



**WELLINGTON NEW ZEALAND**

**PURSUANT** to Section 28 of the Civil Aviation Act 1990

**I, JENNIFER MARY SHIPLEY**, Minister of Transport,

**HEREBY MAKE** the following ordinary rules.

**SIGNED AT** Wellington

This *18* day of *Nov* 1997

by **JENNIFER MARY SHIPLEY**

A handwritten signature in black ink, appearing to read 'J M Shipley', written over a horizontal line.

Minister of Transport

**Civil Aviation Rules**

**Part 43, Amendment 3**

*Docket Nr. 1259 & 1253*

**Civil Aviation Rules**  
**Part 43, Amendment 3**

## **RULE OBJECTIVE, EXTENT OF CONSULTATION AND COMMENCEMENT**

The objective of Part 43, Amendment 3 is to correct the format and content of existing airworthiness rules as a result of industry consultation and Civil Aviation Authority analysis and to bring into force the necessary changes that result from the coming into force of Parts 21, Amendment 5, 145, Amendment 3, and 148, Amendment 1, of the Civil Aviation Rules. Consultation regarding this amendment was conducted as part of the consultation process under those Parts and the consultation details are contained in the summary of consultation details attached to Part 21, Amendment 5 that was signed by the Minister.

In May 1990 the Air Transport Division of the Ministry of Transport published a notice of intention to carry out a complete review of the aviation regulatory system. As of 1 April 1997 the reviewed rules, the Civil Aviation Rules, came into force. Due to the application of some transitional provisions not all of these new rules were immediately applicable.

Prior to 1 April 1997 the Rules and Standards Group of the Civil Aviation Authority identified a requirement to continue to monitor the effectiveness and adequacy of the regulatory boundary and to amend the rules defining this boundary where necessary.

The general airworthiness amendments were developed by the Rules and Standards Group from comments received since the associated rules came into force, consultation with industry representatives, and a petition for rulemaking submitted in accordance with Part 11. The information received by the Rules and Standards Group culminating in the issue of two Notices of Proposed Rulemaking; NPRM 97-2 under Docket 1259 on 5 March 1997 that addressed the general amendments and NPRM 97-5 under Docket 1253 on 9 July 1997 that addressed the petition for rulemaking.

The publication of these notices was advertised in the daily newspapers in the five main provincial centres on 5 March 1997 and 9 July 1997 respectively. The notice was mailed to interested parties, including overseas Aviation Authorities and organisations, who were considered likely to have an interest in the proposal.

A period of 37 days was allowed for comment on the proposed amendments. Thirty written responses were received in response to this

notice. There were 16 specific issues raised but no significant disagreements with the rule. The majority of the changes requested by the commenters were included.

A period of 51 days was allowed for comment on the petition for rulemaking Part 21 proposal. Eight written responses were received in response to this notice. There were no significant disagreements with the rule.

The submissions and verbal comments were considered and the specific issues discussed with the commenters during a series of meetings around New Zealand, where appropriate amending the proposed rules to take account of the comments made.

The rules as amended were then referred to and signed by the Minister of Transport.

Part 43, Amendment 3 comes into force 28 days after its notification in the *Gazette*.

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## Part 43 Amendments

43.1 is amended by removing the notes.

43.51 is amended by revoking paragraphs (a)(3) and (a)(4) and inserting the following:

“

- (3) are authorised by the holder of an aircraft maintenance organisation certificate, issued under Part 145, to perform maintenance within the scope of that certificate; or
- (4) hold a current certificate of maintenance approval issued under Part 66; or
- (5) perform maintenance under the direct supervision of—
  - (i) the holder of an aircraft maintenance engineer licence with an appropriate type rating, issued under Part 66, and the maintenance is within the scope of that licence; or
  - (ii) the holder of an authorisation issued by the holder of an aircraft maintenance organisation certificate, issued under Part 145, and the maintenance is within the scope of that authorisation.”

43.51 is amended by revoking paragraph (b) and inserting the following:

“(b) A person who holds a pilot licence with an appropriate type rating issued under Part 61 may perform the maintenance listed in Appendix A if the licence holder is—

- (1) appropriately trained; and
- (2) authorised by the owner or operator of the aircraft.”

