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Civil Aeronautics Manual 1

Certification, Identification

And Marking of

Aircraft and Related Products

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U. S. DEPARTMENT OF COMMERCE

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CIVIL AERONAUTICS ADMINISTRATION

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Introductory Note

Civil Aeronautics Manuals are published by the Civil Aeronautics Administration to supplement and explain the Civil Air Regulations. This manual contains rules, policies, and interpretations of the Administrator of Civil Aeronautics which pertain to the current requirements of Part 1 of the Regulations of the Civil Aeronautics Board, as amended to August 25, 1955. This manual will be revised from time to time as a result of amendments to Part 1, and as new manual material is found necessary to keep the public informed on acceptable means of showing compliance with the requirements of Part 1.

CAA *rules* are issued pursuant to authority conferred upon the Administrator in the Civil Air Regulations. Such rules are mandatory and must be complied with.

CAA *interpretations* define or explain words and phrases of the Civil Air Regulations. Such interpretations are for the guidance of the public and will be followed by the Administration in determining compliance with the regulations.

CAA *policies* provide recommended methods of complying with the Civil Air Regulations. Such policies are for the guidance of the public and are not mandatory in nature.

The Administrator's rules, interpretations, and policies set forth acceptable procedures and practices for the guidance of the public in complying with the regulations. Other methods or practices which provide equivalent safety to those specified by the Administrator will also be acceptable. Any provisions which are shown to be inapplicable in a particular case may be modified upon request.

The Table of Contents is arranged to show the title and number of each section of the regulations. CAA rules, policies or interpretations follow the pertinent section of the regulations and are identified by consecutive dash numbers appended to the regulation section number.

The text of this manual is arranged to set forth in bold type each numbered section of the Civil Air Regulations followed by related rules, policies, or interpretations of the Administrator. The Administrator's sections pertaining to a particular section of the Board's regulations are identified by consecutive dash numbers appended to the regulation section numbers. Thus section 1.0 means section 1.0 of the Civil Air Regulations, and section 1.0-2 means the second of the Administrator's sections under section 1.0.

This manual outlines the standard procedures for type, production, and airworthiness certification, and for the display of nationality and registration markings. Manufacturers utilizing the delegation option system as provided for in Part 410 of the Regulations of the Administrator will be guided by the rules, policies, and interpretations contained herein, except in those instances wherein regulations provided in Part 410 are at variance with procedures contained in this manual.

Civil Aeronautics Manuals and supplements thereto are published in the Federal Register which in turn is codified in the Code of Federal Regulations at the end of each year. Until such time as Federal Register material is picked up in the Code, reference to material published during a current year is cited by volume, page number and date. Thus, 21 F. R. 2086, May 25, 1956, means volume 21 of the Federal Register, page 2086, published on May 25, 1956.

In future supplements to this manual, the Federal Register publication date and effective date will appear in brackets at the end of each section revised or amended as a matter of information.

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Certification, Identification, and Marking of Aircraft

and Related Product

Applicability and Definitions

1.0 ***Applicability of this part.*** **This part establishes administrative requirements for the issuance of type, production, and airworthiness certificates, and for the identification and marking of aircraft and related products.**

1.1 ***Definitions*****. As used in this part, terms are defined as follows:**

(a) ***Administration*****.**

(1) ***Administrator*****. The Administrator is the Administrator of Civil Aeronautics.**

(2) ***Applicant*****. An applicant is a person or persons applying for approval of an aircraft or any part thereof.**

(3) ***Approved*****. Approved, when used alone or as modifying terms such as means, devices, specifications, etc., shall mean approved by the Administrator.**

(4) ***Authorized representative of the Administrator*****. An authorized representative of the Administrator means any employee of the Civil Aeronautics Administration or any private person, authorized by the Administrator to perform any of the duties delegated to the Administrator by the provisions of this part.**

(5) ***Person*****. Person means any individual, firm, copartnership, corporation, company, association, joint-stock association, or body politic; and includes any trustee, receiver, assignee, or other similar representative thereof.** [1]

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[1] **As defined in section 1 of the Civil Aeronautics Act of 1938, as amended.**

(6) ***Prime manufacturer*****. A prime manufacturer means the person who initiated the design and construction of the product and who applied for the type certificate, or any person to whom a current right to reproduce the product has been transferred.**

(7) ***Subsidiary manufacturer*****. A subsidiary manufacturer means the person who contracted with the prime manufacturer to produce and to supply to the prime manufacturer major assemblies and components which are manufactured in conformity with the prime manufacturer's approved drawings and data for the fabrication of the product.**

(8) ***United States*****. United States means the several States, the District of Columbia, and the several Territories and possessions of the United States, including the Territorial waters and the overlying air space thereof.** [1]

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[1] **As defined in section 1 of the Civil Aeronautics Act of 1938, as amended.**

(b) ***Design*****.**

(1) ***Aircraft*****. An aircraft means any contrivance now known or hereafter invented, used, or designed for navigation of or flight in the air.** [1]

[1] As defined in section 1 of the Civil Aeronautics Act of 1938, as amended.

(2) *Aircraft engine*. An aircraft engine means an engine used, or intended to be used, for propulsion of aircraft and includes all parts, appurtenances, and accessories thereof other than propellers. [1]

[1] As defined in section 1 of the Civil Aeronautics Act of 1938, as amended.

(3) *Appliances*. Appliances mean instruments, equipment, apparatus, parts, appurtenances, or accessories, of whatever description, which are used, or are capable of being or intended to be used, in the navigation, operation, or control of aircraft in flight (including parachutes and including communication equipment and any other mechanism or mechanisms installed in or attached to aircraft during flight), and which are not a part or parts of aircraft, aircraft engines, or propellers. [1]

[1] As defined in section 1 of the Civil Aeronautics Act of 1938, as amended.

(4) *Product*. The term product, as used in this part, means: (i) An aircraft, (ii) an aircraft engine, (iii) a propeller, or (iv) any appliance specified in this subchapter (the Civil Air Regulations) as eligible for a type certificate.

(5) *Propeller*. A propeller includes all parts, appurtenances, and accessories there of. [2]

[2] As defined in section 1 of the Civil Aeronautics Act of 1938, as amended.

1.2 *Type design*. The type design shall consist of such drawings and specifications as are necessary to disclose the configuration of the product and all the design features covered in the requirements of that part of the regulations in this subchapter under which the product is certificated, such inforation on dimensions, materials, and processes as is necessary to define the structural strength of the product, and such other data as are necessary to permit by comparison the determination of the airworthiness of subsequent products of the same type.

Type Certificates

1.10 *Application*. Any person, whether or not a citizen of the United States, may apply for the issuance of a type certificate. The application for a type certificate for a specified product shall be made upon a form and in a manner prescribed by the Administrator.

1.10-1 *Application for aircraft type certificate (CAA rules which apply to sec. 1.10*).

(a) *Application for Aircraft Type Certificate, Form ACA-312.*[1] This application shall be submitted in duplicate by the applicant to the appropriate regional office of the Civil Aeronautics Administration.

[1] Samples of forms referred to in this manual may be found in appendix A.

The application shall be accompanied by a three-view drawing and such preliminary basic data as the applicant may have available.

(b) *Application for an Engine Type Certificate, Form ACA-312*. This application shall be submitted in duplicate, together with preliminary technical data as required by Part 13 of this subchapter, to the Aircraft Engineering Division, Civil Aeronautics Administration, Washington 25, D. C.

(c) *Application for a Propeller Type Certificate, Form ACA-312*. This application, together with Form ACA-335, Propeller Supplement to Application for Type Certificate, ACA - 312, shall be submitted in duplicate to the Aircraft Engineering Division, Civil Aeronautics Administration, Washington 25, D. C.

The Form ACA-335 shall contain a description of the design features, the proposed ruling, and intended application of the propeller.

The preliminary data as required in Part 14 of this subchapter, and the application forms shall be submitted prior to starting any portion of the official type test.

NOTE. -- The application, Form ACA-312, serves as a formal request by the applicant and shall be submitted for each new model eligible for approval under the terms of a type certificate.

1.11 *Products for which issued*. A type certificate may be issued for an aircraft, aircraft engine, propeller, or any appliance for which certification is provided elsewhere in this subchapter.

1.11-1 *Appliances (CAA policies which apply to sec. 1.11*).

(a) *Appliances*. Inasmuch as Part 15 of the Civil Air Regulations of this subchapter has been rescinded, that portion of section 1.11 of the Civil Air Regulations of this subchapter relating to appliances is no longer applicable except as provided in paragraph (b) of this section. Appliances formerly type certificated under the provisions of Part 15 are now accepted by the Administrator for use on civil aircraft of the United States, if the appliance complies with a Technical Standard Order issued by the Administrator, or is approved as part of a product which is type certificated.

(b) *Radio equipment*. Radio equipment for which a Technical Standard Order has not been issued may be type certificated under the provisions of Part 16 of this subchapter.

1.12 Requirements for issuance. A type certificate for a product shall be issued when:

(a) The applicant has submitted the type design (see sec. 1.2), test reports, and computations as may be required by that part of the regulations in this subchapter under which the product is to be certificated.

(b) Upon examination of the type design and the completion of all tests and inspections, the Administrator finds that the type design meets the requirements of the applicable regulations in this subchapter.

1.12-1 *Requirements for issuance of type certificates (CAA policies which apply to sec. 1.12*).

(a) The requirements for the issuance of a type certificate for a product may be found in the following parts of the Civil Air Regulations:

(1) Part 3. Airplane Airplane Airworthiness Normal, Utility, and Acrobatic Categories.

(2) Part 4b. Airplane Airworthiness Transport Categories.

(3) Part 5. Glider Airworthiness.

(4) Part 6. Rotorcraft Airworthiness.

(5) Part 8. Aircraft Airworthiness Restricted Category

(6) Part 9. Aircraft Airworthiness Limited Category.

(7) Part 10. Certification and approval of Imported Aircraft and Related Products.

(8) Part 13. Aircraft Engine Airworthiness.

(9) Part 14. Aircraft Propeller Airworthiness.

(10) Part 16. Aircraft Radio Equipment Airworthiness.

1.12-2 *Inspection of prototype (CAA policies which apply to sec. 1.15-1 (b)*).

The inspections set forth in section 1.15-1 (a) will apply to the product for which a type certificate is requested.

1.13 *Location of manufacturing facilities*. No type certificate for a product shall be issued if the manufacturing facilities therefor are located outside the United States unless where facilities are located outside the United States the Administrator finds that no undue burden on the Government is created in administering applicable requirements of the act or regulations issued thereunder.

1.14 *Transferability*. A type certificate may be transferred or made available to third persons by licensing agreements, and the grantor shall immediately notify the Administrator in writing of any transfer, licensing agreement, or termination thereof. The provisions of section 1.13 shall be complied with.

1.14-1 *Transferability (CAA interpretations which apply to sec. 1.14*).

(a) The CAA and the manufacturer to whom the type certificate is issued are the first and second persons involved, and any other person to whom the type certificate holder may transfer privileges incidental to the type certificate is the "third person."

1.15 *Inspections and tests*.

(a) A representative of the Administrator shall be permitted to make such inspections and, in the case of aircraft, flight tests as may be necessary to determine compliance with applicable requirements.

(b) A product manufactured under a type certificate only shall be required to undergo inspection by a representative of the Administrator to determine whether individual products conform with the type design.

(c) The manufacturer of a product being manufactured under a type certificate only shall maintain at the place of manufacture such technical data and drawings as may be necessary to determine whether the product or any part thereof conforms to the current type design.

(d) A manufacturer producing a product under the terms of a type certificate without a related production certificate shall provide, for products manufactured after six months from the date of issuance of the type certificate, a production inspection system approved by the Administrator which will give assurance that each article produced is in conformity with the type design and is in a condition for safe operation.

1.15-1 *Inspections and tests (CAA policies which apply to sec. 1.15*).

(a) *Prototype inspection*. Each product presented for type certification will be subjected to such conformity

inspections, investigations of the workmanship and fabrication processes, and the witnessing of such structural endurance and operational tests as may be deemed necessary by the Civil Aeronautics Administration to assure that the product meets applicable requirements and is eligible for a type certificate. The inspection of test articles and the prototype will be conducted after acceptance by the manufacturer's inspectors. [2]

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[2] The CAA inspections are not intended to duplicate the manufacturer's inspections, but rather to verify the effectiveness and accuracy of his inspections. The CAA verification will consist of sampling inspections such as witnessing certain inspections and tests conducted by the manufacturer, spot checking the manufacturer's inspection records, conducting sampling conformity inspections of critical parts or dimension., witnessing the assembly of major components and critical parts, and examination of the flight test report or operational log sheets. In addition, the inspection will include the checking of design features for compliance with the requirements which are not readily evaluated from the technical data, such as suitable inspection provisions, suitable provision for servicing and maintenance, and fits, tolerances, clearances, interferences, ventilation, drainage, etc. The frequency of the sampling inspections will depend, to a large extent, on the degree of conformity with the type design data and other requirements applicable to the particular product.

(b) *Fabrication inspection*. Subsequent to type certification parts, assemblies, or products fabricated by the prime, subsidiary, or subdivisional manufacturers operating under the terms of a type certificate only, will be subjected to inspection [2] by an authorized representative of the Administrator (hereinafter called CAA representative) while the articles are in an "inspectable" condition. Drawings and other technical data maintained at the place of manufacture should be made available by the manufacturer to the CAA representative to enable him to ascertain that the finished product, or any part thereof, conforms with the applicable requirements and current approved type design data. During the course of fabrication of all critical parts, major assemblies, and the final assembly of the product, the following will be ascertained: that the product is in conformity with the type design data; that fabrication processes and treatments are in conformity with pertinent specifications; and that workmanship and materials are acceptable. All parts, assemblies, and completed products checked by the CAA representative should bear record of having first been accepted by the manufacturer. At least the following inspections will be made by the CAA representative on aircraft, aircraft engines, propellers and major components to insure conformance with the applicable type certification data:

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[2] The CAA inspections are not intended to duplicate the manufacturer's inspections, but rather to verify the effectiveness and accuracy of his inspections. The CAA verification will consist of sampling inspections such as witnessing certain inspections and tests conducted by the manufacturer, spot checking the manufacturer's inspection records, conducting sampling conformity inspections of critical parts or dimension., witnessing the assembly of major components and critical parts, and examination of the flight test report or operational log sheets. In addition, the inspection will include the checking of design features for compliance with the requirements which are not readily evaluated from the technical data, such as suitable inspection provisions, suitable provision for servicing and maintenance, and fits, tolerances, clearances, interferences, ventilation, drainage, etc. The frequency of the sampling inspections will depend, to a large extent, on the degree of conformity with the type design data and other requirements applicable to the particular product.

(1) *Aircraft.* [3] An inspection for quality of workmanship, materials, processes and for conformity of critical and major parts with the type design data, such as the complete wing, fuselage, tail surfaces, major attachment fittings, primary controls, installation of the hydraulic, fuel, and electrical systems, and power-plant installations.

[3] Aircraft which pass the inspection set forth in this paragraph, and found to be in condition for safe operation, are eligible to receive an original airworthiness certificate issued under the authority of section 1.67 (b).

(i) Each aircraft should be weighed to determine the empty weight and c. g. and the report should be submitted when the aircraft is presented for airworthiness certification.

(ii) Aircraft manufactured under a type certificate only are required by section 1.15-4 (d) to be flight tested at the manufacturer's plant by, or under the supervision of, a CAA Aviation Safety Agent.

(iii) Upon completion of the inspection and flight test at the manufacturer's plant, the aircraft may be shipped unassembled, provided Approval Tags, Form ACA 186, signed by the CAA representative, are attached to all major assemblies, components, and boxes of parts. These will indicate the make, model and serial number of the aircraft.

(2) *Aircraft engines*. An inspection for quality of workmanship, materials, processes, and conformity of critical and major parts with the type design data, including such internal inspections and examination after completion of the engine test run (see sec. 1.15-4 (e)) as may be necessary to ascertain that no unsafe conditions exist. Enough of the operation tests of each engine should be witnessed to determine that the operational characteristics are in conformity with the type design data.

(3) *Propellers*. An inspection for quality of workmanship, materials, processes, and conformity of critical and major parts with the type design data. In the case of variable pitch propellers, enough of the operation tests of each propeller should be witnessed to determine that the propeller will operate properly throughout the approved range of operation (see sec. 1.15-4 (f)).

(4) *Major components*. Any major spare or replacement component of an aircraft, aircraft engine, or propeller manufactured under a type certificate only will be subjected to inspection for conformity and airworthiness by a CAA representative at the manufacturer's plant. The conformity, quality, and acceptability of major components and critical parts manufactured by a subsidiary manufacturer in accordance with the prime manufacturer's approved drawings will be determined in accordance with section 1.34-2 (a) (11), except that a CAA representative will conduct such additional inspections as may be deemed necessary to assure conformity, compliance, and acceptability of materials and workmanship.

(c) *Evidence of inspection approval*. When products, or major components, other than complete aircraft or communication equipment, are manufactured under the terms of a type certificate only, the CAA representative, having determined by inspection that the product or component is acceptable, will prepare and attach thereto, an Approval Tag, Form ACA-186. This tag will show the make, model, and serial number of the product, and will be signed by the CAA representative.

1.15-2 *Production test flight authorization (CAA policies which apply to sec. 1.15*).

(a) To facilitate compliance by manufacturers with related provisions of section 43.10. the reverse side of the Dealer's Aircraft Registration Certificate, Form ACA-1707, will be used to provide flight authorization for production flight testing prior to the initial issuance of individual airworthiness certificates. [4] This flight authorization is provided for the convenience of manufacturers, and has no connection with the issuance, validity, or continuation of the Dealer's Aircraft Registration Certificate. The flight authorization is limited to production test flights, and does not provide for prototype or experimental flight testing. The flight authorization will be issued at the time the Dealer's Aircraft Registration Certificate is issued. The Application for Dealer's Aircraft Registration Certificate(s), Form ACA-1706, contains a section for the use of manufacturers in applying for authorization to conduct production flight tests.

