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NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

14 CFR PARTS 21 AND 33 SELECTED PAPERS

(6 PAGES)

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must show compliance with the requirements of Part 25 of this chapter applicable to the limitations being changed.

[Doc. No. 5085, 29 FR 14567, Oct. 24, 1964, as amended by Amdt. 21–16, 32 FR 13262, Sept. 20, 1967; Amdt. 21–19, 32 FR 17851, Dec. 13, 1967; Amdt. 21–27, 34 FR 18363, Nov. 18, 1969; Amdt. 21–42, 40 FR 1033, Jan. 6, 1975; Amdt. 21–58, 50 FR 46877, Nov. 13, 1985; Amdt. 21–68, 55 FR 32860, Aug. 10, 1990; Amdt. 21–69, 56 FR 41051, Aug. 16, 1991]

Subpart E—Supplemental Type Certificates

SOURCE: Docket No. 5085, 29 FR 14568, Oct. 24, 1964, unless otherwise noted.

§ 21.111 Applicability.

This subpart prescribes procedural requirements for the issue of supplemental type certificates.

§ 21.113 Requirement of supplemental type certificate.

Any person who alters a product by introducing a major change in type design, not great enough to require a new application for a type certificate under § 21.19, shall apply to the Administrator for a supplemental type certificate, except that the holder of a type certificate for the product may apply for amendment of the original type certificate. The application must be made in a form and manner prescribed by the Administrator.

§ 21.115 Applicable requirements.

(a) Each applicant for a supplemental type certificate must show that the altered product meets applicable airworthiness requirements as specified in paragraphs (a) and (b) of § 21.101 and, in the case of an acoustical change described in § 21.93(b), show compliance with the applicable noise requirements of part 36 of this chapter and, in the case of an emissions change described in § 21.93(c), show compliance with the applicable fuel venting and exhaust emissions requirements of part 34 of this chapter.

(b) Each applicant for a supplemental type certificate must meet §§ 21.33 and 21.53 with respect to each change in the type design.

[Amdt. 21–17, 32 FR 14927, Oct. 28, 1967, as amended by Amdt. 21–42, 40 FR 1033, Jan. 6, 1975; Amdt. 21–52A, 45 FR 79009, Nov. 28, 1980; Amdt. 21–61, 53 FR 3540, Feb. 5, 1988; Amdt. 21–68, 55 FR 32860, Aug. 10, 1990; Amdt. 21–71, 57 FR 42854, Sept. 16, 1992]

§ 21.117 Issue of supplemental type certificates.

(a) An applicant is entitled to a supplemental type certificate if he meets the requirements of §§ 21.113 and 21.115.

(b) A supplemental type certificate consists of—

(1) The approval by the Administrator of a change in the type design of the product; and

(2) The type certificate previously issued for the product.

§ 21.119 Privileges.

The holder of a supplemental type certificate may—

(a) In the case of aircraft, obtain airworthiness certificates;

(b) In the case of other products, obtain approval for installation on certificated aircraft; and

(c) Obtain a production certificate for the change in the type design that was approved by that supplemental type certificate.

Subpart F—Production Under Type Certificate Only

SOURCE: Docket No. 5085, 29 FR 14568, Oct. 24, 1964, unless otherwise noted.

§ 21.121 Applicability.

This subpart prescribes rules for production under a type certificate only.

§ 21.123 Production under type certificate.

Each manufacturer of a product being manufactured under a type certificate only shall—

(a) Make each product available for inspection by the Administrator;

(b) Maintain at the place of manufacture the technical data and drawings necessary for the Administrator to determine whether the product and its parts conform to the type design;

(c) Except as otherwise authorized by the Aircraft Certification Directorate

Manager for the geographic area which the manufacturer is located, for products manufactured more than 6 months after the date of issue of the type certificate, establish and maintain an approved production inspection system that insures that each product conforms to the type design and is in condition for safe operation; and

(d) Upon the establishment of the approved production inspection system (as required by paragraph (c) of this section) submit to the Administrator a manual that describes that system and the means for making the determinations required by § 21.125(b).