43.51 is amended by revoking paragraph (c) and inserting the following:

“(c) A person may perform maintenance on a glider or glider component if the person—

- (1) is authorised by the holder of an aviation recreation organisation certificate issued under part 149 to perform maintenance on a glider or glider component; or
- (2) performs the maintenance under the direct supervision of a person authorised by the holder of an aviation recreation organisation certificate issued under part 149 to perform maintenance on a glider or glider component.”

43.53 is revoked and the following new rule inserted:

**“43.53 Performance of maintenance**

(a) Each person performing maintenance on an aircraft or component shall—

- (1) be familiar with the maintenance actions required for the continued airworthiness of that aircraft or component; and
- (2) use adequate housing and facilities for the necessary disassembly, proper inspection, and reassembly of the aircraft; and
- (3) use methods, techniques, and practices that—
  - (i) are prescribed in the current manufacturer's maintenance manual or Instructions for Continued Airworthiness; or
  - (ii) are acceptable to the Director; and
- (4) use materials, parts, and appliances in accordance with Part 21, Subpart K; and
- (5) use the tools, equipment, and test apparatus necessary to ensure completion of the work in accordance with paragraph (a)(3); and
- (6) use any special or test equipment recommended by the manufacturer, or equivalent equipment that ensures the equipment being tested is in operable condition; and
- (7) perform the maintenance so as to ensure that the aircraft or component meets all applicable airworthiness requirements; and



- (8) when performing maintenance specified in the Airworthiness Limitations section of a manufacturer's maintenance manual or Instructions for Continued Airworthiness, perform the maintenance in accordance with that section; and
  - (9) when performing maintenance in accordance with a maintenance programme approved under Part 91 or accepted under Part 119—
    - (i) at the start of the maintenance programme, inspect the aircraft completely; and
    - (ii) after the initial inspection, conduct routine inspections and detailed inspections in accordance with the maintenance programme; and
  - (10) on completion of the maintenance, ensure that the condition of the aircraft or component is satisfactory for release to service and is at least equal to its original or properly modified condition with regard to—
    - (i) aerodynamic function; and
    - (ii) structural strength; and
    - (iii) resistance to vibration and deterioration; and
    - (iv) other qualities affecting airworthiness.
- (b) Except as provided in paragraph (d), no person shall perform maintenance on or release to service—
- (1) an aircraft engaged in air transport operations that has—
    - (i) a MCTOW of more than 5700 kg; or
    - (ii) a maximum certificated passenger seating configuration, excluding any required crew member seat, of 10 seats or more; or
  - (2) a component fitted or intended to be fitted to an aircraft referred to in paragraph (b)(1)—

except under the authority of, and in accordance with the provisions of, a maintenance organisation certificate issued under Part 145.

(c) Except as provided in paragraph (d), no person shall perform any of the following kinds of maintenance on any aircraft or component, or release any aircraft or component to service, except under the authority of, and in accordance with the provisions of, a maintenance organisation certificate issued under Part 145:

- (1) overhaul of a component:
- (2) maintenance on an aircraft or component where the relevant airworthiness data requires the use of a jig that is approved or certified by the manufacturer or that is approved by the Director:
- (3) maintenance on a component where the maintenance involves the disturbance of any part of the component that is supplied as a bench tested unit, except where—
  - (i) the disturbance is for the replacement or adjustment of a part normally replaceable or adjustable in service; and
  - (ii) subsequent functioning of the part disturbed can be demonstrated without the use of test apparatus that is additional to the test apparatus used for normal functioning checks:
- (4) maintenance on an aircraft engine where the maintenance involves—
  - (i) dismantling and assembly of a piston engine except where this is to obtain access to the piston or cylinder assembly; or
  - (ii) dismantling and assembly of any main casing or main rotating assembly of a turbine engine, except where this is for the replacement of a main casing or rotating assembly, the maintenance manual for the engine provides instruction for the replacement, and the removal from the engine is achieved solely by disconnecting the flanges of main casings; or

(iii) disturbance of reduction gear:

- (5) aircraft propeller balancing other than in situ dynamic propeller balancing in accordance with the aircraft manufacturer's instructions:
- (6) maintenance on a helicopter where the maintenance involves the dismantling of any transmission gearbox, except where this is for separation of casings to obtain access for the purpose of internal inspection in accordance with the helicopter manufacturer's instructions.

(d) Paragraphs (b) and (c) shall not apply to an aircraft issued with a special category airworthiness certificate, or a microlight aircraft, glider, powered glider, or balloon.”

