INSPECTION CHECKS

APPLICABLE TO THE INSPECTION OF LAA AIRCRAFT FITTED WITH HIRTH 2 STROKE ENGINES TO CHECK SUITABILITY FOR USE OF UNLEADED MOGAS	LAA / IC-ULM-HIRTH 2 STROKE Issue 4

A/C Type:	Reg:	Engine Model:

This checklist is to be completed by a suitably approved LAA inspector. LAA inspectors are only acceptable for carrying out this task if their LAA approval includes the ability to carry out LAA Permit renewal inspections on the aircraft concerned. This checklist should be used in conjunction with Cap 747, Section 2, Part 4, General Concessions 4 & 5, and 'Operating Information – Unleaded Mogas'. Check the website for the latest issue.

Item	Description	Inspector's Signature
1	Check that engine type is one of those listed below: Hirth 2703, 2705, 2706, F30. (Delete as appropriate). Check with Hirth that the particular engine is fitted with the special pistons and piston rings for use with unleaded fuel.	
2	Check that the engine's fuel system is installed in accordance with the features called for in the installation instructions for Hirth engines, (see attached diagram) in particular:	
	Fuel pipes properly supported to prevent fuel foaming.	
	Standard Hirth fuel pump fitted.	
	Fuel pump impulse line as short and straight as possible, (length typically not more than 6 inches) and of stiff and fire-resistant material.	
	Fuel pump installed in a cool place (not on the engine itself for example). If the pump is alongside the engine there should be a metal heat-shield between the pump and the engine. As far as possible the pump should not be subject to vibration. Correct pump orientation has the outlet at the top and pump diaphragm vertical.	
	If the pump has to be mounted considerably above the tank level (more than a metre), then a back up electric pump (eg Facet) should be fitted, low down in the system, connected in parallel with the pulse pump.	
	Fuel filter of approx. 0.1 – 0.2 mm mesh size situated between tank and carburettor.	
	Fuel filter (finger strainer) of approx. 0.3 mm – 1.0 mm mesh size situated in each tank.	
	Fuel tank fitted with provisions for draining.	
	Fuel pipe material fire-resistant and correct bore. For fuel flows up to 24 litre/hr 5mm diameter bore fuel pipe may be used. (6mm preferred).	
	Fuel cock fitted between engine and tank (exception permitted in some aircraft with tank below engine).	
3	Check that the installation is configured in such a way as to make vapour-lock problems unlikely, in particular:	
	Fuel pipes not routed adjacent to hot components (metal heat shields may help).	
	Fuel tank vent pipes forward-facing to pressurise tank.	
	No 'S bends' (local high-points and low-points) in fuel pipe runs which will tend to trap vapour bubbles.	

Item	Description	Inspector's Signature
4	Check that each fuel tank is not made of a material likely to be chemically attacked by components within unleaded fuel. Whilst polythene tanks, and those moulded using polyester resin or vinylester resin are reputed to be satisfactory with unleaded fuel, some tanks laminated using epoxy resins are known to be attacked. If in doubt, consult the aircraft kit manufacturer and/or carry out a sample test (two weeks duration suggested) to check for signs of the surface becoming 'gummy'.	
5	Check that fuel tanks are not treated with a 'sloshing sealant' likely to chemically detach from the tank inner surface and block fuel outlet. If in doubt, test over two-week period and check condition.	
6	Check that fuel system components such as rubber or plastic pipes, seals in fuel cocks, sight gauge tubes, fuel tank floats, filters, etc, are not made of a material likely to be chemically attacked by components within unleaded fuel. Any fuel system components manufactured for the automotive industry since around 1990 or so are likely to have been made compatible with unleaded fuel. If in doubt, test components in a jam jar of fuel and observe results after appropriate period (two weeks).	
7	Check carburettor ice protection provisions, heat muffs, carb heaters etc. If reliance is placed on 'undercowl temperature' for carb ice protection, ensure that under cowl temperatures are not being accidentally reduced due to loose or worn baffles, air seals etc.	
8	Check that fuel level is visible in sight-gauges. Unleaded fuel, being almost clear in colour, may be hard to see in sight-gauges that have become stained with age, in which case sight- gauge tubes will need to be replaced. A card marked up with diagonal close-pitched lines inserted behind the gauge will help to show up fuel level due to refraction effect – fuel in the sight-gauge appears to alter the angle of the lines.	
9	Carry out a fuel flow check. Surplus flow available must not be less than 25 % of maximum engine fuel demand.	
10	Carry out engine ground run using unleaded Mogas fuel to BS EN 228, 95 RON (Min) and check that running and instrument indications are normal. Mixture strength should not need adjusting. Note that it is normal to find a slightly different grey exhaust pipe deposit with unleaded fuel than with leaded fuel which may give a false impression of changed mixture strength. Check fuel system for leaks and filter(s) for contamination	
11	Fit cockpit placard regarding unleaded Mogas fuel use (spares available from LAA).	
12	Fit placard adjacent to each filler specifying: 'Unleaded Mogas BS EN 228, 95 RON (MIN)'.	

After completion, this checklist is to be signed, dated and stapled into the aircraft's airframe logbook, together with the LAA covering letter to owners. The inspector is to add declarations in the engine and airframe logbooks stating:

> ***'With effect from (date) this aircraft/engine may be run on unleaded petrol to BS EN 228, 95 RON (MIN) in accordance with CAP 747, Section 2, Part 4, General Concession 4*** (if it is an LAA microlight) or ***General Concession 5*** (if it is an LAA aeroplane or gyroplane)*'*

DECLARATION BY LAA INSPECTOR

I declare that the aircraft, registration **G-**_____, has been checked against items 1 to 12 listed above and has been found to comply in all respects.

Name:	Signed:	Insp. No.:	Date: