FLIGHT TEST CHECKS

HYDRAULIC IN-FLIGHT ADJUSTABLE PROPELLERS			LAA/FT-HIFA PROP Issue 5
A/C Type:	Reg:	Engine:	Gearbox ratio: :1
Propeller Type/ Designation:	Dia: in/mm*	Governor Make:	
Loaded Weight: _____ lb* (min 90% MTOW) _____ kg*	CG: in/mm* Aft/Fwd* of datum	OAT: °C	QNH mb

* Delete as appropriate.

1. ENGINE RUNS

The aircraft should face cross-wind.
If wind strength makes parking cross-wind hazardous, face into wind.

Magneto check:- Run engine to normal operating temperature – check RPM, pressures, temps, mag drops, carb heat drop. Check operation of engine and fuel controls.

	FROM AFM, POH		MEASURED
Magneto test RPM or RPM at which tested		No.1 magneto off RPM drop Electronic ignition? Y / N	
Max Drop Permitted		Max Split Permitted	
		No.2 magneto off RPM drop Electronic ignition? Y / N	
Carburettor Hot air or Alternate air test RPM		Hot air or Alternate air RPM drop	

RPM data entered that exceeds the maximum permitted on the Operating Limitations sheet or flight test authorisation will fail the application. It should not be possible to exceed maximum permitted RPM. If it is, then something is wrong – check tacho. Otherwise an inappropriate or incorrectly adjusted propeller may be fitted.

Static Ground Run:- FINE PITCH STOP

With the propeller control lever at full fine pitch and with Wide Open Throttle (WOT), the engine must not over-speed and be RPM limited by the fine pitch stop, typically 50 – 100 RPM below max permitted RPM (refer to manufacturer's instructions), not the governor.

	(FROM AFM, POH)		(MEASURED)
MAX ALLOWABLE ENGINE RPM		MAX ACHIEVED STATIC RPM	
MAX ALLOWABLE OIL TEMPERATURE	_____ °C ____ °F	ACTUAL OIL TEMPERATURE	_____ °C _____ °F
MIN/MAX ALLOWABLE OIL PRESSURE	/ bar/psi*	ACTUAL MIN/MAX OIL PRESSURE	/ bar/psi*
MAX ALLOWED TEMP (CHT OR COOLANT)*	_____ °C ____ °F	ACTUAL MAX TEMP CHT/COOLANT*	_____ °C _____ °F
MAX ALLOWABLE EGT	_____ °C ____ °F	ACTUAL MAX HOTTEST EGT	_____ °C _____ °F
		MANIFOLD PRESSURE	In/Hg
		FUEL PRESSURE	/ bar/psi*

* *Delete as appropriate*

WHEN AT FULL THROTTLE, IS IT POSSIBLE TO MOVE THE PROPELLER CONTROL A SMALL AMOUNT FROM FULL FINE PITCH WITHOUT AN EFFECT ON ENGINE RPM?	YES / NO

2. TAKE-OFF (Valid flight test authorisation issued by LAA Engineering required)

The take-off is to be made with flaps (if fitted) in the take-off position, propeller lever to full fine and wide open throttle. As soon as possible after unstick and before reducing RPM, record:-

UNSTICK SPEED	_____ Kts ____ MPH*	UNSTICK RPM	

3. CLIMB

Flight conditions: **Clear of cloud and turbulence**, and well clear of any hills which could produce wave conditions.

Configuration: **Normal for best rate of climb** (see Manual).

Power: **Maximum Continuous** with air intake in 'Cold' or 'Ram' air position. With the throttle wide open in the climb, the engine must not over-speed. (CS-VLA 33 refers).

Speed: (knots/mph IAS) — Enter scheduled best rate of climb speed, V_Y; Establish the aircraft in the climb at best rate of climb speed and maintain steady heading and speed ± 2 knots/mph throughout. (From POH)

To aid look-out it is permissible to turn during the climb.

Carry out gentle turns (max 10° bank angle)

Notes:

1. Sustained 5 minute climb is normally required to be carried out to establish adequacy of cooling, proper functioning at altitude and to provide sufficient data points to calculate a reliable rate of climb figure. However, where the rate of climb exceeds 1500 ft/min, or an aircraft with a Cirrus Minor or Gipsy Major engine is fitted, then a 3 minute climb will be accepted.
2. Incomplete climbs due to airspace, cloud or other similar reasons will not be accepted.
3. Do not allow engine to exceed limits.
4. Plot and attach a copy of the climb performance results, preferably using the spreadsheet that is available from the flight test section of the LAA website, or use the grid on page 4.