43.55 is amended by removing the notes.

43.57 to 43.75 inclusive are revoked and the following new rules inserted:

***43.57 Annual and 100-hour inspections***

Each person performing an annual or 100-hour inspection required by Part 91 shall perform the tests and inspections listed in Appendix C.

***43.59 Radio station tests and inspections***

Each person performing an inspection of an aircraft radio station required by Part 91 shall perform the tests and inspections listed in Appendix B.

***43.61 Altimeter system tests and inspections***

Each person performing an inspection of the altimeter system required by Part 91 shall perform the tests and inspections listed in Appendix D.

***43.63 SSR transponder tests and inspections***

Each person performing an inspection of the SSR transponder required by Part 91 shall perform the tests and inspections listed in Appendix E.

***43.65 Emergency locator transmitter tests and inspections***

Each person performing an inspection of the emergency locator transmitter required by Part 91 shall perform the tests and inspections listed in Appendix F.

**43.67 Non-destructive testing**

Each person performing maintenance on an aircraft or aircraft component where the applicable maintenance data requires a non-destructive test using fluorescent penetrant, magnetic particle, eddy current, ultrasonic or radiography methods shall—

- (1) hold a certificate issued by the CBIP, appropriate to the technique being used, or an equivalent certificate acceptable to the Director; and
- (2) perform the non-destructive testing using appropriate methods, techniques and practices acceptable to the Director.

**43.69 Maintenance records**

(a) Each person performing maintenance on an aircraft or component shall record, on completion of the maintenance—

- (1) details of the maintenance including, where applicable the identity of the inspection, and any technical data used; and
- (2) for a component removed or fitted—
  - (i) its description; and
  - (ii) its part number and serial number, if any; and
  - (iii) the references to the applicable CAA Form One or other release documentation; and
- (3) details of measurements or test results obtained, including the results of any ground or air tests; and
- (4) for the altimeter system test and inspection, the date and maximum altitude to which the altimeter has been tested; and
- (5) the date of completion; and
- (6) the name of the person completing the maintenance, if other than the person certifying release to service; and
- (7) the location and, where applicable, the name of the facility where the maintenance was carried out; and

(8) where maintenance has been performed as a consequence of the failure of any part, or damage caused by forced landing, other incident, or accident, the reasons for performing the maintenance.

(b) The person performing the maintenance shall—

(1) record the details required by paragraph (a) in the appropriate logbook or in a maintenance record acceptable to the Director; and

(2) record the details legibly and in ink or other permanent material; and

(3) where worksheets or other associated maintenance records are used to document the detail of the maintenance task reference those records in—

(i) the logbook; or

(ii) the maintenance record acceptable to the Director.”

43.101 is amended by inserting the words “to service” after the word “release” in the title.

43.101 is amended by revoking paragraph (b) and inserting the following new paragraph (b):

“(b) A person may certify a glider or glider component for release to service after maintenance if the person is authorised by the holder of an aviation recreation organisation certificate issued under Part 149 to certify maintenance on a glider or glider component.”

43.103 is amended by inserting the following new paragraph (c):

“(c) Where the acceptable technical data for a modification or repair to an aircraft or component includes changes to the operating limitations or flight data in the aircraft flight manual, the certifying person shall not certify the release to service until the changes have been incorporated into the flight manual.”

43.105 to 43.113 inclusive are revoked and the following new rules inserted:

***“43.105 Certifying after maintenance***

(a) Each person who certifies an aircraft or component for release to service after maintenance shall enter in the logbook or other record required by 43.69(b)(1)—

(1) a statement of release to service—

- (i) after the recorded details required by 43.69; and
- (ii) that indicates that the work recorded has been carried out in accordance with the New Zealand Civil Aviation Rules and in respect of that work the aircraft or component is fit for release to service; and

(2) beside the statement of release to service—

- (i) their signature; and
- (ii) their licence, approval, or authorisation number; and
- (iii) the date of entry.

(b) Where a component is not installed on, or allocated to, an aircraft, the person certifying release to service shall certify the release to service on—

(1) CAA Form One for a component that—

- (i) requires maintenance to be conducted under the authority of, and in accordance with the provisions of, a maintenance organisation certificate issued under Part 145; or
- (ii) is to be exported; or

(2) CAA Form Two.

