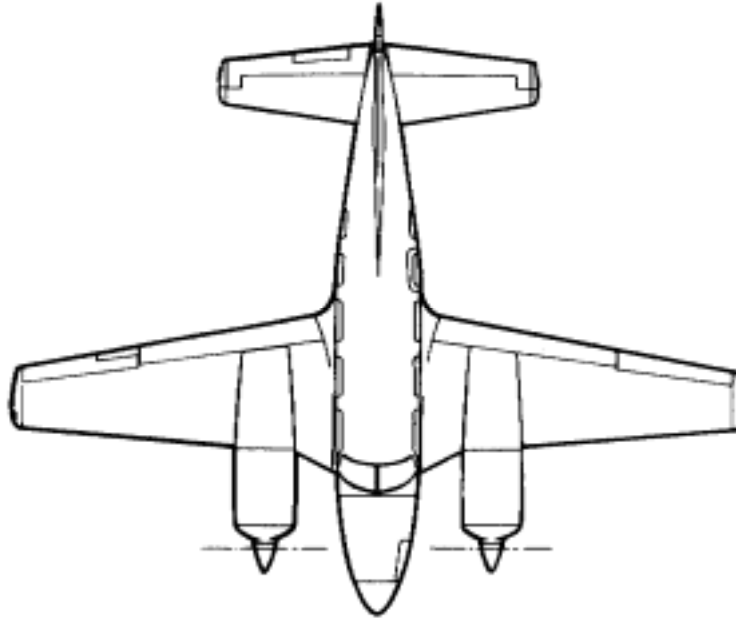


**APPENDIX D TO CAAP 5.23-2(0)**

**MULTI-ENGINE PISTON AEROPLANE ENDORSEMENT**



**ENGINEERING, DATA AND PERFORMANCE QUESTIONNAIRE**

**FOR** \_\_\_\_\_  
(Aeroplane make and model)

Version 2      April 2007

**Name:** \_\_\_\_\_

**ARN:** \_\_\_\_\_

**Endorsed:** \_\_\_\_\_

**ARN:** \_\_\_\_\_

(Signature/Name)

## **The endorsement questionnaire**

To qualify for an aeroplane endorsement you must be able to fly the aeroplane to an acceptable standard and demonstrate a level of knowledge which satisfies the Endorser that you have completed '*training in the operating limitations, procedures and systems of the type of aeroplane for which the endorsement is sought*' Civil Aviation Order (CAO) 40.1.0, paragraph 4.3 Note 1).

This questionnaire will assist you to fully satisfy these knowledge requirements, thereby enhancing safety and reducing industry costs.

The questionnaire will also be a useful ready reference for you in the future, particularly if you do not fly regularly.

In any case, the Civil Aviation Safety Authority (CASA) recommends that both you and your instructor retain a copy of the questionnaire for at least 12 months as proof of completion of training.

## **How to answer these questions**

You should use references such as Flight Manuals, the Pilot Operating Handbook (POH) and theory texts, and make liberal use of notes and sketches on the applicable questionnaire page.

To assist you, the layout of the questionnaire corresponds to the sections of most POH.

Some of the questions may not apply to the aeroplane type on which you are being endorsed, you should mark these 'N/A' (not applicable).

The questionnaire at Appendix E is comprised of 16 pages and may be copied.

**General Aircraft Data**

1.

- (a) What is the make, type and model of the aeroplane?
  
- (b) In which category (categories) is the aeroplane permitted to fly?

**Airspeed Limitation**

2. List the applicable airspeed for the aeroplane type:

- (a)  $V_{NO}$  (normal operating)
  - (i)  $V_{MAX X/WIND}$  (maximum crosswind)
  
  - (ii)  $V_A$  (design manoeuvre speed)
  
  - (iii)  $V_x$  (best climb angle)
  
- (b)  $V_B$  Turbulence penetration speed:
  - (i)  $V_Y$  (best climb rate)
  
  - (iv)  $V_{FE}$  (flap extension)
  
  - (v)  $V_{LO}$  (landing gear operation up)
  
  - (vi)  $V_{LE}$  (landing gear extended)
  
  - (vii)  $V_{LO2}$  (landing gear operation down)
  
  - (viii)  $V_{NE}$  (never exceed)
  
- (c) Maximum landing light operating speed;
  
- (d) Maximum load factor (flaps up) is +      g and -      g; and
  
- (e) Maximum load factor (flaps down) is +      g and -      g.



