

AMATEUR-BUILT AIRCRAFT CERTIFICATION INSPECTION GUIDE

This document has been developed for use by Aviation Safety Inspectors (ASIs) and Designated Airworthiness Representatives (DARs) as a basic inspection guideline for certification of amateur-built aircraft. It is not intended to be all inclusive for every variation of amateur-built aircraft. But, it is general enough in scope to show that the certification inspection is not to be a detailed Annual/100 hour type inspection since the builder/applicant has already declared that the aircraft is "airworthy" by signing the application for the airworthiness certificate. The ASI/DAR issues the special airworthiness certificate for operating the amateur-built aircraft. The ASI/DAR by use of the following guide, should be able to perform what amounts to an in-depth pre-flight that should reasonably assure that the aircraft will operate as intended.

PRELIMINARY TO THE AIRCRAFT INSPECTION

- A. The aircraft must be registered before an airworthiness certificate can be issued. (Check with Oklahoma City, Aircraft Registration Branch, prior to leaving office. Also, check that no letter of denial is on file.) Verify the correct registration numbers are permanently marked in accordance with 14 CFR part 45, subpart C.
- B. Confirm all paperwork is complete, and a Builder's Log or similar type record of construction is available for review.
- Registration: AC Form 8050-1, pink slip; (Verify with Ok. City;) or AC Form 8050-3. Application for Airworthiness Certificate, FAA Form 8130-6. Completed and signed. Eligibility Statement Amateur-Built Aircraft, FAA Form 8130-12. (Notarized) Aircraft Weight and Balance Information, that includes a list of installed equipment.
- C. Does the builder have log books for the airframe, the engine, and the propeller? Some type of permanent record is needed for the airframe in order to have a place to record the issuance of the airworthiness certificate by the ASI or DAR. It is also recommended that separate records be provided for the engine and the propeller.
- D. The aircraft must be 100% complete. The engine should have been run for at least 1 hour. The run should have included operating in a nose high above stall attitude to ensure full fuel flow, and a full power run to verify and ensure maximum designed RPM is attained.
- E. The engine cowling should be opened or removed (as applicable) to allow access to the engine compartment. Inspection panels should be opened or removed for visual access.
- F. Verify that the Weight and Balance has been computed to include: forward limit, aft limit, and maximum gross weight for the aircraft. These calculations should be reviewed for accuracy by the inspector. Will the aircraft be within CG and under gross weight with the proposed pilot?
- G. Ask the builder if any changes/modifications have been made to the kit/plans concerning the

structure, components, or systems of the aircraft, other than those recommended by the kit/plan manufacturer/supplier. Compare some sample parts of the aircraft with the plans. Examine samples of workmanship such as: glue joints, welding, riveting, and composite lay-up.

H. Does the builder have any record of in-process inspections recorded in Builder's Log? Typically, two interim and one final visit are recorded as being performed by an EAA Technical Counselor or A&P mechanic.

I. Was the engine and propeller originally type designed for operation in a type certificated (TC) aircraft? Is the installed engine/prop a compatible combination? (This would be validated by the engine/prop combination being listed on a type certificate data sheet for a certificated aircraft). This information will dictate whether the Phase I test flight time is 25 or 40 hours. To be eligible for the 25 hours, the certificated engine and propeller combination when installed, must be "airworthy." This means, the engine and propeller must meet its type design and be in a condition for safe operation. All applicable Airworthiness Directives must be complied with at this time. If these conditions are not met, the aircraft limitations will mandate the 40 hour Phase I test-flight time requirement.

NOTE: A Type Certificate (TC) as defined in part 21 includes the type design, the operating limitations, the type certificate data sheet (TCDS), the applicable regulations, and any other conditions or limitations prescribed by the Administrator.

Once the amateur-built aircraft operates, the type certificated (TC) engine and propeller no longer conform to the type certificate. Because, the operating limitations listed on the TCDS under which the TC was approved by the FAA will not be valid for the engine and propeller when installed and operated on an airframe that has no standards or approval for installation. If the engine and/or propeller are ever removed from the amateur-built aircraft and installed in a TC'd aircraft, they would subsequently have to be conformed to type design and be found to be in condition for safe operation by the FAA or persons authorized by the FAA, prior to operation.

AIRCRAFT INSPECTION

Definition: For the purpose of this inspection guide, "visually accessible" means that a section, area, part, system, etc., of the aircraft, can be viewed by the opening of a hatch/door or the removal of an inspection plate. It does not mean the removal of equipment, components, or the disassembly of any part of the aircraft that can not be performed by simple means.

Cabin/Cockpit:

- Ensure engine ignition switch(s) is OFF.

Check that there are no sharp corners or edges to catch hands, shoes, or clothing.

Check for passenger warning placard (2 seats or more).

Check that instruments are secure and marked/calibrated as required.

Ask the builder if quantity readings were checked for fuel/sight gauge (s):

Check fuel selector operation (shut off and flow, all tanks), and labeling, if applicable.

Can the pilot reach the fuel selector while strapped in with the shoulder harness locked?

Check brakes, fluid, and solid feel of pedals/control.

Check the flight controls at their full range of movement to detect for possible interference with radios, electrical wires, instrument lines, and engine controls. Do the flight control surfaces move in the correct direction?