[4] A new aircraft, in which a manufacturer's special Flight Authorization, Form ACA-1707, is displayed, may be given a production flight test subject to the following operations limitations which are specified on such form:

Flights, except takeoffs and landings, prohibited over thickly populated areas or large gatherings of people. No flight shall be conducted for hire or reward. Cross-country flights prohibited. Occupancy of the aircraft restricted to personnel essential to the purpose of the flights.

(b) Aircraft to be flown for production flight tests, which are intended for U. S. registration and certification, are required to display the appropriate U. S. identification markings in accordance with sections 1.100 through 1.108.

(c) New aircraft intended for export should display the appropriate foreign identification markings during the production flight testing. If these markings are not available, the aircraft may display temporarily assigned U. S. identification markings.

1.15-3 *Logging of production aircraft flight test time (CAA policies which apply to sec. 1.15 (d)*).

(a) Production flight test time [5] will be recorded on the flight test check-off form. It need not be made a part of the aircraft or aircraft engine logbooks.

[5] All other flight test time, including accelerated service flight testing of prototype or modified aircraft after airworthiness certification, must be recorded in accordance with section 43.23 of this subchapter.

1.15-4 *Production inspection system (CAA rules which apply to sec. 1.15 (d)*).

(a) *General*. The production inspection system established in compliance with section 1.15 shall thereafter be maintained to assure that parts, assemblies, and the completed products are in conformity with approved type design data and are in condition for safe operation. The inspection system established shall be adequate to preclude the installation of unacceptable materials and parts in the finished product. (Statistical quality control procedures may be employed where it is shown that a satisfactory level of quality will be maintained for the particular materials or parts involved.)

(b) *Materials review.* The production inspection system shall include materials review procedures and a Materials Review Board to process parts and materials withheld because of departure from design data or specifications, but which may be serviceable, when such with held items are to be considered for installation in the product. (See secs. 1.34-2 (a) (5) and (6) for procedures.)The Materials Review Board shall consist at least of representatives from the inspection and engineering departments. Parts and materials which are determined by the Materials Review Board to be serviceable shall be properly identified and reinspected if rework or repair is necessary. Parts or materials rejected by the Materials Review Board, or by inspection, shall be marked accordingly and disposed of in a manner which will prevent such parts and materials from being incorporated in the finished product.

(c) *Inspection records*. Adequate inspection records shall be maintained, identified with the completed product where practicable, and retained in the manufacturer's files for at least two years after the product is completed. Complete records of Materials Review Board action applying to materials, parts, assemblies, and the completed product, shall be retained for at least two years, and available for review by CAA representatives.

(d) *Complete aircraft.*

(1) After the prototype is type certificated, each aditional aircraft produced under the terms of a type certificate only shall be flight tested by the manufacturer as a final check on the operation of the completed product. The manufacturer shall develop a production flight test procedure and a flight check-off form, subject to CAA approval, to be used in connection with the initial flight testing of each production aircraft. The flight test procedure shall apply to aircraft to be flown, or delivered disassembled to an authorized distributor.

(2) The production flight test shall provide for at least the following:

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

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

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

(iv) A check of the operational characteristics of the aircraft on the ground.

(v) A check on any other items peculiar to the aircraft being tested which can best be done during the ground or flight operation of the aircraft.

(e) *Complete engines*. Each engine, either reciprocating or turbine, produced under the terms of a type certificate only, shall be subjected to a satisfactory test run by the manufacturer, consisting of break-in runs which shall include a determination of fuel and oil consumption and maximum power characteristics. The test run shall include at least five hours of operation at the maximum rating, of which at least thirty minutes shall be at takeoff power and speed where this rating is in excess of the maximum continuous rating. These tests may be conducted with the engine appropriately mounted and utilizing current types of power and/or thrust measuring equipment (i.e., integral torque meter, thrust meter, dynamometer, calibrated test club or propeller, reaction stand, etc.). For rocket type engines, a satisfactory sampling technique means of testing shall be established. Each engine tested shall be subject to the inspection provided for in section 1.15-1 (b) (2).

(f) *Complete propellers*. Each variable pitch propeller produced under the terms of a type certificate only, shall be subjected to a satisfactory functional test to determine that the propeller will operate properly throughout the normal range of operation, as a final check on its operational characteristics. Each propeller tested shall be subject to the inspection provided for in section 1.15-1 (b) (3).

1.15-5 *Production inspection system standards (CAA policies which apply to sec. 1.15 (d)*). The inspection system should provide for at least the following:

(a) That all incoming materials and purchased or subcontracted parts used in the finished product are as specified in the type design data, or are suitable equivalents.

(b) That all incoming materials and purchased or subcontracted parts are properly identified, when the physical and chemical properties cannot be readily and accurately determined.

(c) That all materials subject to damage and deterioration are suitably stored and adequately protected.

(d) That all processes affecting the quality and safety of the finished product are accomplished in accordance with established industry or government specifications.

(e) That parts and components in process are inspected for conformity with type design data at points in production where accurate determinations can be made.

(f) That current design drawings are readily available to manufacturing and inspection personnel, and used when necessary.

(g) That design changes, including material substitutions, are controlled and approved before being incorporated in the finished product.

(h) That rejected materials and parts are segregated and identified in such a manner as to preclude installation in the finished product.

(i) That materials and parts withheld because of departures from design data or specifications, which are to be considered for installation in the finished product, are processed through established materials review procedures (see sec. 1.15-4 (b)).

(j) That inspection records are maintained (see sec. 1.15-4 (c)).

(k) That an acceptable flight test procedure and flight test check-off list are provided in the case of aircraft (see sec. 1.15-4 (d)).

1.15-6 *Surveillance of production inspection system (CAA policies which apply to sec. 1.15 (d)*).

(a) During the 6-month interval, pending the establishment of the manufacturer's production inspection system, the CAA will conduct inspections to ascertain that the finished product is in conformity with the type design data, is airworthy, safe for installation on certificated aircraft, or, in the case of aircraft, is eligible for an airworthiness certificate.

(b) Materials review dispositions will be spot checked by a representative of the administrator to verify that no obvious adverse effect will result from such dispositions.

(c) At the end of the 6-month interval, the CAA will advise the manufacturer whether the inspection system is considered acceptable. If considered acceptable, as determined by evaluating the results of the system as reflected in the conformity, quality, and airworthiness of the finished products, the CAA will thereafter reduce its inspection surveillance and increase its reliance on the manufacturer's inspection system in the determination of the airworthiness of future products.

(1) Upon approval of the production inspection system, the manufacturer may nominate one or more of his employees for appointment as a Designated Manufacturing Inspection Representative, in accordance with Part 418 of chapter II of this title (Regulations of the Administrator). If the nominee meets the requirements for appointment, he will be authorized by the CAA to issue original airworthiness and/or export certificates for the products produced which are found to conform with the approved type design data; to conduct station and conformity inspections; and to make such additional examinations as may be necessary to ascertain that production articles are airworthy and safe for operation. Such authorization is limited to the manufacturing plant in which the designee is employed.

(d) If the inspection system is not acceptable, as evidenced by questionable parts and materials accepted for installation in the finished product, or significant discrepancies are repeatedly found in the finished products, the issuance of airworthiness certificates for aircraft, or approvals of other products for installation on an aircraft, will be deferred until the manufacturer has made necessary corrective changes.

1.16 *Duration*. A type certificate shall remain in effect until surrendered, suspended, revoked, or a termination date is otherwise established by the Board.

1.17 *Display*. Type certificates shall be made available for examination by an authorized representative of the Board or of the Administrator.

1.18 *Privileges*. The holder or licensee of a type certificate for a product may, in the case of aircraft,

obtain airworthiness certificates (see applicable secs. 1.60 through 1.72), or in the case of engines, propellers, or other products, obtain approval for installation on certificated aircraft; he may obtain a production certificate for such products (see secs. 1.30 through 1.46).

1.19 *Statement of conformity*.

(a) The holder of a type certificate only or of a current right to the benefits of a type certificate only under a licensing arrangement, upon the initial transfer by him of the ownership of any product manufactured under such type certificate or upon application for original issance of an airworthiness certificate for an aircraft, shall furnish to an authorized representative of the Administrator a statement of conformity for such product on a form prescribed by the Administrator. For aircraft manufactured under a type certificate only, there shall be included a statement that the aircraft referred to has been flight checked. For aircraft engines and for variable pitch propellers manufactured under a type certificate only, there shall be included a statement that the engine or propeller referred to has been subjected by the manufacturer to a final operational check. When a production certificate is held in addition to the type certificate, the provisions of section 1.35 shall apply. The Administrator may consider military acceptance in lieu of a statement of conformity for a product which has been manufactured for the military service.

(b) A statement of conformity shall be furnished to an authorized representative of the Administrator, upon a form and in a manner prescribed by the Administrator, for any prototype product presented for type certification.

1.19-1 *Statement of conformity (CAA rules which apply to sec. 1.19 (a)*).

(a) A Statement of Conformity, Form ACA-317, [6] shall be signed by a person who holds a responsible position in the manufacturer's organization and who has been authorized to perform this function by the holder of the type certificate or licensing agreement.

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[6] The reporting requirements of this form are subject to the approval of the Bureau of the Budget in accordance with the Federal Reports Act of 1942.

(b) The flight and operational tests certified to on the Statement of Conformity shall be in accordance with sections 1.15-4 (d) through (f).

Changes in Type Design

1.20 *General*. When the type design is changed, the applicant shall demonstrate that the product complies with the requirements of that part of the regulations in this subchapter under which it was certificated.

1.20-1 *Changes in type design. (CAA policies which apply to sec. 1.20*).

(a) Any design change which may affect the flight characteristics, structural integrity, or airworthiness of an aircraft, engine, propeller or appliance for which a type certificate has been issued may require the submission of additional technical data. The examination of these data may indicate the necessity for additional engineering evaluation, inspection, and tests to substantiate the airworthiness of the product as modified.

1.21 *Classification of changes*. Changes shall be classified as minor and major. A minor change shall be one which has no appreciable effect on the weight, balance, structural strength, reliability, operational characteristics, or other characteristics affecting the airworthiness of the product. A

major change shall be one not classified as a minor change.

1.22 ***Approval of minor changes*****. Minor changes in a type design may be approved in accordance with a method acceptable to the Administrator prior to the submittal to the Administrator of any substantiating or descriptive data.**

1.23 ***Approval of major changes*****. Major changes in a type design shall be approved only after receipt by the Administrator of substantiating data and necessary descriptive data for inclusion in the type design.**

1.24 ***Service experience changes*****.**

(a) Where the Administrator finds as a result of service experience that an unsafe condition exists with respect to a design feature, part or characteristic of any product, and that such a condition is likely to exist or develop in other products of the same type design, he shall provide notice [2] thereof for all operators of products of that type, and the product shall not thereafter be operated until the unsafe condition has been corrected, unless otherwise authorized by the Administrator under specified conditions and limitations, including inspections. In addition, the provisions of subparagraphs (1) and (2) of this paragraph shall apply.

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[2] Notification of any unsafe condition, of the required corrective action, and of compliance dates is usually provided through the medium of Airworthiness Directives issued by the Administrator.

(1) When the Administrator finds that design changes are necessary to correct the unsafe condition of the product, the holder of the type certificate, upon request of the Administrator, shall submit appropriate design changes for the approval of the Administrator.

(2) Upon approval, the descriptive data covering the changes shall be made available by the holder of the type certificate to all operators of products previously certificated under such type certificate.

(b) Where no current unsafe condition exists but the Administrator or the holder of the type certificate finds through service experience that changes in type design will contribute to the safety of the product, the holder of the type certificate may submit appropriate design changes for the approval of the Administrator. Upon approval of such changes the manufacturer shall make available to all operators of the same type of product information on the design changes.

Supplemental Type Certificates

1.25 ***Supplemental type certificates*****. When a person, other than the holder of the type certificate for a product, alters the product by introducing a major change (see sec. 1.21) in a previously approved type design, and the change is not so extensive as to require application for a new type certificate (see secs. 3.11 (e), 4b.11 (e), 5.11 (e), 6.11 (e), 13.11 (e), and 14.11 (e) of this chapter), such person shall apply for the issuance of a supplemental type certificate covering the design change. The application shall be made upon a form and in a manner prescribed by the Administrator.**

1.25-1 *Application for a supplemental type certificate (CAA policies which apply to sec. 1.25*).

(a) *Applicant*. A supplemental type certificate may be issued to more than one applicant for the same design change [7] provided each applicant shows compliance with the applicable airworthiness requirements in accordance with section 1.26. (See sec. 1.28-1.)

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[7] Examples of the types of changes defined in section 1.21 as major design changes are contained in section 18.1-1 of Civil Aeronautics Manual 18. A change in the *empty* weight or balance is not a major design change unless an increase in the maximum weight, center of gravity limits, or other factors listed in the definition of a major change are also involved.

(b) *Form and manner of application*. The applicant should complete three copies of Form ACA-2417 and submit them to the local CAA Aviation Safety Agent. The drawings and technical data substantiating compliance with the applicable airworthiness requirements should also be submitted for approval in accordance with section 1.27-1.

1.26 *Applicable requirements.* The applicant for a supplemental type certificate shall demonstrate that the altered product meets the airworthiness requirements which are applicable to the product involved (see secs. 3.11 (d), 4b.11 (d), 5.11 (d), 6.11 (d), 13.11 (d), and 14.11 (d) of this chapter).

1.26-1 *Airworthiness requirements (CAA policies which apply to sec. 1.26*).

(a) The methods used to show compliance with the applicable airworthiness requirements [8] are the same as those used for original type certification; namely, by preparing drawings, stress analysis, and by conducting ground and flight tests and preparing reports thereon. Acceptable methods of showing compliance are outlined in Civil Aeronautics Manuals 3 and 4b.

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[8] Detailed information on the applicable airworthiness requirements used for the original type certification of the product involved may be obtained from the Civil Aeronautics Administration.

1.27 *Requirements for issuance*. Upon receipt of an application and a satisfactory demonstration of compliance with the applicable requirements in accordance with sections 1.25 and 1.26, the Administrator shall indicate approval of the change in type design. Such approval together with the previously issued type certificate for the product shall constitute a supplemental type certificate.

1.27-1 *Procedures for obtaining approval (CAA policies which apply to sec. 1.27*). CAA approval of a major change in type design is based upon examination of the supporting data, conducting or reviewing tests, inspection of the altered product, and a finding by the CAA that the applicable requirements are met. Such approval involves two steps:

(a) *Design examination*. Approval of the technical supporting data describing the design change and showing compliance with the applicable airworthiness requirements should be obtained from one of the following:

(1) *A CAA Designated Engineering Representative (DER*). After DER approval of the data, the DER will complete, sign, and send Form ACA-1600 "Statement of Compliance of Aircraft or Aircraft Components with the Civil Air Regulations," to the regional CAA Aircraft Engineering Division. Whereas a DER's authority may be limited to certain areas, the DER should indicate on Form ACA-1600 whether any additional areas require CAA approval. On a complex project the DER should contact the appropriate CAA Aircraft Engineering office as early as possible.

(2) *The CAA*. The technical data describing and substantiating the design change should be submitted to the local CAA aviation safety agent for forwarding to the CAA regional office. When necessary, arrangements should be made with CAA for completing any flight or ground testing required by the applicable airworthiness requirements, and the reports of such tests should be included in the technical data pertaining to the design change.

(3) *A Designated Manufacturer's Certification Representative (DMCR*). If the aircraft was originally

certificated under the Delegation Option Procedures of Part 410 of chapter II of this title (Regulations of the Administrator ref. sec. 410.37), a copy of the DMCR's approval letter should be included with the supporting data.

(b) *Inspection of the product*. A new design change normally requires an inspection of a modified article by a CAA representative in order to establish compliance with the applicable airworthiness requirements. See section 1.15. In the case of a complex modification program involving CAA flight tests, the CAA will conduct the appropriate portions of a standard type inspection.

1.27-2 *Issuance and recording of supplemental type certificates (CAA policies which apply to sec. 1.27*).

(a) *Issuance*. When the design examination and inspection described in section 1.27-1 have been satisfactorily completed, the CAA will approve the change in type design by completing Form ACA-2417, This form, signed by the Chief, Aircraft Engineering Division, CAA Regional Office, or other person authorized to perform this function, will constitute the supplemental type certificate for the change in type design.

(b) *Recording and disposition of supplemental type certificates*. One signed copy of Form ACA-2417 will be given a number and returned to the applicant; one copy will be retained in the issuing CAA regional office; and one copy will be sent to the CAA Washington office for use in publishing a summary list of supplemental type certificates. Technical data submitted with the application will be filed in the CAA regional office.

1.28 *Privileges*. The holder or licensee of a supplemental type certificate for an altered product may, in the case of aircraft, obtain airworthiness certificates (see applicable secs. 1.60 through 1.72), or in the case of engines, propellers or other products, obtain approval for installation on certificated aircraft; he may obtain a production certificate (see secs. 1.30 through 1.46) with respect to the change in the type design for which approval was obtained in accordance with sec. 1.27.

***Note*: The provisions of this section are not intended to affect in any way the proprietary rights of the holder of a type certificate or of a supplemental type certificate**.

1.28-1 *Airworthiness certification or approval of modified aircraft or products (CAA policies which apply to sec. 1.28*).

(a) After a supplemental type certificate has been issued in accordance with section 1.27-2, airworthiness certificates for aircraft, or approval for products incorporating the design change may be issued on the basis of an inspection for conformity with the approved data conducted in accordance with section 1.67 or section 18.11 of this subchapter.

(b) The privileges specified in section 1.28 also apply to approvals of major design changes issued prior to August 25, 1955, the effective date of section 1.28. Such approvals are indicated on a Major Repair and Alteration Form ACA-337, air carriers'records, or listed on the CAA Aircraft Specification [9] for the product involved.

