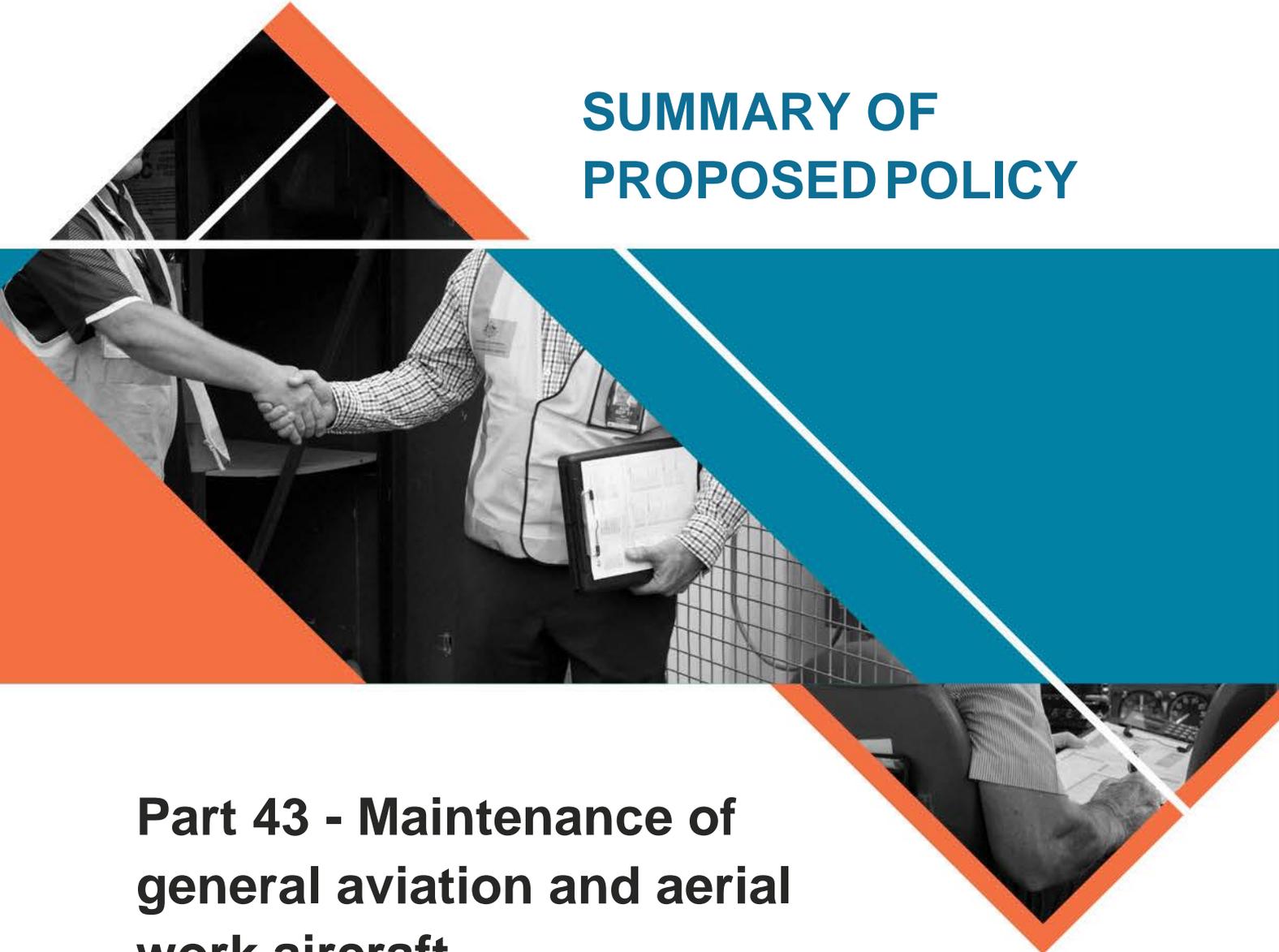




# SUMMARY OF PROPOSED POLICY



## Part 43 - Maintenance of general aviation and aerial work aircraft

<b>Date</b>	December 2018
<b>Project number</b>	SS 05/01
<b>File ref</b>	D18/535477

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## Introduction

The proposed new maintenance regulations for the general aviation (GA) and aerial work (AWK) sectors seek to meet an overarching objective of streamlining maintenance requirements, minimise regulatory burden and reduce costs while maintaining the high aviation standards expected by all Australians.

In August 2018, CASA published a survey that asked respondents to identify current challenges they experienced in GA/AWK maintenance and opportunities to improve Australia's regulatory system. Respondents were also asked to consider how the United States, New Zealand, Europe and Canada approach GA/AWK maintenance and comment on whether one or more of those regulation structures would be a suitable model for Australia.

An overwhelming 78 per cent of respondents indicated a preference for the USA – Federal Aviation Regulation's (US-FARs) model. Of the 11 per cent of respondents who indicated a preference for the New Zealand Civil Aviation Regulations (NZ-CARs), most indicated the FARs as their second choice.

CASA also conducted a detailed technical review of the US-FARs. CASA considers the US-FARs to be a well-established set of regulations, readily accepted by the FAA and US industry alike, with sound policies, clear requirements, scalability across a wide range of aircraft and operations, pathways for industry growth, and good safety outcomes that are historically slightly better than those in Australia.

A Technical Working Group (TWG) appointed by the Aviation Safety Advisory Panel (ASAP) met in September 2018, reviewed the consultation feedback and considered the policy options. As a result of the technical review and this industry consultation and engagement, the US-FARs have been confirmed as the best model on which to base the proposed new maintenance regulations for GA/AWK.

## About this document

This document is made up of 3 sections:

- a. Summary of Proposed policies
- b. Appendix A - Acceptable data
- c. Appendix B - Relevant FAR extracts.

Appendices A and B are provided for reference purposes and hyperlinks throughout the summary document will take you to the relevant references in the appendices.

## Summary of proposed policies

### The proposed new rule set

The proposed new rules will apply to GA/AWK maintenance. This covers all flying activity carried out in VH registered aircraft other than charter and air transport operations. This includes flying training, mustering, firefighting and emergency service operations, search and rescue, aerial surveying and photography, towing, and private flying operations.

Aircraft that are used in charter operations will continue to be maintained by a CAR 30 approval holder, regardless of other GA or AWK uses.

CASA will incorporate the applicable FAR regulations into the *Civil Aviation Safety Regulations 1998* (CASR) with as little amendment as possible. CASA expects to create a new CASR Part 43 reflecting US-FAR Part 43 and other essential US-FAR provisions.

Changes will only be made:

- where words, titles, phrases or legal terminology are incompatible with Australian legal terms
- to clarify the current FAR including removing ambiguity or uncertainty
- to make necessary formatting, paragraph structure and numbering changes
- to incorporate any differences to the proposed policy outcomes that have been consulted with the GA /AWK sectors.

The following specific policy outcomes summarise the main features of the proposed CASR Part 43. This will allow readers to properly gauge the effect of each provision.

The new rule set will not introduce a new Aircraft Maintenance Engineer (AME) licence. It is proposed that some changes will be made in Part 66 to accommodate the Inspection Authorisation (IA) and expanded scope of maintenance. The changes will not affect maintenance under Part 42 of CASR.

#### Principal changes that would occur

Under a new CASR Part based on the US-FARs:

#### Maintenance organisation approval

No maintenance organisation approval would be required for carrying out maintenance of aircraft, engines or components, other than propellers and instruments which would require an AMO approval. This would apply to all aircraft not engaged in air transport operations (presently charter and RPT).

**Note:** Maintenance practices will not change, so existing businesses holding a certificate of approval may continue to maintain aircraft, but without the need for a maintenance organisation approval from CASA. Maintenance could continue to be certified for and on behalf of the organisation by licence holders.

A person certifying maintenance must have established their competency to make that certification. This may be via their licence training or demonstrated under supervision as described in Topic 4 of the summary of policy proposals.

An Aircraft Engineer Licence holder (LAME) would be able to certify, carry out or supervise maintenance of aircraft, engines, components and systems within the scope of their licence.

LAMEs would not be required to obtain type ratings to certify maintenance on type rated aircraft under this proposed CASR.

### **New individual authorisation**

A new individual authorisation—IA—would be introduced. Only IA holders would be able to certify completion of annual inspections and conformity of major modifications/repairs to approved data.<sup>1</sup>

### **CAR 30 approvals phased out**

CAR 30 approvals would be phased out during a transition period determined in consideration of the finalisation of CASR Part 135.

### **Options for doing business**

CAR 30 organisations would certify for maintenance under the licence privileges of the certifying licensed aircraft maintenance engineer. Some CAR 30 approval holders may decide to transition to a Part 145 Approved Maintenance Organisation (AMO) approval. CASA is conducting a Post-Implementation Review (PIR) of Part 145 with the intention of simplifying that Part to improve its suitability for small organisations.

### **Annual inspections for airworthiness management of aircraft**

Annual or progressive inspections will form an essential component in the management of airworthiness of an aircraft. The annual/progressive inspection will be carried out or supervised by an IA holder who will, as part of the inspection, determine that the aircraft remains in conformity with its approved type design as properly modified. Aircraft operating in flying training or aerial work will also be required to undergo 100-hour inspections.

Large aeroplanes (above 5700kg) or multi-engine turbine powered aeroplanes would be required to use a manufacturers inspection program, or a program approved by CASA.

**Note:** An aircraft that has been maintained under this Part could not be operated in air transport operations unless it has undergone an airworthiness review under Part 42 of CASR and otherwise complies with Part 42 requirements.

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<sup>1</sup> FAA Advisory Circular AC 43-210A explains how approved data is defined and what it includes.

## Purpose of this Summary

For readers who are not familiar with the FARs we have extracted below the relevant policy outcomes that will come into effect under the proposed changes.

This document sets out those outcomes in 6 main topic areas and will provide a clear explanation of the responsibilities that will apply under the proposed regulations to:

- a registered operator (RO) of an aircraft
- a person doing maintenance
- a pilot of an aircraft.

The 'grey shaded' dialogue boxes which appear throughout the document highlight significant matters that readers should consider when formulating a response to this consultation.

## Policy Topic 1 - Responsibilities of a registered operator

**Note:** ROs will be responsible for managing the airworthiness of their aircraft which includes everything described in Topic 1. This is not a new requirement, however, it has not been well understood under the CARs.

By default, LAMEs and maintenance organisations have assumed the role of managing the airworthiness and compliance of their customers' aircraft. Nothing in the new rules will prevent this practice from continuing but the obligations will always reside with the RO.

CASA will establish comprehensive industry education programs to assist ROs to understand their obligations under the proposed new regulations.

### General (FAR 91.403)

An RO would be:

- responsible for ensuring that:
  - the aircraft is maintained in an airworthy condition
  - the operational and emergency equipment necessary for an intended flight is serviceable
  - the certificate of airworthiness of the aircraft remains valid
- required to:
  - have maintenance carried out in accordance with proposed CASR Part 43
  - placard inoperative instruments or equipment that are not necessary for an intended flight
  - have aircraft inspected in accordance with an acceptable program
  - ensure compliance with applicable Part 39 ADs
  - report major defects to CASA
  - ensure that a certification authorising return-to-service after maintenance is made by an appropriately licensed person or an AMO.

### Inspections (FAR 91.409)

An RO would be **required** to ensure that:

- all aircraft have an annual inspection carried out or are inspected under a progressive inspection or an approved inspection program

- aircraft engaged in aerial work or flying training have both 100-hour and annual inspections or are inspected in accordance with an approved progressive inspection program
- aircraft have their altimeters, transponder and static pressure systems tested within the 24 months prior to a flight under IFR or in controlled airspace.

**Note:** A 100-hour inspection could be combined with an annual inspection.

**Under the proposed CASR Part; altimeter, transponder and pitot-static system tests could be performed by a B1 or B2 LAME.**

### Large aircraft and multi engine turbine powered aircraft

The RO of a large aeroplane or a multi-engine turbine powered aeroplane will be required to have the aircraft inspected in accordance with an inspection program approved by CASA under FAR 91.409 (e).

A helicopter may be inspected in accordance with Appendix D, however, the turbine engine is required to comply with the replacement times for life-limited parts specified in the aircraft specifications (AWLs), type data sheets, or other documents approved by the responsible NAA.

Additionally, for the helicopter, FAR 43.15 (b) requires the following systems to be inspected in addition to Appendix D. The inspections must be carried out in accordance with relevant maintenance manual or ICAs for the helicopter.

- (1) The drive shafts or similar systems.
- (2) The main rotor transmission gear box for obvious defects.
- (3) The main rotor and centre section (or the equivalent area).
- (4) The auxiliary rotor on helicopters.

### Aircraft maintenance (FAR 91.405)

An RO would be **required** to ensure that:

- mandatory maintenance requirements as specified in an airworthiness limitations section are complied with (see note below)
- components with a mandatory life limit are retired by their required retirement time noting that FAR 91.409(e) requires large aeroplanes, turbine powered multiengine airplanes, and turbine-powered rotorcraft to comply with replacement times for life-limited parts specified in the aircraft specifications, type data sheets, or other documents approved by the Administrator
- if an aircraft is powered by a turbine engine, the components are retired in accordance with the aircrafts airworthiness limitations as approved by the certifying NAA
- a component that has reached its mandatory retirement period is removed from service and dealt with in such a manner as to prevent it being inadvertently returned-to-service
- a component that has reached its mandatory retirement period is not fitted to an aircraft that is to be operated for a flight
- a life limited component that has reached its life limit is controlled to prevent inadvertent reinstallation in a type certificated aircraft. minor repairs or modifications are carried out

in accordance with acceptable data. CASA will provide guidance on what constitutes acceptable data – the policy will reflect that of the FAA

- major repairs or modifications are carried out in accordance with data approved under Part 21 of CASR.

