

Attachment 2

Items for Major Alterations, Major Repairs, and Preventive Maintenance

1. Major repairs

(1) Airframe major repairs. Repairs to the following part of an airframe and repairs of the following types, involving the strengthening, reinforcing, splicing, and manufacturing of primary structural members or their replacement, when replacement is by fabrication such as riveting or welding, are airframe major repairs.

I. Box beams.

II. Monocoque or semimonocoque wings or control surfaces.

III. Wing stringers or chord members.

IV. Spars.

V. Spar flanges.

VI. Members of truss-type beams.

VII. Thin sheet webs of beams.

VIII. Keel and chine members of boat hulls or floats.

IX. Corrugated sheet compression members which act as flange material of wings or tail surfaces.

X. Wing main ribs and compression members.

XI. Wing or tail surface brace struts.

XII. Engine mounts.

XIII. Fuselage longerons.

XIV. Members of the side truss, horizontal truss, or bulkheads.

XV. Main seat support braces and brackets.

XVI. Landing gear brace struts.

XVII. Axles.

XVIII. Wheels.

XIX. Skis, and ski pedestals.

XX. Part of the control system such as control columns, pedals, shafts, brackets, or horns.

XXI. Repairs involving the substitution of material.

XXII. The repair of damaged areas in metal or plywood stressed covering exceeding six inches in any direction.

XXIII. The repair of portions of skin sheets by making additional seams.

XXIV. The splicing of skin sheets.

XXV. The repair of three or more adjacent wing or control surface ribs or the leading edge of wings and control surfaces, between such adjacent ribs.

XXVI. Repair of fabric covering involving an area greater than that required to repair two adjacent ribs.

XXVII. Replacement of fabric on fabric covered part such as wings, fuselages, stabilizers, and control surfaces.

XXVIII. Repairing, including rebottoming, of removable or integral fuel tanks and oil tanks.

(2) Powerplant major repairs. Repairs of the following part of an engine and repairs of the following types are powerplant major repairs:

I. Separation or disassembly of a crankcase or crankshaft of a reciprocating engine equipped with an integral supercharger.

II. Separation or disassembly of a crankcase or crankshaft of a reciprocating engine equipped with other than spur-type propeller reduction gearing.

III. Special repairs to structural engine part by welding, plating, metalizing, or other methods.

(3) Propeller major repairs. Repairs of the following types to a propeller are propeller major repairs:

I. Any repairs to, or straightening of steel blades.

II. Repairing or machining of steel hubs.

III. Shortening of blades.

IV. Retipping of wood propellers.

V. Replacement of outer laminations on fixed pitch wood propellers.

VI. Repairing elongated bolt holes in the hub of fixed pitch wood propellers.

VII. Inlay work on wood blades.

VIII. Repairs to composition blades.

IX. Replacement of tip fabric.

X. Replacement of plastic covering.

XI. Repair of propeller governors.

XII. Overhaul of controllable pitch propellers.

XIII. Repairs to deep dents, cuts, scars, nicks, etc., and straightening of aluminum blades.

XIV. The repair or replacement of internal elements of blades.

(4) Appliance major repairs. Repairs of the following types to appliances are appliance major repairs:

I. Calibration and repair of instruments.

- II. Calibration of radio equipment.
- III. Rewinding the field coil of an electrical accessory.
- IV. Complete disassembly of complex hydraulic power valves.
- V. Overhaul of pressure type carburetors, and pressure type fuel, oil and hydraulic pumps.

2. Major alterations

(1) Airframe major alterations. Alterations of the following part and alterations of the following types, when not listed in the aircraft specifications issued by the CAA or the type certification or type-approved certification regulation chart of the civil aeronautics authority of the State of original design, are airframe major alterations:

- I. Wings.
- II. Tail surfaces.
- III. Fuselage.
- IV. Engine mounts.
- V. Control system.
- VI. Landing gear.
- VII. Hull or floats.
- VIII. Elements of an airframe including spars, ribs, fittings, shock absorbers, bracing, cowling, fairings, and balance weights.
- IX. Hydraulic and electrical actuating system of components.
- X. Rotor blades.
- XI. Changes to the empty weight or empty balance which result in an increase in the maximum certificated weight or center of gravity limits of the aircraft.
- XII. Changes to the basic design of the fuel, oil, cooling, heating, cabin pressurization, electrical, hydraulic, de-icing, or exhaust systems.
- XIII. Changes to the wing or to fixed or movable control surfaces which affect flutter and vibration characteristics.

(2) Powerplant major alterations. The following alterations of a powerplant when not listed in the engine specifications issued by the CAA are powerplant major alterations.

- I. Conversion of an aircraft engine from one approved model to another, involving any changes in compression ratio, propeller reduction gear, impeller gear ratios or the substitution of major engine part which requires extensive rework and testing of the engine.