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[9] An aircraft specification is a document prepared by the Civil Aeronautics Administration in support of a type certificate to set forth the type design, the operating limitations, and any other conditions or limitations prescribed by the Civil Air Regulations for a specific type of aircraft. CAA Aircraft Specifications are available free of charge from the Civil Aeronautics Administration, Aviation Information, W-47, Washington 25, D. C.

Production Certificates

1.30 *Application*. Any person, whether or not a citizen of the United States, may apply for the issuance of a production certificate. The application for a production certificate shall be made upon a form and in a manner prescribed by the Administrator.

1.30-1 *Application for a production certificate (CAA rules which apply to sec. 1.30*). The applicant for a production certificate [10] shall submit to the appropriate CAA regional office, an application file consisting of the following:

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[10] The issuance of the production certificate automatically places greater responsibility in the manufacturer and obviates the requirement for a Statement of Conformity, Form ACA-317, for products produced under the terms of a production certificate, whether for domestic or export certification (see sec. 1.35). The production certificate is an indication that all major groups of a company are adequately contributing to the production of a quality product; that the quality control (or inspection) department is employing sound principles and procedures in determining and controlling the quality of raw materials, purchased equipment, detail parts and assemblies throughout all phages of manufacture to assure structural and functional conformity of the completed product to approved type design data.

(a) Original and one copy, properly completed, of Application for Production Certificate, Form ACA-332. (This form may be obtained from the local CAA Aviation Safety Agent or the appropriate CAA regional office.) Regional office addresses and the states under their jurisdiction are listed in the appendix to this manual.

(b) One copy of the applicant's quality control data, [11] as required by section 1.36.

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[11] When the holder of a currently effective production certificate applies for extension of the, certificate to cover other type certificated products in the same general category, only such additional quality control data as may be necessary to cover those new procedures, methods, or processes required by the new product, need he submitted. If no change is necessary, appropriate notation will be made on the application form. For additional information, see section 1.41-1.

1.30-2 *Processing application (CAA policies which apply to sec. 1.30*).

(a) Upon receipt of an application file, the CAA will examine it, and, if it is considered satisfactory, establish a Production Certification Board [12] to inspect the applicant's facilities and determine their adequacy for the production of duplicates of the product. If the application file is not considered satisfactory, the CAA will request the applicant to furnish additional information or data.

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[12] The Production Certification Board reviews the quality control data, establishes procedures for conducting the inspection of the applicant's facilities, advises applicant of any controversial or marginal conditions pertaining to the quality control data, and related regulations, interpretations, and policies governing the issuance and continuation of a production certificate. After the inspection has been conducted, the Board will discuss with the applicant any decisions reached on marginal or controversial items in an effort to arrive at a satisfactory solution.

The Board will also function in special case of a major nature involving an annual or interim inspection, to determine continued eligibility of the manufacturing facilities under the terms of the production certificate.

1.31 *Products for which issued.* A production certificate shall be issued only for products for which a type certificate is currently in effect. The applicant shall hold a currently effective type certificate for

the product to be manufactured or shall hold a current right to the benefits of such certificate under a licensing agreement.

1.32 *Requirements for issuance*. A person shall be issued a production certificate when the Administrator finds, after examination of the supporting data and after inspection of the organization and production facilities, that the applicant complies with the requirements of sections 1.33 through 1.36.

1.32-1 *Production certification requirements (CAA policies which apply to sec. 1.32*). The provisions set forth in paragraphs (a) through (f) of this section [13] are the minimums which the manufacturer should have established to be eligible for a production certificate.

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[13] The assigned CAA Aviation Safety Agents will use this section as a guide in conducting the factory inspection.

(a) *Purchasing*. The purchase orders for raw stock and parts should be based on approved specifications or other information which will assure the receipt of materials and parts that will be suitable for aircraft construction and meet the design requirements for the product. The specifications and other data should be sufficiently detailed and comprehensive to insure procurement of materials and parts of a uniformly high grade, equaling or exceeding the minimum strength properties in the structural design data. The applicant may use parts, components, and assemblies over which he does or does not have design control, which are fabricated by vendors. In either case, the prime manufacturer (applicant) is responsible for the airworthiness of the completed product and all of its components, and he should establish procedures and methods to assure that the completed product will be structurally sound, safe for operation, and in conformity with approved design data. These procedures may provide for vendors'and suppliers'affidavits and inspection reports in lieu of extensive tests and inspections by the applicant.

(b) *Receiving*. The applicant should have a receiving system and facilities which will provide for the identification, storage, and routing of raw materials, parts, components, and assemblies obtained from vendors and suppliers. This system should provide for the mating of the incoming items with the purchase orders, specifications, or other procurement data so that receiving inspection will be apprised of the requirements and details under which the items were purchased. The storage facilities should be managed by a person who is in charge of all receipts, storage, withdrawals, and related records. The receiving system should preclude the release of materials and parts to production until they have been satisfactorily processed through receiving inspection. The storage area should provide for orderly arrangement of all items which have been accepted by inspection, and which have been identified in such manner as to preclude inadvertent issuance of the wrong material or part. Particular attention should be given to the segregation and identification of items of similar appearances which have different physical characteristics. All defective or damaged materials and parts should be isolated in a separate well defined and controlled area to preclude the installation of such materials or parts in the completed product. The storage system and facilities should specifically provide for the protection of materials subject to damage from abrasion, sunlight, temperature, moisture, grease, corrosion, etc.

(1) The applicant should maintain complete records of all materials and parts received, and their disposition, for at least two years to facilitate, where practicable, rechecking any particular lot of material in which defects may later be discovered. These records should include such information as source, source inspection, quantity (both accepted and rejected), vendors'affidavits, and/or reports indicating conformity with pertinent specifications.

(c) *Production control*. A production control system should be established to insure proper operation and processing of raw materials into the finished product. There should be an operation flow sheet or card showing the materials to be used, machine operations, treatment, fabrication processes, and quality control

inspection and steps to be followed in production for all parts and assemblies to assure that the physical, dimensional, and functional characteristics comply with the type design data. The flow sheet or card should provide for recording the completion of each operation, should accompany the part or assembly through each operation performed, and be a complete record of the manufacturing and inspection processes involved.

(1) Equivalent procedures may be employed, provided they preclude the installation of unfinished, inferior, damaged or otherwise unsatisfactory parts in the completed products.

(d) *Manufacturing facilities*. The applicant should have sufficient housing to accommodate the necessary equipment and materials, and suitable working space for the performance of the work for which the production certificate is sought; suitable facilities for the proper storage, segregation, and protection of materials, parts, and supplies; and suitable means for the proper protection of parts and subassemblies during fabrication, production processing, inspection, and assembly. The amount and type of equipment required will depend upon the complexity of the product and the rate and volume of production.

(1) Provisions should be made to segregate or isolate processes which may adversely affect, or may be affected by, other operations. In the event that manufacturing processes are performed by an outside source, it is the responsibility of the applicant to determine the adequacy of such facilities and to assure that the results of the process are in conformity with the type design data and acceptable manufacturing techniques.

(e) *Machining and forming*. The fabrication of metal parts by various forming and machining operations should be adequately controlled to assure that the dimensions, finishes, radii, contours, etc., are in accordance with the pertinent drawings and established standards.

(f) *Drawing and change control*. The applicant should establish and currently maintain a technical data file system which will assure that the latest drawings and other engineering information are available and used by production and inspection personnel in performing their duties. The applicant should maintain a record of all changes to or deviations from the type design data; these records should be available for ready reference. The system should provide effective means for removal of obsolete information from all locations, and advance approval of deviations, substitutions, etc.

(g) *Quality control*. Additional policies pertaining to the "requirements for issuance" are contained in sections 1.34-1 through 1.34-3.

1.33 *Location of manufacturing facilities*. No production certificate for a product shall be issued if the manufacturing facilities therefor are located outside the United States, unless where facilities are located outside the United States the Administrator finds that no undue burden on the Government is created in administering applicable requirements of the act or regulations issued thereunder.

1.33-1 *Location of manufacturing facilities (CAA policies which apply to sec. 1.33).*

(a) Subsidiary manufacturers'facilities should be located within the United States, since it is not feasible to conduct the required inspections beyond these limits without placing undue burden on the CAA.

1.34 *Quality control*. The applicant shall show that he is adequately prepared to manufacture and control the quality of any product for which he requests production certification, so that each article shall conform with the design provisions of the pertinent type certificate. A product manufactured under a production certificate may be required to undergo inspection by a representative of the Administrator to determine whether the individual product conforms to the type design.

1.34-1 *Quality control -- general (CAA interpretations which apply to sec. 1.34*).

(a) Section 1.34 is interpreted to mean that the applicant has established and can continue to maintain to the

satisfaction of the Administrator an effective quality control system commensurate with the complexity of the type design, fabrication processes, and manufacturing techniques. The system must assure that acceptable quality is maintained throughout all phases of the manufacturing process from the time the materials are received until fabricated into the completed product, and provide a ready means for detection of significant discrepancies.

(b) The CAA will maintain general surveillance of the manufacturer's quality control system to ascertain that the prime objectives of conformity, airworthiness, and safety are assured.

1.34 2 *Quality control (CAA policies which apply to sec. 1.34*). The prime manufacturer's quality control and/or inspection organization should report to management, independent of the manufacturing division, because of the emphasis on safety and the need for unbiased judgment. The quality control department should recognize, and work to, established schedules, but be free of bias due to production pressure. All phases of inspection and control activity, from receiving raw material to delivery of the finished product, should be under a centralized control. If such an arrangement is not possible because certain departments are engaged in highly specialized work, these departments should operate under a separate inspection system, and their activities should be coordinated under the general supervision of a quality control organization. The same procedure should apply in the case of dispersed or branch facilities of a main organization when inspection activity is divided.

(a) *Inspection*. The inspection system should be so organized that parts and materials will receive appropriate inspection while in an inspectable condition. All parts fabricated by the prime manufacturer or subsidiary manufacturer and appliances obtained from any other source shall receive sufficient inspection to assure conformity with the type design data, pertinent specifications and approved manufacturing standards.

(1) *Statistical methods*. Any statistical sampling plan which provides assurance that the materials and parts incorporated in the finished product meet the prime objectives of conformity with drawings, airworthiness, and safety for operation, will be considered acceptable. Sampling inspection techniques that are employed by the manufacturer to determine the acceptability of materials and parts should be based on a careful analysis of the quality requirements of the product tailored to the individual factory on the basis of this analysis. It should not be a "prepackaged" program lifted bodily from another factory or from published literature.

(2) *Control of materials and purchased parts*. Materials should be inspected or tested to determine compliance with the applicable specifications. The tests may be conducted by the prime manufacturer, subsidiary manufacturer, or independent laboratories which are suitably equipped. In case the material is accompanied by an affidavit or test report identifiable with the material, such evidence may be considered satisfactory in lien of actual tests conducted by the manufacturer.

(i) Purchased parts, components, and appliances over which the prime manufacturer does not have design control, should be inspected and tested by the prime manufacturer to the extent necessary to assure that the purchased item will preform properly its intended function in the completed product. Normally, extensive disassembly, testing to destruction, etc., will not be necessary.

(3) *Fabrication inspection*. The prime manufacturer should establish and maintain inspection stations at appropriate locations in the manufacturing process to assure continued control of the quality of parts, components, and assemblies. The manufacturer should assure that quality workmanship and dimensional and functional characteristics which may adversely affect safety are listed or referenced on shop travelers, routing cards, check lists, or other media for the guidance of inspection personnel. Procedures should be established for delivering parts to the inspection stations and for removing and storing inspected parts to assure that unacceptable or rejected parts will not be installed in the completed product.

(4) *Process control*. Processes such as welding, gluing, heat treatment, plating, X-ray, magnetic inspection,

and penetrant inspection, including the equipment and operating personnel, should be closely controlled and performed in accordance with established specifications and procedures satisfactory to the CAA.

(5) *Preliminary materials review*. Materials may be accepted by preliminary materials review, provided that specific methods and procedures for acceptance have been defined and adopted as it result of previous Materials Review Board procedure. When material is first found by the manufacturer's inspectors to depart from the specification and/or drawings, the material should be properly identified, and may be given a *preliminary review* and disposed of by authorized manufacturer's personnel as follows:

(i) Material obviously unfit for use or irreparable, should be disposed of in such manner as to preclude installation in the finished product.

(ii) Material not meeting requirements because of incomplete fabrication may be further processed by established methods to bring the material within specified requirements.

(iii) The CAA Aviation Safety Agent is authorized to approve certain variations or repairs found necessary after company inspection.

(iv) All questionable materials to be considered for use in the finished product which cannot be disposed of by preliminary review action should be designated for Materials Review Board action.

(6) *Materials Review Board procedures*. The Quality Control Department should be responsible for the effective operation of the Materials Review procedure. [14] The CAA factory agent will spot check materials review dispositions, as necessary, to verify that the product consistently meets a satisfactory level of quality and conformity.

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[14] Effective operation of the Materials Review procedure should materially minimize discrepancies end errors which may otherwise become chronic, and furthermore, may serve as a yardstick by means of which the adequacy and acceptability of the production and quality control systems may be evaluated. However, the materials review system should not be used in place of the inspection or quality control system to determine acceptability of parts and materials.

(i) The established materials review procedures should provide that:

(*a*) All materials, parts, and components which are damaged or do not conform to design data and specifications will be withheld and isolated.

(*b*) All items submitted to the Materials Review Board should be reviewed to determine whether such items may be used safety in their present condition, whether rework or repair is feasible, or whether scrapping is necessary.

(*c*) All items which are reworked or repaired in accordance with materials review dispositions will be reinspected for conformity therewith. Any item accepted after this inspection will thereafter be treated as an approved item.

(*d*) All items accepted through materials review action will be so identified.

(*e*) The Materials Review Board should maintain accurate records which will provide at least the following:

(*1*) Name, part number, date, and quantity of pacts involved.

(*2*) The quantity of parts in the lot or order.

(*3*) Description of the discrepancy.

(*4*) The materials review disposition, including rework instructions, if any.

(*5*) The results of reinspection.

(ii) The Materials Review Board should not accept parts which deviate to the extent that mating is adversely affected. Parts or assemblies involving mating should conform to drawing tolerances to the extent that installation, removal, or replacement may be accomplished without misalignment or damage to other components. In assembling parts under these circumstances, no fabrication operations such as cutting, hammering, bending, prying, or forcing should be permitted, or, when final installation has been completed, the parts should not be temporarily or permanently subjected to deformation or distortion of a nature which would cause any undesirable tensions, compressions, stresses, or strains. Where deviating parts, in themselves, are found acceptable, they must not jeopardize the airworthiness or performance of other parts when installed in the assembly. In general, parts which do not conform with the, approved technical data should not be accepted when such parts can be reworked to conform with the approved design data.

(7) *Inspection records*. The manufacturer should maintain adequate records of all inspections and tests performed. Such records as are applicable should be identifiable with the completed product or group of products. These records should be retained in the manufacturer's files for at least two years. All inspection records should be available for review by CAA representatives.

(8) *Inspection status of parts*. The manufacturer should indicate by means of stamps, tags, or other means, whether parts, components, and assemblies are to be accepted, rejected, or withheld for Materials Review Board action. The indication of inspection status may be applied to the individual parts, components, or assemblies; to the container of a group of like parts, components, or assemblies; or, to the shop traveler or routing card for the parts. Materials that are subjected to certain processes, such as heat treat, hardness test, pressure test, X-ray, etc., as required by the drawings or specification, should be identified with a suitable process stamp. Such stamps, which are obliterated by subsequent processing, need not be reapplied if the manufacturer has satisfactory control of the finished parts. All parts inspected and approved should indicate, when practicable, the individual inspector responsible.

(9) *Inspectors required*. The number of inspectors should be sufficient to adequately check all materials, manufacturing processes, and the product to the extent necessary to provide reasonable assurance of conformity, quality, and acceptability of the finished product. Inspection personnel should be vested with sufficient authority to permit them to perform their assigned duties in a manner which will warrant the issuance or continuation of a production certificate, provided other requirements are complied with.

(10) *Inspection tools and testing equipment*. The manufacturer should provide and maintain suitable measuring and testing devices necessary to conduct all phases and types of inspection and tests essential to the continued production of duplicate products. Such devices should be checked at established periods to assure continued accuracy. The manufacturer should establish a schedule of such checks as a portion of his inspection procedure, based on type, purpose, and degree of usage, and should maintain records or other evidence that proper control is being maintained. The tools used by the production department in constructing the part, if used by inspection, should be periodically checked to determine that the results obtained are within approved tolerances and that conformity with approved design data is maintained.

(11) *Inspection -- subsidiary manufacturer*. When parts, components, and assemblies over which the prime manufacturer retains design control are fabricated by a subsidiary manufacturer, they should undergo the same type and degree of inspection and testing as if fabricated by the prime manufacturer. If these items carrot be completely inspected when received at the prime manufacturer's facilities, inspections should be conducted at the subsidiary manufacturer's plant to assure that such items are acceptable for installation on the completed product. When items have been inspected at the subsidiary manufacturer's plant, the prime

manufacturer should conduct a receiving inspection to detect any damage resulting from transit.

(i) The prime manufacturer holds basic responsibility for the conformity, airworthiness, and acceptability of the finished product. Acceptance of a subsidiary manufacturer's quality control system by the CAA does not relieve the prime manufacturer of this responsibility. CAA inspections to be conducted at the subsidiary manufacturer's plant will be arranged through the prime manufacturer who should notify the authorized Aviation Safety Agent when the subsidiary's facilities are ready for CAA inspection. If these facilities and the quality control system are found acceptable, the subsidiary will be granted the same privileges regarding acceptance of items manufactured as though they were produced by the prime manufacturer. Prior to CAA approval of a subsidiary manufacturer's quality control system, parts and assembles should be subjected to a complete inspection for conformity and quality at the prime manufacturer's plant, or arrangements should be made for suitable inspection at the subsidiary manufacturer's plant by the prime manufacturer's inspection personnel and, as required, by CAA representative. Subsequent to the approval of the subsidiary manufacturer's quality control or inspection system, CAA representative will maintain general inspection surveillance at the subsidiary's facilities to ascertain that parts, assemblies, etc., produced are in conformity with the approved drawings and data forming the basis for the fabrication of the product.