***43.107 Inoperative equipment***

Each person who certifies an aircraft or component for release to service that includes equipment permitted to be inoperative under Part 91, shall—

- (1) provide the owner or operator with a list of the inoperative equipment; and
- (2) place a placard on each inoperative instrument and the cockpit controls of each item of inoperative equipment, marking each item *Inoperative*; and
- (3) enter in the logbook or other record required by 43.69(b)(1) a statement of release to service—
  - (i) after the recorded details required by 43.69; and
  - (ii) that indicates that the work recorded has been carried out in accordance with the New Zealand Civil Aviation Rules and in respect of that work the aircraft or component is fit for release to service.

#### **43.109 Discrepancies**

Each person performing an inspection required by an applicable operational rule who does not release the aircraft or component to service shall—

- (1) provide the owner or operator with a list of the discrepancies where the person finds that the aircraft is not in airworthy condition; and
- (2) enter in the logbook or other record required by 43.69(b)(1) a statement—
  - (i) after the recorded details required by 43.69; and
  - (ii) that indicates that the aircraft or component is not fit for release to service; and
- (3) enter beside the statement—
  - (i) their signature; and
  - (ii) their licence, approval, or authorisation number; and
  - (iii) the date of entry.

**43.111**

*[Reserved]*

**43.113 Duplicate inspection of controls**

(a) A person shall not certify an aircraft or component for release to service after the initial assembly, subsequent disturbance, or adjustment of any part of an aircraft control system or component control system unless a duplicate safety inspection of the control system has been performed that includes—

- (1) an inspection after maintenance by a person authorised under 43.101 to certify the release to service of the control system; and
- (2) a second inspection by another person who—
  - (i) has adequate training, knowledge and experience to carry out the second inspection; and
  - (ii) is nominated by the person specified in subparagraph (1).

(b) Each person who certifies a duplicate safety inspection required by paragraph (a) shall enter in the logbook or other record required by 43.69(b)(1)—

- (1) a statement that indicates the aircraft control system or component control system is free from defects and operates correctly; and
- (2) beside the statement—
  - (i) their signature; and
  - (ii) their licence, approval, or authorisation number; and
  - (iii) the date of entry.”

Appendix A of Part 43 is revoked and the following new appendix inserted:



## **“Appendix A — Pilot Maintenance**

Maintenance on aircraft by a person authorised in accordance with 43.51(b) may include:

- (1) replacement of landing gear tyres or tail skid shoes:
- (2) greasing and lubrication that does not require disassembly other than removal of access panels, fairings, or cowls:
- (3) simple or temporary fabric patch repairs where—
  - (i) the repair is not applied to any flying control surface; and
  - (ii) the repair does not require the removal of any control surface or structural parts; and
  - (iii) the repair does not involve restringing or rib stitching:
- (4) restoration of damaged or worn decorative coatings and application of preservative or protective material to components, provided the work does not involve—
  - (i) removal or disassembly of any primary structure; or
  - (ii) disturbance of any operating system; or
  - (iii) control surface restoration, preservation, or protection:
- (5) simple or temporary repairs to fairings or non-structural cover plates:
- (6) replacing side windows, provided the work does not interfere with the structure or any operating system:
- (7) replacing the aircraft battery:
- (8) replacing fuses and lights:
- (9) GPS equipment maintenance including—
  - (i) the installation and removal of receivers provided the equipment has quick disconnect capabilities, any

- subsequent test requirements are built in to the equipment, and the applicable information for the installation and removal of the equipment is immediately available; and
  - (ii) the routine updating of database information:
- (10) replenishment of hydraulic fluid in hydraulic reservoirs:
- (11) compressor washing provided—
- (i) the installation of the wash equipment does not require the disassembly of any primary engine control system; and
  - (ii) the applicable information for the washing is immediately available and includes procedures for the installation and removal of any wash equipment and the safe operation of the engine during the wash runs and any necessary drying runs:
- (12) installation and removal of seats, doors, and role equipment provided—
- (i) the configuration of the aircraft with the particular equipment installed or removed has been approved; and
  - (ii) the aircraft flight manual incorporates the necessary information for the safe operation of the aircraft with the equipment installed or removed, including weight and balance data for each configuration; and
  - (iii) the applicable information for the installation and removal of the equipment is immediately available; and
  - (iv) no special tooling, special equipment, or subsequent inspection is required:
- (13) the completion of repetitive airworthiness directive inspections provided—

- (i) each flight control system that is inspected is flight tested in accordance with Part 91, Subpart G and re-inspected before the aircraft is released to service; and
- (ii) no special tooling or special equipment is required.”