**Normal Procedures**

## 4. State, describe or detail:

- (a) The start sequence for cold and hot starts;
  
- (b) The revolutions per minute (RPM) used for checking:
  - (i) The feathering system (if applicable);
  
  - (ii) Minimum RPM for feathering;
  
  - (iii) The ignition system;
  
  - (iv) The propeller governing system (if applicable); and
  
  - (v) The carburettor heat.
  
- (c) The maximum RPM drop and RPM differential between magnetos when checking the ignition switches;
  
- (d) The use of cowl flaps (if fitted);
  
- (e) The climb power setting, IAS and fuel flow;
  
- (f) A typical 65% power setting, indicated air speed (IAS) and fuel flow at 5000 ft pressure height;
  
- (g) Using the aeroplane flight manual, calculate the endurance for the aeroplane at 5000 ft above mean sea level (amsl) international standard atmospheres.(ISA) with 65% power set; and

- (h) How the mixtures are leaned in the cruise.

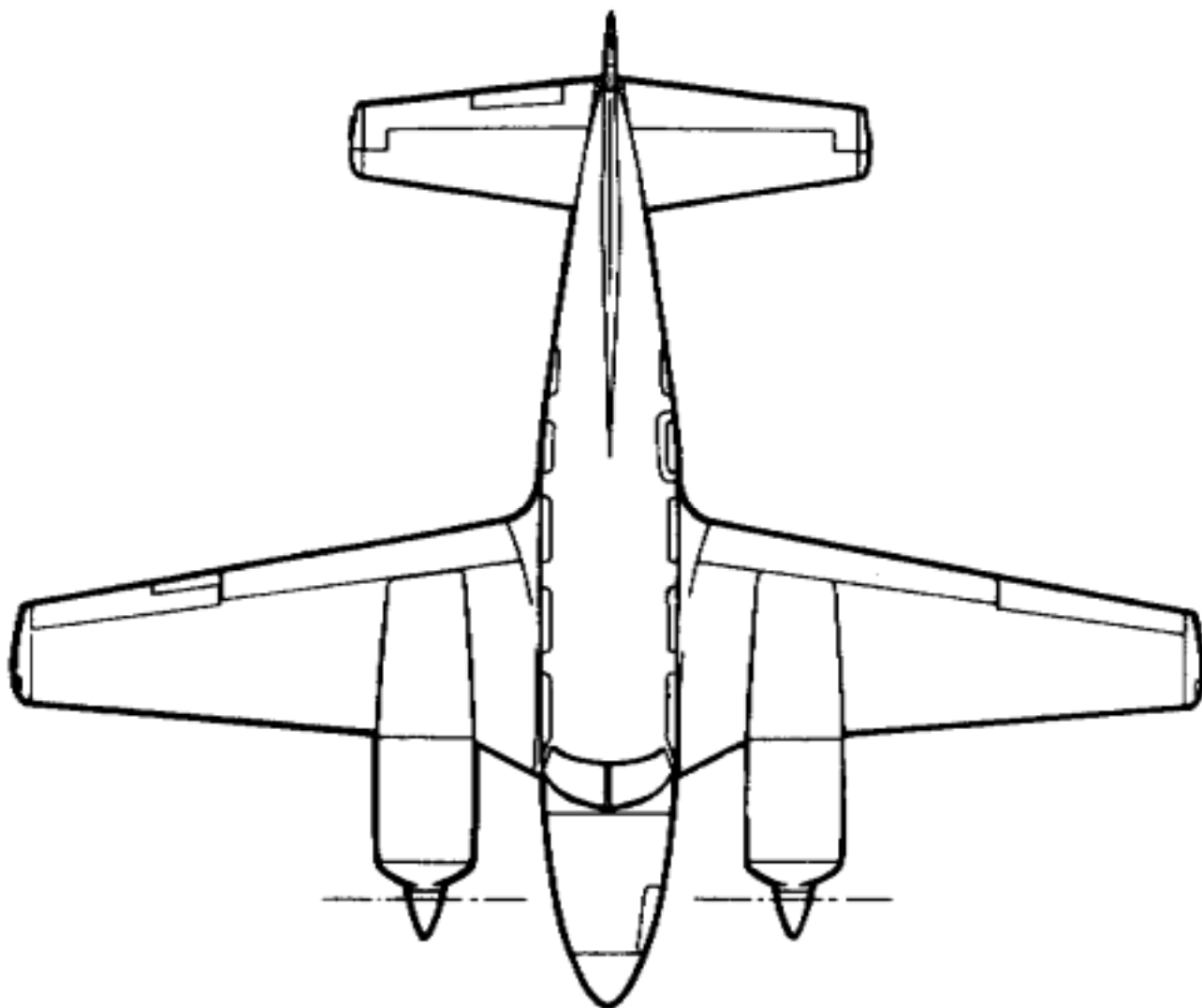
### **Weight and Balance and Performance**