TIME (min)	ALTITUDE (FT) 1013 mb	IAS	RPM	MAP	OIL TEMP	OIL PRESS	CHT/ COOLANT	EGT
0								
1								
2								
3								
4								
5								

If there is any difficulty in recording these figures during the timed climb, maintain the climb speed and power, and record them at the end of the climb.

Towards the end of the climb, record:

FUEL PRESSURE	

RPM data entered that exceeds the maximum permitted on the flight test authorisation and incomplete climb due to airspace restrictions will fail the application.

4. VIBRATION

Check for signs of vibrations or buffeting throughout the rpm range and in all phases of ground running as well as in flight. This may result if the natural frequency of vibration of the engine on its mount rubbers, or the tail surfaces or fuselage, or of the engine/reduction drive coupling should happen to couple in an unfortunate way with the resonant frequency of the propeller blades in bending, or the aerodynamic buffer coming from the slipstream. It may also indicate that the propeller is out of track or out of balance.

SAT	UNSAT	COMMENTS:

5. LEVEL FLIGHT

At a constant altitude not above 2000 feet, after at least 2 minutes at each of the three *different* throttle settings required (provided that this has no detrimental effect on the engine), record:-

POWER SETTING	RPM	MAN PRESS	IAS	OIL TEMP	OIL PRESS	CHT/ COOLANT	EGT	FUEL FLOW Lit/Gal*/ hr
ECONOMY CRUISE								
MAX CONT or CRUISE RPM								
WOT AND **MAX RPM**								
From Max RPM, gently throttle back to idle. Report any undue vibration or behaviour.								
COMMENTS:								

6. PROPELLER CONTROL

FOR PROPELLER SETTINGS THROUGHOUT THE FULL RANGE, IS RPM HUNTING EVIDENT?	YES / NO
WHEN MOVING THE PROPELLER CONTROL, IS PROPELLER RESPONSE SMOOTH AND PROPORTIONAL?	YES / NO
UPON RAPID THROTTLE OPENING, SUCH AS DURING A BAULKED LANDING, RPM WILL OVERSHOOT THE MAXIMUM GOVERNED RPM. RECORD PEAK RPM.	

7. BLADE FEATHERING (if available)

Only where it is possible to re-start the engine in flight, at a height sufficient to do so and over a suitable landing site, shut down the engine and check that blade feathering rpm is appropriate. Then, after engine stop, checking that un-feathering is satisfactory, re-start the engine. Check that the engine stops and re-starts without excessive vibration or other detrimental behaviour.

SAT	UNSAT	COMMENTS:

8. COARSE PITCH STOP

THIS TEST MUST ONLY BE FLOWN IN SMOOTH AIR CONDITIONS

The purpose of this test is to check that flight at V_{NE} can be achieved without exceeding max permitted RPM. The V_{NE} speed is stated in the flight test authorisation or Operating Limitations sheet. Never exceed the V_{NE}. Beware of false reading ASI. Airspeed or RPM data entered that exceeds the maximum permitted will fail the application.

With the propeller lever at full coarse pitch, increase speed up to V_{NE} at the shallowest dive angle possible by maintaining sufficient power but keeping manifold pressure and RPM within maximums permissible (refer to engine operator's manual). If any unusual vibration is felt, immediately reduce speed by closing the throttle and gradually pulling the control column back.

AIRSPEED (V_{NE} = _____)	AIRSPEED	RPM AT V_{NE}	

10. COMPARISON WITH PREVIOUSLY FITTED PROPELLER

Previously fitted propeller Type/Designation:	Dia: Inch/mm*	Pitch:___ins/mm or___deg at _____ % radius/tip*
If possible, comment on relative performance, vibration, etc.:		

11. CERTIFICATION

I certify that I have flown the above aircraft and that the above checks have been carried out to my satisfaction.

Name:	Signed:	Date of Test:	Licence No.:

Once completed, send this form to LAA Engineering. Send in also the *original* aircraft Operating Limitations sheet. (Refer to Technical Leaflet TL 2.02).

Important note: Following conclusion of satisfactory flight test, the modified aircraft must not be flown until issue of modification final approval.

Either complete and submit a plot from the spreadsheet available on the LAA web site or enter appropriate scales and plot climb results on grid below and draw on best fit slope then calculate the average rate of climb.

Ave ROC = _____ fpm

Climb Performance