LAA TYPE ACCEPTANCE DATA SHEET TADS 172D

KITFOX LCC KITFOX SERIES 7

Issue 2 Correction to Max Coolant Temps Dated 27/2/09

1. USA contact

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Uk contact for the type, Les James, expert builder and Kitfox repairs/servicing. Tel 01455 290258.

2. Description

The Kitfox Series 7 is a kit-built, tube and fabric aircraft with STOL capabilities. The Kitfox Series 7 may only be built from kits supplied by Kitfox LCC, previously Skystar Aircraft Corp. Drawings are not available. The aircraft is a conventional high wing, side by side 2-seater. The wings are readily folded for transport or storage. The aircraft features an unusual flapperon arrangement where the full span flapperons are suspended a couple of inches below the trailing edge of the wing. Engines accepted by the LAA for use on the Kitfox Series 7 are the Rotax 912-ULS and 914-UL. Other engine types are promoted by the manufacturers but have not been assessed by LAA at this time. Substantially heavier engines may not be acceptable due to the LAA having restricted the max gross weight of the aeroplane to 1400 Lbs.

The Kitfox Series 7 is a higher-weight development of the earlier models 1 – 6, all of which are also LAA accepted types except for the Mk 6, there being no examples of the Mk 6 in the UK. The Series 7 has much greater in-flight stability than the earlier models 1-4.

The Kitfox Series 7 has a complex welded 4130 steel tube truss fuselage and welded steel tube tail surfaces, both of which are supplied complete in the kit and (optionally) come powder coated. The wings are built around two 6061 T-6 tubular aluminium spars. The jig-built plywood ribs are supplied ready to bond to the spars. Internal bracing within the wings is provided by diagonal tubes. The wing structure is assembled using epoxy adhesive, which is supplied with the kit. Full span flapperons are fitted, actuated by rods connecting at the root end. The flying control system is complex and rather delicate in appearance. A tailwheel undercarriage is normally fitted, using a cantilever leg type main gear. An alternative nosewheel type undercarriage is available but has not been assessed by LAA. The Kitfox is fabric covered overall, and thanks to the use of wide rib cap strips, fabric can be attached to ribs by fabric cement method, rib stitching is not required.

The design maximum gross weight of the Kitfox Mk 7 is 1550 Lbs, as with the later Mk 5 models. Substantiation for the later 1550 Ls max gross weight has not been provided to LAA therefore the Mk 7 design is to be restricted by LAA to 1400 lbs max gross weight at this time. This provides adequate payload with the Rotax 912-ULS or Rotax 914-UL engines.

The Kitfox Series 7 is only eligible as an SEP aeroplane, it cannot be registered as a microlight.

3. Fast Build Kit 51% Compliance

Not applicable, these aircraft are only accepted in slow-build kit form with the fuselage and tail surfaces supplied as pre-welded assembles but the wing requiring assembly from components.

4. Build Manual

Supplied with kit.

5. Build Inspections

Build inspection schedule 9 (tubular aircraft).
Inspector approval codes A-A or A-W or A-K. Inspector signing off final inspection also requires 'first flight' endorsement

6. Maintenance Manual

Simple schedule provided in Pilots Manual. For further guidance refer to LAMS schedule. Refer to build manual for rigging instructions. For engine consult engine manufacturer's schedule.

7. Flight Manual

Flight Manual information supplied with Series 7 kit. For further advice see Ed Downs book 'How to Fly a Kitfox'.

8. Mandatory Permit Directives

None applicable specifically to this aircraft type, but note

MPD: 1998-019-R1 Flexible Fuel Tubing Applies to all permit aircraft

9. LAA Mandatory Modifications

MOD/172D/001 Flap gate modified to prevent selection of flap positions other than zero and first stage.

10. Service Bulletins/Service Letters

- In the absence of any over-riding LAA classification, mods and inspections published by the manufacturer should be complied with according to the manufacturer's recommendation. All bulletins can be downloaded from the manufacturers website at http://www.kitfoxaircraft.com/Service%20Bulletins.htm

- For Rotax engines, there are many Rotax service bulletins dealing with a variety of important safety topics. Copies of the bulletins applicable to individual engines by engine serial can be downloaded directly from the Rotax website at http://www.rotax-aircraft-engines.com More information is available on www.skydrive.co.uk

11. Standard Options

Nosewheel undercarriage option not yet investigated by LAA
Engine installations other than Rotax 912-ULS or 914-UL not yet investigated by LAA