[Doc. No. 5085, 29 FR 14568, Oct. 24, 1964, as amended by Amdt. 21–34, 35 FR 13008, Aug. 15, 1970; Amdt. 21–51, 45 FR 60170, Sept. 11, 1980; Amdt. 21–67, 54 FR 39291, Sept. 25, 1989]

§ 21.125 Production inspection system: Materials Review Board.

(a) Each manufacturer required to establish a production inspection system by § 21.123(c) shall—

(1) Establish a Materials Review Board (to include representatives from the inspection and engineering departments) and materials review procedures; and

(2) Maintain complete records of Materials Review Board action for at least two years.

(b) The production inspection system required in § 21.123(c) must provide a means for determining at least the following:

(1) Incoming materials, and bought or subcontracted parts, used in the finished product must be as specified in the type design data, or must be suitable equivalents.

(2) Incoming materials, and bought or subcontracted parts, must be properly identified if their physical or chemical properties cannot be readily and accurately determined.

(3) Materials subject to damage and deterioration must be suitably stored and adequately protected.

(4) Processes affecting the quality and safety of the finished product must be accomplished in accordance with acceptable industry or United States specifications.

(5) Parts and components in process must be inspected for conformity with the type design data at points in production where accurate determinations can be made.

(6) Current design drawings must be readily available to manufacturing and inspection personnel, and used when necessary.

(7) Design changes, including material substitutions, must be controlled and approved before being incorporated in the finished product.

(8) Rejected materials and parts must be segregated and identified in a manner that precludes installation in the finished product.

(9) Materials and parts that are withheld because of departures from design data or specifications, and that are to be considered for installation in the finished product, must be processed through the Materials Review Board. Those materials and parts determined by the Board to be serviceable must be properly identified and reinspected if rework or repair is necessary. Materials and parts rejected by the Board must be marked and disposed of to ensure that they are not incorporated in the final product.

(10) Inspection records must be maintained, identified with the completed product where practicable, and retained by the manufacturer for at least two years.

§ 21.127 Tests: aircraft.

(a) Each person manufacturing aircraft under a type certificate only shall establish an approved production flight test procedure and flight check-off form, and in accordance with that form, flight test each aircraft produced.

(b) Each production flight test procedure must include the following:

(1) An operational check of the trim, controllability, or other flight characteristics to establish that the production aircraft has the same range and degree of control as the prototype aircraft.

(2) An operational check of each part or system operated by the crew while in flight to establish that, during flight, instrument readings are within normal range.

(3) A determination that all instruments are properly marked, and that all placards and required flight manuals are installed after flight test.

(4) A check of the operati
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§ 21.128 Tests: aircraft eng

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(2) At least five hours of
rated maximum continuc
thrust. For engines hav
takeoff power or thrust
rated maximum continuc
thrust, the five-hour run
30 minutes at rated take
thrust.

(b) The test runs requi
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and using current types
thrust measuring equipme

[Doc. No. 5085, 29 FR 14568, (
amended by Amdt. 21–5, 32 F
1967]

§ 21.129 Tests: propellers.

Each person manufact
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acceptable functional test
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normal range of operation

§ 21.130 Statement of con

Each holder or licensee
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plicant must comply with the applicable requirements of §§21.139, 21.143, and 21.147.

§21.155 Transferability.

A production certificate is not transferable.

§21.157 Inspections and tests.

Each holder of a production certificate shall allow the Administrator to make any inspections and tests necessary to determine compliance with the applicable regulations in this subchapter.

§21.159 Duration.

A production certificate is effective until surrendered, suspended, revoked, or a termination date is otherwise established by the Administrator, or the location of the manufacturing facility is changed.

§21.161 Display.

The holder of a production certificate shall display it prominently in the main office of the factory in which the product concerned is manufactured.

§21.163 Privileges.

(a) The holder of a production certificate may—

(1) Obtain an aircraft airworthiness certificate without further showing, except that the Administrator may inspect the aircraft for conformity with the type design; or

(2) In the case of other products, obtain approval for installation on type certificated aircraft.

(b) Notwithstanding the provisions of §147.3 of this chapter, the holder of a production certificate for a primary category aircraft, or for a normal, utility, or acrobatic category aircraft of a type design that is eligible for a special airworthiness certificate in the primary category under §21.184(c), may—

(1) Conduct training for persons in the performance of a special inspection and preventive maintenance program approved as a part of the aircraft's type design under §21.24(b), provided the training is given by a person holding a mechanic certificate with appropriate airframe and powerplant ratings issued under part 65 of this chapter; and

(2) Issue a certificate of competency to persons successfully completing the approved training program, provided the certificate specifies the aircraft make and model to which the certificate applies.

