating Handbook Questions:

- Can we use the weigh and balance in the POH for our flight?

A: No. The weight and balance in the POH is an example for an Average aircraft, not our specific glider.

Note: Other questions asked during Exercise 1 maybe answered by referencing the POH. The candidate is expected to be familiar with the information found there and where to find it. The exception to this is the numbers in 1 B that are required to be known from memory.

Insurance Questions:

- Show that the glider is insured.

A: Produce the insurance and verify that the aircraft is insured for liability. (minimum $1,000,000 liability for SOSA aircraft, hull insurance is not required by TC).

There are no Intercept order questions:

Crew License Questions:

- Show that your license (or student permit) is valid.

A: Check the medical is valid and that all conditions on it are complied with (i.e. glasses)

- What documents must flight crew members have with them to be legal to fly?

A: License, medical and radio license if operating radio (student can operate radio on instructor's license even when solo).

- Later in your career what additional requirements are there for your license to be valid?

A: Recency requirements must be met. There are 6 month, 2 and 5 year requirements. Require 5 takeoffs/landings in previous 6 months for passengers. To act as pilot in command require 2 year refresher recency requirements to be met, and required to have acted as PiC within 5 years.

Examples of some other valid questions that are variations on those above:

- When is your next medical due?
- What maneuvers are approved in this aircraft?
- How many hours are on the airplane?
- When is the next annual due?

- When is the next compass swing due?
- Are we alright to fly with that snag and why? (reference to the DI book)
- What currency do you need to fly with passengers?
- What do you have to do every 24 months to stay legal to fly?

B. Glider Performance

Aim

To determine that the candidate understands the performance capabilities, approved operating procedures, and limitations for the glider being used for the flight test.

Description

The candidate will be required to demonstrate a practical knowledge of the performance capabilities, approved operating procedures and limitations for the glider to be used on the flight test. Essential performance speeds, applicable to the airplane used, shall be quoted from memory. Other glider performance data may be determined from the Pilot's Operating Handbook

Performance Criteria

The candidate will:

State from memory the following speeds:

- *stall speed*
- *minimum sink speed;*
- *best L/D speed;*
- *maneuvering speed.*
- *Vne speed.*

Required knowledge:

The candidate will be asked some subset of the following questions.

Know these numbers from memory! (substitute L-23 or Puchacz as required):

Puchacz	Stall,	38 kts
	Min sink:	40 kts (138 ft/min)
	Best L/D	46 kts (30:1)
	Maneuvering speed	81 kts (at max gross)
	Never exceed speed	116 kts
L-23 Blanik	Stall,	32 kts
	Min sink:	42 kts (160 ft/min)
	Best L/D	46 kts (28:1)
	Maneuvering speed	81 kts (at max gross)
	Never exceed speed	124 kts

Know or be able to find any of the following:

1 - what the markings on the airspeed indicator mean and what speeds are associated with them (red line, yellow arc, green arc, white arc, yellow triangle)
2 - maximum flap speed
3 - definition of maneuvering speed
4 - maximum aerotow speed
5 - maximum speed with dive brakes extended
6 - maximum g loadings

Examples of some other valid questions that are expansions on those above:

7 - what do we mean by best glide angle?
8 - what do we mean by minimum sink speed?
9 - what happens to our stall speed when we are turning in a thermal?
10 - if our weight changes does our maneuvering speed change? How?
11 - if our weight changes does our best glide angle change? How?
12 - if our weight changes does our minimum sink rate change? How?
13 - if our weight changes does our best glide speed change? How?

Answers:

1. Red line = Vne,
   Yellow arc = caution range, upper limit = VNE, lower limit = Vno
   Green arc = normal operating range, upper limit = Vno, Lower limit = Vs
   White arc = flap operating range, upper limit = Vfe, lower limit = Vso
   Yellow triangle = recommended minimum approach speed at max weight
2. 60 kts (L-13)
3. Maximum speed that full elevator deflection can be used without damage to airframe, at gross weight and with no other controls deflected.
4. 81 kts (Puchacz) 81 (L-23)
5. 116 kts (Puchacz)
6. +5.3/-2.65 (Puchacz/L-23)
7. speed that results in max distance covered for height lost, in still air
8. speed that results in min height lost per unit time, in still air
9. increases
10. yes, decreases
11. no
12. yes, increases
13. yes, increases

C. Weight and Balance, Loading

Aim

To determine that the candidate can correctly complete weight and balance calculations for the glider used for the flight test.