### **An important note about mandatory maintenance**

Under the FARs, only the Administration may mandate or alter maintenance requirements for an aircraft.

Mandatory maintenance requirements in the form of CMRs or AWLs, are established during initial certification of an aircraft, and are identified in an aircraft's instructions for continuing airworthiness or Type Certificate Data Sheet (TCDS) as FAA approved limitations.

Once a Type Certificate (TC) has been issued, the TC holder may recommend changes to maintenance requirements, time limits or replacement intervals, but such changes do not have any legal compliance requirement unless:

- the FAA issues an AD to mandate the maintenance
- an operator has adopted a maintenance program based on the aircraft manufacturer's recommended maintenance program under FAR 91.409 (f) 3 or an operator's approved inspection program, as approved by the FAA under FAR 91.409 (f)(4).

The FAA may at any time approve amendment to the AWLs or CMRs for an aircraft type, but any such change is not retrospective. When a TC is amended, the amended requirements only apply to aircraft manufactured after the amendment date or from a specified serial number.

If the Administration determines that a changed maintenance requirement, time limit or replacement interval should apply to an earlier version of an aircraft, the change is mandated by way of an AD, or the administrator may notify the operator to make changes to the approved aircraft inspection program, if the program is found to be inadequate.

**This policy will be adopted unchanged for Australian maintenance regulations.**

### **Engine TBO – Piston engines**

Under the FARs, a manufacturers' recommended piston engine TBO is not mandatory unless it has been:

- a. described as an airworthiness limitation
- b. prescribed in a regulation
- c. included in an approved maintenance program under FAR 91.409 (f) or (g).

### **Engine TBO – Turbine engines**

Turbine engines aircraft are required to be inspected in accordance with manufacturers data unless otherwise approved under 91.409(f)4.

**Engine ADs will remain unchanged in the short term including AD/ENG/5**

### Aircraft operation and maintenance records (FAR 91.417)

An RO would be **required** to ensure that:

- the aircraft is not operated unless it is airworthy
- for the aircraft, a record of total flight time is kept up to date
- for each airframe, engine and adjustable propeller, a maintenance record is kept
- all maintenance is recorded in the maintenance records
- a certification is made in the maintenance records on completion of maintenance by the LAME who performed or supervised the maintenance
- if an aircraft is sold, maintenance records are handed over to the person who purchases the aircraft.

### Weight and balance

An RO would be **required** to ensure that the aircraft weight and balance details are kept up to date and that flight manual instructions for correct loading are amended as required after repairs or modifications ([FAR 91.9](#)) A B1 LAME would be able to perform aircraft weighing.

### Retention of records (FAR 91.417)

Records will be required to be kept in a manner reflecting FAR 91.417.

All records must be kept secure and intact.

Records of inspections must be kept until the next inspection is carried out. Records of component overhauls must be kept until the next overhaul. Records for aircraft, engines, propellers, rotors and life-limited components must be kept for at least 90 days after an aircraft, engine, propeller, rotor or life-limited component has been permanently withdrawn from service.

### Operation after maintenance (FAR 91.407)

An RO would be **required** to ensure that no person is allowed to operate an aircraft that has undergone maintenance or modification unless both:

- a maintenance record entry required by these proposed regulations has been made
- it has been certified by a person authorised to do so under this Part.

If the maintenance may have appreciably changed the flight characteristics or substantially affected its operation in flight, it is not flown with a person on board who is not a crew member until an appropriately rated pilot with at least a private pilot licence flies the aircraft, makes an operational check of the maintenance or alteration, and logs the flight in the aircraft records.

The aircraft does not have to be flown as required by this provision if, prior to flight, ground tests, inspection, or both show conclusively that the maintenance has not appreciably changed the flight characteristics or substantially affected the flight operation of the aircraft.

As an alternative to conducting a test flight, an independent inspection of a critical control system that has been disturbed during maintenance could be carried out and certified by a holder of any subcategory of B1 licence or a holder of a CASA issued pilot licence. This would

be a continuation of existing requirements. This would not relieve the RO of the requirement to have an operational check flight completed if other maintenance was involved that may have affected the operational characteristics of the aircraft.

## Policy Topic 2 - Responsibilities of a maintainer

### Inspections

A LAME may only carry out or supervise maintenance of an aircraft or aeronautical product including all aspects of electrical maintenance if he or she understands the current instructions of the manufacturer, and the maintenance manuals, for the specific operation concerned.

A maintainer who carries out an annual or a 100-hour inspection would be **required** to use a check list that meets the requirements set out in the associated MOS.

Appendix D of FAR 43 would be the template for an inspection checklist. The current CAR Schedule 5 would be an Acceptable Means of Compliance (AMC) if the inspections are carried out referring to appropriate data.

### Altimeter and ASI system tests

A maintainer carrying out a test of pitot/static pressure systems, altimeters and transponders would be **required** to carry out the tests in accordance with [Appendix E and F of FAR 43](#).

### Modifications

A maintainer who carries out a modification would be **required** to:

- carry out the modification ensuring compliance with the relevant approved data for a major modification or acceptable data for a minor modification as applicable
- enter details of the data used in the aircraft maintenance records. The details should provide sufficient information for another person to identify the actual data that was used for the work
- if a modification requires a change to the aircraft flight manual or additional altered maintenance practices, ensure that the RO is advised of the requirement.

Under the FARs, minor repairs and modifications do not require approved data.<sup>2</sup> A LAME may use any form of acceptable data to carry out a minor repair or modification subject to approval by the RO.

It should be noted that the FARs do not specify what is or is not acceptable data.

The FAA allows maximum flexibility in a person's choice of data for a minor repair or modification. If at any time, the FAA disagrees that data would have been acceptable, the burden of proof rests with the FAA, not the RO or maintainer (being mindful that this only applies to minor repairs or modifications).

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<sup>2</sup> FAA Advisory Circular AC 43-210A explains how approved data and acceptable data is defined.

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Major modifications and repairs are defined in [Appendix A of FAR Part 43](#). Anything not fitting the definitions are by default a minor repair or modification.

For the purpose of facilitating this policy, CASA has provided a draft list of acceptable data at [Appendix A](#) of this summary of proposed policy document. The list is neither exhaustive nor finalised. CASA will publish this list as guidance material to support the new regulations.

## Policy Topic 3 - Maintenance performance rules (FAR 43.13)

### General

A person performing maintenance would be required to use:

- methods, techniques and practices set out in appropriate maintenance instructions
- tools, equipment and test apparatus necessary to ensure that the work is completed in accordance with accepted industry practice
- carry out inspections and repairs in such a manner to ensure that the aircraft, engine, propeller, or aeronautical product being worked on will be at least equal to its originally certificated or properly modified condition.

### Type rated aircraft

If a type rated aircraft is being maintained under the new regulations, a B1 LAME who does not hold the relevant aircraft type rating may carry out maintenance of the aircraft provided that the maintenance task is common to non-type rated aircraft.

If a maintenance task is not common to a task performed on a non-type rated aircraft, the LAME will be required to have:

- been successfully trained in the task by an appropriately qualified person  
or
- satisfactorily performed the task under the supervision of another LAME who may certify for the task

**Note:** The burden of proof of compliance with these requirements rests with the LAME certifying the work. A LAME who does not hold a type rating and who certifies a maintenance task that is unique to a type rated aircraft, must be able to provide evidence on request to an RO or CASA that he or she has met one of the above requirements.

If an ICA requires the use of a particular tool or test equipment, the maintainer would be required to use that item or an alternative tool that ensures the equivalent airworthiness outcome.

A LAME with the appropriate licence will be able to overhaul an engine, but would not be permitted to certify that an engine has been overhauled unless:

- it has been disassembled, cleaned, inspected, repaired as necessary, and reassembled in accordance with the manufacturer's instructions
- it has been tested in accordance with approved standards and technical data, which have been developed and documented by the holder of the type certificate, supplemental type certificate, or a material, part, process, or appliance approval under Part 21 of CASR.

Similar provisions will apply to overhauling of aeronautical products (excluding propellers and Instruments).

Where a FAR provision refers to manufacturers current data, it does not automatically imply the most recent data. Current data means data that was relevant to the particular model of an aircraft at time of manufacture. Subsequent issues of a manufacturers relevant ICA may be used, however that is not mandated under FARs and will not be mandated under the new CASR Part.

FAA Special Airworthiness Information Bulletin HQ-16-14R1 refers:

[http://rgl.faa.gov/Regulatory\\_and\\_Guidance\\_Library/rgSAIB.nsf/0/F9398981C8D834658625830700588FF2?OpenDocument&Highlight=hq-16-14r1](http://rgl.faa.gov/Regulatory_and_Guidance_Library/rgSAIB.nsf/0/F9398981C8D834658625830700588FF2?OpenDocument&Highlight=hq-16-14r1)

If a RO is required under 91.409(e) to use a manufacturers inspection program, the version that is in force at the time of adoption remains the valid program for that aircraft. Subsequent amendments by a manufacturer do not apply retrospectively.

### Recording maintenance (FAR 43.9)

A person who carries out maintenance on an aircraft, engine or propeller, must make a record in the log book that states:

- the date of the maintenance
- aircraft, engine or propeller total time in service, as applicable
- what maintenance has been done including as applicable:
  - details of component changes
  - details of any life-limited component changes including part/serial no., as applicable
  - if a life-limited component is changed, details of when the replacement component will be required to be removed from service
  - if a modification is involved, details of the data used
- a statement that the aircraft is released to service
- the name of the person who is authorising the release to service
- the authorisation details of the person authorising release to service
- the signature of the person authorising the aircraft engine or propeller for release to service.

### Weld repairs

A LAME would be permitted to return an aircraft to service after weld repair work was carried out if the repair work is a minor repair or modification.

If the weld repair is a major repair or modification, the work could only be released to service by the holder of an IA.

### Additional rules for inspections (FAR 43.15)

#### Checklists

A checklist would be **required**, which meets the minimum standards set out in the Appendix D to FAR Part 43. This would be a shared obligation; the **RO would be required** to have a checklist for the aircraft that complies with the minimum standards and **the maintainer would be required** to ensure that he or she carries out an inspection using an appropriate checklist.

### **Type certificate compliance**

The IA carrying out or supervising the annual inspection would also be **required** to determine that the aircraft remains in compliance with its certification basis as properly modified.

### **Test running of engines after an inspection (FAR 43.15)**

#### **Reciprocating engines**

Before returning a piston engine powered aircraft to service after an annual or 100-hour inspection the person returning the aircraft to service would be **required** to run the aircraft engine or engines to determine satisfactory performance in accordance with the manufacturer's recommendations of:

- power output (static and idle r.p.m)
- magnetos
- fuel and oil pressure
- cylinder and oil temperature.

The FARs permit on-condition engine maintenance for piston engine powered GA aircraft.

CASA would publish recommended procedures for LAMEs carrying out a 100-hour or annual inspection on an engine. The recommendations would reflect the procedures set out in AD/ENG/4 and CASA Schedule 5.

#### **Turbine engines**

Before returning a turbine powered aircraft to service after an annual or 100-hour inspection, the person returning the aircraft to service would be **required** to run the aircraft engine or engines to determine that the engine is satisfactorily performing in accordance with the manufacturer's recommendations.

### **Policy Topic 4 - Who may perform or supervise maintenance and authorise a return to service (FAR 43.7)**

An aircraft may not be returned to service after maintenance, except in accordance with the requirements set out in this section.

The holder of at least a private pilot licence could perform maintenance that:

- is specified in paragraph (c) (preventive maintenance) in **Appendix A** of FAR Part 43 as preventive maintenance for the purpose
- is carried out on an aircraft that the pilot is authorised to fly as pilot in command
- the pilot has been authorised to carry out by the RO.

The holder of a B1 licence in the appropriate subcategory could perform or supervise maintenance of an aircraft, engine, propeller or component and return the aircraft or component to service after maintenance:

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- B1 licence holders may perform or supervise maintenance of mechanical, structural, electrical and avionics systems of all aircraft under this part
- A B1 licence holder would not be able to supervise maintenance or authorise return to service of:
  - propellers after major repairs or modifications
  - instruments after any repair or modification.

A B1 LAME would not be permitted to supervise maintenance or modification or authorise return to service after maintenance or modification, any type rated aircraft unless the maintenance is common to a non-type rated aircraft, or the LAME has either:

- been successfully trained in the task by an appropriately qualified person  
or
- satisfactorily performed the task under the supervision of another LAME who may certify for the task

A B1 licence holder who carries out a maintenance task on a component that is not a basic privilege of their licence, would also be required to meet one of the above requirements.

**Note:** The burden of proof of compliance with these requirements rests with the LAME certifying the work. A LAME who does not hold a type rating and who certifies a maintenance task on a type rated aircraft that is unique to that aircraft type, must be able to provide evidence on request to an RO or CASA that he or she has met one of the above requirements.

A B2 LAME would be permitted to return to service, an avionics component which is covered by the scope of the persons B2 licence, regardless of whether the component is intended for use on a type rated aircraft.

If an avionics component is not covered by the B2 licence, the LAME may return the component to service if the LAME has:

- been successfully trained in the maintenance by an appropriately qualified person  
or
- satisfactorily performed the maintenance under the supervision of another LAME who may certify for the task

**Note:** A B2 lame who authorises return to service an avionics component that is not covered by the scope of their licence, must be able to provide evidence on request to an RO, CASA or a B1 LAME who is installing the equipment, that they have complied with one of the above requirements.