Appendix B of Part 43 is revoked and the following new appendix inserted:

## **“Appendix B — Aircraft Radio Station Inspection**

Each person referred to in 43.59 shall—

- (1) examine the maintenance records for service history and compliance with the applicable maintenance rules; and
- (2) inspect and test the bonding of mounting racks and shock mounts for a maximum resistance of 0.05 ohms; and
- (3) inspect and test the complete radio station for interference between items of equipment; and
- (4) inspect and test the audio integration and intercom systems to ensure that—
  - (i) the residual noise level is below -30 dB in the absence of an audio input signal; and
  - (ii) with input signals of the normal magnitude, the ratio of wanted to unwanted output is not less than 45 dB; and
- (5) check that the VSWR of the transmission lines and aerials is less than 3:1 for the following:
  - (i) VHF Comm:
  - (ii) HF Comm (T/R to antenna coupler):
  - (iii) DME:
  - (iv) ELT; and
- (6) check that the system channelling is correct for the following:

- (i) VHF Comm:
  - (ii) HF Comm (T/R to antenna coupler):
  - (iii) ILS:
  - (iv) VOR:
  - (v) DME; and
- (7) inspect and test the VHF Comm system to ensure that the performance of the system is acceptable during normal operation; and
- (8) inspect and test the HF Comm system to ensure that—
- (i) the antenna integrity and insulation resistance is acceptable; and
  - (ii) the performance of the system is acceptable during normal operation; and
- (9) inspect and test the operation of ADF including—
- (i) testing the sense antenna for integrity and insulation resistance; and
  - (ii) testing the audio function; and
- (10) inspect and test the operation of ILS receivers with a field test set, including—
- (i) testing flag warnings for modulation failure, centre line and glide path accuracies, sense, and course widths; and
  - (ii) testing the audio function; and
- (11) inspect and test the operation of VOR with a field test set, including—
- (i) testing flag warnings for modulation failure; and

- (ii) omni-radial resolving, and radio magnetic indicators, accuracy at 30° intervals; and
  - (iii) carrying out  $\pm 1^\circ$  test for freedom of meter movement, sense, and course width; and
  - (iv) testing the audio function; and
- (12) inspect and test the operation of the marker receiver with a field test set including—
- (i) testing operations of 400, 1300 and 3000 Hz tones and associated lamps; and
  - (ii) where fitted, operation of hi/lo sensitivity; and
- (13) inspect and test the operation of DME with a field test set, including—
- (i) testing range accuracy and ground speed readings; and
  - (ii) testing the audio function.”

Appendix C of Part 43 is revoked and the following new appendix inserted:

## **“Appendix C—Annual and 100-hour Inspection**

This appendix applies to persons referred to in 43.57.

### **C.1 General**

- (a) The aircraft and its components shall first be thoroughly cleaned.
- (b) The inspection shall be a thorough functional and visual check of the designated system, component, assembly, or installation.
- (c) The inspection shall be conducted with all applicable inspection panels, access doors, cowls, and detachable fairings and fillets, removed.

### **C.2 Inspections**

- (a) All items shall be inspected for general condition that includes, as applicable, the following:

- (1) correct operation, full and free movement in the correct sense:
- (2) correct rigging, alignment, and tension:
- (3) appropriate lubrication:
- (4) correct fluid quantities or levels:
- (5) correct gaseous pressures:
- (6) security and cleanliness:
- (7) legibility and correctness of markings and placards:
- (8) wear within acceptable limits:
- (9) no loose or missing fasteners:
- (10) vents free from obstruction:
- (11) correct clearance:
- (12) bonding straps correctly positioned, undamaged, and secure:
- (13) freedom from excessive—
  - (i) leakage; and
  - (ii) corrosion or deterioration of protective treatments; and
  - (iii) cracks and disbonds; and
  - (iv) deformation, scoring, chafing, flat spots, and fraying; and
  - (v) obstruction or other obvious damage; and
  - (vi) burning, arcing, or heat damage.