(12) *Final inspection and functional test.* The completed product should be inspected for completeness and quality of workmanship. As a final check on the airworthiness of the completed product, each aircraft, aircraft engine, and variable pitch propeller produced under the terms of a production certificate will be subjected to the following tests:

(i) In addition to the manufacturer's production flight test, aircraft produced under a production certificate will be flight tested periodically by the CAA. (See sec. 1.15-2 for flight authorization and sec. 1.15-3 concerning logging flight test time.) The number or percentage of aircraft which will be flight tested by the CAA will be dependent upon the complexity and size of the aircraft, and upon experience gained while conducting functional and reliability tests of prototype and production aircraft prior to issuance of the production certificate. The manufacturer should formulate a flight test schedule that is acceptable to CAA representatives conducting the tests.

(*a*) Aircraft may be delivered unassembled to an authorized distributor prior to initial assembly and flight test, provided the manufacturer will advise the distributor of the established flight test procedure and furnish him with copies of the approved flight test check-off form. Flight test procedures employed by a distributor must be equivalent to those established by the manufacturer, and include the use of an identical flight test check-off form. These forms, when prepared by the manufacturer, will be filed as part of the aircraft inspection record, and, when prepared by a distributor, should be retained by him for at least 2 years.

(ii) Each aircraft engine, either reciprocating or turbine, produced under the terms of a production certificate should be subjected to a satisfactory test run consisting of a break-in run, which should include at least the determination of each engine's fuel and oil consumption and maximum power characteristics. These tests may be conducted with the engine appropriately mounted and utilizing the current types of power and/or thrust measuring equipment (i.e., integral torque meter, thrust meter, dynamometer, calibrated test club or propeller, reaction stand, etc.). Rocket type engines should be checked periodically by an established sampling technique. Sufficient internal examination of each engine should be accomplished to reasonably ascertain that no unsafe conditions exist.

(iii) Each variable pitch propeller produced under the terms of a production certificate should be subjected to a satisfactory functional test to determine that the propeller will operate properly throughout the normal range of operation, as a final check on its operational characteristics.

1.34-3 *Quality control -- special procedure (CAA policies which apply to sec. 1.34*).

(a) *Standard empty weight and c. g. for production aircraft.* The following procedure applies only to newly

manufactured aircraft (except helicopters and transport category aircraft) which are produced under the terms of a production certificate.

(1) Manufacturers desiring to establish an average empty weight and empty c. g. in lieu of actually weighing each aircraft, should prepare a detailed proposal regarding the procedure to be followed. This material should be furnished to the assigned Aviation Safety Agent for approved. Any proposal which will provide an accurate determination of average empty weight and c. g. will be considered acceptable.

(2) The following example outlines an acceptable method for effecting this system.

(i) Actually weigh and determine the empty weight and c. g. of ten aircraft of the model, on the basis of each having the same "basic" equipment of the same weight (s) and same arm (s). Each aircraft may be weighed with its own "special equipment installed, provided the weights and arms of those special equipment items are determined before installation. In such cases the effect of the "special" equipment on empty weight and c. g. should be computed, and adjustments made to determine the basic weight and c. g. position of each individual airplane. If the weight and c. g. of none of these ten airplanes deviate by more than 1 percent or ½ percent MAC, respectively, from the average for the entire ten, then that average may be considered acceptable for subsequent aircraft of identical equipment, subject to the periodic spot check specified in subdivision (ii) of this subparagraph.

(ii) Subsequently, with respect to identical aircraft, weigh an individual aircraft at regular intervals; e. g., each tenth aircraft for the purpose of determining continued accuracy of the initial empty weight and empty c. g. established. If this weighing indicates a variation in empty weight which is in excess of 1 percent of the initially established weight, or a variation in the empty c. g. which exceed one-half percent of the MAC, sufficient identical aircraft should be checked to determine if the change in weight and/or c. g. is chronic. If it is determined to be an isolated case, the actual weight and c. g. shall be utilized for that one airplane. If the change is found to be chronic and consistent, a new average weight should be established in accordance with procedures followed in establishing the initial average empty weight and c. g. conditions.

(3) A weight and balance report is required in connection with each aircraft presented for airworthiness certification. These reports may be computed for aircraft which are not actually weighed, and should be marked "computed." All other reports should be marked "actual."

1.35 *Privileges*. It shall not be necessary for the holder of a production certificate to furnish a statement of conformity for each of the products produced under the terms of the production certificate. The holder of a production certificate may obtain an airworthiness certificate in the case of aircraft (see sec. 1.67 (a)) and in the case of engines, propellers, or other products may obtain approval for installation on certificated aircraft.

1.35-1 *Statement of conformity (CAA policies which apply to sec. 1.35*).

(a) The Statement of Conformity, Form ACA-317, also will not be required for a product to be exported, provided the product is produced under the terms of a production certificate.

1.36 *Quality control data requirements; prime manufacturer*. The applicant shall submit for approval by the Administrator, as evidence of his ability to control the quality of any product for which he requests a production certificate, data describing the inspection and test procedures necessary to insure that each article produced is in conformity with the type design and is in a condition for safe operation. The data submitted shall include such of the following as are applicable to the product involved:

(a) A statement describing assigned responsibilities and delegated authority of the quality control organization, together with a chart indicating the functional relationship of the quality control organization to management and to other organizational components and indicating the chain of

authority and responsibility within the quality control organization.

(b) A description of inspection procedures applying to raw materials, outside purchased items, and parts and assemblies produced by subsidiary manufacturers. The information shall include the methods used to insure acceptable quality of parts and assemblies which cannot be completely inspected for conformity and quality when delivered to the prime manufacturer's plant.

(c) A description of the methods used for production inspection of individual parts and complete assemblies, including the identification of any special manufacturing processes involved, the description of the means used to control such processes, a description of the final test procedure for the complete product, and, in the case of aircraft, a copy of the manufacturer's production flight test procedure and checkoff list.

(d) An outline of the materials review system, including the procedure for recording review board decisions and disposing of rejected parts.

(e) An outline of a system by means of which company inspectors are kept currently informed regarding changes in engineering drawings, specifications, and quality control procedures.

(f) A list or chart showing location and type of inspection stations.

1.36-1 *Quality control data requirements (CAA policies which apply to sec. 1.36).*

(a) The quality control data (one copy only) should be submitted in manual form with the Application for a Production Certificate, Form ACA-332, to the local CAA Aviation Safety Agent. The data should include such material as inspection procedures, process controls, production and inspection control forms, imprint of the various inspection stamps, etc.

1.36 2 *Quality control data (CAA interpretations which apply to sec. 1.36*).

(a) The words "description," "statement" and "outline" as used in section 1.36 are interpreted to mean a comprehensive description of the quality control organization and the methods, procedures and practices employed to control the quality of the finished product.

1.37 *Information on subsidiary manufacturers*. The prime manufacturer shall make available information regarding all major inspections accomplished by a subsidiary manufacturer for acceptance of parts or assemblies for which the prime manufacturer is responsible.

1.37-1 *Information on inspection system -- subsidiary manufacturers (CAA policies which apply to sec. 1.37).*

(a) The prime manufacturer should include in the quality control data required by section 1.36, sufficient information to define and explain the means established to assure that all major parts and assemblies conform with the design data when manufactured by a subsidiary manufacturer.

1.38 *Changes in quality control system*. Subsequent to the issuance of a production certificate, any changes to the quality control system shall be subject to review by the Administrator. The holder of a production certificate shall immediately notify the Administrator in writing of any such changes affecting the data prescribed in section 1.36.

1.38-1 *Changes in quality control system (CAA interpretations which apply to sec. 1.38*).

(a) The phrase, "any changes to the quality control system," is interpreted to mean changes to a manufacturer's organization, systems, procedures or processes which may affect the inspection, conformity, or airworthiness of the product. Changes which are not consistent with the quality control data submitted in

accordance with section 1.36 must be promptly forwarded to the CAA by means of revised pages or supplemental information. The CAA will review these changes to determine that the quality, conformity, or airworthiness of the product will not be adversely affected.

(b) It is not the purpose of this requirement to impose an unrealistic burden on the holder of the production certificate by requiring an immediate notification of each and every insignificant change in the operations of the quality control systems as may be necessary on a day to day basis. The intent is to provide current quality control data for the use of the CAA Aviation Safety Agent in the performance of his duties and responsibilities.

1.39 *Multiple products*. The Administrator may authorize more than one type certificated product to be manufactured under the terms of one production certificate provided that the products have similar production characteristics.

1.39-1 *Multiple products (CAA policies which apply to sec. 1.39*).

(a) More than one airplane type may be manufactured under the same production certificate, provided the types of construction and processes are similar. However, two basically different products such as an airplane and helicopter or an airplane and an engine will not be included under one production certificate. Separate production certificates will be issued for dissimilar products.

1.40 *Production limitation record*. A production limitation record shall be issued as part of a production certificate. The record shall list the type certificate of every product which the applicant is authorized to manufacture under the terms of a production certificate. Where different models of a basic type approved under the same type certificate number require different fabrication methods and processes, the Administrator may list the model designation of the product for which authorization is given, as well as the type certificate number, on the production limitation record.

1.40 1 *Production limitation record (CAA policies which apply to sec. 1.40*).

(a) The production limitation record is actually page 2 of the production certificate. Therefore, the Production Certificate, Form ACA-333, and the Production Limitation Record, Form ACA-333a, should always be displayed together. (See sec. 1.45 Display.) Products approved for production under the terms of the production certificate are listed on the production limitation record by type certificate number(s) and date issued. Revisions to the production certificate for the purpose of adding or deleting a product are accomplished by revising the production limitation record only (see sec. 1.41-1).

1.41 *Modification of the production limitation record*. The holder of a production certificate desiring the addition of a type certificate and/or model to the production certificate shall submit an application therefor upon a form and in a manner prescribed by the Administrator. The applicant shall comply with the applicable requirements of sections 1.32 through 1.36 and 1.38.

1.41-1 *Modifying a production limitation record (CAA policies which apply to sec. 1.41*).

(a) To obtain the addition of a new type certificate number to a production limitation record, the manufacturer should submit an Application for Production Certificate, Form ACA-332, in duplicate. This application should be accompanied by any changes in the quality control data (see secs. 1.30, 1.36, 1.37 and 1.38) not previously reported which are pertinent to products covered by the new type certificate.

(1) Upon approval of the quality control data and a satisfactory inspection of the facilities, a superseding production limitation record will be issued, listing the new type certificate number. The manufacturer will be requested to return the superseded production limitation record for cancellation.

(b) To obtain the extension of production certificate privileges for a new model added to a type certificate

previously listed on the production limitation record the manufacturer may follow the procedure outlined in paragraph (a) of this section, or notify the CAA that production certification privileges are desired with respect to the new model by so indicating in the space provided on the Application for Type Certificate, Form ACA-312. If the application for production certificate privileges is approved, the manufacturer will be notified that these privileges have been extended to cover the new model.

(c) The manufacturer, by letter, may request the deletion of one or more type certificates from a production limitation record. It is recommended that the manufacturer request deletions of type certificates on the production limitation record when neither complete products nor space parts covered by such certificates are being produced. In such cases, a revised production limitation record reflecting the requested changes will be issued by the CAA regional office and forwarded to the manufacturer with a request that the superseded production limitation record be returned for cancellation.

1.42 *Transferability*. A production certificate shall not be transferred.

1.42-1 *Change of ownership (CAA policies which apply to sec. 1.42*).

(a) When the ownership of a company holding a production certificate is transferred, the production certificate should be surrendered to the appropriate CAA regional office for cancellation. The new owner should apply for a new production certificate which will be processed as an original application in accordance with section 1.30.

1.43 *Inspections and tests*. A representative of the Administrator shall be permitted to make such inspections and, in the case of aircraft, flight tests as may be necessary to determine compliance with the requirements of the regulations in this subchapter.

1.43-1 *Inspection by CAA representative (CAA policies which apply to sec. 1.43*). The CAA representative will maintain surveillance of the manufacturer's facilities; make such spot inspections of individual products as may be necessary to ascertain that the manufacturing facilities and quality control system continuously comply with related requirements and that individual products conform with approved type design data; and issue domestic and export airworthiness certificates. The representative is authorized to approve certain design changes and repairs, and to assist in other activities involving the Civil Air Regulations; e. g., witnessing various types of engineering and quality control inspections and tests, investigating reported service difficulties and accidents, and training and supervising designated manufacturing inspection representatives.

(a) *Inspection station surveillance*. This is one of the inspection techniques which the CAA representative will use in evaluating the continued acceptability of the Manufacturing facilities, systems, and procedures, and in determining that component parts and the completed products reasonably conform to the type design data. This inspection technique involves a systematic evaluation of the operation of the manufacturer's inspection stations. Each station, as listed in the manufacturer's quality control data, will be visited and evaluated as often as the CAA representative deems necessary to assure that quality products are being produced. The results of these station inspections will be recorded on a suitable form for future reference and follow-up. In accomplishing station inspection activities, the following general items or factors will be evaluated:

(1) Adherence to established quality control data.

(2) Adequacy and competency of the quality control system.

(3) Operation of the designee system.

(4) Adequacy of facilities and equipment.

(5) Availability of adequate drawings, engineering orders, etc.

(6) Adequacy of inspection aids, devices, gauges, etc.

(7) Adequacy of inspection records (travel sheets, reports, tags, stamps, etc.).

(8) Operation of Materials Review Board.

(9) Identification and disposition of items processed by Materials Review Board.

(10) Adequacy of processes control.

(11) Completeness and accuracy of inspection records.

(b) *Production conformity inspection*. This is a technique used by the CAA representative to supplement inspection station surveillance; or in small plants with a low rate of production, it may be used in lieu of station inspection. A conformity inspection is an inspection of a part or process conducted to establish the degree of conformity with the applicable drawings or specifications.

(1) Production conformity inspections will be made on major structural items and assemblies such as major structural forgings and castings, critical parts, major assemblies and subassemblies, systems, installations, and processes. The conformity inspection of minor items will be held to a minimum whenever feasible.

(2) In evaluating the inspection control of an area, random samples of the part(s) being manufactured in the area will be subjected to detailed conformity inspection only after the parts have been accepted in accordance with the manufacturer's established procedures. The CAA representative may inspect the part, or he may witness the inspection conducted by the manufacturer's employee. General shop practices and workmanship will also be considered in the evaluation.

(3) The CAA representative will check equipment and process records against the product characteristics to evaluate the effectiveness of the control.

(4) Examples of conformity inspections are as follows:

(i) The physical dimensional checking, or the witnessing of the physical dimensional checking, of a part and, where applicable, the complete product or assembly, to the specified dimensions on the approved drawings.

(ii) Witnessing the heat treatment of parts and checking the various steps followed in the heat treatment operation against the applicable specifications.

(iii) Conducting or witnessing resistence spot welding pull tests and checking the results to the applicable specification or drawings.

(iv) Witnessing the hardness testing of heat treated steel and aluminum parts.

(v) Checking, or witnessing the checking of, the moisture content of lumber to the applicable drawing or specification.

(vi) Witnessing the production testing to determine the engine's fuel and oil consumption and maximum power characteristics.

(vii) Witnessing the inspection of propellers for balance, blade edge and face alignment, track, blade contour, assembly, and operation.

(viii) Checking a rivet pattern to an applicable drawing.

(ix) Checking an oxyacetylene welder while he is accomplishing a weld.

(x) Witnessing the laboratory checking of plating or heat treatment solution to the applicable specifications.

(c) *Additional inspections of party and assemblies*. These will be conducted on a sampling basis to the extent and frequency necessary to evaluate the effectiveness of inspection control and related functions; to assure proper fabricating and assembly methods and procedures; and to ascertain that adequate safeguards are employed to minimize the probability of damage to materials, parts and assemblies. During these inspections, it will also be ascertained that inspection tags, "travel" cards, etc., are being properly completed, and that parts in process are properly identified during the various stages of fabrication.

(d) *Airworthiness inspections*. Inspections will be conducted by the CAA representative on the completed products, as necessary, to assure that the products comply with applicable airworthiness requirements and are safe for operation. Upon application and following completion of satisfactory inspection, the CAA representative will issue domestic airworthiness certificates or certificates of airworthiness for export.

(e) *Interim inspections*. As considered necessary, the CAA representative will conduct interim inspections of changes to the manufacturing and quality control procedures that occur from time to time which may affect the airworthiness of the product.

a. Annual Inspections. A factory inspection will be conducted at least once a year to assure that the facilities are at least equivalent to the standards described in the quality control data for the issuance of the production certificate. Any conditions found which are not considered equivalent to the standards, or appear undesirable, will be reported to the manufacturer for consideration and corrective action.

1.43-2 *Inspection by CAA Designated Manufacturing Inspection Representatives (CAA policies which apply to sec. 1.43).*

(a) A manufacturer holding a production certificate may obtain the appointment of individuals in his employ as Designated Manufacturing Inspection Representatives who may be authorized to act in the capacity of Aviation Safety Agents. Information relative to the designation and the authority of these representatives is contained in Part 418 of Chapter II of this title (Regulations of the Administrator).

1.44 *Duration*. A production certificate shall remain in effect until surrendered, suspended, revoked, or a termination date is otherwise established by the Board, or the location of the manufacturing facility is changed.

1.44-1 *Duration (CAA policies which apply to sec. 1.44*).

(a) *Surrender*. Where production has been indefinitely or permanently discontinued, the manufacturer should surrender the production certificate to the regional office, or to the assigned Aviation Safety Agent, with a written request for cancellation.