12. Special Inspection Points

- Inspectors should check all components supplied in the kit carefully for quality before construction starts. One or two of the early Kitfox examples were snagged for poor welding quality - in one case a complete fuselage had to be rejected. Wing spar tubes were in one case found to have been unacceptably damaged on receipt.
- The build manual is reasonably clear and few construction problems have been reported, although builders need to take great care with the assembly of the wings which require critical drilling and alignment, particularly the fitting of spar tube reinforcements, wing strut attachments and root fittings. Ensure when first assembling and fitting wings that correct wing dihedral is achieved and that there is no unwanted sweep-forward or sweep-back.
- Check any 'squashed and bent' tube ends carefully for signs of minute cracks caused during manufacture, and dress out any damage to prevent cracks growing from these points in service.
- Ensure that all blind rivets are 'set' squarely and fully, and check that rivet heads are seated properly with a feeler gauge.
- Inspectors must stress to builders the importance of proper surface preparation and cleanliness during all bonding operations.
- Another point to watch is careful assembly of the flying control system.
- The build manual is not particularly detailed regarding engine installation and fuel system details etc. See Rotax installation manual and Rotax installation checklist for guidance, and LAA-required mods.
- The folding wing and flapperon arrangement gives rise to a complex flapperon control system with many joints and short pushrods. In practice, once satisfactorily rigged, the system requires little maintenance, but the inspector should ensure adequate fits and clearances throughout with freedom from backlash etc. Pushrods should not foul the structure when the wing is folded.
- Refer to construction manual and service information concerning rigging and control surface range of movement
- In addition to the manufacturers maintenance schedule presented in the Pilots Manual, LAMS should be used as a guide to required inspections and this is reflected in the checklist in Section 1 of the LAA's permit renewal application form. LCC, Denney and Skystar service information should also be reviewed. Rotax engines should be maintained to the Rotax maintenance schedule. Maintenance of the airframe is typical of a fabric-covered wood and metal airframe.Problems have been experienced with cabin doors opening in flight if the latches are not properly adjusted, this causes no particular hazard (it is intended that the aeroplane is able to be flown with doors open in hot weather) but can be alarming if not anticipated. This is most likely to occur during sideslip manoeuvres.
- Due to the openings in the fuselage fabric covering around the wing roots, particular care must be taken to check that exhaust fumes are not entering the cockpit, which has caused difficulties with several examples. It is recommended that a CO detector be fitted. If problems are experienced, sealing the various leakage paths and fitting an extended exhaust tailpipe (approximately eight inches long) has been found to provide a cure.
- Problems have been experienced with fuel flow between the wing tanks and header tank being interrupted by vapour bubbles forming in the pipework, causing engine failure once the contents of the header tank are exhausted. It is essential to check that the fuel pipes connecting the main and header tanks are free of air bubbles and

fuel is flowing as desired, particularly after the wings have been folded and unfolded. Some owners blow into the wing tank vent pipes during their pre-flight checks to help clear the fuel pipes of air bubbles.

- Heavy landings are indicated by bent tubes in the vicinity of the undercarriage attachments. Be wary of loosening or detachment of the bonded joints between wing ribs and spars, particularly where the root ribs attach to the rear spar which take a considerable torsion load when the wings are folded especially if fuel is left in the wing tanks. One Kitfox suffered glue failure in this area before its first flight, probably due to having been 'hangared' in a dark-coloured container in bright sunshine, causing ambient temperatures inside the container in excess of the epoxy's 'transition' temperature. Remember that the epoxy used to assemble these kits is just as vulnerable to high temperature as the epoxies used in the wet lay-up of composite aircraft, and similar care must be taken. An Australian Kitfox suffered in-flight break-up due to failure of the carry-through tube in the fuselage where the wing struts attach, due to internal corrosion of the steel tubing. This tube is normally sealed at both ends during the welding of the fuselage, so that corrosion should not be able to take place unless it is penetrated by subsequently installed pop-rivets or similar. No internal corrosion in this area is acceptable. Problems have been experienced with fuel leaks from tanks, release of fuel tank 'sloshing sealer' inside tanks and deterioration of fuel hoses through chemical attack (replacement by aeronautical spec fuel tubing such as 'Aeroquip' is desirable). Failure of the rather crude fuel cocks have occurred either through detachment of the round 'plugs' supposedly press-fitted into the case of the valve, degradation of their '0 ring' seals when immersed in fuel, or misalignment of the valve stops causing the valve to be partially shut when apparently on the 'fully open' stop. Any sudden change in the 'feel' of the valve may indicate that the '0 ring' seal is displaced and must be checked before further flight. Pay particular attention to the proper maintenance of the flying control system including freedom from jamming, stiffness, binding of rod-end spherical bearings etc. One AN3 pivot bolt in the flying control system of a Kitfox cracked in service, fortunately without accident. It would not be out of order to insist on critical pivot bolts being withdrawn annually for inspection and being replaced at the first sign of significant wear or other distress. Many Kitfox aircraft on the LAA fleet are now around ten years old are likely to be due for recovering - especially those which have been tied down outside for any length of time. This will also give an opportunity to examine the underlying structure for condition. The 'Bettsometer' can be used to check the fabric strength while doing minimal damage, to the fabric being tested. Contact: Clive Betts of Brighton, tel. 01273 726343.
- As the design employs certain very lightweight design features, in common with most kitplanes of this era particular care needs to be taken to monitor condition in service and replace components as they become worn or develop cracks.

