TYPE CERTIFICATION PROCESS

MARCH 2, 1995

FOREWORD

This order establishes procedures for accomplishing the evaluation and approval of aircraft type design data and changes to approved type design data. The procedures contained in this order apply to all Engineering and Manufacturing personnel.

This order has been extensively rewritten to include current guidance for the evaluation and approval of aircraft type design data and changes to approved type design data. This edition of FAA Order 8110.4A replaces the guidance and procedures found in FAA Order 8110.4

Any deficiencies found, clarifications needed, or improvements to be suggested regarding the content of this order should be forwarded to the Aircraft Certification Service, Automated Systems Branch, AIR-520, Attention: Directives Management Officer, for consideration. Your assistance is welcome. Federal Aviation Administration Form 1320-19, Directive Feedback Information, is located on the last page of this order for your convenience. If an interpretation is urgently needed, you may contact the Aircraft Engineering Division, Policy and Procedures Branch, AIR,110, for guidance, but you should also use the FAA Form 1320-19 as a follow-up to verbal conversation.

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Manager, Aircraft Engineering Division

TABLE OF CONTENTS

CHAPTER 1. GENERAL

CHAPTER 2. TYPE CERTIFICATION PROCESS

CHAPTER 3. TYPE CERTIFICATES

CHAPTER 4. SUPPLEMENTAL TYPE CERTIFICATES

CHAPTER 5. MANUFACTURING AND ENGINEERING RESPONSIBILITIES AND FUNCTIONS RELATIVE TO INSPECTION AND TEST

LIST OF ILLUSTRATIONS

CHAPTER 1. GENERAL

1. PURPOSE. This order prescribes the responsibilities and procedures for Federal Aviation Administration (FAA) aircraft certification personnel responsible for the certification process required by the Federal Aviation Regulations for civil aircraft, aircraft engines, and propellers.

2. DISTRIBUTION. This order is distributed to Washington headquarters branch level of the Aircraft Certification Service, Flight Standards Service, and Office of Environment and Energy; to branch level of the regional aircraft certification directorates and regional Flight Standards Division; to all aircraft certification field offices, to the Brussels Aircraft Certification Division, and to all DER's.

3. CANCELLATION. Order 8110.4, Type Certification, dated December 28, 1967 is canceled.

4. BACKGROUND AND DISCUSSION.

a. Order 8110.4, Type Certification was published for internal use of the Federal Aviation Administration (FAA) to provide policy and guidance for type certification of aircraft products. This revision of Order 8110.4 provides updated guidance to the FAA on type certification procedures.

b. The Federal Aviation Act of 1958 as replaced with 49 U.S.C. 40101 et seq. directs the FAA to promote safety of flight of civil aircraft in air commerce by prescribing and revising minimum standards governing the design, materials, workmanship, construction, and performance of aircraft, aircraft engines, and propellers. The Aircraft Certification Regulatory Program (ACRP) was developed to accomplish this mission. As part of the ACRP, the Aircraft Certification Service administers the type certification program to determine compliance with the prescribed standards and to maintain certificate integrity (continued airworthiness). An organizational diagram of the Aircraft Certification Service is included in appendix 9. The Aircraft Certification Service is composed of four headquarters divisions, four certification directorates, and a European Certification Division (Brussels, Belgium). The four headquarters divisions are: Aircraft Engineering Division, Aircraft Production and Airworthiness Certification Division, Systems Surveillance and Analysis Division, and the Planning and Program Management Division. The four certification directorates are: the Small Airplane Directorate (Central Region), the Transport Airplane Directorate (Northwest Mountain Region), the Rotorcraft Directorate (Southwest Region), and the Engine and Propeller Directorate (New England Region). The Aircraft Certification Service's responsibility for administering the Federal Aviation Regulations is divided as follows:

(1) The Aircraft Engineering Division is responsible for:

(a) Overall policy and guidance for engineering portions of the Aircraft Certification Regulatory Program;

(b) 14 CFR part 21 (part 21)--Certification Procedures for Products and Parts;

(c) 14 CFR part 39 (part 39)--Airworthiness Directives;

(d) 14 CFR part 183 (part 183)--Representatives of the Administrator; and

(e) All Special Federal Aviation Regulations pertaining to type certification.