(b) *Suspension or revocation*. Suspension or revocation of a production certificate will be handled in accordance with the enforcement procedures contained in Part 408 of chapter II of this title (Regulations of the Administrator).

(c) *Change in location*. In the event the manufacturing facilities are physically moved from the location indicated on the production certificate, the certificate will automatically terminate and should be returned to the regional office, or assigned agent, for cancellation.

1.45 Display. A production certificate shall be prominently displayed in the main office of the factory.

1.45-1 *Display (CAA policies which apply to sec. 1.45*).

(a) The purpose of section 1.45 is to make the certificates available to representatives of the Administrator in order that they may at any time see that the certificates are current and in order. To facilitate such an examination, it is recommended that production certificates be posted in a conspicuous place in the office of the factory.

1.46 *Responsibility of holder*. The holder of a production certificate shall maintain the quality control system in conformity with the data and procedures approved for the production certificate. He also shall determine that each completed product submitted for airworthiness certification or approval is in conformity with the type design and is in a condition for safe operation.

Aircraft and Product Identification

1.50 *Identification*.

(a) Each product manufactured under the terms of a type or production certificate shall display permanently such data as may be required to show its identity. The data shall include such of the following items as the Administrator finds appropriate: (1) Manufacturer's name, (2) model designation, (3) manufacturer's serial number (if article is numbered serially), otherwise the date of manufacture, except that articles subject to deterioration as a result of aging (parachutes, parachute flares, etc.), shall bear the date of manufacture in addition to the serial number, if any, (4) type certificate number, (5) production certificate number, (6) capacity or rating.

1.50-1 *Identification (CAA policies which apply to sec. 1.50*).

(a) The primary purpose of identification data is to furnish information which will readily identify and indicate the approval status of individual products fabricated under the requirements of the Civil Air Regulations. The identification plate attached to products which are manufactured under the terms of a production certificate should list both the type and production certificate numbers. Those type certificated products manufactured without benefit of a production certificate should list the type certificate number.

(b) The "Capacity or Rating" should be indicated in the identification data with respect to products such as engines, and other products for which definite ratings or capacities are established. The display of ratings on aircraft and propellers is not necessary.

(c) After the product has been properly identified by the manufacturer and approved by the Administrator, the identification data required by this section should not be changed or altered without the approval of the CAA, and it should remain with the product to which assigned.

(1) For example, the following should not be changed or altered without CAA approval:

(i) Manufacturer's name.

(ii) Model designation.

(iii) The manufacturer's serial number.

(iv) Date of manufacture when required.

(v) Type Certificate number.

(vi) Production Certificate number (if applicable).

(vii) Capacity or rating (if applicable).

(d) For requirements concerning identification plates, see the airworthiness pact applicable to the particular product involved.

Replacement and Modification Parts

1.55 *Applicable rules*. Any person other than the holder of the type certificate producing replacement or modification parts for sale for installation on a type certificated product shall comply with sections 1.12 (a) and (b), 1.13, 1.15(a) and (d), 1.20, and 1.50(also see sec. 1.25).

Note: The provisions of this section are not applicable to parts produced under the terms of a type and/or production certificate, to parts produced by owners or operators for maintaining or altering their own products, or to standard parts (such as bolts and nuts) conforming to established industry or Government specifications; e. g., SAE and military specifications, and CAA Technical Standard Orders.

1.55-1 *Replacement and modification parts--design approval (CAA policies which apply to sec. 1.55*). Any person, whether or not a citizen of the United States, may apply to the CAA regional office for approval of the design of a part for use on a type certificated product. Such part must comply with the Civil Air Regulations governing the basic design for the product on which the part will be installed.

(a) Engineering design approval is a prerequisite for CAA approval of the fabrication inspection system. Evidence of design approval may be shown by one of the following means:

(1) A statement confirming that the design data has been approved by the CAA. This statement must contain the date and nature of the design approval.

(2) Evidence of a licensing arrangement with the holder of the type certificate covering the product on which the part is to be installed.

(3) A statement confirming that the approved design data of the type certificate holder was obtained from the CAA. Such data is available only when the type certificate holder has given permission for its release.

(b) A design that is obtained by copying an approved part but is not substantiated by technical data is not acceptable as a basis for production inspection system approval.

(c) The design approval entitles the holder to production privileges equivalent to those accorded to the holder of a type certificate.

(d) After CAA approval, the design data for a part should be retained by the manufacturer and made available to any CAA representative. Each change to a part should be approved by the CAA and the manufacturer should identify such change on the drawing. The manufacturer should keep a record of each change with its date of CAA approval.

1.55-2 *Replacement and modification parts-inspection approval (CAA policies which apply to sec. 1.55).*

(a) The request, in duplicate, for a fabrication inspection system approval, together with evidence of design approval, should be submitted to the appropriate regional office or to the local CAA agent (letter form). The request should list the nomenclature of the part, part number, manufacturer's name, and model of the type certificated product for which the part has been approved for installation.

(b) Prior to the approval of the fabrication inspection system Approval Tag, Form ACA 186, will be used by the CAA representative, not to exceed 6 months, as evidence of inspection approval. After the

inspection system is approved, the manufacturer must indicate on the part or package of small parts, evidence that they were produced under an approved inspection system. The symbol "CAA-PMA" is evidence that the part (s) has been manufactured under a CAA-Parts Manufacturer Approval.

(c) Each part or package shipped should be accompanied by approved installation drawings or specifications, where applicable, to assure that the installation will conform to the basic approval.

(d) Each part manufactured or modified shall be marked with such of the following data as the Administrator finds appropriate:

(1) Manufacturer's or modifier's name, trademark or symbol. The trademark or symbol should be filed with the CAA and will be included on the supplemental type certificates and approved replacement parts listing.

(2) Part number.

(3) Name and model designation of the type certificated product(s) for which the part is eligible for installation, or if impractical, a tag should be attached to the part indicating installation eligibility information.

(e) If the Administrator finds that the fabrication inspection system cannot be approved or that parts manufactured or modified subsequent to the approval of the inspection system repeatedly contain significant discrepancies, the installation of parts on certificated products in either case may be restricted until satisfactory corrective action is initiated by the manufacturer.

(f) The approval of a fabrication inspection system will be evidenced by a letter from the Chief, Manufacturing Inspection Branch to the manufacturer. The letter of approval is not transferable and will be surrendered to the CAA upon written request.

1.55-3 Reserved.

1.55-4 *Surveillance of inspection system, (CAA polices which apply to sec. 1.55).*

(a) The assigned Aviation Safety Agent will use sections 1.55-1 through 1.55-3 as a guide in conducting inspection of the manufacturing facilities. If the manufacturer's facilities are found acceptable by evaluating the, results of the inspection system and as reflected in the quality and workmanship of the finished parts, the inspection system should be approved. The CAA thereafter will reduce its inspection surveillance and increase its reliance on the manufacturer's inspection system in the determination of the acceptability of future parts.

(1) The CAA representative will conduct periodic inspections of the manufacturer's facilities; make such spot inspections of individual parts as may be necessary to ascertain that the manufacturing facilities and inspection system continuously complies with the standards set forth in sections 1.55-1 through 1.55-3; that the individual parts conform to the approved design data; that fabrication processes and treatments are in compliance with pertinent specifications; and that the quality of workmanship and materials are acceptable.

(2) Drawings and other technical data maintained in the place of manufacture should be made available by the manufacturer to the CAA representative to enable him to ascertain that the finished part conforms to applicable requirements and current design data.

(3) If the manufacturer's inspection system is not considered acceptable as evidenced by significant discrepancies found in the finished parts, the issuance of the fabrication inspection system approval will be deferred until necessary corrective action has been taken.

(4) Upon approval of the inspection system, the manufacturer may nominate one or more employees for appointment as Designated Manufacturing Inspection Representative, in accordance with Part 418 of

chapter II of this title (Regulations of the Administrator). If the nominee meets the requirements for appointment, he will be authorized by the CAA to issue certificates of airworthiness for export for the finished parts which conform to the type design data, to conduct station and conformity inspections, and to make such additional examinations and inspections as may be necessary to ascertain that the parts are safe for installation on certificated products. Such authorization is limited to the manufacturing plant in which the designee is employed.

Airworthiness Certificates

1.60 *Application*. Any U. S. citizen may apply for issuance of an airworthiness certificate for an aircraft provided that he is the registered owner of the aircraft or his agent. The application for an airworthiness certificate shall be made upon a form and in a manner prescribed by the Administrator.

1.60-1 "*Registered owner" (CAA interpretations which apply to sec. 1.60*).

(a) The term "registered owner of the aircraft," as used in section 1.60, means the person listed on the official CAA register as the owner of the aircraft. (Regulations of the Administrator, Part 501, sets forth the rules and procedures concerning aircraft registration certificates.)

1.60-2 *Application form (CAA rules which apply to sec. 1.60)*

(a) Application for an airworthiness certificate shall be made by completing Form ACA-305, Application for Airworthiness Certificate and/or Annual Inspection of an Aircraft, original only, and submitting it to the local CAA Aviation Safety field representative.

(Application forms, Form ACA-305, are available from all CAA regional and district offices, and Designated Manufacturing Inspection Representatives.)

1.60-3 *Processing application (CAA policies which apply to sec. 1.60).*

(a) *Application requirements*. The CAA will not require the applicant for a Certificate of Airworthiness to show legal evidence that he is a U. S. citizen and the owner of the aircraft, nor will his agent be required to furnish such evidence. The certifying statement made upon the application, Form ACA-305, will be accepted as satisfying the citizenship and ownership requirements of section 1.60.

However, at the time the aircraft is presented for the airworthiness inspection, a current registration certificate executed in the name of the applicant must be displayed in the aircraft. Failure to present a current registration certificate will be considered an incomplete application and cause for rejection of the application. There are three types of registration certificates, any one of which will be considered acceptable for the purpose of indicating that the aircraft is currently registered. The three types of registration certificates acceptable are:

(b) *The permanent type*. Part A of Form ACA-500 is the permanent registration certificate. This certificate is the one returned to the registered owner from the Aircraft Records Branch, Washington, D. C. The certificate will have been validated by the Washington office of the CAA and is current as of the date of issue shown on the form.

(c) *The temporary type*. This certificate is the original of Part B of Form ACA-500. This form is completed by the applicant and displayed in the aircraft in accordance with instructions furnished with the form. The duration of this certificate is set forth in item 5 of the certificate.

(d) *Dealer's aircraft registration certificate*. A current Dealer's Aircraft Registration Certificate, Form ACA-1707, is recognized as a current registration certificate for the purpose of making application for an

airworthiness certificate. (Dealers'aircraft registration certificates are described and provided for in Regulations of the Administrator, Part 502.)

(e) *CAA procedure*. During the course of the inspection, the CAA representative conducting the airworthiness inspection will indicate on the Aircraft Inspection Report, Form ACA-305a, which is forwarded to Washington, the type of registration certificate displayed in the aircraft. This information will be compared with the official registration records in Washington to determine if the applicant is the official registered owner. Discrepancies involving official registration will be brought to the attention of the registered owner by the Washington office.

1.60-4 *Airworthiness certificates (CAA policies which apply to sec. 1.60).*

(a) Upon satisfactory application, and when the aircraft described in the application is found to conform with the airworthiness requirements specified in other related sections of the Civil Air Regulations, the CAA representative making the airworthiness determination will prepare a Certificate of Airworthiness, Form ACA-1362, or ACA-1362A, and deliver it to the applicant.

(b) The Certificate of airworthiness will contain the following information: aircraft nationality and registration mark, airworthiness classification, expiration date of certificate, date certificate was issued, signature of validating CAA representative, and scope of certificate.

1.61 ***Aircraft categories for which airworthiness certificates are issued.***

(a) Airworthiness certificates are issued for aircraft whose type design has been certificated under the normal, utility, acrobatic, or transport categories, for aircraft of the restricted category, and for surplus military aircraft in the limited category. In addition, experimental certificates and special flight permits are issued.

1.61-1 *Airworthiness certificate classifications (CAA policies which apply to sec. 1.61*).

(a) For purposes of airworthiness identification and administration, airworthiness certificates are classified as Standard, Limited, Restricted, and Experimental. Aircraft found to conform to the "limited'or "restricted category" requirements will be issued a Limited or Restricted Certificate of Airworthiness, respectively. Aircraft found eligible for certification under the "normal," "utility," "acrobatic," or "transport category" requirements will be issued a Standard Airworthiness Certificate. Experimental airworthiness certificates will be issued for aircraft conforming to the requirements of section 1.74.

1.62 ***Amendment or modification*****. An airworthiness certificate may be amended or modified only upon application to the Administrator.**

1.62-1 *Changing airworthiness classification (CAA policies which apply to sec. 1.62).*

(a) Application to amend or modify an airworthiness certificate should be submitted to a CAA representative on Form ACA-305, entitled "Application for Airworthiness Certificate and/or Annual Inspection of an Aircraft. "Upon finding the aircraft eligible for the classification of airworthiness specified on the application, the CAA representative will reissue the Certificate of Airworthiness, Form ACA-1362 and/or prescribe changes, if necessary, to the aircraft operating limitations required by section 43.10 (b).

(b) An example of a condition which would require amendment or modification of the Air-worthiness Certificate and/or operating limitations is cited below:

(1) An aircraft certificated in the standard classification of airworthiness, to be used for research and development. The experimental installation does not conform to the design requirements for standard certification. Therefore, it would be necessary to have this aircraft certificated in the experimental classification of airworthiness in order to conduct the research and development experiments. The CAA

representative would, in this case, prescribe the appropriate operating limitations.

1.63 *Transferability*. An airworthiness certificate shall be transferred with the aircraft.

1.64 *Duration*.

(a) Unless sooner surrendered, suspended, revoked, or a termination date is otherwise established by the Board, an airworthiness certificate shall remain in effect as long as the maintenance requirements of Part 43 of this subchapter are complied with.

(b) The Administrator may, from time to time, reinspect any aircraft or part thereof to see whether it is in an airworthy condition. The owner, operator, or bailee of the aircraft shall make it available for such inspection upon request.

(c) Upon suspension, revocation, or the general termination by order of the Board of an airworthiness certificate, the owner, operator, or bailee of an aircraft shall, upon request, surrender the certificate to an authorized representative of the Administrator.

1.65 *Display*. An airworthiness certificate shall be carried in the aircraft at all times, and shall be displayed as prescribed by the Administrator.

1.65-1 *Display of airworthiness certificate (CAA rules which apply to sec. 1.65.)*

(a) The airworthiness certificate shall be displayed at the cabin or cockpit entrance in such a manner that it is legible to passengers or crew.

1.66 *Airworthiness certificates for normal utility, acrobatic, and transport categories*. Aircraft certificated in the normal, utility, acrobatic, and transport categories may be used for the carriage of persons and property for compensation or hire. This provision shall also apply to import aircraft certificated in accordance with Part 10 of this subchapter and section 1.67 (c) of this part.

1.67 *Airworthiness certificate; requirements for issuance*. The requirements for the issuance of an airworthiness certificate are stated in paragraphs (a) through (c) of this section.

(a) *Aircraft manufactured under a production certificate*. An applicant for the original issuance of an airworthiness certificate for an aircraft, whose type design was certificated in categories other than the limited category, manufactured under the terms of a production certificate, may be issued such certificate, without further showing. The Administrator may inspect the aircraft to see if it conforms to the type design.

(b) *Aircraft manufactured under type certificate only*. An applicant for the original issuance of an airworthiness certificate for an aircraft, whose type design was certificated in categories other than the limited category, manufactured under the terms of a type certificate only, shall be issued such certificate upon presentation of a statement of conformity for such aircraft issued by the manufacturer when, upon inspection of the aircraft, the Administrator finds that the aircraft conforms to the type design, and is in a condition for safe operation.

(c) *Import aircraft*. An applicant for the original issuance of an airworthiness certificate for an import aircraft type certificated in accordance with Part 10 of this subchapter shall be issued such certificate when the government of the country where the aircraft was manufactured certifies, or the Administrator finds, that the aircraft conforms to the type design and is in a condition for safe operation.

1.68 *Airworthiness certificates for restricted category aircraft.* Aircraft certificated in the restricted category shall not be used for the carriage of persons or cargo for compensation or hire. For

purposes of this section, crop dusting, seeding, and other similar specialized operations are not considered as the carriage of persons or cargo for compensation or hire. Other special limitations for such aircraft are prescribed under the provisions of Part 8 of this subchapter. This section shall also apply to import aircraft certificated in accordance with Part 10 of this subchapter and section 1.69 of this part.

1.69 ***Airworthiness certificates for restricted category aircraft; requirements for issuance*****. The requirements for issuance of an airworthiness certificate for an aircraft in the restricted category are as stated in paragraphs (a) and (b) of this section.**

(a) ***Aircraft manufactured under a production certificate or type certificate only*****. An applicant for the original issuance of an airworthiness certificate for an aircraft in the restricted category, type certificated under the provisions of section 8.10 (a)(1) of this subchapter, shall comply with the appropriate provisions of section 1.67.**

(b) ***Other aircraft*****. An applicant for the issuance of an airworthiness certificate for aircraft of the restricted category other than those referred to in paragraph (a) of this section, such as surplus military aircraft and modified civil aircraft, may be issued such certificate when he demonstrates compliance with the provisions of subparagraphs (1) through (3) of this paragraph.**

(1) The aircraft has been type certificated under the provisions of section 8.10 (a)(2) of this chapter, or modified under the provisions of section 8.10 (b) of this subchapter:

(2) The aircraft has been inspected by the Administrator and found by him to be in a good state of preservation and repair and in condition for safe operation; and

(3) The Administrator has prescribed operating limitations in accordance with Part 8 of this subchapter.

1.69-1 *Issuance of restricted airworthiness certificates (CAA policies which apply to sec. 1.69).*

(a) CAA policies concerning "restricted category" airworthiness certificates are contained in Part 8 of this subchapter. (The manual for Part 8 may be procured from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.)