The fact that the aircraft has folding wings means that it may be more prone to damage while in transport or in storage than a machine kept permanently rigged and hangared. One Kitfox crashed almost certainly as a result of damage caused by a prior road accident in which its trailer was shunted by a car driven by the owner's wife. Another Kitfox's mainspar tube had to be scrapped after it was dented by a collision with a gatepost while being towed.

13. Operating Limitations and Placards

1. Maximum number of occupants authorised to be carried: Two

2. The aircraft must be operated in compliance with the following operating limitations, which shall be displayed in the cockpit by means of placards or instrument markings:

2.1 Aerobatic Limitations

Intentional spinning is prohibited
Aerobatic manoeuvres are prohibited

2.2 Loading Limitations

Maximum Total weight Authorised: 1400 Lbs
CG Range: 9.5 inches to 15.5 inches aft of datum.
Datum Point is: leading edge of wing

2.3 Engine Limitations

Maximum Engine RPM: 5800
Maximum continuous engine RPM: 5500

2.4 Airspeed Limitations

Maximum Indicated Airspeed: 140 mph
Maximum Indicated Airspeed with Flaps Extended: 80 mph

2.5 Other Limitations

The aircraft shall be flown by day and under Visual Flight Rules only.
Smoking in the aircraft is prohibited.
To ensure optimum elevator authority it is recommended that flaps are not lowered when landing if the centre of gravity is forward of 10.5 inches aft of datum.

Additional Placard
“Occupant Warning - This Aircraft has not been Certificated to an International Requirement”

Fireproof identification plate must be fitted to fuselage, engraved or stamped with aircraft’s registration letters.

14. Additional Engine Limitations/Placards

With Rotax 912-ULS engine: Maximum CHT: 135°C
Max Coolant Temp:120°C (with 50/50 Glycol/water coolant)
Oil Temp Limits: 50°C to 130°C (Normal 90-110°C)
Oil Pressure 2-5 Bar
Minimum Fuel Pressure: 0.15 bar

With Rotax 914-UL engine: Maximum Manifold Pressure: 1300 hPa (max continuous, 1150 hPa)
Maximum EGT: 950°C
Maximum CHT: 135°C
Max Coolant Temp:120°C (with 50/50 Glycol/water coolant)
Oil Temp Limits: 50°C to 130°C (Normal 90-110°C)
Oil Pressure 1.5-7 Bar (1.5-5 Bar normal)

15. Special Test Flying Issues

- Rotax 912 flight test schedule if Rotax 912-ULS engine fitted.
- The early model Kitfoxes were popular aeroplanes which initially suffered a high accident rate in the UK largely because it was built and flown in numbers by inexperienced people, without appreciation of the handling qualities of the type, or the hazards of strip flying. A proper 'check-out on type' from someone familiar with the Kitfox should be undertaken, especially by those without plenty of previous tailwheel experience. Particular care should be taken not to operate in windy conditions until experience is gained. The book by Ed Downs, 'How to Fly A Kitfox' (available from LCC Aircraft) is recommended.
- The throttle control on these aircraft is of ‘vernier’ type which while allowing accurate fine adjustment, can cause 'finger trouble' when coarse power changes are needed rapidly, for example when landing in gusty conditions.
- If wing-folding is undertaken then carefully check before further flight that apart from the wing leading edge pins being properly locked in place, the fuel pipes from wing fuel tanks have not become kinked at the wing hinge or created an air lock at this point.
- Check for signs of CO contamination in cockpit, if exhaust smell is noticed this must be corrected by attention to exhaust system and cabin seals.
- Check fuel system feeds from all tanks without developing air locks or accumulating air in header tank.
- Due to reducing elevator authority in the flare when power off, it is recommended that when the cg is further forward than 10.5 inches AOD, the aircraft is landed with flaps up.

16. Control surface deflections

Ailerons	Up:	TBD degrees
	Down:	TBD degrees
Elevators	Up:	TBD degrees
	Down:	TBD degrees
Rudder	Left	TBD degrees
	Right	TBD degrees
Flap	Down	TBD degrees
Elevator tab	Up and down TBD degrees	

Approved :

F.R.Donaldson
Chief Engineer

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