(b) The following items shall be inspected using the following criteria and the general inspection criteria contained in paragraph (a):

- (1) the components of the fuselage and hull group including—

- (i) fabric and skin for deterioration, distortion, and other evidence of failure, and defective or insecure attachment of fittings; and
  - (ii) systems and components for improper installation, apparent defects, and unsatisfactory operation:
- (2) the components of the cabin and cockpit group including—
- (i) cabin and cockpit generally for uncleanliness and loose equipment that might foul the controls; and
  - (ii) cabin heating systems for sources of carbon monoxide contamination; and
  - (iii) seats and safety belts for poor condition, apparent defects, and security of adjustment devices; and
  - (iv) windows and windshields for deterioration and breakage; and
  - (v) instruments for poor condition, mounting, marking, and, where practicable, improper operation; and
  - (vi) flight and engine controls for improper installation and improper operation; and
  - (vii) batteries for improper installation and improper charge; and
  - (viii) emergency exits for improper operation; and
  - (ix) all systems for improper installation, poor general condition, apparent or obvious defects, and insecurity of attachment:
- (3) the components of the engine and nacelle group including—
- (i) the engine section for visual evidence of excessive oil, fuel, or hydraulic leaks, and sources of such leaks; and

- (ii) studs and nuts for improper torquing or obvious looseness, and obvious defects; and
  - (iii) the engine for metal particles or foreign matter on screens and sump drain plugs and if there is weak cylinder compression, for improper internal condition and improper internal tolerances; and
  - (iv) engine mounts for cracks and looseness of mount to engine and airframe; and
  - (v) flexible vibration dampeners for poor condition and deterioration; and
  - (vi) engine controls for defects, improper travel, and improper safety; and
  - (vii) lines, hoses, and clamps for leaks, improper condition, and looseness; and
  - (viii) exhaust stacks for cracks, defects, and improper attachment; and
  - (ix) accessories for apparent defects and insecurity of mounting; and
  - (x) all systems for improper installation, poor general condition, defects, and insecure attachments; and
  - (xi) cowlings for cracks and defects:
- (4) the components of the landing gear group including—
- (i) all units for poor condition and insecurity of attachment; and
  - (ii) linkages, trusses, and members for undue or excessive wear, fatigue, and distortion; and
  - (iii) shock absorbing devices for improper charge; and



- (iv) the retracting and locking mechanism for improper operation; and
  - (v) hydraulic lines for leakage; and
  - (vi) the electrical system for chafing and improper operation of switches; and
  - (vii) wheels for cracks, defects, and condition of bearings; and
  - (viii) tyres for wear and cuts; and
  - (ix) brakes for improper adjustment; and
  - (x) floats and skis for apparent or obvious defects and insecurity of attachment:
- (5) all components of the wing and centre section assembly for poor general condition, fabric or skin deterioration, distortion, evidence of failure, and insecurity of attachment:
- (6) all components and systems that make up the complete empennage assembly for poor general condition, fabric or skin deterioration, distortion, evidence of failure, improper component installation, improper component operation, and insecurity of attachment:
- (7) the components of the propeller group including—
- (i) propeller assembly for cracks, nicks, binds, and oil leakage; and
  - (ii) bolts for improper torquing and lack of safety; and
  - (iii) anti-icing devices for improper operation and obvious defects; and
  - (iv) control mechanisms for condition, improper operation, insecure mounting, and restricted travel; and

- (v) all components for improper installation, poor general condition, apparent or obvious defects, and insecurity of attachment:
- (8) the components of the radio group including—
  - (i) radio and electronic equipment for improper installation and insecure mounting; and
  - (ii) wiring and conduits for improper routing, insecure mounting, and obvious defects; and
  - (iii) bonding and shielding for improper installation and poor condition; and
  - (iv) antenna, including trailing antenna, for poor condition, insecure mounting, and improper operation:
- (9) for a helicopter, systems and components for improper operations and obvious defects that include—
  - (i) the drive shafts and similar systems; and
  - (ii) transmission system components; and
  - (iii) main rotors; and
  - (iv) auxillary rotors:
- (10) each installed miscellaneous item that is not otherwise covered by this listing for improper installation and improper operation.”

Appendix D of Part 43 is revoked and the following new appendix inserted:

**“Appendix D—Altimeter System Tests and Inspections**

This appendix applies to persons referred to in 43.61.