1.70 ***Multiple airworthiness certification*****. Multiple airworthiness certification shall conform to the provisions of paragraphs (a) and (b) of this section.**

(a) An aircraft shall be issued an airworthiness certificate in the restricted category and in any one or more of the other airworthiness categories prescribed by the regulations in this subchapter, if the applicant shows compliance with the requirements for each category when the aircraft is in the configuration for that category and if the aircraft can be converted from one category to another by removal or addition of equipment by simple mechanical means.

(b) Any aircraft certificated in the restricted and any other category shall be inspected and approved by an authorized representative of the Administrator, or by a certificated mechanic with an appropriate airframe rating, to determine airworthiness each time the aircraft is converted from the restricted category to another category for the carriage of passengers for compensation or hire, unless the Administrator finds this unnecessary for safety in a particular case.

1.70-1 *Issuance of multiple airworthiness certificates (CAA polices which apply to sec. 1.70).*

(a) CAA policies concerning multiple airworthiness certificates are contained in Part 8 of this subchapter. (See sec. 1.69-1 for procurement of the manual for Part 8.)

1.71 *Airworthiness certificate for limited category aircraft*. Airworthiness certificates in the limited category are issued for surplus military aircraft type certificated under Part 9 of this subchapter. Aircraft in the limited category may not be used for the carriage of persons or property for compensation or hire.

1.71-1 *Issuance of limited airworthiness certificates (CAA policies which apply to sec. 1.71).*

(a) *Aircraft models issued a limited type certificate.*

Table 1

(b) *Application procedure for an original limited airworthiness certificate.* The following procedure should be followed by an applicant for a Limited Airworthiness Certificate.

(1) Establish that the aircraft in question is one of the models or series that have been issued a Limited Type Certificate. (See sec. 1.71-1 (a) for listing of aircraft issued a "limited category" type certificate.)

(2) Determine that the aircraft configuration conforms to the requirements set forth in the pertinent "limited category" aircraft specification.

(3) Present evidence that the periodic inspection has been accomplished by an appropriately rated mechanic immediately prior to submitting the application. The scope of a periodic inspection is described under section 18.30-18 of Civil Aeronautics Manual 18.

(4) Accomplish a flight test for the purpose of checking the proper functions of the powerplant, instruments and controls of air-frame and powerplant.

(5) Present logbooks for the aircraft. The logbooks should show the results of the flight test and be signed by the pilot making the flight test. The entry should indicate that the aircraft performs normally and is considered airworthy.

(6) Present any information or technical orders that the CAA representative deems necessary to establish airworthiness compliance.

(7) Present a properly executed application for a Limited Airworthiness Certificate. Application for a Limited Airworthiness Certificate is made on Form ACA-305. (See sec. 1.60-2 for application procedure.)

(8) Present with the application a "limited category" aircraft specification for the particular model shown on the application. "Limited category" aircraft specifications are available free of charge from the CAA regional offices, or the CAA Office of Aviation Information, Washington 25, D. C.

The applicant should discuss the "limited category" aircraft certification requirements with the local CAA representative prior to formally submitting the aircraft for inspection and certification. This procedure is not mandatory; however, it will usually expedite final approval since the CAA representative will be able to instruct the applicant concerning the requirements for his particular aircraft.

1.72 *Airworthiness certificate for limited category aircraft; requirements for reissuance*. An applicant for an airworthiness certificate for an aircraft in the limited category shall show that the aircraft has been previously type certificated in the limited category, and that the aircraft complies fully with the requirements of Part 9 of this subchapter.

1.72-1 *Procedure to be followed for recertification in the "limited category" (CAA policies which apply to sec. 1.72).*

(a) Aircraft previously certificated in the, "limited category" and subsequently certificated in the

"restricted" or "experimental" classification of airworthiness are eligible for recertification in the "limited" classification of airworthiness; provided, the aircraft is restored to the original level of airworthiness and is in a good state of preservation and repair, and in condition for safe operation. Application for recertification should be made in the same manner as outlined in section 1.71-1 (b).

1.73 *Experimental certificates*. Experimental certificates are issued for amateur built aircraft and for aircraft which are to be used for experiment, for exhibition, for air racing, and to show compliance with Civil Air Regulations for the issuance of type certificates and related purposes.

1.73-1 *Experimental airworthiness certification (CAA policies which apply to sec. 1.73).*

(a) *type of operations*. Experimental airworthiness certificates are issued for the following, and similar types of operations: research and development; flight testing leading to type certificates; testing of new installations such as powerplants, propellers, controls, electronic equipment, etc., racing and exhibition flights and amateur-built aircraft.

(b) *Experimental military type aircraft.* Aircraft built on a military contract and identified by military aircraft identification marks are considered public aircraft and do not require issuance of airworthiness certificates. However, aircraft of military design built independently by manufacturers with the intention of demonstrating to prospective military purchasers, and not having military identification, will be required to obtain an Experimental Airworthiness Certificate inasmuch as such aircraft would be considered civil aircraft.

(c) *Amateur-built aircraft.* Amateur-built aircraft will be eligible for an Experimental Airworthiness Certificate when the applicant presents satisfactory evidence that the aircraft was designed and/or fabricated by an individual or group of individuals, the project having been undertaken for educational or recreation purposes and the CAA finds that the aircraft complies with the amateur-built aircraft requirements set forth in section 1.74-3.

1.74 Experimental certificates; requirements for issuance. The requirements for the issuance of experimental certificates are as stated in paragraphs (a) and (b) of this section.

(a) In applying for an experimental certificate the applicant shall submit:

(1) A statement upon a form and in a manner prescribed by the Administrator setting forth the purpose for which the aircraft is to be used.

(2) Sufficient data, such as photographs, to identify the aircraft, and,

(3) Upon inspection of the aircraft, any pertinent information found necessary by the Administrator to safeguard the general public.

(b) The Administrator shall prescribe appropriate operating restrictions for the use of experimental aircraft. Such restrictions shall include the prohibition of carrying persons or property for compensation or hire.

1.74-1 *Requirements for the issuance of experimental airworthiness certificates (CAA rules which apply to sec. 1.74 (a)).* In addition to the information required to be submitted on application Form ACA-305, the applicant shall indicate on a separate sheet of paper:

(a) The purpose of the experiment.

(b) The estimated time or number of flights required to conduct the experiment.

(c) The areas over which it is desired to conduct the experiment.

(d) A three-view drawing of the aircraft specifying only the external dimensions. (Three-view dimensioned photographs will be acceptable in lieu of the drawings. This information need not be submitted for any "experimental" aircraft converted from a basic approved type provided the external configuration has not appreciably changed.)

1.74-2 *Additional information (CAA policies which apply to sec. 1.74 (a)).*

(a) The applicant may be called upon to submit additional information during the airworthiness inspection conducted by the CAA representative. For example, the CAA representative might request the applicant to furnish information concerning a particular construction technique used to fabricate the aircraft or information as to the type of material or gauge of tubing. The purpose of such requests by the CAA representative would be to help determine the general airworthiness of the aircraft and to establish operation limitations or restrictions to safeguard the general public.

1.74-3 *Certification of amateur-built air-craft (CAA policies which apply to sec. 1.74).* The following policies will apply to the certification and operation of aircraft of amateur design and construction designed and built by educational institutions and individuals without complying with all the requirements of "standard" aircraft:

(a) *Scope*. While amateur-built aircraft are issued "experimental" airworthiness certificates, the airworthiness requirements for this type of aircraft are of greater scope than those for other types of "experimental" aircraft. The reason is that after the aircraft has completed the flights specified in paragraph (g) and paragraph (h) of this section, the aircraft operation limitations, upon application, may be modified to permit the carriage of nonrevenue passengers. In addition, the area restrictions normally prescribed for "experimental" aircraft may be modified to authorize extended flights.

(b) *Design and construction, powerplant and equipment.* Amateur-built aircraft should not have any apparent unsatisfactory features of design and construction.

The following guide to design and construction should be followed by an applicant if he intends to apply for an amateur-built aircraft Experimental Airworthiness Certificate:

(1) Approved components such as engines, propellers, wheels, and similar items should be used wherever possible. Structural components of other aircraft may be used; however, it is not intended that this provision be used to avoid obtaining approval of major alterations to aircraft previously certificated in another category.

(2) Protrusions, knobs, sharp corners, and other objects likely to cause serious injury to the pilot or passengers in the event of a minor crash should be reduced to a minimum. Where removal is impractical, consideration should be given to use of padding.

(3) Instruments and equipment as required by section 43.30 (a) of this subchapter should be installed. Safety belts should be installed for each seat.

(4) Suitable in means, consistent with the size and complexity of the aircraft, should be provided to reduce the hazard of fire. A fire wall isolating the engine compartment from the remainder of the aircraft should be provided.

(5) Any engine or propeller may be used, provided no adverse characteristics of the engine, propeller, or engine-propeller combination are evident or known to the Administrator.

(6) The complete powerplant installation, including the propeller, as installed in the aircraft should satisfactorily undergo at least one hour of ground operation from idling to full throttle, power prior to the first flight. The applicant may use any time interval he desires at the various speeds he selects.

(7) Only fuel of a grade which will eliminate destructive detonation and minimize the possibility of vapor lock should be used.

(8) Suitable means should be provided to minimize the possibility of carburetor ice.

(9) An identification plate containing at least the following should be displayed in the cabin or cockpit:

(i) The name and address of the builder.

(ii) The model designation.

(iii) The serial number.

(iv) The date of manufacture.

(c) *Essential data*. In addition to the information furnished on application, Form ACA-305, the following information should be submitted with the application:

(1) Horsepower rating of engine and propeller.

(2) Empty weight and maximum weight at which the aircraft will be operated.

(3) Number of seats installed and their arrangement with respect to each other.

(4) Whether single or dual control.

(5) Fuel and oil capacities.

(6) Maximum speed at which the applicant expects to operate the aircraft.

(7) A statement as to the criteria (any regulations, design data, or other information) used as a basis for the design.

(d) *Examination and inspection*. As part of the certification procedure the aircraft will be subjected to examination and general inspection for airworthiness by an authorized CAA representative. Compliance with specific design requirements contained in paragraph (b) of this section, as well as good aeronautical practice will be determined by means of this inspection and examination. Any apparent unairworthy feature, workmanship or device disclosed by the inspection will be repaired, reworked, or otherwise be changed to be acceptable to the CAA prior to certification as an amateur-built aircraft.

(e) *Initial restrictions*. Upon satisfactory completion of all necessary inspections and testing on the ground, the CAA representative will issue an amateur-built aircraft "experimental" airworthiness certificate. Initially, the aircraft operating limitations of all amateur-built aircraft will contain appropriate restrictions as follows:

(1) Only day VFR flight will be authorized.

(2) The permissible flight area will be restricted to minimize any hazard to the general public. In no case will the initial permissible flight area exceed a 25-mile radius from applicant's base. Flights over thickly populated areas will be prohibited.

(3) Occupants of the aircraft will be limited to essential crew members, and, except in single place aircraft, the cabin or cockpit will be placarded, "Passengers Prohibited," in such a manner and location as to be visible from all seats.

(4) The aircraft will not be used for the carriage of cargo nor in connection with any business or employment.

(5) Such additional restrictions as the Administrator may deem necessary in the interest of safety.

(f) *Modified restrictions*. Upon satisfactory completion of the flight experience requirements outlined in paragraph (g) of this section, and the flight test demonstration outlined in paragraph (h), the flight operation restrictions applied at the time of initial certification may be amended as follows:

(1) Acrobatics may not be performed while carrying passengers.

(2) The restriction regarding flight areas may be removed.

(3) Passengers or cargo may not be carried for compensation or hire.

The placard "Passengers Prohibited" may be removed and the following substituted:

"Passenger Warning-this aircraft is amateur-built and does not comply with the Federal Safety Regulations for 'standard'aircraft."

(g) *Flight experience*. Prior to conducting the flight demonstration provided in paragraph (h) of this section, and subsequent to modification of the operating restrictions as provided for in paragraph (f), the applicant should submit evidence that the following flight experience has been accumulated on the aircraft.

(1) The aircraft should have been flown at least 50 hours when a type certificated engine is installed, or 75 hours when an uncertificated engine is used.

(2) When application is made for the modification of the operation restrictions, the applicant should submit a log of the aircraft flight history, containing at least the following information:

(i) The duration of each individual flight counted toward the flight time of (1) above.

(ii) A statement as to the purpose of each flight (test, pleasure, or proficiency).

(iii) Number of landings made.

(iv) A full description of any mishaps however minor, or any experiences not entirely normal that occur during the flight experience period.

The pertinent portion of the log should be certified by the signature of the applicant and by the signature of the pilot or pilots, other than the applicant that flew the aircraft during the flight experience period.

(h) *Flight test demonstration*. Upon satisfactory completion of the flight experience required in paragraph (g) of this section, the applicant may apply for the modified restrictions provided for in paragraph (f) of this section. Application should be made in writing to the local CAA Aviation Safety District Office. An aviation safety agent will reexamine the aircraft and the flight experience record and upon finding them satisfactory will witness the flight test demonstration. The flight test will be conducted by a certificated pilot holding at least a private pilot's rating. The flight test will be of such scope as to demonstrate that the aircraft performance is adequate for such operations with respect to takeoff, climb, and landing at maximum and minimum weights, for which the aircraft is to be certificated. The aircraft will be demonstrated to be satisfactorily controllable and reasonably maneuverable during taxiing, takeoff, climb, level flight, dive and landing, with or without power. Adequate provisions should be made for emergency egress and use of parachutes by the crew during the flight test.

1.75 *Experimental certificates; duration*.

(a) An experimental certificate shall remain in effect for one year from the date of issuance or renewal, unless a shorter period is established by the Administrator.

(b) The Administrator may, from time to time, reinspect any aircraft or part thereof to ascertain whether it is in an airworthy condition. The owner, operator, or bailee of the aircraft shall, upon request, make it available for such inspection.

(c) Upon suspension, revocation, or termination by order of the Board of an experimental certificate, the owner, operator, or bailee of the aircraft shall, upon request, surrender the certificate to an authorized representative of the Administrator.

1.75-1 *Duration of experimental airworthiness certificate (CAA policies which apply to sec. 1.75).*

(a) Experimental airworthiness certificates will be issued to expire on a specific date, or will indicate a condition under which the certificate will automatically expire. The duration of the experimental certificate may vary from one flight to a limited number of operating hours, or days. In any case, the duration will not exceed one year.

(b) It is the policy of the CAA to do everything possible to encourage legitimate, experimentation leading to improvement in aircraft whenever this may be done without endangering the lives of persons or property not involved in the experimentation. Since it is recognized that a certain amount of danger to the operator is inherent in all experimental flying, the certificates issued for experimental aircraft will contain specific operating conditions and limitations designed to protect the lives and property of persons not involved in the experimentation.

1.76 *Special flight permits*. A special flight permit may be issued for an aircraft which may not currently meet applicable airworthiness requirements, but which is capable of safe flight, for the purpose of permitting the aircraft to be flown to a base where repairs or alterations are to be made, or to permit the delivery or export of the aircraft, or to permit production flight tests of new production aircraft.

1.76-1 *Special flight permits (CAA interpretations which apply to sec. 1.76)*

(a) *General*. Section 43.10 (a) states in part that "No aircraft, except foreign aircraft authorized by the Administrator to be flown in the United States, shall be operated unless an appropriate and valid airworthiness certificate or special flight authorization and a registration certificate issued to the owner of the, aircraft are carried in the aircraft * * *."

"Special flight authorization," mentioned above, is interpreted to mean the special flight permit described in this section. Special flight permits are issued for only two purposes: the first and primary purpose is to permit aircraft not fully complying with the established airworthiness requirements to be flown to bases where repairs or alterations may be made; the second purpose is to permit "flyaway" delivery or flights to points of export of aircraft which are airworthy but not eligible for a U. S. Certificate of Airworthiness. For example, an aircraft purchased by a person other than an American citizen would not be eligible for a U. S. Certificate of Airworthiness due to the fact that a current U. S. Registration Certificate is a prerequisite to obtaining an airworthiness certificate, and only a U. S. citizen, who can present proof of ownership, may obtain a current Aircraft Registration Certificate.

1.77 *Special flight permits; requirements for issuance*. The requirements for the issuance of special flight permits are as stated in paragraphs (a) and (b) of this section.

(a) Where found necessary by the Administrator, an applicant for a special flight permit shall submit a statement in a form approved by the Administrator indicating the purpose of the flight, the proposed itinerary, the duration of authorization requested, the persons to be on board the aircraft,

the particulars, if any, in which the aircraft does not comply fully with the applicable airworthiness requirements, and the restrictions, if any, deemed necessary for safe operation of the aircraft.

(b) The Administrator shall accomplish, or shall require the applicant to accomplish, such appropriate inspections or tests as the Administrator may deem necessary in the interest of safety.

(c) Nothing in paragraphs (a) and (b) of this section shall prevent the issuance to an air carrier by the Administrator of a general authorization to conduct ferry flights for specified purposes as provided in those paragraphs, under such terms and conditions as may from time to time be prescribed by the Administrator.

1.77-1 *Application for permit (CAA rule which apply to sec. 1.77).*

(a) *Persons who may make application.* The registered aircraft owner or his agent shall make application for a special flight permit.

(b) *Application form.* Application shall be made by completing in duplicate Form ACA-1779 entitled "Application and Authorization for Ferry Permit," and submitting it to an authorization CAA Aviation Safety representative.

(Application forms are available at all CAA regional and Aviation Safety District Offices and from designated CAA representatives. The application form consists of two parts: the first part is completed by the applicant and furnishes a description of the aircraft, and the proposed flight; the second part is completed by the CAA representative, and is the authority to conduct the flight. This part shall be prepared to contain the condition., and limitations under which the flight is to he conducted.)

