

An Experimental Condition Inspection Checklist

This Condition Inspection Checklist is Compiled from FAR 43, Appendix D, typical experimental aircraft operators handbooks and experiences when working with amateur built aircraft. Items in italics are added information and inspections beyond the basic FAR 43 guidelines. It is absolutely imperative that the owner/manufacturer provide the inspector with all documentation pertaining to the airframe, kit, engine and accessory manuals provided by manufacturers for proper inspection, installation, operation and servicing of his homebuilt aircraft or be prepared with extensive research costs.

This checklist is for personal use only and does not take the place of or guidance provided by any manufacturer.

Aircraft Make/Model: _____ S/N: _____

Engine Make/Model: _____ S/N: _____

Propeller Make/Model: _____ S/N: _____

Date of Inspection: _____

TT Airframe: _____ TT Engine: _____

Experimental Aircraft should be inspected fully every 25 hours for the first 100 hours as it is common to find build errors, compromises, installation errors and documentation errors normally not found in a production aircraft.

Prior to the inspection, it is advisable to run the engine and operate all controls and avionics to determine the status of the aircraft, taking note of the following:

Oil Pressure, voltage output/charging, ignition drop on right and left, suction and fuel pressure, static max RPM, idle RPM and proper choke and ignition cut off, as well as all flight controls to determine aircraft condition.

Research the aircrafts' compliance with current modifications, AD(s), SB(s), AI(s), SI(s), SB(s), and avionics AD(s) or software updates. Check that the aircraft log books show proper documentation of these items.

The weight and balance and equipment list must be reviewed to determine if changes to the aircraft have not been documented properly.

Scope and Detail of Items (As Applicable to the Particular Aircraft) to be Included in Annual, Conditional and 100-Hour Inspections:

(a) Prior to inspection the person performing an annual or condition inspection shall thoroughly clean the aircraft, *wheel wells and control recesses* . For an annual, condition or 100-hour inspection the person performing the inspection shall, remove or open all necessary inspection plates, cowling, access doors, fairing, removable interior trim carpets, covers and cushions . *He shall thoroughly clean aircraft engine.*

(b) Each person performing an annual or 100-hour inspection shall inspect (where applicable) the following components of the fuselage and hull group:

(1) Fabric / composite / metal skin-for deterioration, buckling, cracking, distortion, or other evidence of failure, and defective or insecure attachment of fittings.

If applicable to a transportable kit, unfold and or remove the wings and tail planes and inspect :

Pass	Fail	Stabilators and Rudder:
		<i>Tab hinges for binding, wear and corrosion. Tab drive pin and bracket for corrosion cracking or glass delamination.</i>
		<i>Check tail plane bearings/bushings for security and cleanliness inside of the stab.</i>
		<i>Check the Tail plane drive bushings in the rib for wear and security.</i>
		<i>Rudder: Check for cracks near hinges, delaminations, scrapes, rudder horn security and stops for proper operation, proper throw and condition.</i>