### **Return to service after a scheduled inspection**

A LAME may return an aircraft to service after a 100-hour inspection.

A LAME must hold an IA to return an aircraft to service after an annual inspection. An IA holder would be permitted to return an aircraft to service after performing or supervising the performance of an annual inspection.

If an LAME including an IA holder has an exclusion E12 (Propellers) attached to their AME licence, they would not be permitted to certify for completion of 100-hour or annual inspections of an aircraft equipped with one or more propellers unless the LAME has either:

- successfully completed an examination in the relevant module of the Part 66 licence syllabus
- carried out an inspection of the excluded system(s) to the satisfaction of a person who is qualified to perform the inspection
- or
- satisfactorily carried out an annual inspection of the kind of aircraft under the supervision of an IA holder who is qualified to perform the inspection.

A person who completes CASA examination GC (propellers) will be deemed to have met these requirements.

### **Return to service after major repair or modification (FAR 65.95)**

An aircraft could only be returned to service after major modifications and repairs by a holder of an IA.

### **Repairs and modifications to propellers**

Major repairs and modifications to propellers could only be supervised and returned to service by an AMO.

### **Repairs and modifications to aircraft instruments**

Repairs and modifications to instruments could only be carried out under the control of an AMO.

## **Policy Topic 5 - Inspection Authorisation (FAR 65.91)**

The IA would be a new kind of authorisation held by an individual.

The IA structure as in the USA (and New Zealand) is well established and a fundamental part of the regulatory system.

An applicant for an IA would be required to:

- hold a subcategory of B1 licence which does not have an engine exclusion. The licence subcategory must be valid for the scope of the IA application and have been in effect for a total of at least 3 years
- have been actively engaged in exercising the privileges of their licence for at least the 2-year period before the date of application
- have a fixed base of operations at which they may be located in person or by telephone during a normal working week, but it need not be the place where they will exercise the inspection authority
- have available to them the equipment, facilities, and inspection data necessary to properly inspect airframes, powerplants, propellers, or any related part or appliance
- pass a written test on their ability to inspect according to safety standards for returning aircraft to service after major repairs and major alterations and annual and progressive inspections performed under Part 43.

## Duration

An inspection authorisation would be issued for a period of 2 years. However, the holders may exercise the privileges of that authorisation only while they hold a current, valid AMEL.

An inspection authorisation would cease to be effective whenever any of the following occurs:

- The authorisation is surrendered, suspended, or revoked.
- The holder no longer has a fixed base of operation.
- The holder no longer has the equipment, facilities, and inspection data required by FAR 65.91(c) (3) and (4) for issuance of his authorisation.

## Renewal

To be eligible for renewal of an inspection authorisation an applicant would be required to present evidence that the applicant still meets the requirements (1) through (4) of the eligibility criteria. In addition, during the time the applicant held the inspection authorisation, the applicant must show completion of one of the activities in 65.93(a) (1) through (5) below during first year of the 2-year inspection authorisation period, and completion of one of the five activities during the second year of the 2-year period:

(1) Performed at least one annual inspection for each 90 days that the applicant held the current authority; or

(2) Performed at least two major repairs or major alterations for each 90 days that the applicant held the current authority; or

(3) Performed or supervised and approved at least one progressive inspection in accordance with standards prescribed by the Administrator; or

(4) Attended and successfully completed a refresher course, acceptable to CASA, of not less than 8 hours of instruction; or

(5) Passed an oral or written test to determine that the applicant's knowledge of applicable regulations and standards is current.

An inspection authorisation holder who does not complete one of (1) through (5) by the end of first year of the 2-year inspection authorisation period would not be able exercise inspection authorisation privileges after the end of the first year. The inspection authorisation holder would be able to resume exercising inspection authorisation privileges after passing a written test to determine that the applicant's knowledge of the applicable regulations and standards is current. An inspection authorisation holder who passes the written test would be deemed to have completed the requirements of the first year.

In addition to the privileges of the AME licence, an IA holder would also be authorised to:

- return an aircraft to service after an annual inspection, a major repair or a major modification
- supervise a progressive inspection schedule.

## Policy Topic 6 - Manual of Standards – additional detail

A Manual of Standards (MOS) would need to set out the following:

### Inspection checklist

A template will be provided that will be based on ([Appendix D of FAR 43](#)), will include helicopters and provide for a progressive inspection.

### Maintenance by a pilot

A list of maintenance tasks that may be performed by a pilot would be based on the preventive maintenance list ([Appendix A of FAR 43](#)).

A supplementary list will describe additional tasks that pilots may carry out on non-private (currently aerial work and flying training) aircraft subject to appropriate training and authorisation by the RO.

### Measuring equipment

A list of acceptable standards against which measuring equipment may be tested to verify accuracy:

- manufacturer's instructions are acceptable standards
- other acceptable standards will be described in guidance material.

No prescription will be made as to who may do the checking or the frequency of the checking, that will be left to the discretion of the maintainer acting within the bounds of the relevant standard.

### Use of aeronautical products in maintenance

- a. CASA Form 1 or other authorised release certificates will not be a mandatory requirement for the GA sector.

Under the FARs, a mechanic can assess an aircraft component, repair as necessary and release it to service.

- b. The regulations will place responsibility on the RO to ensure that any replacement component is suitable for use on the aircraft.

The regulations would allow a maintainer to install a component supplied by an RO if the maintainer is satisfied that use of the component would not create an unsafe condition.

### Experimental Aircraft

CASA will exclude experimental aircraft from the requirements relating to compliance with certification basis.

The type of maintenance program for an experimental aircraft will be specified in the conditions attached to the experimental certificate.

An owner-builder who has constructed more than half of an aircraft (a qualified owner-builder) will be permitted to maintain the aircraft and release it to service after repairs, modifications and annual condition inspections.

A qualified owner-builder will be permitted to carry out maintenance for other aircraft owners provided that the aircraft is an amateur-built aircraft and is essentially similar to an aircraft that the qualified owner-builder has previously constructed.

An owner of an amateur-built aircraft who is not a qualified owner-builder will be permitted to exercise the same privileges as a qualified owner-builder if he or she has completed a skills-based course of training acceptable to CASA that covers the maintenance to be carried out.

Owner-builders who have manufactured a propeller may maintain the propeller.

Owner-builders who have manufactured, assembled or overhauled an engine for their aircraft may maintain the engine. Other owner-builders may maintain their engine if they have completed a course of training for the maintenance that is acceptable to CASA.

Qualified owner-builders may maintain instrument systems but may not repair instruments that are flight instruments or navigation instruments required for operations in controlled airspace or under IFR.

### **Repairman Certificates Light Sport Aircraft and amateur-built aircraft**

A person who has completed a condition inspection course of training that is acceptable to CASA on a particular class of amateur-built experimental aircraft or experimental light sport aeroplane may be issued with a Repairman (Inspection) Certificate by the training provider.

A holder of a Repairman (Inspection) Certificate may perform the annual condition inspection on:

- A light sport aeroplane:
  - That is owned by the holder
  - That has been issued an experimental certificate for operating a light-sport aircraft under paragraph 21.191(J) of CASR
  - That is in the same class of light-sport-aircraft for which the holder has completed the training
- An amateur-built aircraft:
  - That is owned by the holder
  - That has been issued an experimental certificate for operating an amateur-built aircraft under paragraph 21.191(g) of CASR
  - That is in the same class of amateur-built aircraft for which the holder has completed the training.

A person who has completed a maintenance course of maintenance training that is acceptable to CASA may be issued with a Repairman (Maintenance) Certificate by the training provider:

A holder of a Repairman (Maintenance) Certificate may:

- Approve and return to service an aircraft that has been issued a special airworthiness certificate under
  - Regulation 21.186 of CASR (Light Sport Aircraft)

- Regulation 21.195 of CASR for the purpose of paragraphs 21.191 (g) (amateur-built aircraft) , (h)(kit-built aircraft, (j) & (k) (Light Sport aircraft)

or any part thereof, after performing or inspecting maintenance (to include the annual condition inspection and 100-hour inspection if applicable), preventive maintenance, or an alteration (excluding a major repair or a major alteration on a product produced under a Part 21 approval)

- Only perform maintenance, preventive maintenance, and an alteration on an aircraft that is in the same class of aircraft for which the holder has completed the training. Before performing a major repair, the holder must complete additional training acceptable to CASA and appropriate to the repair performed.

The holder of a Repairman (Maintenance) Certificate may not approve for return to service any aircraft or part thereof unless that person has previously performed the work concerned satisfactorily. If that person has not previously performed that work, the person may show the ability to do the work by performing it to the satisfaction of CASA, or by performing it under the direct supervision of a LAME or a holder of a Repairman (Maintenance) certificate, who has had previous experience in the specific operation concerned. The repairman may not exercise the privileges of the certificate unless the repairman understands the current instructions of the manufacturer (if applicable) and the maintenance manuals for the specific operation concerned.

## Project background

This project is a key element of CASA's regulatory reform program. The objective is to create a better set of maintenance regulations for the GA and aerial work sectors, with clear requirements that are proportionate for those sectors, reducing costs for industry where possible, and maintaining the high safety standard of aviation in Australia.

## Previous consultations

CASA launched a survey on 9 August 2018 in which industry participants were asked to identify issues with the existing maintenance regulations and provide suggested remedies. CASA also asked respondents to consider the maintenance regulations in use in the USA, Europe, New Zealand and Canada, and identify possible benefits or limitations of each structure. The survey received 76 industry responses. Of those respondents who indicated a preference for one of the international rule sets, 78% preferred the FARs and 11% preferred the NZ CARs. In most cases, those who preferred the NZ CARs indicated the FARs as their second choice.

## The Aviation Safety Advisory Panel

The ASAP has been established to provide the CASA Chief Executive Officer (CEO) and Director of Aviation Safety (DAS) with informed, objective high-level advice from the aviation community on current, emerging and potential issues that have, or may have, significant implications for aviation safety and the way CASA performs its functions. Under the ASAP Terms of Reference, a Technical Working Group (TWG) was appointed by the ASAP to provide specific advice for the GA maintenance regulations project. The TWG met on 26 and 27 September 2018 to review the survey results and the proposed policies for the new GA maintenance regulations. The TWG supported the policy conclusions and the members agree

that CASAs interpretation of the industry preference for the FARs is accurate. As a result of these considerations and outcomes, CASA proposes to base the new regulatory structure for CASR Part 43 on the FARs.

## **Impact on industry**

CASA estimates that compliance costs for existing maintenance providers will be substantially reduced by removal of the obligation to (1) conduct internal audits and (2) obtain CASA approval to expand or change the range of maintenance services that they provide.

For new maintenance providers, set-up costs will be considerably reduced by the removal of the CASA entry control requirements which can add as much as \$25,000 to start-up costs.

Operators will benefit from the more widely available maintenance service providers which these rules will facilitate, and the lower overall operating costs for maintainers.

## **Safety risk analysis**

The proposed rules are based on the FARs under which GA safety standards in the United States is equal to, or marginally higher than, Australian standards. CASA expects the changes to either maintain or raise existing levels of safety.

## **Regulation impact statement**

The Office of Best Practice Regulation (OBPR) has not yet assessed the proposed amendments, however, CASA has set a target of no overall cost increases to the GA industry.

## **Closing date for comment**

CASA will consider all comments received as part of this consultation process and incorporate changes as appropriate. Comments on the proposed new maintenance regulations should be submitted through the online response form by close of business 31 January 2019.

## **Appendix A**

### **Acceptable data**

## A.1 Acceptable data

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- Type certificate data sheets.
- Foreign type certificate data sheets used for the issue of a type acceptance certificate.
- Type design data for type certificated products e.g. approved drawings issued by the type certificate holder.
- Design change data that support a design change approved under Part 21.
- Data approved by a form 337.
- Data provided by CASA or a recognised authority in an advisory circular or other advisory document.
- Airworthiness directives that give specific instructions for modification or repair.
- Supplemental type certificates or approvals issued by CASA or a recognised foreign NAA.
- Data giving specific instructions for modification or repair contained in a maintenance manual, repair manual, overhaul manual, continuing airworthiness document, service bulletin, or an equivalent provided by the manufacturer of the product for which it is to be used and which is listed in the type certificate or by reference in the type acceptance certificate i.e. data that has been approved for use by the type certificate holder.

**Note:** This includes data provided by the manufacturer of a component of a product where that component is a part of the approved type design of the product.

- Data included in, and specific to the category of, an airworthiness certificate.

## **Appendix B**

### **Relevant FAR extracts**

## B.1 Relevant FAR extracts

### FAR Part 65

#### 65.81 General privileges and limitations.

- (a) A certificated mechanic may perform or supervise the maintenance, preventive maintenance or alteration of an aircraft or appliance, or a part thereof, for which he is rated (but excluding major repairs to, and major alterations of, propellers, and any repair to, or alteration of, instruments), and may perform additional duties in accordance with 65.85, 65.87, and 65.95. However, he may not supervise the maintenance, preventive maintenance, or alteration of, or approve and return to service, any aircraft or appliance, or part thereof, for which he is rated unless he has satisfactorily performed the work concerned at an earlier date. If he has not so performed that work at an earlier date, he may show his ability to do it by performing it to the satisfaction of the Administrator or under the direct supervision of a certificated and appropriately rated mechanic, or a certificated repairman, who has had previous experience in the specific operation concerned.
- (b) A certificated mechanic may not exercise the privileges of his certificate and rating unless he understands the current instructions of the manufacturer, and the maintenance manuals, for the specific operation concerned.