***D.1 The static pressure system test:***

- (a) Ensure freedom from entrapped moisture and restrictions.
- (b) Ensure the leakage is within the following established tolerances:

(1) For unpressurised aeroplanes:

- (i) **Method:** Evacuate any static pressure system incorporating a static port to a pressure differential of approximately 1 inch of mercury or to a reading, on the altimeter, 1000 feet above the aircraft elevation at the time of the test:
- (ii) **Tolerance:** Without additional pumping for a period of 1 minute, the loss of indicated altitude shall not exceed 100 feet on the altimeter:

(2) For pressurised aeroplanes:

- (i) **Method:** Evacuate the static pressure system until a pressure differential equivalent to the maximum cabin differential for which the aeroplane is type certificated is achieved:
- (ii) **Tolerance:** Without additional pumping for a period of 1 minute, the loss of indicated altitude must not exceed 2 per cent of the equivalent altitude of the maximum cabin differential pressure or 100 feet, whichever is the greater:

(c) Determine that the static port heater, if installed, is operable.

(d) 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.

**D.2 The altimeter test:**

(a) Unless otherwise specified each test for performance may be conducted with the instrument subjected to vibration.

(b) When tests are conducted with the temperature substantially different from an ambient temperature of approximately 25 degrees Celsius allowance should be made for the variation from the specified condition.

(c) Altimeter tests shall be carried out in accordance with the following:

**Scale error:**

- (1) The altimeter shall, with the barometric pressure scale at 1013.25 millibars, be subjected successively to pressures corresponding to the altitude listed in Table 1 up to the maximum normally expected operating altitude of the aircraft in which the altimeter is to be installed:
- (2) The reduction in pressure shall be made at a rate not exceeding 20 000 feet per minute to within approximately 2000 feet of the test point:
- (3) The test point shall be approached at a rate compatible with the test equipment:
- (4) 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:
- (5) The error at all test points shall not exceed the tolerances listed in Table 1:

**Hysteresis:**

- (6) 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 tests prescribed in paragraph (b)(1)-(5) and the hysteresis test shall commence while the altimeter is at this pressure:
- (7) Pressure shall be increased at a rate simulating a descent in altitude at the rate of 5000 to 20 000 feet per minute until within 3000 feet of the first test point which is 50 % of maximum altitude:
- (8) The test point shall then be approached at a rate of approximately 3000 feet per minute:
- (9) 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:
- (10) 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 which is 40 % of maximum altitude is reached:

- (11) 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:
- (12) After the reading has been taken, the pressure shall be increased further, in the same manner as before, until atmospheric pressure is reached:
- (13) The reading of the altimeter at either of the two test points shall not differ by more than the tolerance specified in Table 2 from the reading of the altimeter for the corresponding altitude recorded during the scale error test prescribed in paragraph (b)(1)-(5):

**After effect:**

- (14) Not more than 5 minutes after the completion of the hysteresis test prescribed in paragraph (b)(6)-(13), 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 2:

**Friction:**

- (15) The altimeter shall be subjected to a steady rate of decrease of pressure approximating 750 feet per minute.
- (16) At each altitude listed in Table 3, the change in reading of the pointers after vibration shall not exceed the corresponding tolerance listed in Table 3:

**Case leak:**

- (17) 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 2 during an interval of 1 minute:

**Barometric scale error:**

(18) 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 4, and shall cause the pointer to indicate the equivalent altitude shown in Table 4 with a tolerance of 25 feet.

(d) Altimeters that are of 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.

***D.3 The automatic pressure altitude reporting equipment and ATC transponder system integration test:***

(a) Each test shall be conducted in accordance with paragraph (b).

(b) 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.

(c) The difference between the automatic reporting output and the altitude displayed at the altimeter shall not exceed 125 feet.

**TABLE 1— SCALE ERROR**

-1000	1050.406	20	14 000	595.239	100
0	1013.250	20	16 000	549.152	110
500	995.075	20	18 000	505.998	120
1000	977.166	20	20 000	465.633	130
1500	959.518	25	22 000	427.915	140
2000	942.129	30	25 000	376.009	155

3000	908.117	30	30 000	300.896	180
4000	875.105	35	35 000	238.423	205
6000	811.996	40	40 000	187.539	230
8000	752.624	60	45 000	147.477	255
10 000	696.817	80	50 000	115.972	280
12 000	644.408	90			

**TABLE 2 — TEST TOLERANCES**

Case Leak Test	100
First test point (50% of maximum altitude)	75
Second test point (40% of maximum altitude)	75
After effect test	30

**TABLE 3 — FRICTION**

1000	70
2000	70
3000	70
5000	70

**TABLE 4 — PRESSURE ALTITUDE**

951.55	-1727
965.10	-1340
982.03	-863
998.96	-392

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

1013.25	0
1032.82	+531
1046.37	+893
1049.41	+974

Appendix E of Part 43 is revoked and the following new appendix inserted:

### **“Appendix E—ATC Transponder Tests and Inspections**

This appendix applies to persons referred to in 43.63.