(2) The Production and Airworthiness Certification Division is responsible for:

(a) Overall policy and guidance for manufacturing portions of the Aircraft Certification Regulatory Program;

(b) Part 21--Certification Procedures for Products and Parts;

(c) 14 CFR part 43 (part 43)--Maintenance, Preventive Maintenance, Rebuilding, and Alteration;

(d) 14 CFR part 45 (part 45)--Identification and Registration Marking;

(e) Part 183--Representatives of the Administrator; and

(f) All Special Federal Aviation Regulations pertaining to certification conformance, airworthiness certification, and production.

(3) The Small Airplane Directorate (Central Region is responsible for:

(a) 14 CFR part 23 (part 23)--Airworthi ness Standards: Normal, Utility, Acrobatic, and Commuter Category Airplanes;

(b) 14 CFR part 31 (part 31)--Manned Free Balloons;

(c) Technical guidance for part 23 restricted category airplanes;

(d) Airworthiness standards for gliders and airships; and

(e) Technical guidance for Primary Category Airplanes.

(4) The Transport Airplane Directorate (Northwest Mountain Region) is responsible for:

(a) 14 CFR part 25 (part 25)--Airworthiness Standards: Transport Category Airplanes; and

(b) Technical guidance for part 25 restricted category airplanes.

(5) The Rotorcraft Directorate (Southwest Region) is responsible for:

(a) 14 CFR part 27 (part 27)--Airworthiness Standards: Normal Category Rotorcraft;

(b) 14 CFR part 29 (part 29)--Airworthiness Standards: Transport Category Rotorcraft;

(c) Technical guidance for parts 27 and 29 restricted category rotorcraft;

(d) Powered lift aircraft; and

(e) Technical guidance for Primary Category Rotorcraft.

(6) The Engine and Propeller Directorate (New England Region) is responsible for:

(a) 14 CFR part 33 (part 33)--Airworthiness Standards: Aircraft Engines; and

(b) 14 CFR part 35 (part 35)--Airworthiness Standards: Propellers.

(7) Aircraft Certification Office (ACO). Each directorate incorporates one or more ACO's. The ACO's do the actual certification of aircraft and products. They work directly with the applicant and provide the main interface between the public and the FAA.

(8) Aircraft Evaluation Group (AEG). An AEG, co-located with each directorate, is responsible to Flight Standards Aircraft Evaluation Program Staff Manager for determining operational acceptability and continuing airworthiness

requirements of newly certified or modified aircraft intended to be operated under the provisions of the Federal Aviation Regulations.

c. Discussion. The type certification process described in this order applies to type certificates (TC's), amended TC's, and supplemental type certificates (STC's) unless otherwise stated.

(1) The entire type certification process is provided in Chapter 2 of this order. Supportive information and procedures are contained in the remaining chapters. Chapter 3 contains a discussion on TC's. Chapter 4 contains a discussion on STC's. Chapter 5 contains a discussion on manufacturing and engineering responsibilities and functions relative to inspection and test. Chapter 6 contains additional information on restricted category aircraft, surplus military aircraft, noise certification, and flight test.

(2) This order is issued and controlled by the Policy and Procedures Branch (AIR-110) of the Aircraft Certification Service (AIR-1).

CHAPTER 2. TYPE CERTIFICATION PROCESS

5. GENERAL.

a. This chapter describes the type certification process. This process applies to TC's, amended TC's, and STC activities, although all of the steps/procedures may not apply to all certification activities, especially on small projects. Figure 2-1, Type Certification Process, provides an outline of the type certification process. Details of the process are provided in the text of this order. In addition to a TC or STC, it is necessary to have a production certificate (PC), or other FAA production approval prior to manufacturing the product. These approvals will require concurrent work with a Manufacturing Inspection District Office (MIDO).

b. Each aircraft certification directorate has an established AEG which is directly responsible to the Flight Standards Aircraft Evaluation Program Staff Manager for the operational and maintenance aspects of the certification process. This order describes the responsibilities of the AEG and reflects the close liaison required between the ACO and AEG in the certification process.

c. Cooperative Concurrent Certification (CCC) is an ongoing project of the Aircraft Certification Service. The FAA and the European Joint Aviation Authorities (JAA) have agreed to interim principles and procedures for joint certification projects to be conducted under those agreements. The primary objective of CCC is to eliminate the unnecessary burdens imposed on aircraft manufacturers and operators through the conduct of separate FAA and JAA type certification projects by:

(1) Reaching a jointly agreed type certification basis to the extent possible and practicable under the Federal Aviation Regulations;

(2) Participation by the importing authorities' specialists in pre-agreed areas of special interest during the lead (exporting) authorities' type certification program;

(3) Issuance of respective TC's on the same day when it has been determined that the applicant is entitled to issuance of the certificate.