Pass	Fail	Wing Group:
		<i>Wing connect pins in the root rib for cracking, deformation, and security. Regrease as necessary.</i>
		<i>Main wing spar for wear and security.</i>
		<i>Aileron quick disconnect mechanism for smooth operation, cracking, any shims for security and all bolts and nuts for security.</i>
		<i>Interior wing pushrods, bearings and bell cranks for proper operation, condition, corrosion and cracks.</i>
		<i>Ailerons for cracks near hinges, delaminations, scrapes, rudder horn security and stops for proper operation, proper throw and condition.</i>
		<i>Flaps for hinge bracket security, corrosion, delaminations, stops, holdowns etc.</i>
		<i>Wing skins at trailing edge for delamination, aileron support attachments, flap attachments, exterior lighting security and operation.</i>
		<i>Pitot tube and tubing for security and proper sealing, blockage and static tip security.</i>
		(2) Systems and components-for improper installation, apparent defects, and unsatisfactory operation.
		<i>Inspect wire, pitot static, fuel and any other quick disconnects of systems affected by wing fold or removal for brittle, cracked or worn components..</i>
		(3) Envelope, gas bags, tanks, and related parts-for poor condition and serviceability.
Pass	Fail	(c) Each person performing an annual or 100-hour inspection shall inspect (where applicable) the following components of the cabin and cockpit group:
		(1) Generally\for uncleanliness and loose equipment that might foul the controls.
		<i>Check for required registration and airworthiness documentation.</i>
		<i>Remove the fuel tank outlet fittings and flush the tank with fresh fuel. Clean the screens of the tank fittings and inspect for deterioration of hoses and lines. Note that the monowheel must have the tail lifted to carry out a flushing action.</i>
		<i>Reattach fuel tank outlets and check for security and leaks.</i>
		<i>Check fuel line routing for clearance from controls, cables and wiring. Assure the fuel lines are not kinked or installed with improper radius.</i>
		<i>Wing sockets on fuselage sides for security, cracking, corrosion and the surrounding area of the sockets for buckling, cracking and damage.</i>
		<i>Pip Pin for correct fit and security on the rear of the fitting in the cup. Check also the pin freely springs into the locked position and is free of corrosion.</i>
		<i>Inspect in the wing spar hole for the condition of the pitch and roll control systems for correct operation, security of all rod ends, bolts and security of the quick disconnect pads</i>
		<i>Tail plane mass balance arm for control stop security, damage, lateral cables or rub strip security and all bolts for security.</i>
		<i>Electric pitch trim motors and mechanisms for correct operation, corrosion and damage. Check wiring is free of chafing and clear of controls.</i>
		<i>Tail plane mechanism for security, cracking corrosion, and lube both inside and out, pins/bolts are free of cracks, secure and cotter pinned. See AD/SBs.</i>
		<i>Flap drive motor for correct operation and security.</i>
		(2) Seats and safety belts\for poor condition and apparent defects.
		(3) Windows and windshields\for deterioration and breakage.
		<i>Doors for damage and safe operation. Also check:</i>
		<i>Hinges for security and wear.</i>
		<i>Door struts for security and operation.</i>
		<i>Shoot-bolts and latching mechanism for damage and correct operation.</i>
		(5) Flight and engine controls\for improper installation and improper operation.

Pass	Fail	<i>Cockpit Controls:</i>
		<i>Rudder Pedals for cracking and freedom of operation. Confirm that full rudder movement can be achieved before the rudder pedal contacts the firewall.</i>
		<i>Stick movement should not contact the instrument panel during full operation.</i>
		<i>Check added equipment such as trims, autopilot servo mechanisms and glider wing equipment covers do not restrict stick movement.</i>
		<i>Check autopilot mechanisms cannot jam, over center, or restrict flight control movements.</i>
		<i>Check brake handle(s), parking brakes, throttle, choke, and parking brake mechanisms are operational, and are free of wear, leaks, chafing.</i>
		(4) Instruments for poor condition, mounting, marking, and (where practicable) improper operation.
		<i>Ensure all access panels, or cockpit module modifications are properly reinforced if the basic structure has been modified beyond the allowable mods in the build manual. Inspect for proper documentation as well as being free of buckling, cracking or deformations.</i>
		(6) Batteries\for improper installation and improper charge.
		(7) All systems\for improper installation, poor general condition, apparent and obvious defects, and insecurity of attachment.
(d) Each person performing an annual or 100-hour inspection shall inspect (where applicable) components of the engine and nacelle group as follows:		
Pass	Fail	<i>Refer to the appropriate engine manufacturer's 100 hour inspection, installation and maintenance manuals for further detail on the areas below:</i>
		(1) Engine section\for visual evidence of excessive oil, fuel, or hydraulic leaks, and sources of such leaks.
		(2) Studs and nuts\for improper torquing and obvious defects.
		(3) Internal engine\for cylinder compression and for metal particles or foreign matter on screens and sump drain plugs. If there is weak cylinder compression, for improper internal condition and improper internal tolerances.
		<i>Perform a warm engine compression test to determine status:</i>
		<i>Compression Results: Cyl 1 ___, Cyl 2 ___, Cyl 3 ___, Cyl 4 ___, etc.</i>
		<i>Change oil per engine manufacturers direction and filter. Cut and inspect oil filter for contaminants and check magnetic pickup if installed.</i>
		(4) Engine mount\for cracks, looseness of mounting, and looseness of engine to mount.
		<i>Check high temp (Binx) nuts on the engine frame to the ring mount and the frame to engine bolts for security, cracks and corrosion.</i>
		(5) Flexible vibration dampeners\for poor condition and deterioration.
		<i>Inspect engine mount and main /nose gear landing gear mount and firewall for corrosion, cracks, damage and security.</i>
		(6) Engine controls\for defects, improper travel, and improper safetying.
		(7) Lines, hoses, and clamps-for leaks, improper condition and looseness.