5. Specify the correct values of:

- (a) The maximum ramp weight;
- (b) The maximum take-off weight (MTOW);
- (c) The maximum landing weight;
- (d) The maximum zero fuel weight;
- (e) The maximum number of adult persons on board (POB);
- (f) The maximum baggage weight; and
- (g) The maximum fuel which can be carried with a full load of adult passengers (80 kg/person) and maximum baggage weight.
- (h) Do any of the weight limitations in (a) to (g) vary between categories?
- (i) If so, what are the weight limitations of each category?
- (i) Using the aeroplane flight manual, and a typical loading problem posed by the endorser, determine the take-off weight and balance solution (MTOW and CG position), the amount of fuel that can be carried and the endurance;
- (j) Calculate the take-off distance required at maximum take-off weight, 2500 ft amsl and, outside air temperature (OAT) 30° C, and the minimum landing distance at maximum landing weight;

**Fuel System, Fuel and Fluids**

6. State, sketch or show on the aircraft diagram:
  - (a) The correct grade of fuel;
  - (b) Any approved alternate fuel;
  - (c) The location of fuel tanks and drain points;
  - (d) The total and usable fuel in each tank;
  - (e) The position of the fuel tank vents;
  - (f) Whether the engines have a carburettor or fuel injection system;
  - (g) If applicable, describe the priming system and its use; and
  - (h) Where the fuel boost/auxiliary pumps are located:
    - (i) Are these electrical or mechanical?
    - (ii) Maximum and minimum operating pressure; and
    - (iii) When pumps should be used;
  - (i) If applicable, the fuel tank change procedure;



- (j) What conditions apply to tank selection for take-off and landing?
- (k) When refuelling, to less than full tanks, what restrictions apply, and how is the fuel quantity checked?
- (l) If applicable, describe the cross feed system;
- (m) If applicable, the minimum and normal hydraulic fluid capacity;
- (n) The correct grade of oil for the aeroplane;
- (o) The minimum oil quantity before flight;
- (p) The maximum quantity of oil;
- (q) The maximum, minimum and normal engine oil pressures; and
- (r) The maximum, minimum and normal engine oil temperatures.

**Asymmetric Performance**

7. Answer the following questions:

- (a) What indicated air speed (IAS) is  $V_{MCA}$  in the take-off configuration?
  
- (b) What effect will full flap have on  $V_{MCA}$ ?
  
- (c) What speed is  $V_{SSE}$ ?
  
- (d) What is the fuel flow rate with one engine shut down at 1000 ft amsl on an ISA day?
  
- (e) What is the rate of climb with one engine shutdown, propeller feathered maximum AUW, 1000 ft amsl, take-off power, undercarriage and flap retracted, on an ISA day?
  - (i) On an International Standard Atmosphere (ISA) +20 day?
  
- (f) Which engine is the critical engine?
  
- (g) What is the single engine rate of climb speed ( $V_{YSE}$ )?
  
- (h) How does single engine flight affect the range of the aeroplane?

**Engines and Propeller**

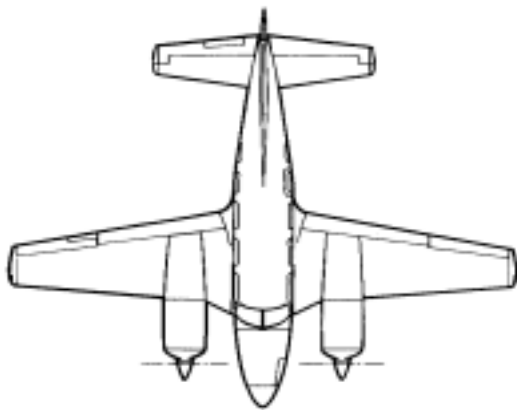
8. Answer the following:

- (a) What is the make/model of the engines?
  
- (b) What is the power output, and number of cylinders?
  
- (c) What is the take-off power setting and time limit?
  
- (d) What is the maximum continuous power?
  