NOTE: This process is intended to enhance communication at the beginning of the TC process but not to depart from established FAA certification requirements.

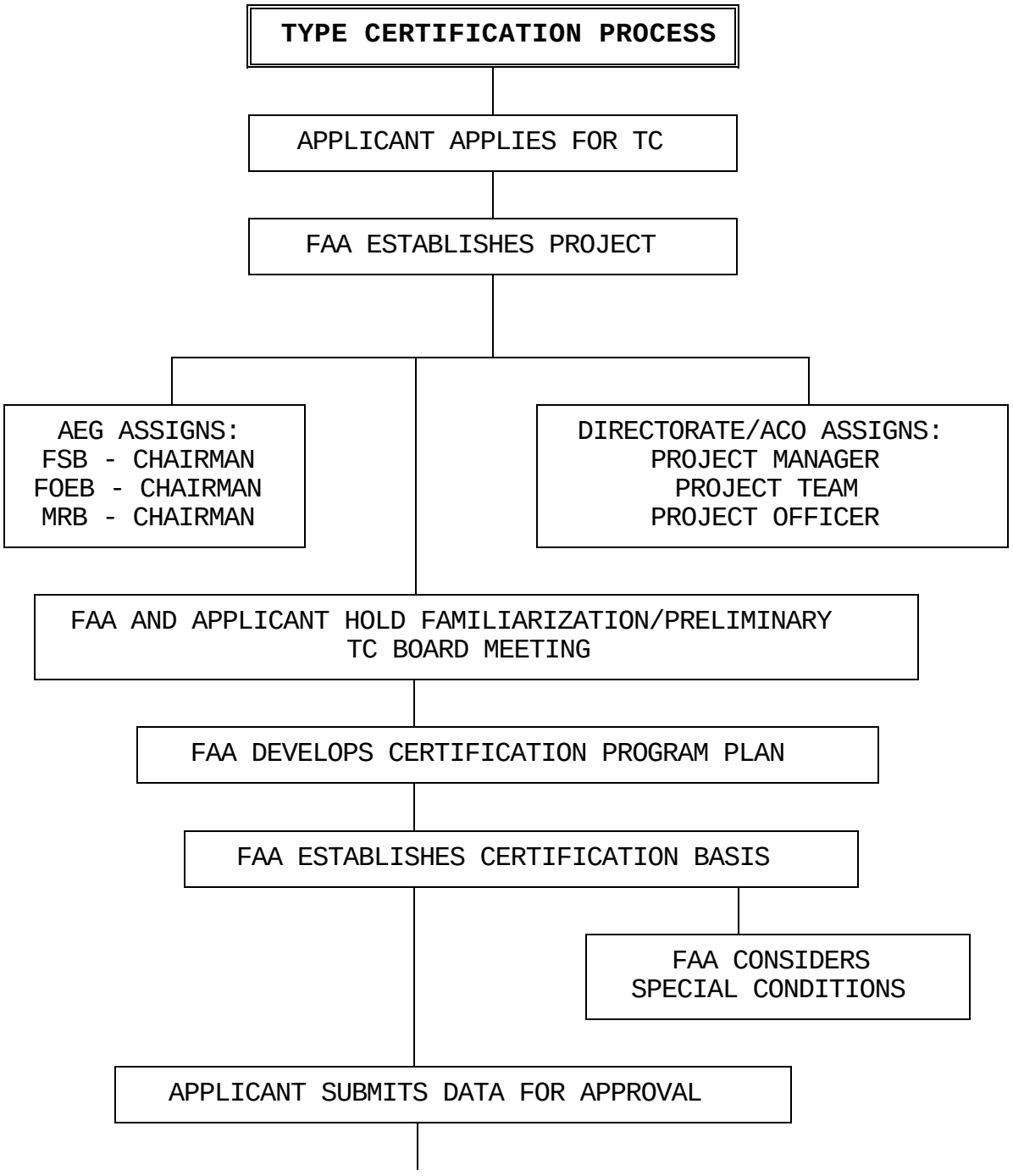

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Figure 2-1 Type Certification Process