[Doc. No. 23345, 57 FR 41368, Sept. 9, 1992]

§21.165 Responsibility of holder.

The holder of a production certificate shall—

(a) Maintain the quality control system in conformity with the data and procedures approved for the production certificate; and

(b) Determine that each part and each completed product, including primary category aircraft assembled under a production certificate by another person from a kit provided by the holder of the production certificate, submitted for airworthiness certification or approval conforms to the approved design and is in a condition for safe operation.

[Doc. No. 5085, 29 FR 14569, Oct. 24, 1964, as amended by Amdt. 21–64, 53 FR 48521, Dec. 1, 1988; Amdt. 21–70, 57 FR 41368, Sept. 9, 1992]

Subpart H—Airworthiness Certificates

SOURCE: Docket No. 5085, 29 FR 14569, Oct. 24, 1964, unless otherwise noted.

§21.171 Applicability.

This subpart prescribes procedural requirements for the issue of airworthiness certificates.

§21.173 Eligibility.

Any registered owner of a U.S.-registered aircraft (or the agent of the owner) may apply for an airworthiness certificate for that aircraft. An application for an airworthiness certificate must be made in a form and manner acceptable to the Administrator, and may be submitted to any FAA office.

[Amdt. 21–26, 34 FR 15244, Sept. 30, 1969]

§21.175 Airworthiness certificates: classification.

(a) Standard airworthiness certificates are airworthiness certificates issued for aircraft type certificated in the normal, utility, acrobatic, commuter, or transport category, and for

AUTHORITY: 49 U.S.C. 1344, 1354(a), 1355, 1421, 1423, 1424, 1425; 49 U.S.C. 106(g) (Revised Pub. L. 97–449, January 12, 1983).

SOURCE: Docket No. 3025, 29 FR 7453, June 10, 1964, unless otherwise noted.

NOTE: For miscellaneous amendments to cross references in this Part 33, see Amdt. 33–2, 31 FR 9211, July 6, 1966.

Subpart A—General

§ 33.1 Applicability.

(a) This part prescribes airworthiness standards for the issue of type certificates and changes to those certificates, for aircraft engines.

(b) Each person who applies under part 21 for such a certificate or change must show compliance with the applicable requirements of this part and the applicable requirements of part 34 of this chapter.

[Amdt. 33–7, 41 FR 55474, Dec. 20, 1976, as amended by Amdt. 33–14, 55 FR 32861, Aug. 10, 1990]

§ 33.3 General.

Each applicant must show that the aircraft engine concerned meets the applicable requirements of this part.

§ 33.4 Instructions for Continued Airworthiness.

The applicant must prepare Instructions for Continued Airworthiness in accordance with Appendix A to this part that are acceptable to the Administrator. The instructions may be incomplete at type certification if a program exists to ensure their completion prior to delivery of the first aircraft with the engine installed, or upon issuance of a standard certificate of airworthiness for the aircraft with the engine installed, whichever occurs later.

[Amdt. 33–9, 45 FR 60181, Sept. 11, 1980]

§ 33.5 Instruction manual for installing and operating the engine.

Each applicant must prepare and make available to the Administrator prior to the issuance of the type certificate, and to the owner at the time of delivery of the engine, approved instructions for installing and operating the engine. The instructions must include at least the following:

(a) *Installation instructions.* (1) The location of engine mounting attachments, the method of attaching the engine to the aircraft, and the maximum allowable load for the mounting attachments and related structure.

(2) The location and description of engine connections to be attached to accessories, pipes, wires, cables, ducts, and cowling.

(3) An outline drawing of the engine including overall dimensions.

(b) *Operation instructions.* (1) The operating limitations established by the Administrator.

(2) The power or thrust ratings and procedures for correcting for nonstandard atmosphere.

(3) The recommended procedures, under normal and extreme ambient conditions for—

(i) Starting;

(ii) Operating on the ground; and

(iii) Operating during flight.