#### ***E.1 General***

- (a) The ATC transponder tests may be conducted using a bench check or portable test equipment.
- (b) 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.
- (c) For Mode S, operate the test equipment at a nominal rate of 50 Mode S interrogations per second.
- (d) An additional 3 dB loss is allowed to compensate for antenna coupling errors during receiver sensitivity measurements conducted in accordance with E.4 (b) below when using portable test equipment.



**E.2 Radio reply frequency test**

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

**E.3 Suppression test**

- (a) When classes 1B and 2B ATCRBS Transponders, or Classes 1B, 2B, and 3B Mode S transponders are interrogated at a rate between 230 and 1000 Mode 3/A 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 1200 Mode 3/A interrogations per second—
  - (1) verify that the transponder does not respond to more than 1 % of ATCRBS interrogations when the amplitude of  $P_2$  pulse is equal to the  $P_1$  pulse; and
  - (2) verify that the transponder replies to at least 90 % of ATCRBS interrogations when the amplitude of the  $P_2$  pulse is 9 dB less than the  $P_1$  pulse.
- (b) 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.

**E.4 Receiver sensitivity test**

- (a) Verify that, for any class of ATCRBS Transponder, the minimum triggering level of the receiver for the system is  $-73 \pm 4$  dbm, or that for any class of Mode S transponder, the minimum triggering level of the receiver for Mode S format ( $P_6$  type) interrogations is  $-74 \pm 3$  dbm by use of a test set—

- (1) connected to the antenna end of the transmission line; or
  - (2) connected to the antenna terminal of the transponder with a correction for transmission line loss; or
  - (3) utilising radiated signals.
- (b) 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.

#### ***E.5 RF peak output power test***

Verify that the transponder RF output power is within the following specifications for the class of transponder using the conditions prescribed in E.4 (a):

- (1) For class 1A and 2A ATCRBS transponders, the minimum RF peak output power is at least 21.0 dbw (125 watts):
- (2) For class 1B and 2B ATCRBS transponders, the minimum RF peak output power is at least 18.5 dbw (70 watts):
- (3) 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, the minimum RF peak output power is at least 21.0 dbw (125 watts):
- (4) For class 1B, 2B, and 3B Mode S transponders, the minimum RF peak output power is at least 18.5 dbw (70 watts):
- (5) For any class of ATCRBS or any class of Mode S transponders, the maximum RF peak output power does not exceed 27.0 dbw (500 watts).

#### ***E.6 Mode S diversity transmission channel isolation test***

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 non-selected antenna by at least 20 dB.

**E.7 Mode S address test**

Interrogate the Mode S transponder using the correct address and at least two incorrect addresses and making the interrogations at a nominal rate of 50 interrogations per second and verify that it replies only to its assigned address.

**E.8 Mode S formats test**

- (a) Interrogate the Mode S transponder with UF for which it is equipped and verify that the replies are made in the correct format using the surveillance formats UF=4 and 5.
- (b) Verify that the altitude reported in the replies to UF=4 are the same as that reported in a valid ATCRBS Mode C reply.
- (c) 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, using the communication formats UF=20, 21, and 24.

**E.9 Mode S all-call interrogations test**

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).

**E.10 Mode S ATCRBS-only all-call interrogation test**

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.

**E.11 Mode S Squitter test**

Verify that the Mode S transponder generates a correct squitter approximately once per second.”

Appendix F of Part 43 is revoked and the following new appendix inserted:

**“Appendix F—Emergency Locator Transmitter Tests and Inspections**

Each person referred to in 43.65 shall—

- (1) inspect the beacon and mountings for general condition particularly for corrosion or corrosion deposits; and
- (2) test the impact switch for correct operation; and
- (3) test the transmitter output, using an appropriate test set, to ensure that the output meets the manufacturer's specification."