- II. Changes to the engine by replacing aircraft engine structural part with part not supplied by the original manufacturer or part not specifically approved by the CAA or Authority of State of Design.
 - III. Installation of an accessory which is not approved for the engine.
 - IV. Removal of accessories that are listed as required equipment on the aircraft or engine specification.
 - V. Installation of structural part other than the type of part approved for the installation.
 - VI. Conversions of any sort for the purpose of using fuel of a rating or grade other than that listed in the engine specifications.
- (3) Propeller major alterations. The following alterations of a propeller, when not authorized in the propeller specifications issued by the CAA or the type certification or type-approved certification regulation chart of the civil aeronautics authority of the State of original design, are propeller major alterations:
- I. Changes in blade design.
 - II. Changes in hub design.
 - III. Changes in the governor or control design.
 - IV. Installation of a propeller governor or feathering system.
 - V. Installation of propeller de-icing system.
 - VI. Installation of part not approved for the propeller.
- (4) Appliance major alterations. Alterations of the basic design not made in accordance with recommendations of the appliance manufacturer or in accordance with a CAA Airworthiness Directive are appliance major alterations. In addition, changes in the basic design of radio communication and navigation equipment approved under type certification or a Technical Standard Order that have an effect on frequency stability, noise level, sensitivity, selectivity, distortion, spurious radiation, AVC characteristics, or ability to meet environmental test conditions and other changes that have an effect on the performance of the equipment are also major alterations.
3. Preventive maintenance. Preventive maintenance is limited to the following work, provided it does not involve complex assembly operations:
- (1) Removal, installation, and repair of landing gear tires.
 - (2) Replacing elastic shock absorber cords on landing gear.
 - (3) Servicing landing gear shock struts by adding oil, air, or both.
 - (4) Servicing landing gear wheel bearings, such as cleaning and greasing.
 - (5) Replacing defective safety wiring or cotter keys.

- (6) Lubrication not requiring disassembly other than removal of nonstructural items such as cover plates, cowlings, and fairings.
- (7) Making simple fabric patches not requiring rib stitching or the removal of structural part or control surfaces. In the case of balloons, the making of small fabric repairs to envelopes (as defined in, and in accordance with, the balloon manufacturers' instructions) not requiring load tape repair or replacement.
- (8) Replenishing hydraulic fluid in the hydraulic reservoir.
- (9) Refinishing decorative coating of fuselage, balloon baskets, wings tail group surfaces (excluding balanced control surfaces), fairings, cowlings, landing gear, cabin, or cockpit interior when removal or disassembly of any primary structure or operating system is not required.
- (10) Applying preservative or protective material to components where no disassembly of any primary structure or operating system is involved and where such coating is not prohibited or is not contrary to good practices.
- (11) Repairing upholstery and decorative furnishings of the cabin, cockpit, or balloon basket interior when the repairing does not require disassembly of any primary structure or operating system or interfere with an operating system or affect the primary structure of the aircraft.
- (12) Making small simple repairs to fairings, nonstructural cover plates, cowlings, and small patches and reinforcements not changing the contour so as to interfere with proper air flow.
- (13) Replacing side windows where that work does not interfere with the structure or any operating system such as controls, electrical equipment, etc.
- (14) Replacing safety belts.
- (15) Replacing seats or seat part with replacement part approved for the aircraft, not involving disassembly of any primary structure or operating system.
- (16) Trouble shooting and repairing broken circuits in landing light wiring circuits.
- (17) Replacing bulbs, reflectors, and lenses of position and landing lights.
- (18) Replacing wheels and skis where no weight and balance computation is involved.
- (19) Replacing any cowling not requiring removal of the propeller or disconnection of flight controls.
- (20) Replacing or cleaning spark plugs and setting of spark plug gap clearance.
- (21) Replacing any hose connection except hydraulic connections.
- (22) Replacing prefabricated fuel lines.
- (23) Cleaning or replacing fuel and oil strainers or filter elements.
- (24) Replacing and servicing batteries.
- (25) Cleaning of balloon burner pilot and main nozzles in accordance with the balloon manufacturer's instructions.

- (26) Replacement or adjustment of nonstructural standard fasteners incidental to operations.
- (27) The interchange of balloon baskets and burners on envelopes when the basket or burner is designated as interchangeable in the balloon type certificate data and the baskets and burners are specifically designed for quick removal and installation.
- (28) The installations of anti-misfueling devices to reduce the diameter of fuel tank filler openings provided the specific device has been made a part of the aircraft type certificate data by the aircraft manufacturer, the aircraft manufacturer has provided CAA-approved instructions for installation of the specific device, and installation does not involve the disassembly of the existing tank filler opening.
- (29) Removing, checking, and replacing magnetic chip detectors.
- (30) Removing and replacing self-contained, front instrument panel-mounted navigation and communication devices that employ tray-mounted connectors that connect the unit when the unit is installed into the instrument panel, (excluding automatic flight control systems, radar echo devices, and microwave frequency distance measuring equipment (DME)). The approved unit must be designed to be readily and repeatedly removed and replaced, and pertinent instructions must be provided. Prior to the unit's intended use, an operational check must be performed in accordance with the applicable instructions.