Check seat and shoulder harness/seat belt installation. Are they installed in accordance with the plan/drawing as recommended by the manufacturer?

Check canopy and /or door latching system for proper operation and security.

Check windshield and other windows for security.

Check for compass and a correction card, and other instruments/avionics as required for intended 14 CFR part 91 operation. Day VFR-only does not require flight instruments. Night VFR and IFR require compliance with FAR 91.205.

Check visually accessible items with emphasis on flight and engine controls, for locknuts, cotter pins, safety wire, etc.

Fuselage:

- Check visually accessible wing/strut/landing gear attach points.

If a battery is installed, check for mounting security and vent system.

Where accessible, check control cables/rods for binding, clearance, smooth and snag-free operation, and safety of turnbuckles.

Has the control cable tension been set as recommended by the kit/plans manufacturer?

Check fuel caps for security and vent system for operation (if applicable).

Check instrument static ports for blockage (if applicable).

Empennage:

- Horizontal and vertical stabilizers, rudder, and elevator, check for security and travel.

Check for positive control stops.

Check control surface hinges, and control mechanism for function and security. Check safety pins/wire, as applicable. Check control counter-weights for security.

Check for correct direction of travel when controls are operated from the cockpit. The elevator should go up, when the stick/yoke is pulled back. The rudder should move right, when the right pedal is pushed. Are trim tabs installed, and are they correctly marked for control input? They normally travel in a direction opposite the control surface.

Check the aircraft data plate for builder's name, model designation, and builders serial number,

Wings:

- Visually check wing attach and strut attach points where applicable.

Check fuel caps for security and vent system for operation (if applicable).

- Check control surface hinges and control mechanism for function and security. Check safety pins/wire, as applicable. Check control counter-weights for security.

Check ailerons for correct direction of travel when controls are operated from the cockpit. Right aileron should go up and the left one should go down, when the stick/yoke is moved to the right, and the opposite direction when moved left. Are trim tabs installed, and are they correctly marked for control input? (They normally travel in a direction opposite the control surface.)

Landing Gear:

- Visually check attach points, strut extension, and extra allowance for flex brake lines (if

applicable), brake system, tires, and wheel fairings.

Does aircraft have retractable landing gear? Was a gear retract and extension performed with the installed tire/wheel combination? Was an emergency gear extension performed (if applicable)? An entry in the maintenance record of this function by the builder is usually sufficient.

Was landing gear wheel alignment checked?

If equipped with conventional gear (a tail wheel), will the aircraft taxi in a straight line?

Engine Compartment:

- Has the engine ground run been performed and recorded in the engine maintenance record?

Has the engine been installed in accordance with the kit/plans manufacturers recommendations?

Is the engine and engine mounts secure and grounded with electrical ground straps?

Are the fuel and oil lines compatible with the fluid. All fluid lines should be of material and installed as recommended by the kit/plans manufacturer.

Fluid lines and filters should be located away from the exhaust system.

Is the exhaust system secure, and does it have a heater muff? (Carbon Monoxide in the cabin must be considered).

Is the firewall fabricated from material recommended by the kit/plans manufacturer?

Does the engine have carburetor heat or alternate air, and does it work?

Are the spark plug wires secure to the plugs.

Ask for a record of the differential compression/cylinder pressure test to determine if it meets specifications of the engine manufacturer. If any cylinders are below specifications, then don't issue the A/W certificate until repairs are made.

Check engine and propeller controls for operation, security, and routing.

Check security of fuel and electrical system components and alignment of drive belts where applicable.

- **Propeller:**

Have the propeller bolts been properly torqued (Builder's Log entry), and are they safetied?

Is spinner installed, and is it secure?

Has prop track been checked?

Is the propeller damaged or nicked?

Are the propeller tips painted for visibility?

Miscellaneous items:

- Is the aircraft equipped in accordance with FAR 91.205 for the operations that the owner/operator intends to fly, or for the limitations issued in Phase II? (Night VFR, IFR).

If a ballistic chute is installed, is it installed I/A/W the manufacturers instructions?

If the aircraft has 2 seats or more, check for installation and operation of the Emergency Locator Transmitter (ELT).

Is the pitot static system open?

Are any of the fluid systems leaking ?

Is there a low point sump drain in the fuel system?

Is draining the sump listed on the pre-flight checklist?

THIS AIRCRAFT _____, REGISTRATION NUMBER, N _____ WAS

(List Model, S/N)

INSPECTED ON __ / __ / __. IT WAS FOUND ELIGIBLE FOR THE CERTIFICATE REQUESTED. ENTRY WAS MADE IN THE AIRCRAFT RECORDS AND THE APPROPRIATE LIMITATIONS WERE ISSUED.

(Signature, FAA/DAR)

It is the owner/operator's responsibility to comply with the operating limitations issued for an experimental aircraft as part of the airworthiness certificate. The limitations are issued under an operating regulation, (part 91.319). It is suggested that the FAA inspector/DAR explain the limitations to the owner/operator so they are clearly understood prior to the aircraft being operated.

Other Aircraft: (To be added as the need and resources allow.)

- Aircraft on floats: planes and helicopters.

Rotorcraft