Description

The candidate will be required, using actual weights to apply the approved weight and balance data for the glider used in the test to make practical computations for the actual test including take-off and landing weights. If a loading graph or computer is available with the glider, it may be utilized. Knowledge of weight and balance graphs and envelopes, shall be demonstrated.

Performance Criteria

The candidate will:

- determine if the take-off and landing weights and center of gravity are within permissible limits for the intended flight;
- demonstrate practical knowledge of how to correct a situation in which the center of gravity is out of limits and/or in which the gross weight has been exceeded.

Required knowledge:

The candidate will be required to produce a weight and balance calculation for the flights and show that the glider is within limits.

Example wieght and balance for L-23:

	Wieght(lb)	arm(in)	moment (in lb)
Empty:	683	- 26.24	-17,923.1
Pilot :	200	+ 51.0	+10,200
Instructor:	200	0.0	0
Baggage:	10	-10.0	- 100
Totals:	1,093		-7,823.1

cg location = (-7823.1/1093) = -7.16"

Allowable cg range : -4.397" to -12.783" ---------->> cg in range
Allowable max takeoff: 1124 lbs ---------->> takeoff wieght ok
Allowable max baggage: 22 lbs ---------->> baggage ok
Allowable max pilot: 242 lbs ---------->> this is ok.

Glider OK to go.

Example wieght and balance for L-13:

	Wieght(lb)	arm(in)	moment (in lb)
Empty:	647	119.0	+ 76,993
Pilot :	200	43.7	+ 8,740
Instructor:	200	87.8	+ 17,560
Baggage:	20	100	+ 2,000
Totals:	1,067		+105,293

cg location = (105,293/1067) = + 98.7"

Allowable cg range : 96.8" to 104.2" ---------->> cg is in range
Allowable max takeoff: 1,102 lbs ---------->> takeoff wieght ok
Allowable max baggage: 61 lbs ---------->> baggage ok

Glider OK to go.

Example wieght and balance for SZD-50-3:

	Wieght(lb)	arm(in)	moment (in lb)
Empty:	827	25.0	+20,675
Pilot :	200	- 52.7	- 10,540
Instructor:	200	- 9.8	- 1,960
Baggage:	20	0	0
Totals:	1,247		+ 8,175

cg location = (8,175/1247) = + 6.56"

Fuselage and tail wieght = 425 lbs
non-lifting parts = 200 + 200 + 20 + 425 = 845 lbs

Allowable cg range : 3.6" to 13.1" ---------->> cg is in range
Allowable max takeoff: 1,256 lbs ---------->> takeoff wieght ok
Allowable max baggage: 44 lbs ---------->> baggage ok
Allowable max pilot: 242 lbs ---------->> this is ok.
Allowable max non-lifting parts 877.5lbs ---------->> below max

Glider OK to go.

The candidate will be required to show proficiency in the use of the cockpit loading charts for weight and balance determination.

Note: The cockpit loading placard in the L-13 is not very straight forward to use. An example of one is reproduced at right.

The candidate can expect a question similar to the following:

"With a 200 lbs pilot and a 200 pound passanger, show me that we are ok to fly using the cockpit chart?"