- (e) Are the engines supercharged or turbo-charged?
  
- (f) What is the maximum manifold air pressure (MAP) permitted?
  
- (g) If turbo-charged, what:
  - (i) Is the type of waste gate fitted (Fixed, Manual or Automatic)?
  
  - (ii) Is the procedure for operating the waste gate?
  
  - (iii) Prevents the engine from being over-boosted?
  
- (h) If supercharged, what:
  - (i) Prevents the engine from being over-boosted?
  
  - (ii) Controls the MAP in the climb/descent?
  
- (i) Describe the propeller governing system; and
  
- (j) If the oil pressure to the propeller dome is lost, does the propeller go into coarse or fine pitch?

**Airframe**

9. Answer the following:

- (a) What type is the undercarriage system (fixed/retractable/tricycle/conventional)?
- (b) Which control surfaces can be trimmed?
- (c) Describe the flap actuating system;
- (d) Describe the flap indicating system;
- (e) What is the flap operating range?
- (f) Sketch the location of all exits;



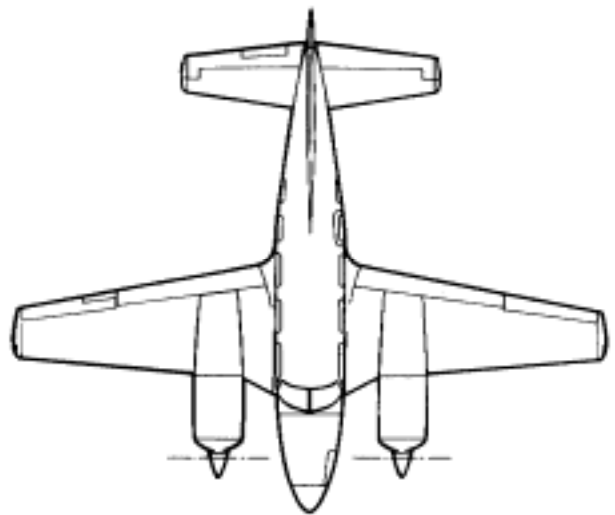
- (g) Describe/sketch the location of:
  - (i) Landing/taxi lights;
  - (ii) Fresh air intakes; and
  - (iii) Fuel caps;
- (h) What is the wingspan of the aeroplane?

**Ancillary Systems**

10. Answer the following questions:

- (a) What systems are hydraulically operated?
  
- (b) What procedures are followed when a hydraulic system failure is suspected?
  
- (c) How many brake applications would be expected from a fully pressurised brake accumulator (if applicable)?
  
- (d) What are the sources of electrical power?
  
- (e) What is the DC system voltage?
  
- (f) Can an external power source be used?
  - (i) If so, what is the procedure?
  
- (g) Where are the battery and external power receptacle located?
  
- (h) How long can the battery supply emergency power?
  
- (i) Following an alternator/generator failure in flight, which non-essential electrical services should be switched off?
  
- (j) Which, if any, ancillary system(s) would be lost if the left engine is shut down and the propeller feathered?
  
- (k) Which, if any, ancillary system(s) would be lost if the right engine is shut down and the propeller feathered?

- (l) If a stall-warning device is fitted, is it electrical or mechanical?
- (m) How is the cockpit ventilated?
- (n) How is the cockpit heated?
- (o) If a fuel-burning heater is installed, describe the method used to turn the heater on and off, and detail any limitations;
- (p) What is the fuel consumption of the heater?
- (q) Describe the pressurisation system (if applicable);
- (r) Show the location of the following safety equipment:
- (i) fire extinguisher;
  - (ii) Emergency locator transmitter (ELT);
  - (iii) Torches;
  - (iv) Survival equipment; and
  - (v) First aid kit.
- (s) Explain all the methods of disengaging the autopilot;
- (t) Under what conditions will the autopilot automatically disengage? and
- (u) Explain how an electrical trim can be over-riden if it runs away.



**Flight Instruments**

1. Answer the following questions:

(a) Where are the pitot head(s), static vent(s) and any water drain points for the pitot/static system located?

(b) Is there a pitot heat system fitted?

(c) Is there an alternate static source fitted? - if so:

(i) Where is this located?

(ii) What is the purpose of this system?

(iii) If used, what effect does it have on the pressure instruments?

(d) Which flight instruments are operated electrically?

(e) Which flight instruments are gyroscopically operated?

(f) Which instruments are operated by vacuum?

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