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#### 65.85 Airframe rating; additional privileges.

- (a) Except as provided in paragraph (b) of this section, a certificated mechanic with an airframe rating may approve and return to service an airframe, or any related part or appliance, after he has performed, supervised, or inspected its maintenance or alteration (excluding major repairs and major alterations). In addition, he may perform the 100-hour inspection required by part 91 of this chapter on an airframe, or any related part or appliance, and approve and return it to service.
- (b) A certificated mechanic with an airframe rating can approve and return to service an airframe, or any related part or appliance, of an aircraft with a special airworthiness certificate in the light-sport category after performing and inspecting a major repair or major alteration for products that are not produced under an FAA approval provided the work was performed in accordance with instructions developed by the manufacturer or a person acceptable to the FAA.

#### 65.87 Powerplant rating; additional privileges.

- (a) Except as provided in paragraph (b) of this section, a certificated mechanic with a powerplant rating may approve and return to service a powerplant or propeller or any related part or appliance, after he has performed, supervised, or inspected its maintenance or alteration (excluding major repairs and major alterations). In addition, he may perform the 100-hour inspection required by part 91 of this chapter on a powerplant or propeller, or any part thereof, and approve and return it to service.
- (b) A certificated mechanic with a powerplant rating can approve and return to service a powerplant or propeller, or any related part or appliance, of an aircraft with a special airworthiness certificate in the light-sport category after performing and inspecting a major repair or major alteration for products that are not produced under an FAA approval, provided the work was performed in accordance with instructions developed by the manufacturer or a person acceptable to the FAA.

**65.91 Inspection authorization.**

- (a) An application for an inspection authorization is made on a form and in a manner prescribed by the Administrator.
- (b) An applicant who meets the requirements of this section is entitled to an inspection authorization.
- (c) To be eligible for an inspection authorization, an applicant must—  
Hold a currently effective mechanic certificate with both an airframe rating and a powerplant rating, each of which is currently effective and has been in effect for a total of at least 3 years;
- (d) Have been actively engaged, for at least the 2-year period before the date he applies, in maintaining aircraft certificated and maintained in accordance with this chapter;  
Have a fixed base of operations at which he may be located in person or by telephone during a normal working week but it need not be the place where he will exercise his inspection authority;
- (e) Have available to him the equipment, facilities, and inspection data necessary to properly inspect airframes, powerplants, propellers, or any related part or appliance;  
and
- (f) Pass a written test on his ability to inspect according to safety standards for returning aircraft to service after major repairs and major alterations and annual and progressive inspections performed under part 43 of this chapter.

An applicant who fails the test prescribed in paragraph (c)(5) of this section may not apply for retesting until at least 90 days after the date he failed the test.

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**65.92 Inspection authorization: Duration.**

- (a) Each inspection authorization expires on March 31 of each odd-numbered year. However, the holder may exercise the privileges of that authorization only while he holds a currently effective mechanic certificate with both a currently effective airframe rating and a currently effective powerplant rating.
- (b) An inspection authorization ceases to be effective whenever any of the following occurs:
  - (1) The authorization is surrendered, suspended, or revoked.
  - (2) The holder no longer has a fixed base of operation.
  - (3) The holder no longer has the equipment, facilities, and inspection data required by §65.91(c) (3) and (4) for issuance of his authorization.
- (c) The holder of an inspection authorization that is suspended or revoked shall, upon the Administrator's request, return it to the Administrator.

**65.93 Inspection authorization: Renewal.**

- (a) To be eligible for renewal of an inspection authorization for a 2-year period an applicant must present evidence during the month of March of each odd-numbered year, at the responsible Flight Standards office, that the applicant still meets the requirements of §65.91(c) (1) through (4). In addition, during the time the applicant held the inspection authorization, the applicant must show completion of one of the activities in §65.93(a) (1) through (5) below by March 31 of the first year of the 2-year inspection authorization period, and completion of one of the five activities during the second year of the 2-year period:
  - (1) Performed at least one annual inspection for each 90 days that the applicant held the current authority; or
  - (2) Performed at least two major repairs or major alterations for each 90 days that the applicant held the current authority; or

- (4) Performed or supervised and approved at least one progressive inspection in accordance with standards prescribed by the Administrator; or
  - (5) Attended and successfully completed a refresher course, acceptable to the Administrator, of not less than 8 hours of instruction; or
  - (6) Passed an oral test by an FAA inspector to determine that the applicant's knowledge of applicable regulations and standards is current.
- (b) The holder of an inspection authorization that has been in effect:
- (1) for less than 90 days before the expiration date need not comply with paragraphs (a)(1) through (5) of this section.
  - (2) for less than 90 days before March 31 of an even-numbered year need not comply with paragraphs (a)(1) through (5) of this section for the first year of the 2-year inspection authorization period.
- (c) An inspection authorization holder who does not complete one of the activities set forth in §65.93(a) (1) through (5) of this section by March 31 of the first year of the 2-year inspection authorization period may not exercise inspection authorization privileges after March 31 of the first year. The inspection authorization holder may resume exercising inspection authorization privileges after passing an oral test from an FAA inspector to determine that the applicant's knowledge of the applicable regulations and standards is current. An inspection authorization holder who passes this oral test is deemed to have completed the requirements of §65.93(a) (1) through (5) by March 31 of the first year.

**65.95 Inspection authorization: Privileges and limitations.**

- (a) The holder of an inspection authorization may—
- (1) Inspect and approve for return to service any aircraft or related part or appliance (except any aircraft maintained in accordance with a continuous airworthiness program under part 121 of this chapter) after a major repair or major alteration to it in accordance with part 43 [New] of this chapter, if the work was done in accordance with technical data approved by the Administrator; and
  - (2) Perform an annual or perform or supervise a progressive inspection according to §§43.13 and 43.15 of this chapter.
- (b) When he exercises the privileges of an inspection authorization the holder shall keep it available for inspection by the aircraft owner, the mechanic submitting the aircraft, repair, or alteration for approval (if any), and shall present it upon the request of the Administrator or an authorized representative of the National Transportation Safety Board, or of any Federal, State, or local law enforcement officer.
- (c) If the holder of an inspection authorization changes his fixed base of operation, he may not exercise the privileges of the authorization until he has notified the responsible Flight Standards office or International Field Office for the area in which the new base is located, in writing, of the change.

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**65.104 Repairman certificate—experimental aircraft builder—Eligibility, privileges and limitations.**

- (a) To be eligible for a repairman certificate (experimental aircraft builder), an individual must—
- (1) Be at least 18 years of age;
  - (2) Be the primary builder of the aircraft to which the privileges of the certificate are applicable;
  - (3) Show to the satisfaction of the Administrator that the individual has the requisite skill to determine whether the aircraft is in a condition for safe operations; and

- (4) Be a citizen of the United States or an individual citizen of a foreign country who has lawfully been admitted for permanent residence in the United States.
- (b) The holder of a repairman certificate (experimental aircraft builder) may perform condition inspections on the aircraft constructed by the holder in accordance with the operating limitations of that aircraft.
- (c) Section 65.103 does not apply to the holder of a repairman certificate (experimental aircraft builder) while performing under that certificate.

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## **FAR Part 91**

### **91.9 Civil aircraft flight manual, marking, and placard requirements.**

- (a) Except as provided in paragraph (d) of this section, no person may operate a civil aircraft without complying with the operating limitations specified in the approved Airplane or Rotorcraft Flight Manual, markings, and placards, or as otherwise prescribed by the certificating authority of the country of registry.
- (b) No person may operate a U.S.-registered civil aircraft -
  - (1) For which an Airplane or Rotorcraft Flight Manual is required by § 21.5 of this chapter unless there is available in the aircraft a current, approved Airplane or Rotorcraft Flight Manual or the manual provided for in § 121.141(b); and
  - (2) For which an Airplane or Rotorcraft Flight Manual is not required by § 21.5 of this chapter, unless there is available in the aircraft a current approved Airplane or Rotorcraft Flight Manual, approved manual material, markings, and placards, or any combination thereof.
- (c) No person may operate a U.S.-registered civil aircraft unless that aircraft is identified in accordance with part 45 of this chapter.
- (d) Any person taking off or landing a helicopter certificated under part 29 of this chapter at a heliport constructed over water may make such momentary flight as is necessary for takeoff or landing through the prohibited range of the limiting height-speed envelope established for the helicopter if that flight through the prohibited range takes place over water on which a safe ditching can be accomplished and if the helicopter is amphibious or is equipped with floats or other emergency flotation gear adequate to accomplish a safe emergency ditching on open water.

### **91.401 Applicability.**

- (a) This subpart prescribes rules governing the maintenance, preventive maintenance, and alterations of U.S.-registered civil aircraft operating within or outside of the United States.
- (b) Sections 91.405, 91.409, 91.411, 91.417, and 91.419 of this subpart do not apply to an aircraft maintained in accordance with a continuous airworthiness maintenance program as provided in part 121, 129, or §§91.1411 or 135.411(a)(2) of this chapter.
- (c) Sections 91.405 and 91.409 of this part do not apply to an airplane inspected in accordance with part 125 of this chapter.

### **91.403 General.**

- (a) The owner or operator of an aircraft is primarily responsible for maintaining that aircraft in an airworthy condition, including compliance with part 39 of this chapter.

- (b) No person may perform maintenance, preventive maintenance, or alterations on an aircraft other than as prescribed in this subpart and other applicable regulations, including part 43 of this chapter.
- (c) No person may operate an aircraft for which a manufacturer's maintenance manual or instructions for continued airworthiness has been issued that contains an airworthiness limitations section unless the mandatory replacement times, inspection intervals, and related procedures specified in that section or alternative inspection intervals and related procedures set forth in an operations specification approved by the Administrator under part 121 or 135 of this chapter or in accordance with an inspection program approved under §91.409(e) have been complied with.
- (d) A person must not alter an aircraft based on a supplemental type certificate unless the owner or operator of the aircraft is the holder of the supplemental type certificate, or has written permission from the holder.

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**91.405 Maintenance required.**

Each owner or operator of an aircraft—

- (a) Shall have that aircraft inspected as prescribed in subpart E of this part and shall between required inspections, except as provided in paragraph (c) of this section, have discrepancies repaired as prescribed in part 43 of this chapter;
- (b) Shall ensure that maintenance personnel make appropriate entries in the aircraft maintenance records indicating the aircraft has been approved for return to service;
- (c) Shall have any inoperative instrument or item of equipment, permitted to be inoperative by §91.213(d)(2) of this part, repaired, replaced, removed, or inspected at the next required inspection; and
- (d) When listed discrepancies include inoperative instruments or equipment, shall ensure that a placard has been installed as required by §43.11 of this chapter.

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**91.407 Operation after maintenance, preventive maintenance, rebuilding, or alteration.**

- (a) No person may operate any aircraft that has undergone maintenance, preventive maintenance, rebuilding, or alteration unless—
  - (1) It has been approved for return to service by a person authorized under §43.7 of this chapter; and
  - (2) The maintenance record entry required by §43.9 or §43.11, as applicable, of this chapter has been made.
- (b) No person may carry any person (other than crewmembers) in an aircraft that has been maintained, rebuilt, or altered in a manner that may have appreciably changed its flight characteristics or substantially affected its operation in flight until an appropriately rated pilot with at least a private pilot certificate flies the aircraft, makes an operational check of the maintenance performed or alteration made, and logs the flight in the aircraft records.
- (c) The aircraft does not have to be flown as required by paragraph (b) of this section if, prior to flight, ground tests, inspection, or both show conclusively that the maintenance, preventive maintenance, rebuilding, or alteration has not appreciably changed the flight characteristics or substantially affected the flight operation of the aircraft.

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**91.409 Inspections.**

- (a) Except as provided in paragraph (c) of this section, no person may operate an aircraft unless, within the preceding 12 calendar months, it has had—
- (1) An annual inspection in accordance with part 43 of this chapter and has been approved for return to service by a person authorized by §43.7 of this chapter; or
  - (2) An inspection for the issuance of an airworthiness certificate in accordance with part 21 of this chapter.

No inspection performed under paragraph (b) of this section may be substituted for any inspection required by this paragraph unless it is performed by a person authorized to perform annual inspections and is entered as an “annual” inspection in the required maintenance records.

- (b) Except as provided in paragraph (c) of this section, no person may operate an aircraft carrying any person (other than a crewmember) for hire, and no person may give flight instruction for hire in an aircraft which that person provides, unless within the preceding 100 hours of time in service the aircraft has received an annual or 100-hour inspection and been approved for return to service in accordance with part 43 of this chapter or has received an inspection for the issuance of an airworthiness certificate in accordance with part 21 of this chapter. The 100-hour limitation may be exceeded by not more than 10 hours while en route to reach a place where the inspection can be done. The excess time used to reach a place where the inspection can be done must be included in computing the next 100 hours of time in service.

- (c) Paragraphs (a) and (b) of this section do not apply to—

- (1) An aircraft that carries a special flight permit, a current experimental certificate, or a light-sport or provisional airworthiness certificate;
- (2) An aircraft inspected in accordance with an approved aircraft inspection program under part 125 or 135 of this chapter and so identified by the registration number in the operations specifications of the certificate holder having the approved inspection program;
- (3) An aircraft subject to the requirements of paragraph (d) or (e) of this section; or
- (4) Turbine-powered rotorcraft when the operator elects to inspect that rotorcraft in accordance with paragraph (e) of this section.