Item No.	Item	Occupants lb. (kp)								
		2 persons				1 person				
1	Pilot in front seat	176	176	154	154	176	154	154	154	lb.
		80.0	80.0	70.0	70.0	80.0	70.0	70.0	70.0	kp
2	Front parachute or	22	22	22	4	22	22	22	4	lb.
	cushion	10.0	10.0	10.0	1.8	10.0	10.0	10.0	1.8	kp
3	Pilot in rear seat	176	176	154	154					lb.
		80.0	80.0	70.0	70.0					kp
4	Rear parachute or	22	22	22	4					lb.
	cushion	10.0	10.0	10.0	1.8					kp
5	Baggage or equipment	61				61	61			lb.
		27.5				27.5	27.5			kp
Variable load		457 207.5	396 180.0	352 160.0	316 143.6	259 117.5	237 107.5	176 80.0	158 71.8	lb. kp
Sailplane empty weight Operational weight		644 292.0	644 292.0	644 292.0	644 292.0	644 292.0	644 292.0	644 292.0	644 292.0	lb. kp
		1101 499.5	1040 472.0	996 452.0	960 435.6	903 409.5	881 399.5	820 372.0	802 363.8	lb. kp
Centre of Gravity position (% of MAC)		27.5	25.8	28.7	30.7	32.4	35.3	33.7	36.2	%

The candidate will be asked some subset of the following questions.

- What is the effect on handling of a forward cg?

A: Glider handling is heavier and more sluggish, reduced elevator effectiveness near stall speed, stall/spin behavior more benign.

- What is the effect on handling of an aft cg?

A: Glider handling is lighter and more responsive, increased elevator effectiveness near stall speed, stall/spin behavior more violent.

- What is the main danger if flying with cg exceeding the forward limit?

A: May have insufficient elevator control available for slow speed flight.

- What is the main danger if flying with cg exceeding the aft limit?

A: Glider becomes progressively less stable until it is uncontrollable, stall spin behavior becomes more vicious, spins become unrecoverable.

D. Pre-Flight Inspection

Aim

To determine that the candidate can complete internal and external checks in accordance with the approved checklist.

Description

The candidate shall determine that the glider is ready for the intended flight.

All required equipment and documents shall be located and, so far as can be determined by pre-flight inspection, the glider shall be confirmed to be airworthy.

Performance Criteria

The candidate will:

- using an orderly procedure, inspect the glider including at least those items listed by the manufacturer or glider owner;
- verify that the glider is in condition for safe flight;
- describe the appropriate action to take for any unsatisfactory item detected or described by the examiner;
- identify and verify the location and security of baggage and required equipment;

Required knowledge:

In addition to completing a thorough walk around (daily inspection) the candidate can be asked to identify/locate any of the following and discuss its function:

- pitot head
- static port(s)
- T/E probe
- radio antennae
- tow cable release (winch or aerotow)
- rigging fittings (i.e. pins, couplers, fairings removed during derigging)
- determine tire pressure
- find what proper tire pressure should be

E. Operation of Aircraft Systems

Aim

To determine that the candidate can operate aircraft systems in accordance with the Pilot's Operating Handbook.

Description

The candidate will be expected to demonstrate practical knowledge of the operation of systems installed on the glider being used for the flight test.

Performance Criteria

The candidate will operate the glider systems in accordance with the Pilot's Operating Handbook and explain the operation of at least two of the following systems:

- primary flight controls and trim
- flaps
- landing gear
- avionics system
- pitot-static system and associated flight instruments

Required knowledge:

The candidates should be able to answer, and to a limited extent discuss, any of the following questions.

primary flight controls and trim:

- What type of elevator trim system is used? (i.e. aerodynamic tab or spring?)

- To trim nose up what way does the trim tab move?

- What direction does the flight control move for a given stick/pedal movement? (i.e. push left pedal, what moves and in which direction?)

flaps:

- What type of flap is on the glider?

- What is their purpose?

- What limitations are there to their use?

landing gear:

- what are the required tire pressures?

- is the gear retractable?

avionics system:

- Demonstrate tuning radio on, setting frequencies, adjusting volume and squelch.

- What is squelch?

- What would you check if the radio doesn't turn on?

pitot-static system and associated flight instruments:

- What instruments are connected to the static port?

- What instruments are connected to the pitot tube?

- If the atmospheric pressure drops rapidly what instruments are affected and what would they read?

- What kind of airspeed does the airspeed indicator show?