[Amdt. 33–6, 39 FR 35463, Oct. 1, 1974, as amended by Amdt. 33–9, 45 FR 60181, Sept. 11, 1980]

§ 33.7 Engine ratings and operating limitations.

(a) Engine ratings and operating limitations are established by the Administrator and included in the engine certificate data sheet specified in § 21.41 of this chapter, including ratings and limitations based on the operating conditions and information specified in this section, as applicable, and any other information found necessary for safe operation of the engine.

(b) For reciprocating engines, ratings and operating limitations are established relating to the following:

(1) Horsepower or torque, r.p.m., manifold pressure, and time at critical

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(2) Fuel grade
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(ii) Oil at the
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and
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(3) Oil grade
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applicant;
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a supersonic e
state operatio
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engine;
(iv) Fuel at
the applicant;
(v) External
specified by th

the APU mode under the maximum conditions of engine speed, torque, temperature, air bleed, and power extraction as specified by the applicant.

(b) Dynamic braking: A total of 400 application-release cycles of brake engagements must be made in a manner which clearly demonstrates its ability to function without adverse effects on the complete engine under the maximum conditions of engine acceleration/deceleration rate, speed, torque, and temperature as specified by the applicant. The propeller must be stopped prior to brake release.

(c) One hundred engine starts and stops with the propeller brake engaged.

(d) The tests required by paragraphs (a), (b), and (c) of this section must be performed on the same engine, but this engine need not be the same engine used for the tests required by §33.87.

(e) The tests required by paragraphs (a), (b), and (c) of this section must be followed by engine disassembly to the extent necessary to show compliance with the requirements of §33.93(a) and §33.93(b).

[Amdt. 33–11, 51 FR 10346, Mar. 25, 1986]

§33.97 Thrust reversers.

(a) If the engine incorporates a reverser, the endurance calibration, operation, and vibration tests prescribed in this subpart must be run with the reverser installed. In complying with this section, the power control lever must be moved from one extreme position to the other in not more than one second except, if regimes of control operations are incorporated necessitating scheduling of the power-control lever motion in going from one extreme position to the other, a longer period of time is acceptable but not more than three seconds. In addition, the test prescribed in paragraph (b) of this section must be made. This test may be scheduled as part of the endurance run.

(b) 175 reversals must be made from flight-idle forward thrust to maximum reverse thrust and 25 reversals must be made from rated takeoff thrust to maximum reverse thrust. After each reversal the reverser must be operated at full reverse thrust for a period of one minute, except that, in the case of a reverser intended for use only as a braking means on the ground, the reverser need only be operated at full reverse thrust for 30 seconds.

[Doc. No. 3025, 29 FR 7453, June 10, 1964, as amended by Amdt. 33–3, 32 FR 3737, Mar. 4, 1967]

§33.99 General conduct of block tests.

(a) Each applicant may, in making a block test, use separate engines of identical design and construction in the vibration, calibration, endurance, and operation tests, except that, if a separate engine is used for the endurance test it must be subjected to a calibration check before starting the endurance test.

(b) Each applicant may service and make minor repairs to the engine during the block tests in accordance with the service and maintenance instructions submitted in compliance with §33.4. If the frequency of the service is excessive, or the number of stops due to engine malfunction is excessive, or a major repair, or replacement of a part is found necessary during the block tests or as the result of findings from the teardown inspection, the engine or its parts must be subjected to any additional tests the Administrator finds necessary.

(c) Each applicant must furnish all testing facilities, including equipment and competent personnel, to conduct the block tests.

[Doc. No. 3025, 29 FR 7453, June 10, 1964, as amended by Amdt. 33–6, 39 FR 35470, Oct. 1, 1974; Amdt. 33–9, 45 FR 60181, Sept. 11, 1980]

APPENDIX A TO PART 33—INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

A33.1 GENERAL

(a) This appendix specifies requirements for the preparation of Instructions for Continued Airworthiness as required by §33.4.

(b) The Instructions for Continued Airworthiness for each engine must include the Instructions for Continued Airworthiness for all engine parts. If Instructions for Continued Airworthiness are not supplied by the engine part manufacturer for an engine part, the Instructions for Continued Airworthiness for the engine must include the information essential to the continued airworthiness of the engine.