- (d) *Progressive inspection.* Each registered owner or operator of an aircraft desiring to use a progressive inspection program must submit a written request to the responsible Flight Standards office, and shall provide—

- (1) A certificated mechanic holding an inspection authorization, a certificated airframe repair station, or the manufacturer of the aircraft to supervise or conduct the progressive inspection;
- (2) A current inspection procedures manual available and readily understandable to pilot and maintenance personnel containing, in detail—
  - (i) An explanation of the progressive inspection, including the continuity of inspection responsibility, the making of reports, and the keeping of records and technical reference material;
  - (ii) An inspection schedule, specifying the intervals in hours or days when routine and detailed inspections will be performed and including instructions for exceeding an inspection interval by not more than 10 hours

- while en route and for changing an inspection interval because of service experience;
- (iii) Sample routine and detailed inspection forms and instructions for their use; and
- (iv) Sample reports and records and instructions for their use;
- (v) Enough housing and equipment for necessary disassembly and proper inspection of the aircraft; and
- (vi) Appropriate current technical information for the aircraft.

The frequency and detail of the progressive inspection shall provide for the complete inspection of the aircraft within each 12 calendar months and be consistent with the manufacturer's recommendations, field service experience, and the kind of operation in which the aircraft is engaged. The progressive inspection schedule must ensure that the aircraft, at all times, will be airworthy and will conform to all applicable FAA aircraft specifications, type certificate data sheets, airworthiness directives, and other approved data. If the progressive inspection is discontinued, the owner or operator shall immediately notify the responsible Flight Standards office, in writing, of the discontinuance. After the discontinuance, the first annual inspection under §91.409(a)(1) is due within 12 calendar months after the last complete inspection of the aircraft under the progressive inspection. The 100-hour inspection under §91.409(b) is due within 100 hours after that complete inspection. A complete inspection of the aircraft, for the purpose of determining when the annual and 100-hour inspections are due, requires a detailed inspection of the aircraft and all its components in accordance with the progressive inspection. A routine inspection of the aircraft and a detailed inspection of several components is not considered to be a complete inspection.

- (e) *Large airplanes (to which part 125 is not applicable), turbojet multiengine airplanes, turbopropeller-powered multiengine airplanes, and turbine-powered rotorcraft.* No person may operate a large airplane, turbojet multiengine airplane, turbopropeller-powered multiengine airplane, or turbine-powered rotorcraft unless the replacement times for life-limited parts specified in the aircraft specifications, type data sheets, or other documents approved by the Administrator are complied with and the airplane or turbine-powered rotorcraft, including the airframe, engines, propellers, rotors, appliances, survival equipment, and emergency equipment, is inspected in accordance with an inspection program selected under the provisions of paragraph (f) of this section, except that, the owner or operator of a turbine-powered rotorcraft may elect to use the inspection provisions of §91.409(a), (b), (c), or (d) in lieu of an inspection option of §91.409(f).
- (f) *Selection of inspection program under paragraph (e) of this section.* The registered owner or operator of each airplane or turbine-powered rotorcraft described in paragraph (e) of this section must select, identify in the aircraft maintenance records, and use one of the following programs for the inspection of the aircraft:
  - (1) A continuous airworthiness inspection program that is part of a continuous airworthiness maintenance program currently in use by a person holding an air carrier operating certificate or an operating certificate issued under part 121 or 135 of this chapter and operating that make and model aircraft under part 121 of this chapter or operating that make and model under part 135 of this chapter and maintaining it under §135.411(a)(2) of this chapter.
  - (2) An approved aircraft inspection program approved under §135.419 of this chapter and currently in use by a person holding an operating certificate issued under part 135 of this chapter.
  - (3) A current inspection program recommended by the manufacturer.
  - (4) Any other inspection program established by the registered owner or operator of that airplane or turbine-powered rotorcraft and approved by the Administrator under paragraph (g) of this section. However, the Administrator may require revision of this inspection program in accordance with the provisions of §91.415.

Each operator shall include in the selected program the name and address of the person responsible for scheduling the inspections required by the program and make a copy of that program available to the person performing inspections on the aircraft and, upon request, to the Administrator.

- (g) *Inspection program approved under paragraph (e) of this section.* Each operator of an airplane or turbine-powered rotorcraft desiring to establish or change an approved inspection program under paragraph (f)(4) of this section must submit the program for approval to the responsible Flight Standards office. The program must be in writing and include at least the following information:
- (1) Instructions and procedures for the conduct of inspections for the particular make and model airplane or turbine-powered rotorcraft, including necessary tests and checks. The instructions and procedures must set forth in detail the parts and areas of the airframe, engines, propellers, rotors, and appliances, including survival and emergency equipment required to be inspected.
  - (2) A schedule for performing the inspections that must be performed under the program expressed in terms of the time in service, calendar time, number of system operations, or any combination of these.
- (h) *Changes from one inspection program to another.* When an operator changes from one inspection program under paragraph (f) of this section to another, the time in service, calendar times, or cycles of operation accumulated under the previous program must be applied in determining inspection due times under the new program.

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**91.411 Altimeter system and altitude reporting equipment tests and inspections.**

- (a) No person may operate an airplane, or helicopter, in controlled airspace under IFR unless—
- (1) Within the preceding 24 calendar months, each static pressure system, each altimeter instrument, and each automatic pressure altitude reporting system has been tested and inspected and found to comply with appendices E and F of part 43 of this chapter;
  - (2) Except for the use of system drain and alternate static pressure valves, following any opening and closing of the static pressure system, that system has been tested and inspected and found to comply with paragraph (a), appendix E, of part 43 of this chapter; and
  - (3) Following installation or maintenance on the automatic pressure altitude reporting system of the ATC transponder where data correspondence error could be introduced, the integrated system has been tested, inspected, and found to comply with paragraph (c), appendix E, of part 43 of this chapter.
- (b) The tests required by paragraph (a) of this section must be conducted by—
- (1) The manufacturer of the airplane, or helicopter, on which the tests and inspections are to be performed;
  - (2) A certificated repair station properly equipped to perform those functions and holding—
    - (i) An instrument rating, Class I;

- (ii) A limited instrument rating appropriate to the make and model of appliance to be tested;
  - (iii) A limited rating appropriate to the test to be performed;
  - (iv) An airframe rating appropriate to the airplane, or helicopter, to be tested; or
- (3) A certificated mechanic with an airframe rating (static pressure system tests and inspections only).
- (c) Altimeter and altitude reporting equipment approved under Technical Standard Orders are considered to be tested and inspected as of the date of their manufacture.
- (d) No person may operate an airplane, or helicopter, in controlled airspace under IFR at an altitude above the maximum altitude at which all altimeters and the automatic altitude reporting system of that airplane, or helicopter, have been tested.

**91.413 ATC transponder tests and inspections.**

- (a) No persons may use an ATC transponder that is specified in 91.215(a), 121.345(c), or §135.143(c) of this chapter unless, within the preceding 24 calendar months, the ATC transponder has been tested and inspected and found to comply with appendix F of part 43 of this chapter; and
- (b) Following any installation or maintenance on an ATC transponder where data correspondence error could be introduced, the integrated system has been tested, inspected, and found to comply with paragraph (c), appendix E, of part 43 of this chapter.
- (c) The tests and inspections specified in this section must be conducted by—
- (1) A certificated repair station properly equipped to perform those functions and holding—
    - (i) A radio rating, Class III;
    - (ii) A limited radio rating appropriate to the make and model transponder to be tested;
    - (iii) A limited rating appropriate to the test to be performed;
  - (2) A holder of a continuous airworthiness maintenance program as provided in part 121 or §135.411(a)(2) of this chapter; or
  - (3) The manufacturer of the aircraft on which the transponder to be tested is installed, if the transponder was installed by that manufacturer.

**91.415 Changes to aircraft inspection programs.**

- (a) Whenever the Administrator finds that revisions to an approved aircraft inspection program under §91.409(f)(4) or §91.1109 are necessary for the continued adequacy of the program, the owner or operator must, after notification by the Administrator, make any changes in the program found to be necessary by the Administrator.
- (b) The owner or operator may petition the Administrator to reconsider the notice to make any changes in a program in accordance with paragraph (a) of this section.
- (c) The petition must be filed with the Executive Director, Flight Standards Service within 30 days after the certificate holder or fractional ownership program manager receives the notice.
- (d) Except in the case of an emergency requiring immediate action in the interest of safety, the filing of the petition stays the notice pending a decision by the Administrator.

**91.417 Maintenance records.**

- (a) Except for work performed in accordance with §§91.411 and 91.413, each registered owner or operator shall keep the following records for the periods specified in paragraph (b) of this section:
- (1) Records of the maintenance, preventive maintenance, and alteration and records of the 100-hour, annual, progressive, and other required or approved inspections, as appropriate, for each aircraft (including the airframe) and each engine, propeller, rotor, and appliance of an aircraft. The records must include—
    - (i) A description (or reference to data acceptable to the Administrator) of the work performed; and
    - (ii) The date of completion of the work performed; and
    - (iii) The signature, and certificate number of the person approving the aircraft for return to service.
  - (2) Records containing the following information:
    - (i) The total time in service of the airframe, each engine, each propeller, and each rotor.
    - (ii) The current status of life-limited parts of each airframe, engine, propeller, rotor, and appliance.
    - (iii) The time since last overhaul of all items installed on the aircraft which are required to be overhauled on a specified time basis.
    - (iv) The current inspection status of the aircraft, including the time since the last inspection required by the inspection program under which the aircraft and its appliances are maintained.
    - (v) The current status of applicable airworthiness directives (AD) and safety directives including, for each, the method of compliance, the AD or safety directive number and revision date. If the AD or safety directive involves recurring action, the time and date when the next action is required.
    - (vi) Copies of the forms prescribed by §43.9(d) of this chapter for each major alteration to the airframe and currently installed engines, rotors, propellers, and appliances.
- (b) The owner or operator shall retain the following records for the periods prescribed:
- (1) The records specified in paragraph (a)(1) of this section shall be retained until the work is repeated or superseded by other work or for 1 year after the work is performed.
  - (2) The records specified in paragraph (a)(2) of this section shall be retained and transferred with the aircraft at the time the aircraft is sold.
  - (3) A list of defects furnished to a registered owner or operator under §43.11 of this chapter shall be retained until the defects are repaired and the aircraft is approved for return to service.
- (c) The owner or operator shall make all maintenance records required to be kept by this section available for inspection by the Administrator or any authorized representative of the National Transportation Safety Board (NTSB). In addition, the owner or operator shall present Form 337 described in paragraph (d) of this section for inspection upon request of any law enforcement officer.

- (d) When a fuel tank is installed within the passenger compartment or a baggage compartment pursuant to part 43 of this chapter, a copy of FAA Form 337 shall be kept on board the modified aircraft by the owner or operator.

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**91.419 Transfer of maintenance records.**

Any owner or operator who sells a U.S.-registered aircraft shall transfer to the purchaser, at the time of sale, the following records of that aircraft, in plain language form or in coded form at the election of the purchaser, if the coded form provides for the preservation and retrieval of information in a manner acceptable to the Administrator:

- (a) The records specified in §91.417(a)(2).
- (b) The records specified in §91.417(a)(1) which are not included in the records covered by paragraph (a) of this section, except that the purchaser may permit the seller to keep physical custody of such records. However, custody of records by the seller does not relieve the purchaser of the responsibility under §91.417(c) to make the records available for inspection by the Administrator or any authorized representative of the National Transportation Safety Board (NTSB).

**91.421 Rebuilt engine maintenance records.**

- (a) The owner or operator may use a new maintenance record, without previous operating history, for an aircraft engine rebuilt by the manufacturer or by an agency approved by the manufacturer.
- (b) Each manufacturer or agency that grants zero time to an engine rebuilt by it shall enter in the new record—
  - (1) A signed statement of the date the engine was rebuilt;
  - (2) Each change made as required by airworthiness directives; and
  - (3) Each change made in compliance with manufacturer's service bulletins, if the entry is specifically requested in that bulletin.
- (c) For the purposes of this section, a rebuilt engine is a used engine that has been completely disassembled, inspected, repaired as necessary, reassembled, tested, and approved in the same manner and to the same tolerances and limits as a new engine with either new or used parts. However, all parts used in it must conform to the production drawing tolerances and limits for new parts or be of approved oversized or undersized dimensions for a new engine.

**Part 43**

**43.1 - Applicability**

- (a) Except as provided in paragraphs (b) and (d) of this section, this part prescribes rules governing the maintenance, preventive maintenance, rebuilding, and alteration of any—
  - (1) Aircraft having a U.S. airworthiness certificate;
  - (2) Foreign-registered civil aircraft used in common carriage or carriage of mail under the provisions of Part 121 or 135 of this chapter; and

(3) Airframe, aircraft engines, propellers, appliances, and component parts of such aircraft.

(b) This part does not apply to any aircraft for which the FAA has issued an experimental certificate, unless the FAA has previously issued a different kind of airworthiness certificate for that aircraft.

(c) This part applies to all life-limited parts that are removed from a type certificated product, segregated, or controlled as provided in §43.10.

(d) This part applies to any aircraft issued a special airworthiness certificate in the light-sport category except:

(1) The repair or alteration form specified in §§43.5(b) and 43.9(d) is not required to be completed for products not produced under an FAA approval;

(2) Major repairs and major alterations for products not produced under an FAA approval are not required to be recorded in accordance with appendix B of this part; and

(3) The listing of major alterations and major repairs specified in paragraphs (a) and (b) of appendix A of this part is not applicable to products not produced under an FAA approval.