Pass	Fail	Ignition group:
		<i>Spark Plugs: Remove, inspect and replace with properly gapped plugs.</i>
		<i>Ignition wires, inspect and check for security, chafing and damage.</i>
Pass	Fail	Fuel Group:
		<i>If not accomplished already: Remove the fuel tank outlet fittings and flush the tank with fresh fuel. Clean the screens of the tank fittings and inspect for deterioration of hoses and lines. Reinstall the outlet fittings with new hose as appropriate and continue checking the system.</i>
		<i>Check fuel lines for fire sleeve, security, leakage, deterioration and hardness.</i>
		<i>Inspect carburetor(s) for security, rubber seals and leakage.</i>
		<i>Remove float bowls and check for corrosion, overtightening and cleanliness.</i>
		<i>Check fuel pump (likely installed in the center tunnel, or aft baggage bay area) for proper operation, fuel pressure, ability to reprime itself if dry, leakage and security.</i>
		<i>Change fuel filter, check for proper installation, and visually check for flow and leakage. Rescuer as necessary.</i>
		<i>Check fuel return for proper operation IAW the engine manufacturers guidelines.</i>
		<i>Turn on the boost pump and check the fuel lines, fittings and carb bowls for leaks. Check the return and fuel pressure lines for operations.</i>
		<i>Check fuel pump pressure readings are within engine manufacturers guidelines.</i>
Pass	Fail	Air inlet, radiator and oil coolers if installed to include thermostats.
		<i>Check coolant and oil hoses for chafing, cracking, heat damage and leaks.</i>
		<i>Check radiators and oil cooler for security, damage, leaks and blockages of fins.</i>
		<i>Remove, clean and replace air filter.</i>
		<i>(8) Exhaust stacks\for cracks, defects, and improper attachment.</i>
		<i>Check surrounding equipment for heat damage or signs of overheating, soot, discoloration, or wear of heat shields.</i>
		<i>(9) Accessories\for apparent defects in security of mounting.</i>
		<i>(10) All systems\for improper installation, poor general condition, defects, and insecure attachment.</i>
		<i>Note: Change oil at engine manufacturer's recommended interval or annually and coolant every second year. Inspect fluids for particles, discoloration or viscosity problems.</i>

Pass	Fail	Battery inspection (may be located in engine compartment, baggage bay or aft fuselage):
		<i>Inspect battery box and drain tube and vent lines for correct routing and operation.</i>
		<i>Check battery for proper security and hold down support.</i>
		<i>Clean terminals, check electrolyte level if possible.</i>
		<i>Inspect all electrical wiring for security and chafing.</i>
		<i>Check main ground to engine, avionics, and accessory for security and cleanliness.</i>
		<i>(11) Cowling\for cracks, and defects.</i>

Pass	Fail	Upon completion of the inspection, run engine again and note the following:
		<i>Oil Pressure, voltage output/charging, ignition drop on right and left, suction and fuel pressure, static max RPM, idle RPM and proper choke and ignition cut off. Perform a compression and carb balance check if necessary after mx.</i>
		<i>A final engine run is recommended and compression tests may be necessary after the above maintenance. Carburetor idle cold and hot, and balance check may also be necessary to perform again. This is an excellent time to verify engine instrument readings, mag drop checks, and leak checks to assure the engine is ready for service.</i>