1.71-2 *Airworthiness (CAA policies which apply to sec. 1.77).*

(a) While the aircraft may not be eligible for a Certificate of Airworthiness, it must be found safe for the flight described on the application prior to commencing the flight. The CAA representative may make this determination prior to issuing the authorization, or he may require a pre-flight inspection to be conducted by a certificated mechanic in order to determine that the aircraft is safe for the flight authorized.

1.77-3 *Flight restrictions (CAA policies which apply to sec. 1.77).* The following flight restrictions will be prescribed for all aircraft to be operated under a special flight permit:

(a) The carriage of persons other than crew members will be prohibited.

(b) Weather minimums under which the flight may be conducted will be established.

(c) The duration of the authorization will be shown.

(d) The purpose of the flight will be indicated.

(e) Special area restrictions will be listed, if applicable.

(f) Preflight inspection requirements, if any, will be listed.

(g) The origin, destination, and proposed itinerary, taking into consideration reasonable deviations necessitated by weather or other circumstances beyond the control of the operator will be indicated.

1.77-4 *Authorization for air carrier ferry flight of a four-engine airplane with one engine inoperative (CAA rules which apply to sec. 1.77 (c))*

(a) *General authorization*. An air carrier is authorized to conduct ferry flights of a four-engine airplane with

one engine inoperative, to a base where repairs are to be made to the inoperative engine, in accordance with the following conditions and limitations:

(1) The airplane model has been test flown and found satisfactory for safe flight in accordance with the flight test requirements of paragraph (b) of this section.

(2) The CAA Approved Airplane Flight Manual contains the performance data specified in paragraph (c) of this section and the flight is conducted in accordance with such data.

(3) The air carrier's operations manual contains operating procedures specified in paragraph (d) of this section and the flight is conducted in accordance with such procedures.

(4) No person other than required members of the flight crew shall be carried on board the airplane during such flight.

(5) No flight crew member shall be used unless he is thoroughly familiar with the operating procedures for one-engine-inoperative ferry flights specified in the air carrier's operations manual and the limitations and performance information set forth in the CAA Approved Airplane Flight Manual.

(b) *Flight tests*. The performance of the airplane with one engine inoperative shall be determined by flight test in accordance with the following:

(1) A speed shall be chosen, but in no case shall it be less than $1.3Vs_3$, at which the airplane is satisfactorily controllable in a climb with the critical engine inoperative and its propeller removed or in a configuration desired by the applicant, and all other engines operating at the maximum power determined in subparagraph (3) of this paragraph.

(2) The distance to accelerate to the speed specified in subparagraph (1) of this paragraph and climb to 50 feet shall be determined with the landing gear extended, the critical engine inoperative and its propeller removed or in a configuration desired by the applicant, and the other engines operating at not more than the power specified in subparagraph (3) of this paragraph.

(3) The procedures to be used during takeoff flight, and landing shall be established, i. e., the approximate trim settings, the method of power application, maximum power and speed.

(4) The performance shall be determined at a maximum weight not to exceed that which will permit a rate of climb of at least 400 feet per minute in the enroute configuration specified in section 4b.120 (c) of this subchapter at an altitude of 5,000 feet.

(c) *CAA Approved Airplane Flight Manual*. The CAA Approved Airplane Flight, Manual shall contain the following performance data determined in accordance with paragraph (b) of this section covering at least the following variables:

(1) Maximum weight

(2) C. G. range

(3) Configuration of the inoperative propeller

(4) Runway length for takeoff

(5) Altitude range.

(d) *Air carrier's operations manual*. Operating procedures shall be established in the air carrier's operations manual which will provide for the safe operation of the airplane, with specific provisions for operations

from airports where the runways may require a takeoff or approach over populated areas. No airplane shall be taken off where the initial climb is made over thickly populated areas. VFR weather conditions shall exist at the airport of takeoff and at the intended destination. The manual shall also include procedures for the inspection of the operating condition of the remaining engines.

Aircraft Nationality and Registration Marks

1.100 *General*. The identification of each aircraft shall be marked, and the markings shall be displayed as required in sections 1.101 through 1.107. No design, mark, or symbol which modifies or confuses the identification marks shall be placed on an aircraft, except with the approval of the Administrator.

1.101 *Display of identification marks*. Identification marks shall be displayed in accordance with the provisions in paragraphs (a) and (b) of this section.

(a) Aircraft registered for the first time after December 31, 1948, shall display identification marks consisting of the Roman capital letter "N", denoting United States registration, followed by the registration number. Other aircraft which display identification marks containing an airworthiness symbol "C", "R", "X", or "L", and which are operated solely within the United States may display such identification marks until the first time such aircraft are recovered or refinished to an extent necessitating the reapplication of the identification mark. Thereafter, such aircraft, and after December 31, 1950, all aircraft of United States registry operated outside of the United States, shall display identification marks consisting of the Roman capital letter "N", denoting United States registration, followed by the registration number.

(b) When an identification mark including only the Roman capital letter "N" and the registration number is utilized, limited and restricted category aircraft and experimental aircraft shall display the words "limited," "restricted," or "experimental," respectively, near each entrance to the cabin or cockpit of the aircraft. These markings shall be in letters not less than 2 inches nor more than 6 inches in height.

1.101-1. *Assignment of registration numbers (CAA policies which apply to sec. 1.101 (a)).*

(a) *General*. Section 1.101 (a) requires that all U. S. civil aircraft display identification marks. This section, in part, states that the identification marks shall be the Roman capital letter "N" followed by the registration number. The purpose of this policy is to make known the method by which an aircraft owner can obtain a registration number for an unidentified aircraft.

Most aircraft are assigned a registration number and display the proper identification marks prior to leaving the manufacturer's plant. Generally speaking, the registration number will continue to identify that particular aircraft throughout the remainder of its operating life. There are many times, however, that it is necessary for the owner of the aircraft to request that a registration number be assigned his aircraft. This is particularly true with converted military surplus, amateur-built aircraft, experimental aircraft, and aircraft imported from other countries which have not been certificated at the manufacturer's plant.

(b) *Procedure.*

(1) An aircraft should be assigned a registration number before the owner applies for registration. To obtain a registration number, the aircraft owner should furnish the local Aviation Safety District Office, or International Field Office if the aircraft is located outside the United States, the following information:

(i) The name, of the aircraft manufacturer.

(ii) The aircraft model.

(iii) The aircraft serial number.

(2) This information can usually be found on the manufacturer's nameplate, displayed in the aircraft, or on the bill of sale. Upon receipt of this information, the CAA representative will issue a registration number. This number is used when making application for registration and must be displayed on the aircraft in accordance with the requirements of sections 1.101 through 1.107.

1.102 ***Location of identification marks.*** **Identification marks shall be located in accordance with paragraphs (a) through (e) of this section.**

(a) ***Fixed-wing aircraft.*** **The requirements of subparagraphs (1) through (3) of this paragraph shall be applicable to fixed-wing aircraft.**

(1) ***Wing surfaces*****. Identification marks shall be displayed on the right half of the upper surface and the left half of the lower surface of the wing structure. As far as possible, the marks shall be located an equal distance from the leading and trailing edges of the wing. The top of the marks shall be toward the leading edge of the wing.**

(2) ***Vertical tail surfaces*****. Identification marks shall be displayed on the upper half of the vertical tail surface. They shall be displayed on both sides of a single tail surface and on the outer sides of multitail surfaces. They may be placed either horizontally or vertically.**

(3) ***Fuselage surfaces.*** **Identification marks shall be displayed on the fuselage when the aircraft does not have a vertical tail surface. The marks shall be located on each side of the top half of the fuselage, just forward of the leading edge of the horizontal tail surface. They may be placed either horizontally or vertically.**

(b) ***Rotorcraft.*** **The requirements of subparagraphs (1) and (2) of this paragraph shall be applicable to rotorcraft.**

(1) ***Bottom fuselage surfaces*****. Identification marks shall be displayed on the bottom surface of the fuselage or cabin. The top of the marks shall be toward the left side of the fuselage.**

(2) ***Side fuselage surfaces*****. Identification marks shall be displayed below the window lines and as near the cockpit as possible.**

(c) ***Airships*****. The requirements of subparagraphs (1) and (2) of this paragraph shall be applicable to airships.**

(1) ***Horizontal stabilizer surfaces*****. Identification marks shall be displayed on the upper surface of the right horizontal stabilizer and on the under surface of the left horizontal stabilizer. The top of the marks shall be toward the leading edge of the stabilizer. The marks shall be placed horizontally.**

(2) ***Vertical stabilizer surfaces.*** **Identification marks shall be displayed on each side of the bottom half of the vertical stabilizer. The marks shall be placed horizontally.**

(d) ***Spherical balloons*****. Identification marks for spherical balloons shall be displayed on two places diametrically opposite, and shall be located near the maximum horizontal circumference of the balloon.**

(e) ***Nonspherical balloons*****. Identification marks for nonspherical balloons shall be displayed on each side. They shall be located near the maximum cross section of the balloon, immediately above either the rigging band or the points of attachment of the basket or cabin suspension cables.**

1.103 ***Measurements of identification marks.*** **The measurements of identification marks shall conform**

to the provisions of paragraphs (a) through (d) of this section.

(a) ***Fixed-wing aircraft.*** **The requirements of subparagraphs (1) and (2) of this paragraph shall be applicable to fixed-wing aircraft.**

(1) ***Wing surfaces*****. The height of the identification marks on the wings shall be at least 20 inches.**

(2) ***Fuselage and vertical tail surfaces*****. Identification marks shall be such as to leave at least a margin of 2 inches along each edge of the surface. Within these stipulations, the marks shall be as large as practicable, except that this rule shall not be interpreted as requiring the use of marks exceeding 6 inches in height or permitting the use of marks smaller than 2 inches in height. The letters and numbers of each separate group of identification marks shall be of equal height.**

(b) ***Rotorcraft.*** **The requirements of subparagraphs (1) and (2) of this paragraph shall be applicable to rotorcraft.**

(1) ***Fuselage or cabin bottom surfaces.*** **Identification marks shall be at least four-fifths as high as the fuselage is wide, but need not be more than 20 inches high.**

(2) ***Fuselage or cabin side surfaces*****. Identification marks shall conform to requirements stipulated in subparagraph (a)(2) of this section.**

(c) ***Lighter-than-air aircraft.*** **The requirements of subparagraph (1) of this paragraph shall be applicable to lighter-than-air aircraft.**

(1) On each airship, spherical balloon, or nonspherical balloon identification marks shall be at least 20 inches high.

(d) ***All aircraft.*** **The requirements of subparagraphs (1) through (3) of this paragraph shall be applicable to all aircraft.**

(1) ***Width*****. Identification marks shall be two-thirds as wide as they are high with the exception of number "1" which shall be one-sixth as wide as it is high.**

(2) ***Thickness*****. Identification marks shall be formed by solid lines of a thickness equal to one-sixth of the character height.**

(3) ***Spacing.*** **The space between the identification numbers and letters shall be not less than one-fourth of the character width.**

1.104 ***Color*****. On each aircraft, identification marks shall contrast in color with the background.**

1.105 ***Affixation.*** **On each aircraft identification marks shall be painted or shall be affixed by such other means as will insure a similar degree of permanence and legibility, except that aircraft intended for immediate delivery to a foreign purchaser may display identification marks affixed with readily removable material.**

1.106 ***Design*****. On each aircraft, identification marks shall have no ornamentation.**

1.107 ***Maintenance*****. On each aircraft, identification marks shall be kept clean and legible at all times.**

1.108 ***Identification marks for nonconventional aircraft.*** **The identification marking rules prescribed in sections 1.101 through 1.107 are intended to apply to conventional aircraft as they are known today. When aircraft are developed which do not conform to the general configuration of present-day aircraft, a procedure for identification marking shall be prescribed by the Administrator.**

1.108-1 *Identification marks for nonconventional aircraft (CAA rules which apply to sec. 1.108.)*

(a) *Purpose*. The purpose of this rule is to prescribe the procedure for displaying identification marks on noneonventional aircraft. For the purpose of prescribing identification marks, an aircraft is considered to be nonconventional when it is impossible to display the identification marks in accordance with the applicable rules prescribed in sections 1.101 through 1.107.

(b) *Procedure*. The owner of the aircraft shall submit to the local CAA representative a dimensioned three view drawing, or dimensioned photographs of the aircraft, including a statement setting forth the reason why it is not possible to identify the aircraft in accordance with the standard requirements. If the owner desires to include a proposed method of marking, it too will be considered. Such proposal shall take into consideration, as near as possible, the standard identification marking procedure set forth in sections 1.101 through 1.107.

This information shall be submitted to the local CAA representative as far in advance of the anticipated flight date as possible, since the CAA representative must forward the information to the Washington office for final decision.

1.109 Identification marks for export aircraft. An aircraft manufactured in the United States for delivery outside the United States or its possessions may display such identification marks as are required by the State of registry of the aircraft. Such aircraft shall be operated only for the purpose of test and demonstration flights for a limited period of time or while in necessary transit to the purchaser.

1.109-1 *Identification marks for export aircraft. (CAA policies which apply to sec. 1.109).* When foreign nationality and registration markings are not available for display upon new aircraft to be exported via flyaway to U. S. border or to some other location in U. S. where the aircraft will be disassembled for shipment, U. S. identification markings may be displayed on the aircraft in the normal manner (provided title to the aircraft is held by a citizen of the U S.), and the markings may be affixed with a readily removable material.

(a) To minimize the cost involved in affixing identification markings to new aircraft being exported, exporters (manufacturers, dealers, and distributors who are holders of dealers'aircraft registration certificates) may request a special U. S. identification number consisting of one to three digits, which will be preceded by the letter N when displayed on the aircraft. Only one such number will be issued to each exporter, to be used repetitively in connection with previously unregistered aircraft which are being exported. These numbers will be used only in connection with the flyaway delivery of aircraft which are being exported, and will be displayed only during that portion of the fly-away delivery which takes place over U. S. territory. In the event two or more aircraft displaying the same identification number may be flying in relatively close formation, each aircraft will be identified, insofar as radio contacts are concerned, by combining the identification number displayed with the last two digits of the manufacturer's serial number of the aircraft. For example, an aircraft displaying the identification mark N2M and having manufacturer's serial number 203040 will be identified as N2M40. In order that the pilot may readily determine his radio call number, a placard bearing the call number of the aircraft should be displayed on the windshield or instrument panel in a location readily visible to the pilot. In this example, the placard would read N2M40. [15]

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[15] See appendix A of this manual for a table aircraft nationality markings.

1.110 *Removal of aircraft identification marks.* When an aircraft of United States registry is sold to a citizen of a foreign country, the United States identification marks must be removed from such aircraft by the United States registered owner or his agent prior to its delivery to the purchaser.

Note: The reporting requirements of forms contained in this manual have been approved by the Bureau of the Budget pursuant to the Federal Reports Act of 1942.

Appendix A

Regional Offices and Areas of Jurisdiction

REGION 1. *Headquarters Office at Jamaica, Long Island, N.Y.*-Composed of the States of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, Delaware, New Jersey, Pennsylvania, Ohio, Maryland, Virginia, West Virginia, Kentucky, and the District of Columbia.

REGION 2. *Headquarters Office at Fort Worth, Tex*.-Composed of the States of Tennessee, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Arkansas, Oklahoma, Louisiana, and Texas; Territories of Puerto Rico, Swan Island, Virgin Islands, and Canal Zone.

REGION 3. *Headquarters Office at Kansas City, Mo.*-Composed of the States of Michigan, Indiana, Wisconsin, Illinois, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas.

REGION 4. *Headquarters Office at Los Angeles, Calif.*-Composed of the States of Montana, Wyoming, Colorado, New Mexico, Arizona, Utah, Idaho, Washington, Oregon, Nevada, and California.

REGION 5. *Headquarters Office at Anchorage, Alaska*.-Consists of the Territory of Alaska, including the Aleutian Islands.

REGION 6. *Headquarters Office at Honolulu, T.H.*-Consists of the areas contained within the Honolulu, Wake and Guam Flight Information Regions established by ICAO. (Major operations are conducted in the Territory of Hawaii and the islands of Canton, Wake and Guam.)

INTERNATIONAL REGION. *Headquarters Office at Washington 25, D. C.*-Consists of those areas of the world not under the specific jurisdiction of other CAA regions.

Figure 1

Table - TABLE OF AIRCRAFT NATIONALITY MARKINGS

Table 1 - Type Certification

Table 2 - Production Certification

Table 3 - Designated Manufacturing Inspection Representative

Table 4 - Airworthiness Certification

Table 5 - Dealer’s Aircraft Registration

Figure 1 - Form ACA-312, Application for Type Certificate.

Figure 2 - Form ACA-335, Propeller Supplement to Application for Type Certificate ACA-312.

Figure 3 - Form ACA-316, Type Inspection Authorization-for aircraft.

18. (1) The Manufacturing Inspection Agent is requested to:

(a) Determine the propeller high and low pitch stop settings and the feathered pitch setting.

(b) Determine fuel tank sump capacity in most critical attitude.

(c) Determine the make, model, and serial numbers of the oil radiators installed.

(d) Ascertain quantity of undrainable oil in the radiator.

(e) Ascertain that the following items of Pre-flight Type Certification Board Report, dated June 20, 1955, are completed before the conduct of the official flight test: B3w, B3y, B5e, and B6g.

(2) The Flight Test Agent is requested to:

(a) Observe the fuel tank vent discharge pattern under various flight attitudes to determine that fuel or fumes will not enter the wing.

(b) Investigate the automatic feathering feature of the propeller combined with the centrifugally actuated high pitch stop to determine that:

(1) The propeller can be feathered under conditions of sudden engine stoppage such as would be caused by ignition or fuel system failure.

(2) The propeller will not inadvertently feather under any normal operating conditions, including power off stalls at idling or zero thrust r.p.m.

The ability to feather under these conditions should be determined for the following flight configurations:

(a) Take-off.

(b) Climb at Max. Cont. Power.

(c) Cruise, 67% Max. Cont. Power.

(d) Power off'glide at maximum approach indicated air speed.