#### **43.2 - Records of Overhaul and Rebuilding**

(a) **No person may describe in any required maintenance entry or form an aircraft, airframe, aircraft engine, propeller, appliance, or component part as being overhauled unless—**

(1) Using methods, techniques, and practices acceptable to the Administrator, it has been disassembled, cleaned, inspected, repaired as necessary, and reassembled; and

(2) It has been tested in accordance with approved standards and technical data, or in accordance with current standards and technical data acceptable to the Administrator, which have been developed and documented by the holder of the type certificate, supplemental type certificate, or a material, part, process, or appliance approval under §21.305 of this chapter.

(b) No person may describe in any required maintenance entry or form an aircraft, airframe, aircraft engine, propeller, appliance, or component part as being rebuilt unless it has been disassembled, cleaned, inspected, repaired as necessary, reassembled, and tested to the same tolerances and limits as a new item, using either new parts or used parts that either conform to new part tolerances and limits or to approved oversized or undersized dimensions.

#### **43.3 - Persons Authorized to Perform Maintenance, Preventive Maintenance, rebuilding, and alterations**

(a) Except as provided in this section and §43.17, no person may maintain, rebuild, alter, or perform preventive maintenance on an aircraft, airframe, aircraft engine, propeller, appliance, or component part to which this part applies. Those items, the performance of which is a major alteration, a major repair, or preventive maintenance, are listed in appendix A.

(b) The holder of a mechanic certificate may perform maintenance, preventive maintenance, and alterations as provided in Part 65 of this chapter.

(c) The holder of a repairman certificate may perform maintenance, preventive maintenance, and alterations as provided in part 65 of this chapter.

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- (d) A person working under the supervision of a holder of a mechanic or repairman certificate may perform the maintenance, preventive maintenance, and alterations that his supervisor is authorized to perform, if the supervisor personally observes the work being done to the extent necessary to ensure that it is being done properly and if the supervisor is readily available, in person, for consultation. However, this paragraph does not authorize the performance of any inspection required by Part 91 or Part 125 of this chapter or any inspection performed after a major repair or alteration.
- (e) The holder of a repair station certificate may perform maintenance, preventive maintenance, and alterations as provided in Part 145 of this chapter.
- (f) The holder of an air carrier operating certificate or an operating certificate issued under Part 121 or 135, may perform maintenance, preventive maintenance, and alterations as provided in Part 121 or 135.
- (g) Except for holders of a sport pilot certificate, the holder of a pilot certificate issued under part 61 may perform preventive maintenance on any aircraft owned or operated by that pilot which is not used under part 121, 129, or 135 of this chapter. The holder of a sport pilot certificate may perform preventive maintenance on an aircraft owned or operated by that pilot and issued a special airworthiness certificate in the light-sport category.
- (h) Notwithstanding the provisions of paragraph (g) of this section, the Administrator may approve a certificate holder under Part 135 of this chapter, operating rotorcraft in a remote area, to allow a pilot to perform specific preventive maintenance items provided—
  - (1) The items of preventive maintenance are a result of a known or suspected mechanical difficulty or malfunction that occurred en route to or in a remote area;
  - (2) The pilot has satisfactorily completed an approved training program and is authorized in writing by the certificate holder for each item of preventive maintenance that the pilot is authorized to perform;
  - (3) There is no certificated mechanic available to perform preventive maintenance;
  - (4) The certificate holder has procedures to evaluate the accomplishment of a preventive maintenance item that requires a decision concerning the airworthiness of the rotorcraft; and
  - (5) The items of preventive maintenance authorized by this section are those listed in paragraph (c) of appendix A of this part.
- (i) Notwithstanding the provisions of paragraph (g) of this section, in accordance with an approval issued to the holder of a certificate issued under part 135 of this chapter, a pilot of an aircraft type-certificated for 9 or fewer passenger seats, excluding any pilot seat, may perform the removal and reinstallation of approved aircraft cabin seats, approved cabin-mounted stretchers, and when no tools are required, approved cabin-mounted medical oxygen bottles, provided—
  - (1) The pilot has satisfactorily completed an approved training program and is authorized in writing by the certificate holder to perform each task; and
  - (2) The certificate holder has written procedures available to the pilot to evaluate the accomplishment of the task.
- (j) A manufacturer may—
  - (1) Rebuild or alter any aircraft, aircraft engine, propeller, or appliance manufactured by him under a type or production certificate;
  - (2) Rebuild or alter any appliance or part of aircraft, aircraft engines, propellers, or appliances manufactured by him under a Technical Standard Order Authorization, an FAA-Parts Manufacturer Approval, or Product and Process Specification issued by the Administrator; and

- (3) Perform any inspection required by Part 91 or Part 125 of this chapter on aircraft it manufacturers, while currently operating under a production certificate or under a currently approved production inspection system for such aircraft.

#### **43.7 - Persons Authorized to Approve Aircraft for Return to Service**

- (a) Except as provided in this section and §43.17, no person, other than the Administrator, may approve an aircraft, airframe, aircraft engine, propeller, appliance, or component part for return to service after it has undergone maintenance, preventive maintenance, rebuilding, or alteration.
- (b) The holder of a mechanic certificate or an inspection authorization may approve an aircraft, airframe, aircraft engine, propeller, appliance, or component part for return to service as provided in Part 65 of this chapter.
- (c) The holder of a repair station certificate may approve an aircraft, airframe, aircraft engine, propeller, appliance, or component part for return to service as provided in Part 145 of this chapter.
- (d) A manufacturer may approve for return to service any aircraft, airframe, aircraft engine, propeller, appliance, or component part which that manufacturer has worked on under §43.3(j). However, except for minor alterations, the work must have been done in accordance with technical data approved by the Administrator.
- (e) The holder of an air carrier operating certificate or an operating certificate issued under Part 121 or 135, may approve an aircraft, airframe, aircraft engine, propeller, appliance, or component part for return to service as provided in Part 121 or 135 of this chapter, as applicable.
- (f) A person holding at least a private pilot certificate may approve an aircraft for return to service after performing preventive maintenance under the provisions of §43.3(g).
- (g) The holder of a repairman certificate (light-sport aircraft) with a maintenance rating may approve an aircraft issued a special airworthiness certificate in light-sport category for return to service, as provided in part 65 of this chapter.
- (h) The holder of at least a sport pilot certificate may approve an aircraft owned or operated by that pilot and issued a special airworthiness certificate in the light-sport category for return to service after performing preventive maintenance under the provisions of §43.3(g).

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#### **43.9 - Content, Form, and Disposition of Maintenance Records**

- (a) Maintenance record entries. Except as provided in paragraphs (b) and (c) of this section, each person who maintains, performs preventive maintenance, rebuilds, or alters an aircraft, airframe, aircraft engine, propeller, appliance, or component part shall make an entry in the maintenance record of that equipment containing the following information:
  - (1) A description (or reference to data acceptable to the Administrator) of work performed.
  - (2) The date of completion of the work performed.
  - (3) The name of the person performing the work if other than the person specified in paragraph (a)(4) of this section.
  - (4) If the work performed on the aircraft, airframe, aircraft engine, propeller, appliance, or component part has been performed satisfactorily, the signature, certificate number, and kind of certificate held by the person approving the work. The signature constitutes the approval for return to service only for the work performed.

- (b) Each holder of an air carrier operating certificate or an operating certificate issued under Part 121 or 135, that is required by its approved operations specifications to provide for a continuous airworthiness maintenance program, shall make a record of the maintenance, preventive maintenance, rebuilding, and alteration, on aircraft, airframes, aircraft engines, propellers, appliances, or component parts which it operates in accordance with the applicable provisions of Part 121 or 135 of this chapter, as appropriate.
- (c) This section does not apply to persons performing inspections in accordance with Part 91, 125, §135.411(a)(1), or §135.419 of this chapter.
- (d) In addition to the entry required by paragraph (a) of this section, major repairs and major alterations shall be entered on a form, and the form disposed of, in the manner prescribed in appendix B, by the person performing the work.

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#### 43.10 - Disposition of Life Limited Aircraft Parts

- (a) Definitions used in this section. For the purposes of this section the following definitions apply.  
Life-limited part means any part for which a mandatory replacement limit is specified in the type design, the Instructions for Continued Airworthiness, or the maintenance manual.  
Life status means the accumulated cycles, hours, or any other mandatory replacement limit of a life-limited part.
- (b) Temporary removal of parts from type-certificated products. When a life-limited part is temporarily removed and reinstalled for the purpose of performing maintenance, no disposition under paragraph (c) of this section is required if—
  - (1) The life status of the part has not changed;
  - (2) The removal and reinstallation is performed on the same serial numbered product; and
  - (3) That product does not accumulate time in service while the part is removed.
- (c) **Disposition of parts removed from type-certificated products.** Except as provided in paragraph (b) of this section, after April 15, 2002 each person who removes a life-limited part from a type-certificated product must ensure that the part is controlled using one of the methods in this paragraph. The method must deter the installation of the part after it has reached its life limit. Acceptable methods include:
  - (1) **Record keeping system.** The part may be controlled using a record keeping system that substantiates the part number, serial number, and current life status of the part. Each time the part is removed from a type certificated product, the record must be updated with the current life status. This system may include electronic, paper, or other means of record keeping.
  - (2) **Tag or record attached to part.** A tag or other record may be attached to the part. The tag or record must include the part number, serial number, and current life status of the part. Each time the part is removed from a type certificated product, either a new tag or record must be created, or the existing tag or record must be updated with the current life status.
  - (3) **Non-permanent marking.** The part may be legibly marked using a non-permanent method showing its current life status. The life status must be updated each time the part is removed from a type certificated product, or if the mark is removed, another method in this section may be used. The mark must be accomplished in accordance with the instructions under §45.16 of this chapter in order to maintain the integrity of the part.
  - (4) **Permanent marking.** The part may be legibly marked using a permanent method showing its current life status. The life status must be updated each time the part is removed from a type-certificated product. Unless the part is permanently removed from use on type certificated products, this permanent mark must be accomplished in

accordance with the instructions under §45.16 of this chapter in order to maintain the integrity of the part.

- (5) **Segregation.** The part may be segregated using methods that deter its installation on a type-certificated product. These methods must include, at least—
- (i) Maintaining a record of the part number, serial number, and current life status, and
  - (ii) Ensuring the part is physically stored separately from parts that are currently eligible for installation.
- (6) **Mutilation.** The part may be mutilated to deter its installation in a type certificated produce. The mutilation must render the part beyond repair and incapable of being reworked to appear to be airworthy.
- (7) **Other methods.** Any other method approved or accepted by the FAA.

(d) **Transfer of life-limited parts.** Each person who removes a life-limited part from a type certificated product and later sells or otherwise transfers that part must transfer with the part the mark, tag, or other record used to comply with this section, unless the part is mutilated before it is sold or transferred

#### **43.11 - Content, Form, and Disposition of Records for Inspections**

- (a) **Maintenance record entries.** The person approving or disapproving for return to service an aircraft, airframe, aircraft engine, propeller, appliance, or component part after any inspection performed in accordance with part 91, 125, §135.411(a)(1), or §135.419 shall make an entry in the maintenance record of that equipment containing the following information:
- (1) The type of inspection and a brief description of the extent of the inspection.
  - (2) The date of the inspection and aircraft total time in service.
  - (3) The signature, the certificate number, and kind of certificate held by the person approving or disapproving for return to service the aircraft, airframe, aircraft engine, propeller, appliance, component part, or portions thereof.
  - (4) **Except for progressive inspections**, if the aircraft is found to be airworthy and approved for return to service, the following or a similarly worded statement—“I certify that this aircraft has been inspected in accordance with (insert type) inspection and was determined to be in airworthy condition.”
  - (5) **Except for progressive inspections**, if the aircraft is not approved for return to service because of needed maintenance, noncompliance with applicable specifications, airworthiness directives, or other approved data, the following or a similarly worded statement—“I certify that this aircraft has been inspected in accordance with (insert type) inspection and a list of discrepancies and unairworthy items dated (date) has been provided for the aircraft owner or operator.”
  - (6) **For progressive inspections**, the following or a similarly worded statement—“I certify that in accordance with a progressive inspection program, a routine inspection of (identify whether aircraft or components) and a detailed inspection of (identify components) were performed and the (aircraft or components) are (approved or disapproved) for return to service.” If disapproved, the entry will further state “and a list of discrepancies and unairworthy items dated (date) has been provided to the aircraft owner or operator.”
  - (7) If an inspection is conducted under an inspection program provided for in part 91, 125, or §135.411(a)(1), the entry must identify the inspection program, that part of the inspection program accomplished, and contain a statement that the inspection was performed in accordance with the inspections and procedures for that particular program.
- (b) **Listing of discrepancies and placards.** If the person performing any inspection required by part 91 or 125 or §135.411(a)(1) of this chapter finds that the aircraft is unairworthy or does not meet the applicable type certificate data, airworthiness directives, or other approved data upon which its airworthiness depends, that persons must give the owner or

lessee a signed and dated list of those discrepancies. For those items permitted to be inoperative under ~~§91.213(d)(2) of this chapter~~, that person shall place a placard, that meets the aircraft's airworthiness certification regulations, on each inoperative instrument and the cockpit control of each item of inoperative equipment, marking it "Inoperative," and shall add the items to the signed and dated list of discrepancies given to the owner or lessee.