Pass	Fail	(e) Each person performing an annual or 100-hour inspection shall inspect (where applicable) the following components of the landing gear group:
		(1) All units\for poor condition and insecurity of attachment.
		(2) Shock absorbing devices\for improper oleo fluid level. <i>Check bungee cords, springs and pivot bearings for operation and condition.</i>
		(3) Linkages, trusses, and members\for undue or excessive wear fatigue, and distortion.
Pass	Fail	For all retractable gear:
		<i>Prepare the aircraft for a retraction test .</i>
		<i>Hoist aircraft with engine hoist or jacks with wings attached.</i>
		<i>Retract landing gear and extend.</i>
		<i>Check for ease of operation, bushings for looseness, pivot points for wear, retract handle for tightness, over center operation on both arms, bungee for rot or wear rubber blocks for proper operation and firmness, and shocks for leakage.</i>
		<i>Lubricate all pivot points and check clearances all around.</i>
		(4) Retracting and locking mechanism\for improper operation.
Pass	Fail	For all fixed and retractable gear:
		(5) Hydraulic lines\for leakage.
		(6) Electrical system\for chafing and improper operation of switches.
		(7) Wheels\for cracks, defects, and condition of bearings. <i>Remove wheels and repack bearings of all three gear of the trigeard.</i>
		<i>Reinstall wheels and bearings and torque IAW brake manufacturers directions not the original kit manufacturers supplied directions.</i>
		(8) Tires\for wear and cuts.
		(9) Brakes\for improper adjustment. <i>If brake fluid is discolored, rebleed the system to clean out impurities.</i>
		<i>Check disk for warpage, grooving and surface condition.</i>
		(10) Floats and skis\for insecure attachment and obvious or apparent defects. <i>Tail wheel springs, cables and fittings for security, tension, and wear.</i>
		<i>Tail wheel support and attachment to fuselage for security and corrosion.</i>
		<i>Tail wheel limit devices or locking mechanisms for proper operation.</i>
		<i>Nose gear shimmy dampener and shaft, inspect and lubricate.</i>
Pass	Fail	(f) Each person performing an annual or 100-hour inspection shall inspect (where applicable) all components of the wing and center section assembly for poor general condition, fabric or skin deterioration, distortion, evidence of failure, and insecurity of attachment. (See b 1 above)
Pass	Fail	(g) Each person performing an annual or 100-hour inspection shall inspect (where applicable) all components and systems that make up the complete empennage assembly for poor general condition, fabric or skin deterioration, distortion, evidence of failure, insecure attachment, improper component installation, and improper component operation. (See b 1 above)
Pass	Fail	(h) Each person performing an annual or 100-hour inspection shall inspect (where applicable) the following components of the propeller group:
		(1) Propeller assembly\for cracks, nicks, binds, and oil leakage. <i>Check propeller blade angle, tracking, and balance.</i>
		(2) Bolts\for improper torquing and lack of safetying.
		(3) Anti-icing devices\for improper operations and obvious defects.
		(4) Control mechanism\for improper operation, insecure mounting, and restricted travel. <i>Check spinner and back plate for security and cracking/damage.</i>

Pass	Fail	(i) Each person performing an annual or 100-hour inspection shall inspect (where applicable) the following components of the radio group:
		(1) Radio and electronic equipment\for improper installation and insecure mounting.
		(2) Wiring and conduits\for improper routing, insecure mounting, and obvious defects.
		(3) Bonding and shielding\for improper installation and poor condition.
		(4) Antenna including trailing antenna\for poor condition, insecure mounting, and improper operation.
Pass	Fail	(j) Each person performing an annual or 100-hour inspection shall inspect (where applicable) each installed miscellaneous item that is not otherwise covered by this listing for improper installation and improper operation.
		<i>Additional items under this group should include but are not limited to the following components:</i>
		<i>Radio Transmissions for clarity and range.</i>
		<i>Transponder for proper altitude and code readings.</i>
		<i>Electronic engine monitors for proper display and readings.</i>
		<i>EFIS for proper indications and readings</i>
		<i>Autopilot operation and override capability.</i>
		<i>Wheel brake and parking brake for ease of operation and effectiveness.</i>

Pass	Fail	ELT Inspection: 91.207(d)
		d) Each emergency locator transmitter required by paragraph (a) of this section must be inspected within 12 calendar months after the last inspection for--
		(1) Proper installation;
		(2) Battery corrosion;
		(3) Operation of the controls and crash sensor; and
		(4) The presence of a sufficient signal radiated from its antenna.

Pass	Fail	Final reassembly after inspection:
		<i>Install wings and stabilators.</i>
		<i>Perform afirst flight final checklist provided in the kit build manual (Such as the Annex E of Europa or similar).</i>
		<i>Pay particular attention to the following:</i>
		<i>Aileron quick disconnect slop.</i>
		<i>Stabilator / elevator and trim tab looseness</i>
		<i>Flap operation.</i>
		<i>Quick disconnects at the wing to fuselage, wiring and pitot static connections.</i>
		<i>Check exterior lights for operation and compliance</i>
		<i>Check heat and ventilation systems for proper operation and fire/exhaust carbon monoxide poisoning protection.</i>
		<i>Check pitot and static with proper devices to ensure proper connection and operation.</i>
		<i>Firewall for security, buckling, gap sealing and proper penetration sealing for wires, fuel lines and controls.</i>