(3) The fuel burning heater installation in its present configuration has not been approved engineering-wise and is not being presented for approval at this time.

(4) The Aero Engine Model B-074-0 has not been type certificated, the Brown Model CH-82XF-2/8833 propeller has not been approved for the rating of this engine, and the engine--propeller--airplane combination has not been approved vibration-wise. As no information is available in this office regarding limitations of the B-074-0 engine, it is recommended that the applicant contact the engine manufacturer for limitations and recommended instrumentation.

(5) The engine installation has an anti-icing carburetor; therefore compliance with the requirements of CAR 3.606 (d) of Amendment 3-10 should be determined.

(6) The landing gears should be retracted under as many conditions as possible, including altitude, to evaluate the suitability of the 5 ampere circuit breaker in the landing gear circuit in simulating cold weather operation.

(7) Determine the adequacy of the landing gear retraction system, and clean storage clips for elimination of interference with the fuel selector valve.

Figure 4 - Form ACA-316, Type Inspection Authorization-for engine.

The Manufacturing Inspection Agent will please witness the following tests and inspections. In addition, if

possible, personnel from W-245 or NY-245 will participate in the teardown inspection.

18.1 Calibration Teat

Conduct a power calibration aver the entire operating range maintaining average cylinder head and cylinder barrel temperatures within 50° F of maximum desired and oil inlet temperature within 10° F of maximum desired during the testing under maximum continuous and take-off conditions. Sufficient data should be obtained to enable construction of locked throttle fuel loops starting at T.O. power and speed, at M.C. power and speed, and at cruising power and speed, showing cylinder head temperatures, as well as the following curves at a mixture setting conforming to the specified full rich fuel consumption:

(a) Constant speed curves (sea level performance chart).

(b) Full throttle curve (where applicable).

(c) Propeller load curve.

Curves (b) and (c) should show specific fuel consumption, as well as horsepower versus engine speed. The fuel loops and constant speed curves requested above, need not be return if sufficient previous data have been obtained.

18.2 Detonation Test

Conduct detonation characteristic tests over the entire operating range including mixture control runs at take-off power and speed, maximum continuous power and speed and at cruising powers and speeds. The maximum specified inlet air and oil in temperatures should be maintained daring the test, however, a check should also be made with full cold carburetor air to ensure detonation free operation is obtainable under this condition. The cylinder head temperature should be set at the start of each curve in the full rich condition, and the cooling air conditions should then remain unaltered during the remainder of each curve. The cylinder head temperature net should be as high as possible but permit leaning to be accomplished without exceeding the maximum specified head temperature. During all other phases of testing, any indications of detonation should be noted.

18.3 Torsional Vibration Survey

Torsional vibration characteristics of this engine are considered similar to those of the 0-340 engine; therefore, no additional torsional data will be required. Endurance testing will be required, however, at 2625 RPM at Full Throttle for 15 hours to substantiate the engine at resonant torsional conditions.

18.4 Endurance Test

(a) 20 hours consisting of alternate periods as follows:

1-1/2 hours at maximum continuous power and speed - 2700 rpm, F.T.

1/2 hour at 75% max. continuous power and 91% speed -2450 rpm. & 25.0" MP.

(b) 20 hours consisting of alternate periods as follows:

1-1/2 hours at max. continuous power and speed - 2700 rpm. F.T.

1/2 hour at 70% max. continuous power and 89% speed - 2400 rpm. & 24.0" M.P.

(c) 20 hours consisting of alternate periods as follows?

1-1/2 hours at max. continuous power and speed - 2700 rpm. F.T.

1/2 hour at 65% power and 87% speed - 2340 rpm. & 22.9" M.P.

(d) 20 hours consisting of alternate periods as follows?

1-1/2 hours at max. continuous power and speed - 2700 rpm. F.T.

1/2 hour at 60% power and 84.5% speed - 2280 rpm. & 21.7" M.P.

(e) 20 hours consisting of alternate periods as follows:

1-1/2 hours at maximum torsional, power and speed - 2625 rpm. F.T.

1/2 hour at 50% power and 79.5% speed - 2150 rpm. & 20.0" M.P.

(f) 20 hours consisting of alternate periods as follows:

2-1/2 hours at max. continuous power and speed - 2700 rpm. F.T.

2-1/2 hours at max. cruise power - 75% max. continuous power and 91% speed - 2450

rpm. & 25.0" M.P.

(g) 30 hours consisting of alternate periods as follows:

5 min. at T.O. Power and speed - 2700 rpm. F.T.

5 min. at Best Economy Cruise Power - 75% max. cont. power & speed - 2450 rpm. &

25.0" M.P.

Operating Conditions

All testing will be conducted under the following conditions, except where otherwise indicated:

(a) Cylinder head temperatures - hottest head 500° F. *** 100° bayonet type thermocouple during first 50 hours of F.T. running during endurance test.

(b) Cylinder barrel temp. - hottest barrel - 300° F. *** 10° F.

(c) Oil inlet temp. (first 50 hrs.) - 245° F. *** 5° F.

(d) Carburetor entr. pressure - 29.90 - 30.0 Hg abs.

(e) Carburetor entr. temp - 70° - 90°

(f) Mixture setting - Full Rich.

(g) Fuel Temp. - 70° - 90° F.

(h) Fuel press. - 3 to 5 PSIO.

(i) Speed and power is to be held *** 3% of desired.

18.5 Operation Test

Conduct an operation test with a propeller to determine that the engine shows no tendency towards unsatisfactory operation with respect to the following:

(a) Starting

(b) Idling

(c) Acceleration

(d) Backfire characteristics

(e) After-burning characteristics

(f) Ignition

Determine rpm drop with engine operating on each magneto breaker alone and at the same time determine tendency toward detonation at appreciable power (at least 75% power).

Some of these characteristics can be ascertained during the endurance testing, however, the report submitted should discuss each of the above items in a special section entitled "Operation Test."

18.6 Teardown Inspection and Miscellaneous Determinations

Witness or conduct the following at the completion of the testing:

(a) Weighing of the engine

(b) Compression ratio check

(c) Valve leakage test

(d) General visual inspection

(e) Magnetic particle inspection of highly stressed steel parts

(f) Fluorescent inspection, or equivalent, of highly stressed nonmagnetic parts, including crankcase, cylinder heads and pistons

(g) Measurement of parts as deemed necessary; the pertinent measurements should be specified on measurement sheets which show the original or before test" measurements

(h) Conduct any other inspections deemed necessary.

Special Notes

1. All operations are to be conducted with the minimum grade of fuel specified by the engine manufacturer. If detergent oil is used, the engine will be restricted to use that type of detergent oil only.

2. The endurance testing should be conducted with all accessory pads and drives loaded.

3. Conduct any other tests or inspections deemed necessary.

Figure 5 - Form ACA-316, Type Inspection Authorization-for propeller.

APPENDIX A

No. CP39-lW

Date 7-27-15

Attachment A

to

Type Inspection Authorization

Type Tests for Variable Pitch Propellers

Make Aircraft Propeller Co. Model 48A10/1247-l

The manufacturer proposes to comply with pertinent requirements of CAR 14 as indicated below. Items so indicated have been waived on the basis of substantiating data submitted by the manufacturer. Specified tests may be conducted in any sequence acceptable to both the manufacturer and the CAA representative.

Witness as many of the following tests and inspections as is considered necessary to validate the manufacturer' s test reports.

I. Type Test Schedule

Propeller rpm specified in all cases except where noted.

Items I(A)(l), I(B)(l), I(B)(2), I(C) to be witnessed

by CAA personnel from NY-244 ASDO No. 42

Items I(B(3) to be witnessed

by CAA personnel from NY-244 ASDO No. 47

Items ----------to be witnessed

by CAA designee----------

(A) Centrifugal Load Test. For hub and blade retention system.

(1) One hour whirl of propeller at 1609 rpm.

(2) Static pull of dummy blades in hub at ----------lbs.

(3) One hour whirl of hub with dummy blades at----------rpm.

(B) Endurance Test.

(1) 50 hours at 2750 HP and 1138 rpm. Proposed engine P&W Model R-4360

geared .425 (engine rpm 2680).

(2) 50 hours at 2000 HP and 970 rpm. Engine same as for (1).

(3) 10 hours at 3250 HP and 1270 rpm. Proposed engine Wright Model R-3350TC geared .4375 (engine rpm 2900).

(4) Endurance test during engine test as covered by T.I.A No.----------dated ----------for the ----------engine Model----------

(C) Functional Test.

(1) 1500 complete cycles of pitch change by means of the automatic control mechanism.

(2) 50 complete feathering cycles. With operation of feathering control, mixture control may be moved to idle cut-off, or throttle may be closed, or the engine stopped.

(3) 200 complete reversing cycles. During each cycle, propeller will be operated in full reverse pitch for one minute at 2750 HP and 1138 rpm.

II. Tear-down Inspection. To be witnessed by CAA personnel from NY-244 ASDO No. 42

Shall follow completion of all tests.

(A) Conduct conformity checks, Indicate any parts showing appreciable wear, corrosion, galling, interference with other parts, etc.

(B) Inspect the applicable parts listed below by the magnetic particle, dye penetrant, fluorescent penetrant, acid etching, or anodizing process where applicable, supplementing one process by another if necessary.

(1) Blades, hub bodies and spiders, blade retention parts, parts that transmit motion when changing pitch, pitch stops, areas in spinners in vicinity of mounting bolts.

(2) For steel blades, supplement the magnetic particle inspection by X-ray inspection if deemed advisable.

(C) If assigned agent considers any other inspections necessary, please contact the Power Plant Branch, W-245.

III. General Information.

(A) Location of tests:

Items I(A)(l), I(B)(l), I(B)(2), I(G), and II will be conducted at the Aircraft Propeller Company test facilities at Smithville, Connecticut. Item I(B) (3) will be conducted at the Aircraft Engine Company test facilities at Johnsville, New Jersey.

Figure 6 - Form ACA-283-3-4b Part I, Type Inspection Report, Part I, Aircraft Ground Inspection. Page 1

Figure 6 - Form ACA-283-3-4b Part I, Type Inspection Report, Part I, Aircraft Ground Inspection. Page 2

Figure 6 - Form ACA-283-3-4b Part I, Type Inspection Report, Part I, Aircraft Ground Inspection. Page 3

Figure 6 - Form ACA-283-3-4b Part I, Type Inspection Report, Part I, Aircraft Ground Inspection. Page 4

Figure 6 - Form ACA-283-3-4b Part I, Type Inspection Report, Part I, Aircraft Ground Inspection. Page 5

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A. Period of inspection; from December 16, 1955 to M January 29, 1956.

B. Where conducted ABC Airplane Company, Paloma, N. J.

C. Were unsatisfactory items noted during this inspection which

resulted in changes to the product? No

D. Were revised technical data submitted by reason of required changes? No

E. Did inspections and/or tests involve several articles of the product? No

(If so, identify by serial number(s) below, under Remarks.)

F. Is type approval recommended? No

G. Is this model recommended for Production Certification

privileges? Yes

Remarks

NOTE: List all correspondence on file in the district and regional offices relating to this project. Copies are not to be included unless they are important and furnish information which is not otherwise available in this document.

(To continue "Remarks," insert pages. Number such pages 6A, 6B, etc.)

NOTE: Items not required by the Type Inspection Authorization were not changed from those originally approved.

The following comments are made with respect to special investigations and/or tests conducted by reason of instructions contained in section 18 of the referenced Type Inspection Authorization (not covered by regulations referenced herein), and are identified in accordance with the TIA numbering:

NOTE: List the results of special investigations by the same number as on the Type Inspection Authorization, Form ACA-316.

GROUND INSPECTION

1. Actual Empty Weight, Empty Weight C.G., Dimensions and Clearances

1.0 Level Attitude

1.0.1 Describe leveling provisions (CAR 3.401 and 4b.391) Longitudinal: left side of fuselage stations 459 and 485, 3" below windows, lateral lower aft side of fuselage frame 598

1.0.2 Datum location 100 inches forward of nose of fuselage

1.0.3 Horizontal distance, datum to average main landing gear C/L 474.88 in.

1.0.4 Horizontal distance, datum to average auxiliary landing gear C/L 251.6 in.

1.0.5 Weight, plus unusable fuel X undrainable oil X engine coolant □ XX full hydraulic fluid

Note: Equipment list should indicate items installed when weighed X

Left Main Gear 14775 lbs.

Right Main Gear 14800 lbs

Auxiliary Gear 4467 lbs.

Total 34042 lbs.

1.0.5.1 Empty C.G. is 33.*78* in. fwd. of average main landing gear C/L.

1.0.5.2 Empty C.G. is 491.38 in. aft of datum.

1.0.5.3 Most Forward C.G. Loading:

Fuel 1010 gals; Oil 40 gals.; Crew 2;

Passengers 44; Baggage----------lbs. aft 3000 lbs. fwd.

1.0.5.4 Most Rearward C.G. Loading:

Fuel 1010 gals.; Oil 30 gals.; Crew 3;

Passengers 44 ; Baggage 6000 lbs. aft 1000 lbs. fwd.

Note: See Page 26 of this report for propeller clearance data.

2. Detail Inspection

2.0 General - In accordance with basic responsibilities, or on the basis of specific requests by engineering representatives, the following constitutes a record of inspections and tests conducted or observed by Manufacturing Inspection agents with respect to prototype or modified products presented for type certification.

2.0.1 Are adequate detail drawings, specifications, parts lists, and other necessary data and drawings available to fabricators and company inspectors?

CAR 3.15, 3.292 4b.15, 4b.301 Yes

2.0.2 Are drawings relating to changes and deviations promptly furnished in proper form to fabricators and Company inspectors?

CAR 3.15, 3.292 4..15, 4..301 Yes

2.0.3 Is the manufacturer maintaining adequate records of significant changes and deviations?

CAR 3.15 4b.15 Yes

2.0.4 Are parts and assemblies properly stamped, marked, or otherwise identified to indicate inspection status during various stages of fabrication?

CAR 3.15, 3.292 4b.15, 4b.301 Yes

2. 0.5 Is receiving inspection adequate to determine that purchased parts and materials are in conformity with applicable drawings and specifications prior to storing or issuance?

CAR 3.15 4b.15 Yes

2.0.6 Are adequate check lists, travel cards, or inspection records maintained?

CAR 3.15 4b.15 Yes

2.0.7 Are quality control measures exercised for aircraft processes so supervised and controlled as to assure that materials subjected thereto are in conformity with applicable drawings and specifications?

CAR 3.15 4b.15 Yes

2.0.8 Are fabrication methods, plant operation, and procedures so supervised and controlled as to produce a consistently sound and airworthy product?

CAR 3.293, 3.294 4b.302 Yes

2.0.9 Does sampling inspection of standard fasteners (e.g., bolts, nuts, pins, screws, rivets, etc.) indicate that they are in conformity with related drawings and specifications?

CAR 3.294 4b.303 Yes

2.010 Does sampling inspection of a standard fasteners indicate acceptable standards of workmanship?

CAR 3.294 4b.303 Yes

2.0.11 Is workmanship throughout the product satisfactory?

CAR 3.292 4b302 Yes

2.0.12 Have adequate protective control measures been employed in a stocking and transportation to provide protection for materials against deterioration or reduction in service life expectancy due to weathering, corrosion, abrasion, mishandling, or other causes?

CAR 3.295 4b.304 Yes

2.0.13 With respect to a seaplane, have special treatments specified in related drawings or applicable

specifications; i.e., those necessary to prevent corrosion from salt water operations, been accomplished?

CAR 3.295 4b.304

2.0.14 Are adequate means (inspection openings, etc.) provided to permit ready access to parts or systems requiring periodic inspection, adjustment, or servicing?

CAR 3.296 4b.305 Yes

Remarks

NOTE: Pages 1 and 5 of this form are used for reporting type certification inspection of engines and propellers. The Type Inspection Report, Part I, Rotorcraft Ground Inspection, Form ACA 283-6, will be used in reporting results of this activity on all helicopters and similar type of aircraft. The Form ACA 283-6 is not included in this Appendix because of its similarity to the Form ACA 283-3-4b.

Figure 7 - Form ACA-317, Statement of Conformity.

Figure 8 - Form ACA-1257, Conformity Inspection Report.

Figure 9 - Form ACA-331, Type Certificate.

Figure 10 - Form ACA-2417, Supplemental Type Certificate.

Figure 11 - Form ACA-186, Approval Tag.

Figure 12 - Form ACA-1600, Statement of Compliance of Aircraft or Aircraft Components with the Civil Air Regulations.

Figure 13 - Form ACA-332, Application for Production Certificate.

Figure 14 - Form ACA-314, Manufacturing Inspection Report. Page 1

Figure 14 - Form ACA-314, Manufacturing Inspection Report. Page 2

Figure 15 - Form ACA-333, Production Certificate.

Figure 16 - Form ACA-333a, Production Limitation Record.

Figure 17 - Form ACA-1557, Production Certificate Number Assignment Card.

Figure 18 - Form ACA-1381, Statement of Qualifications for Designated Manufacturing Inspection Representative.

Figure 19 - Form ACA-1382, Certificate of Authority.

Figure 20 - Form ACA-1521, Designated Manufacturing Inspection Representative Number Assignment Card.

Figure 21 - Form ACA-305, Application for Airworthiness Certificate and/or Annual Inspection of an Aircraft.

Figure 22 - Form ACA-305a, Aircraft Inspection Report.

Figure 23 - Form ACA-1362, Certificate of Airworthiness.

Figure 24 - Form ACA-1779, Application and Authorization for Ferry Permit.

Figure 25 - Example of an inspection report used for airworthiness certification.

Figure 26 - Form ACA-132, Aircraft Record Card.

Figure 27 - Form ACA-1706, Application for Issuance of Dealers'Aircraft Registration Certificate-s

Figure 28 - Form ACA-1707, Dealers Aircraft Registration Certificate.

Figure 29 - Form ACA-1707-Reverse-Manufacturer’s Special Flight Authorization.

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