#### **43.12 - Maintenance Records: Falsification, Reproduction, or Alteration**

- (a) No person may make or cause to be made:
- (1) Any fraudulent or intentionally false entry in any record or report that is required to be made, kept, or used to show compliance with any requirement under this part;
  - (2) Any reproduction, for fraudulent purpose, of any record or report under this part; or
  - (3) Any alteration, for fraudulent purpose, of any record or report under this part.
- (b) The commission by any person of an act prohibited under paragraph (a) of this section is a basis for suspending or revoking the applicable airman, operator, or production certificate, Technical Standard Order Authorization, FAA-Parts Manufacturer Approval, or Product and Process Specification issued by the Administrator and held by that person

#### **43.13 - Performance Rules (General)**

- (a) Each person performing maintenance, alteration, or preventive maintenance on an aircraft, engine, propeller, or appliance shall use the methods, techniques, and practices prescribed in the current manufacturer's maintenance manual or Instructions for Continued Airworthiness prepared by its manufacturer, or other methods, techniques, and practices acceptable to the Administrator, except as noted in §43.16. He shall use the tools, equipment, and test apparatus necessary to assure completion of the work in accordance with accepted industry practices. If special equipment or test apparatus is recommended by the manufacturer involved, he must use that equipment or apparatus or its equivalent acceptable to the Administrator.
- (b) Each person maintaining or altering, or performing preventive maintenance, shall do that work in such a manner and use materials of such a quality, that the condition of the aircraft, airframe, aircraft engine, propeller, or appliance worked on will be at least equal to its original or properly altered condition (with regard to aerodynamic function, structural strength, resistance to vibration and deterioration, and other qualities affecting airworthiness).
- (c) Special provisions for holders of air carrier operating certificates and operating certificates issued under the provisions of Part 121 or 135 and Part 129 operators holding operations specifications. Unless otherwise notified by the administrator, the methods, techniques, and practices contained in the maintenance manual or the maintenance part of the manual of the holder of an air carrier operating certificate or an operating certificate under Part 121 or 135 and Part 129 operators holding operations specifications (that is required by its operating specifications to provide a continuous airworthiness maintenance and inspection program) constitute acceptable means of compliance with this section.

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#### **43.15 - Additional Performance Rules for Inspections.**

- (a) **General.** Each person performing an inspection required by part 91, 125, or 135 of this chapter, shall—

- (1) Perform the inspection so as to determine whether the aircraft, or portion(s) thereof under inspection, meets all applicable airworthiness requirements; and
  - (2) If the inspection is one provided for in part 125, 135, or §91.409(e) of this chapter, perform the inspection in accordance with the instructions and procedures set forth in the inspection program for the aircraft being inspected.
- (b) **Rotorcraft.** Each person performing an inspection required by Part 91 on a rotorcraft shall inspect the following systems in accordance with the maintenance manual or Instructions for Continued Airworthiness of the manufacturer concerned:
- (1) The drive shafts or similar systems.
  - (2) The main rotor transmission gear box for obvious defects.
  - (3) The main rotor and center section (or the equivalent area).
  - (4) The auxiliary rotor on helicopters.
- (c) **Annual and 100-hour inspections.**
- (1) Each person performing an annual or 100-hour inspection shall use a checklist while performing the inspection. The checklist may be of the person's own design, one provided by the manufacturer of the equipment being inspected or one obtained from another source. This checklist must include the scope and detail of the items contained in appendix D to this part and paragraph (b) of this section.
  - (2) Each person approving a reciprocating-engine-powered aircraft for return to service after an annual or 100-hour inspection shall, before that approval, run the aircraft engine or engines to determine satisfactory performance in accordance with the manufacturer's recommendations of—
    - (i) Power output (static and idle r.p.m.);
    - (ii) Magnetos;
    - (iii) Fuel and oil pressure; and
    - (iv) Cylinder and oil temperature.
  - (1) Each person approving a turbine-engine-powered aircraft for return to service after an annual, 100-hour, or progressive inspection shall, before that approval, run the aircraft engine or engines to determine satisfactory performance in accordance with the manufacturer's recommendations.

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(d) **Progressive inspection.**

- (1) Each person performing a progressive inspection shall, at the start of a progressive inspection system, inspect the aircraft completely. After this initial inspection, routine and detailed inspections must be conducted as prescribed in the progressive inspection schedule. Routine inspections consist of visual examination or check of the appliances, the aircraft, and its components and systems, insofar as practicable without disassembly. Detailed inspections consist of a thorough examination of the appliances, the aircraft, and its components and systems, with such disassembly as is necessary. For the purposes of this subparagraph, the overhaul of a component or system is considered to be a detailed inspection.
- (2) If the aircraft is away from the station where inspections are normally conducted, an appropriately rated mechanic, a certificated repair station, or the manufacturer of the aircraft may perform inspections in accordance with the procedures and using the forms of the person who would otherwise perform the inspection.

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**43.16 - Airworthiness Limitations**

Each person performing an inspection or other maintenance specified in an Airworthiness Limitations section of a manufacturer's maintenance manual or Instructions for Continued Airworthiness shall perform the inspection or other maintenance in accordance with that

section, or in accordance with operations specifications approved by the Administrator under part 121 or 135, or an inspection program approved under §91.409(e).

43.17 - Maintenance **Performed** on U.S. Aeronautical Products by Certain Canadian Persons

(a) Definitions . For purposes of this section:

**Aeronautical product** means any civil aircraft or airframe, aircraft engine, propeller, appliance, component, or part to be installed thereon.

**Canadian aeronautical product** means any aeronautical product under airworthiness regulation by Transport Canada Civil Aviation.

**U.S. aeronautical product** means any aeronautical product under airworthiness regulation by the FAA.

(b) Applicability. This section does not apply to any U.S. aeronautical products maintained or altered under any bilateral agreement made between Canada and any country other than the United States.

(c) Authorized persons .

(1) A person holding a valid Transport Canada Civil Aviation Maintenance Engineer license and appropriate ratings may, with respect to a U.S.-registered aircraft located in Canada, perform maintenance, preventive maintenance, and alterations in accordance with the requirements of paragraph (d) of this section and approve the affected aircraft for return to service in accordance with the requirements of paragraph (e) of this section.

(2) A Transport Canada Civil Aviation Approved Maintenance Organization (AMO) holding appropriate ratings may, with respect to a U.S.-registered aircraft or other U.S. aeronautical products located in Canada, perform maintenance, preventive maintenance, and alterations in accordance with the requirements of paragraph (d) of this section and approve the affected products for return to service in accordance with the requirements of paragraph (e) of this section.

(d) Performance requirements . A person authorized in paragraph (c) of this section may perform maintenance (including any inspection required by Sec. 91.409 of this chapter, except an annual inspection), preventive maintenance, and alterations, provided—

(1) The person performing the work is authorized by Transport Canada Civil Aviation to perform the same type of work with respect to Canadian aeronautical products;

(2) The maintenance, preventive maintenance, or alteration is performed in accordance with a Bilateral Aviation Safety Agreement between the United States and Canada and associated Maintenance Implementation Procedures that provide a level of safety equivalent to that provided by the provisions of this chapter;

(3) The maintenance, preventive maintenance, or alteration is performed such that the affected product complies with the applicable requirements of part 36 of this chapter; and

(4) The maintenance, preventive maintenance, or alteration is recorded in accordance with a Bilateral Aviation Safety Agreement between the United States and Canada and associated Maintenance Implementation Procedures that provide a level of safety equivalent to that provided by the provisions of this chapter.

(e) Approval requirements.

(1) To return an affected product to service, a person authorized in paragraph (c) of this section must approve (certify) maintenance, preventive maintenance, and alterations performed under this section, except that an Aircraft Maintenance Engineer may not approve a major repair or major alteration.

(2) An AMO whose system of quality control for the maintenance, preventive maintenance, alteration, and inspection of aeronautical products has been approved by Transport Canada Civil Aviation, or an authorized employee performing work for such an AMO, may approve (certify) a major repair or major alteration performed under this section if the work was performed in accordance with technical data approved by the FAA.

(f) No person may operate in air commerce an aircraft, airframe, aircraft engine, propeller, or appliance on which maintenance, preventive maintenance, or alteration has been performed under this section unless it has been approved for return to service by a person authorized in this section.

## **Appendix A to Part 43 – Major Alterations, Major Repairs, and Preventive Maintenance**

### **(a) Major alterations—**

1. *Airframe major alterations.* Alterations of the following parts and alterations of the following types, when not listed in the aircraft specifications issued by the FAA, 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.
  - (xiv) *(Powerplant major alterations.* The following alterations of a powerplant when not listed in the engine specifications issued by the FAA, are powerplant major alterations.
  - (xv) 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 parts which requires extensive rework and testing of the engine.
  - (xvi) Changes to the engine by replacing aircraft engine structural parts with parts not supplied by the original manufacturer or parts not specifically approved by the Administrator.
  - (xvii) Installation of an accessory which is not approved for the engine.
  - (xviii) Removal of accessories that are listed as required equipment on the aircraft or engine specification.
  - (xix) Installation of structural parts other than the type of parts approved for the installation.
  - (xx) Conversions of any sort for the purpose of using fuel of a rating or grade other than that listed in the engine specifications.
2. *Propeller major alterations.* The following alterations of a propeller when not authorized in the propeller specifications issued by the FAA 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 parts not approved for the propeller.

3. *Appliance major alterations.* Alterations of the basic design not made in accordance with recommendations of the appliance manufacturer or in accordance with an FAA 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.

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**(b) Major repairs—**

1. *Airframe major repairs.* Repairs to the following parts 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) Parts 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 parts 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 parts 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 parts 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 aluminium 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.

(c) *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 parts 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.

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- (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 parts with replacement parts 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 FAA-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) The inspection and maintenance tasks prescribed and specifically identified as preventive maintenance in a primary category aircraft type certificate or supplemental type certificate holder's approved special inspection and preventive maintenance program when accomplished on a primary category aircraft provided:
  - (i) They are performed by the holder of at least a private pilot certificate issued under part 61 who is the registered owner (including co-owners) of the affected aircraft and who holds a certificate of competency for the affected aircraft (1) issued by a school approved under §147.21(e) of this chapter; (2) issued by the holder of the production certificate for that primary category aircraft that has a special training program approved under §21.24 of this subchapter; or (3) issued by another entity that has a course approved by the Administrator; and
  - (ii) The inspections and maintenance tasks are performed in accordance with instructions contained by the special inspection and preventive maintenance

- program approved as part of the aircraft's type design or supplemental type design.
- (31) 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, transponders, 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, and operational check must be performed in accordance with the applicable sections of part 91 of this chapter.

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## Appendix B to FAR 43 – Recording of Major Repairs and Major Alterations

(a) Except as provided in paragraphs (b), (c), and (d) of this appendix, each person performing a major repair or major alteration shall—

- (1) Execute FAA Form 337 at least in duplicate;
- (2) Give a signed copy of that form to the aircraft owner; and
- (3) Forward a copy of that form to the FAA Aircraft Registration Branch in Oklahoma City, Oklahoma, within 48 hours after the aircraft, airframe, aircraft engine, propeller, or appliance is approved for return to service.

(b) For major repairs made in accordance with a manual or specifications acceptable to the Administrator, a certificated repair station may, in place of the requirements of paragraph (a)—

- (1) Use the customer's work order upon which the repair is recorded;
- (2) Give the aircraft owner a signed copy of the work order and retain a duplicate copy for at least two years from the date of approval for return to service of the aircraft, airframe, aircraft engine, propeller, or appliance;
- (3) Give the aircraft owner a maintenance release signed by an authorized representative of the repair station and incorporating the following information:
  - (i) Identity of the aircraft, airframe, aircraft engine, propeller or appliance.
  - (ii) If an aircraft, the make, model, serial number, nationality and registration marks, and location of the repaired area.
  - (iii) If an airframe, aircraft engine, propeller, or appliance, give the manufacturer's name, name of the part, model, and serial numbers (if any); and

(4) Include the following or a similarly worded statement—

"The aircraft, airframe, aircraft engine, propeller, or appliance identified above was repaired and inspected in accordance with current Regulations of the Federal Aviation Administration and is approved for return to service. Pertinent details of the repair are on file at this repair station under Order No. \_\_\_\_\_, dated \_\_\_\_\_ .

Signed \_\_\_\_\_  
(signature of authorized representative)  
(Repair station name)  
(Certificate No.)  
(Address)"

(c) Except as provided in paragraph (d) of this appendix, for a major repair or major alteration made by a person authorized in §43.17, the person who performs the major repair or major alteration and the person authorized by §43.17 to approve that work shall execute an FAA Form 337 at least in duplicate. A completed copy of that form shall be—

(1) Given to the aircraft owner; and

(2) Forwarded to the Federal Aviation Administration, Aircraft Registration Branch, AFS-750, Post Office Box 25504, Oklahoma City, OK 73125, within 48 hours after the work is inspected.

(d) For extended-range fuel tanks installed within the passenger compartment or a baggage compartment, the person who performs the work and the person authorized to approve the work by §43.7 shall execute an FAA Form 337 in at least triplicate. A completed copy of that form shall be—

(1) Placed on board the aircraft as specified in §91.417 of this chapter;

(2) Given to the aircraft owner; and

(3) Forwarded to the Federal Aviation Administration, Aircraft Registration Branch, AFS-751, Post Office Box 25724, Oklahoma City, OK 73125, within 48 hours after the work is inspected.

### **Appendix D to Part 43 – Scope and Detail of Items (as Applicable to the Particular Aircraft) To Be Included in Annual and 100-Hour Inspections**

(a) Each person performing an annual or 100-hour inspection shall, before that inspection, remove or open all necessary inspection plates, access doors, fairing, and cowling. He shall thoroughly clean the aircraft and 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 and skin—for deterioration, distortion, other evidence of failure, and defective or insecure attachment of fittings.