(c) The applicant must submit to the FAA a program to show how changes to the Instructions for Continued Airworthiness made by the applicant or by the manufacturers of engine parts will be distributed.

A33.2 FORMAT

(a) The Instructions for Continued Airworthiness must be in the form of a manual or manuals as appropriate for the quantity of data to be provided.

(b) The format of the manual or manuals must provide for a practical arrangement.

A33.3 CONTENT

The contents of the manual or manuals must be prepared in the English language. The Instructions for Continued Airworthiness must contain the following manuals or sections, as appropriate, and information:

(a) *Engine Maintenance Manual or Section.* (1) Introduction information that includes an explanation of the engine's features and data to the extent necessary for maintenance or preventive maintenance.

(2) A detailed description of the engine and its components, systems, and installations.

(3) Installation instructions, including proper procedures for uncrating, deinhibiting, acceptance checking, lifting, and attaching accessories, with any necessary checks.

(4) Basic control and operating information describing how the engine components, systems, and installations operate, and information describing the methods of starting, running, testing, and stopping the engine and its parts including any special procedures and limitations that apply.

(5) Servicing information that covers details regarding servicing points, capacities of tanks, reservoirs, types of fluids to be used, pressures applicable to the various systems, locations of lubrication points, lubricants to be used, and equipment required for servicing.

(6) Scheduling information for each part of the engine that provides the recommended periods at which it should be cleaned, inspected, adjusted, tested, and lubricated, and the degree of inspection the applicable wear tolerances, and work recommended at these periods. However, the applicant may refer to an accessory, instrument, or equipment manufacturer as the source of this information if the applicant shows that the item has an exceptionally high degree of complexity requiring specialized maintenance techniques, test equipment, or expertise. The recommended overhaul periods and necessary cross references to the Airworthiness Limitations section of the manual must also be included. In addition, the applicant must include an inspection program that includes the frequency and extent of the inspections necessary to provide for the continued airworthiness of the engine.

(7) Troubleshooting information describing probable malfunctions, how to recognize those malfunctions, and the remedial action for those malfunctions.

(8) Information describing the order and method of removing the engine and its parts and replacing parts, with any necessary precautions to be taken. Instructions for proper ground handling, crating, and shipping must also be included.

(9) A list of the tools and equipment necessary for maintenance and directions as to their method of use.

(b) *Engine Overhaul Manual or Section.* (1) Disassembly information including the order and method of disassembly for overhaul.

(2) Cleaning and inspection instructions that cover the materials and apparatus to be used and methods and precautions to be taken during overhaul. Methods of overhaul inspection must also be included.

(3) Details of all fits and clearances relevant to overhaul.

(4) Details of repair methods for worn or otherwise substandard parts and components along with the information necessary to determine when replacement is necessary.

(5) The order and method of assembly at overhaul.

(6) Instructions for testing after overhaul.

(7) Instructions for storage preparation, including any storage limits.

(8) A list of tools needed for overhaul.

A33.4 AIRWORTHINESS LIMITATIONS SECTION

The Instructions for Continued Airworthiness must contain a section titled Airworthiness Limitations that is segregated and clearly distinguishable from the rest of the document. This section must set forth each mandatory replacement time, inspection interval, and related procedure required for type certification. If the Instructions for Continued Airworthiness consist of multiple documents, the section required by this paragraph must be included in the principal manual. This section must contain a legible statement in a prominent location that reads: "The Airworthiness Limitations section is FAA approved and specifies maintenance required under §§ 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved."

[Amdt. 33–9, 45 FR 60181, Sept. 11, 1980, as amended by Amdt. 33–13, 54 FR 34330, Aug. 18, 1989]

PART 34—FUEL VENTING AND EXHAUST EMISSION REQUIREMENTS FOR TURBINE ENGINE POWERED AIRPLANES

Subpart A—General Provisions

Sec.

(6)

Federal Aviatio

Subpart B—Engir (New and In Engines)

Subpart C—E: Aircraft G

Subpart D—Ex Aircraft G

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Subpart H—Test Smoke Emiss Engines)

AUTHORITY: 42 106(g); 49 U.S.C. 1423.

SOURCE: Docket 10, 1990, unless oth

Subpart A—

§ 34.1 Definitio

As used in this herein shall have the Clean Air Act, et. seq.):