(2) Systems and components—for improper installation, apparent defects, and unsatisfactory operation.

(3) Envelope, gas bags, ballast tanks, and related parts—for poor condition.

(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.

(2) Seats and safety belts—for poor condition and apparent defects.

(3) Windows and windshields—for deterioration and breakage.

(4) Instruments—for poor condition, mounting, marking, and (where practicable) improper operation.

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- (5) Flight and engine controls—for improper installation and improper operation.
- (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:
  - (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.
  - (4) Engine mount—for cracks, looseness of mounting, and looseness of engine to mount.
  - (5) Flexible vibration dampeners—for poor condition and deterioration.
  - (6) Engine controls—for defects, improper travel, and improper safetying.
  - (7) Lines, hoses, and clamps—for leaks, improper condition and looseness.
  - (8) Exhaust stacks—for cracks, defects, and improper attachment.
  - (9) Accessories—for apparent defects in security of mounting.
  - (10) All systems—for improper installation, poor general condition, defects, and insecure attachment.
  - (11) Cowling—for cracks, and defects.
- (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.
  - (3) Linkages, trusses, and members—for undue or excessive wear fatigue, and distortion.
  - (4) Retracting and locking mechanism—for improper operation.
  - (5) Hydraulic lines—for leakage.
  - (6) Electrical system—for chafing and improper operation of switches.
  - (7) Wheels—for cracks, defects, and condition of bearings.

(8) Tires—for wear and cuts.

(9) Brakes—for improper adjustment.

(10) Floats and skis—for insecure attachment and obvious or apparent defects.

(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.

(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.

(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.

(2) Bolts—for improper torquing and lack of safetying.

(3) Anti-icing devices—for improper operations and obvious defects.

(4) Control mechanisms—for improper operation, insecure mounting, and restricted travel.

(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.

(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.

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## **Appendix E to Part 43 – Altimeter System Test and Inspection**

Each person performing the altimeter system tests and inspections required by §91.411 of this chapter must comply with the following:

(a) Static pressure system:

- (1) Ensure freedom from entrapped moisture and restrictions.
- (2) Perform a proof test to demonstrate the integrity of the static pressure system in a manner acceptable to the Administrator. For airplanes certificated under part 25 of this chapter, determine that leakage is within the tolerances established by §25.1325.
- (3) Determine that the static port heater, if installed, is operative.
- (4) Ensure that no alterations or deformations of the airframe surface have been made that would affect the relationship between air pressure in the static pressure system and true ambient static air pressure for any flight condition.

(b) Altimeter:

(1) Test by an appropriately rated repair facility in accordance with the following subparagraphs. Unless otherwise specified, each test for performance may be conducted with the instrument subjected to vibration. When tests are conducted with the temperature substantially different from ambient temperature of approximately 25 degrees C., allowance shall be made for the variation from the specified condition.

(i) *Scale error.* With the barometric pressure scale at 29.92 inches of mercury, the altimeter shall be subjected successively to pressures corresponding to the altitude specified in Table I up to the maximum normally expected operating altitude of the airplane in which the altimeter is to be installed. The reduction in pressure shall be made at a rate not in excess of 20,000 feet per minute to within approximately 2,000 feet of the test point. The test point shall be approached at a rate compatible with the test equipment. The altimeter shall be kept at the pressure corresponding to each test point for at least 1 minute, but not more than 10 minutes, before a reading is taken. The error at all test points must not exceed the tolerances specified in Table I.

(ii) *Hysteresis.* The hysteresis test shall begin not more than 15 minutes after the altimeter's initial exposure to the pressure corresponding to the upper limit of the scale error test prescribed in subparagraph (i); and while the altimeter is at this pressure, the hysteresis test shall commence. Pressure shall be increased at a rate simulating a descent in altitude at the rate of 5,000 to 20,000 feet per minute until within 3,000 feet of the first test point (50 percent of maximum altitude). The test point shall then be approached at a rate of approximately 3,000 feet per minute. The altimeter shall be kept at this pressure for at least 5 minutes, but not more than 15 minutes, before the test reading is taken. After the reading has been taken, the pressure shall be increased further, in the same manner as before, until the pressure corresponding to the second test point (40 percent of maximum altitude) is reached. The altimeter shall be kept at this pressure for at least 1 minute, but not more than 10 minutes, before the test reading is taken. After the reading has been taken, the pressure shall be increased further, in the same manner as before, until atmospheric pressure is reached. The reading of the altimeter at either of the two test points shall not differ by more than the tolerance specified in Table II from the reading of the altimeter for the corresponding altitude recorded during the scale error test prescribed in paragraph (b)(i).

(iii) *After effect.* Not more than 5 minutes after the completion of the hysteresis test prescribed in paragraph (b)(ii), the reading of the altimeter (corrected for any change in atmospheric pressure) shall not differ from the original atmospheric pressure reading by more than the tolerance specified in Table II.

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(iv) *Friction.* The altimeter shall be subjected to a steady rate of decrease of pressure approximating 750 feet per minute. At each altitude listed in Table III, the change in reading of the pointers after vibration shall not exceed the corresponding tolerance listed in Table III.

(v) *Case leak.* The leakage of the altimeter case, when the pressure within it corresponds to an altitude of 18,000 feet, shall not change the altimeter reading by more than the tolerance shown in Table II during an interval of 1 minute.

(vi) *Barometric scale error.* At constant atmospheric pressure, the barometric pressure scale shall be set at each of the pressures (falling within its range of adjustment) that are listed in Table IV, and shall cause the pointer to indicate the equivalent altitude difference shown in Table IV with a tolerance of 25 feet.

(2) Altimeters which are the air data computer type with associated computing systems, or which incorporate air data correction internally, may be tested in a manner and to specifications developed by the manufacturer which are acceptable to the Administrator.

(c) Automatic Pressure Altitude Reporting Equipment and ATC Transponder System Integration Test. The test must be conducted by an appropriately rated person under the conditions specified in paragraph (a). Measure the automatic pressure altitude at the output of the installed ATC transponder when interrogated on Mode C at a sufficient number of test points to ensure that the altitude reporting equipment, altimeters, and ATC transponders perform their intended functions as installed in the aircraft. The difference between the automatic reporting output and the altitude displayed at the altimeter shall not exceed 125 feet.

(d) Records: Comply with the provisions of §43.9 of this chapter as to content, form, and disposition of the records. The person performing the altimeter tests shall record on the altimeter the date and maximum altitude to which the altimeter has been tested and the persons approving the airplane for return to service shall enter that data in the airplane log or other permanent record.

TABLE I

Altitude	Equivalent pressure (inches of mercury)	Tolerance ±(feet)
-1,000	31.018	20
0	29.921	20
500	29.385	20
1,000	28.856	20
1,500	28.335	25
2,000	27.821	30
3,000	26.817	30
4,000	25.842	35
6,000	23.978	40

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8,000	22.225	60
10,000	20.577	80
12,000	19.029	90
14,000	17.577	100
16,000	16.216	110
18,000	14.942	120
20,000	13.750	130
22,000	12.636	140
25,000	11.104	155
30,000	8.885	180
35,000	7.041	205
40,000	5.538	230
45,000	4.355	255
50,000	3.425	280

TABLE II—TEST TOLERANCES

Test	Tolerance (feet)
Case Leak Test	±100
Hysteresis Test:	
First Test Point (50 percent of maximum altitude)	75
Second Test Point (40 percent of maximum altitude)	75
After Effect Test	30

TABLE III—FRICTION

Altitude (feet)	Tolerance (feet)
1,000	±70
2,000	70

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3,000	70
5,000	70
10,000	80
15,000	90
20,000	100
25,000	120
30,000	140
35,000	160
40,000	180
50,000	250

TABLE IV—PRESSURE-ALTITUDE DIFFERENCE

Pressure (inches of Hg)	Altitude difference (feet)
28.10	-1,727
28.50	-1,340
29.00	-863
29.50	-392
29.92	0
30.50	+ 531
30.90	+ 893
30.99	+ 974

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### **Appendix F to Part 43 – ATC Transponder Tests and Inspections**

The ATC transponder tests required by §91.413 of this chapter may be conducted using a bench check or portable test equipment and must meet the requirements prescribed in paragraphs (a) through (j) of this appendix. If portable test equipment with appropriate coupling to the aircraft antenna system is used, operate the test equipment for ATCRBS transponders at a nominal rate of 235 interrogations per second to avoid possible ATCRBS interference. Operate the test equipment at a nominal rate of 50 Mode S interrogations per second for Mode S. An additional 3 dB loss is allowed to compensate for antenna coupling errors during receiver

sensitivity measurements conducted in accordance with paragraph (c)(1) when using portable test equipment.

(a) Radio Reply Frequency:

- (1) For all classes of ATCRBS transponders, interrogate the transponder and verify that the reply frequency is  $1090 \pm 3$  Megahertz (MHz).
- (2) For classes 1B, 2B, and 3B Mode S transponders, interrogate the transponder and verify that the reply frequency is  $1090 \pm 3$  MHz.
- (3) For classes 1B, 2B, and 3B Mode S transponders that incorporate the optional  $1090 \pm 1$  MHz reply frequency, interrogate the transponder and verify that the reply frequency is correct.
- (4) For classes 1A, 2A, 3A, and 4 Mode S transponders, interrogate the transponder and verify that the reply frequency is  $1090 \pm 1$  MHz.

(b) Suppression: When Classes 1B and 2B ATCRBS Transponders, or Classes 1B, 2B, and 3B Mode S transponders are interrogated Mode 3/A at an interrogation rate between 230 and 1,000 interrogations per second; or when Classes 1A and 2A ATCRBS Transponders, or Classes 1B, 2A, 3A, and 4 Mode S transponders are interrogated at a rate between 230 and 1,200 Mode 3/A interrogations per second:

- (1) Verify that the transponder does not respond to more than 1 percent of ATCRBS interrogations when the amplitude of  $P_2$  pulse is equal to the  $P_1$  pulse.
- (2) Verify that the transponder replies to at least 90 percent of ATCRBS interrogations when the amplitude of the  $P_2$  pulse is 9 dB less than the  $P_1$  pulse. If the test is conducted with a radiated test signal, the interrogation rate shall be  $235 \pm 5$  interrogations per second unless a higher rate has been approved for the test equipment used at that location.

(c) Receiver Sensitivity:

- (1) Verify that for any class of ATCRBS Transponder, the receiver minimum triggering level (MTL) of the system is  $-73 \pm 4$  dbm, or that for any class of Mode S transponder the receiver MTL for Mode S format (P6 type) interrogations is  $-74 \pm 3$  dbm by use of a test set either:
  - (i) Connected to the antenna end of the transmission line;
  - (ii) Connected to the antenna terminal of the transponder with a correction for transmission line loss; or
  - (iii) Utilized radiated signal.
- (2) Verify that the difference in Mode 3/A and Mode C receiver sensitivity does not exceed 1 db for either any class of ATCRBS transponder or any class of Mode S transponder.

(d) Radio Frequency (RF) Peak Output Power:

- (1) Verify that the transponder RF output power is within specifications for the class of transponder. Use the same conditions as described in (c)(1)(i), (ii), and (iii) above.

(i) For Class 1A and 2A ATCRBS transponders, verify that the minimum RF peak output power is at least 21.0 dbw (125 watts).

(ii) For Class 1B and 2B ATCRBS Transponders, verify that the minimum RF peak output power is at least 18.5 dbw (70 watts).

(iii) For Class 1A, 2A, 3A, and 4 and those Class 1B, 2B, and 3B Mode S transponders that include the optional high RF peak output power, verify that the minimum RF peak output power is at least 21.0 dbw (125 watts).

(iv) For Classes 1B, 2B, and 3B Mode S transponders, verify that the minimum RF peak output power is at least 18.5 dbw (70 watts).

(v) For any class of ATCRBS or any class of Mode S transponders, verify that the maximum RF peak output power does not exceed 27.0 dbw (500 watts).

NOTE: The tests in (e) through (j) apply only to Mode S transponders.

(e) Mode S Diversity Transmission Channel Isolation: For any class of Mode S transponder that incorporates diversity operation, verify that the RF peak output power transmitted from the selected antenna exceeds the power transmitted from the nonselected antenna by at least 20 db.

(f) Mode S Address: Interrogate the Mode S transponder and verify that it replies only to its assigned address. Use the correct address and at least two incorrect addresses. The interrogations should be made at a nominal rate of 50 interrogations per second.

(g) Mode S Formats: Interrogate the Mode S transponder with uplink formats (UF) for which it is equipped and verify that the replies are made in the correct format. Use the surveillance formats UF = 4 and 5. Verify that the altitude reported in the replies to UF = 4 are the same as that reported in a valid ATCRBS Mode C reply. Verify that the identity reported in the replies to UF = 5 are the same as that reported in a valid ATCRBS Mode 3/A reply. If the transponder is so equipped, use the communication formats UF = 20, 21, and 24.

(h) Mode S All-Call Interrogations: Interrogate the Mode S transponder with the Mode S-only all-call format UF = 11, and the ATCRBS/Mode S all-call formats (1.6 microsecond  $P_4$  pulse) and verify that the correct address and capability are reported in the replies (downlink format DF = 11).

(i) ATCRBS-Only All-Call Interrogation: Interrogate the Mode S transponder with the ATCRBS-only all-call interrogation (0.8 microsecond  $P_4$  pulse) and verify that no reply is generated.

(j) Squitter: Verify that the Mode S transponder generates a correct squitter approximately once per second.

(k) Records: Comply with the provisions of §43.9 of this chapter as to content, form, and disposition of the records.