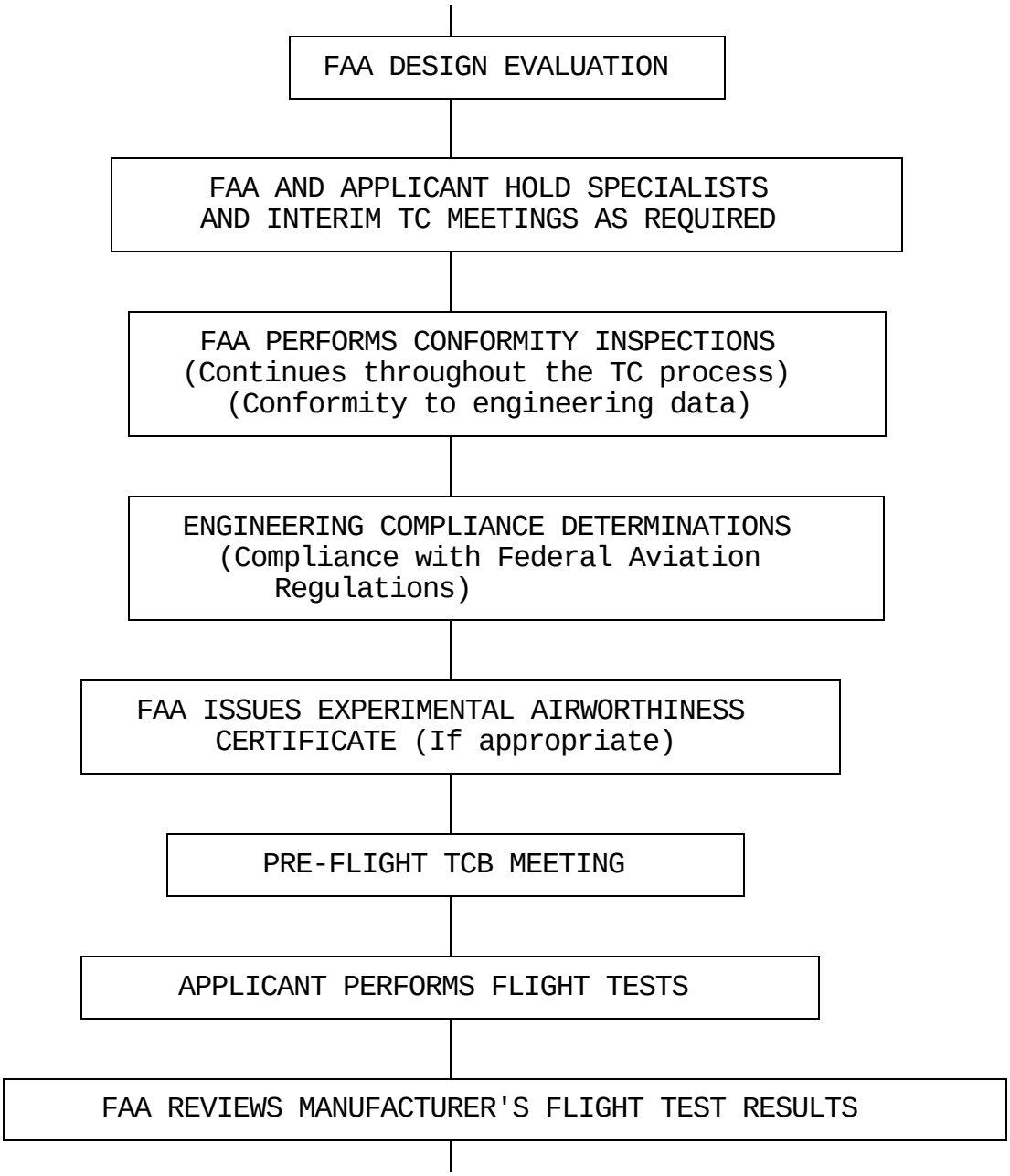

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Figure 2-1. Type Certification Process - continued.

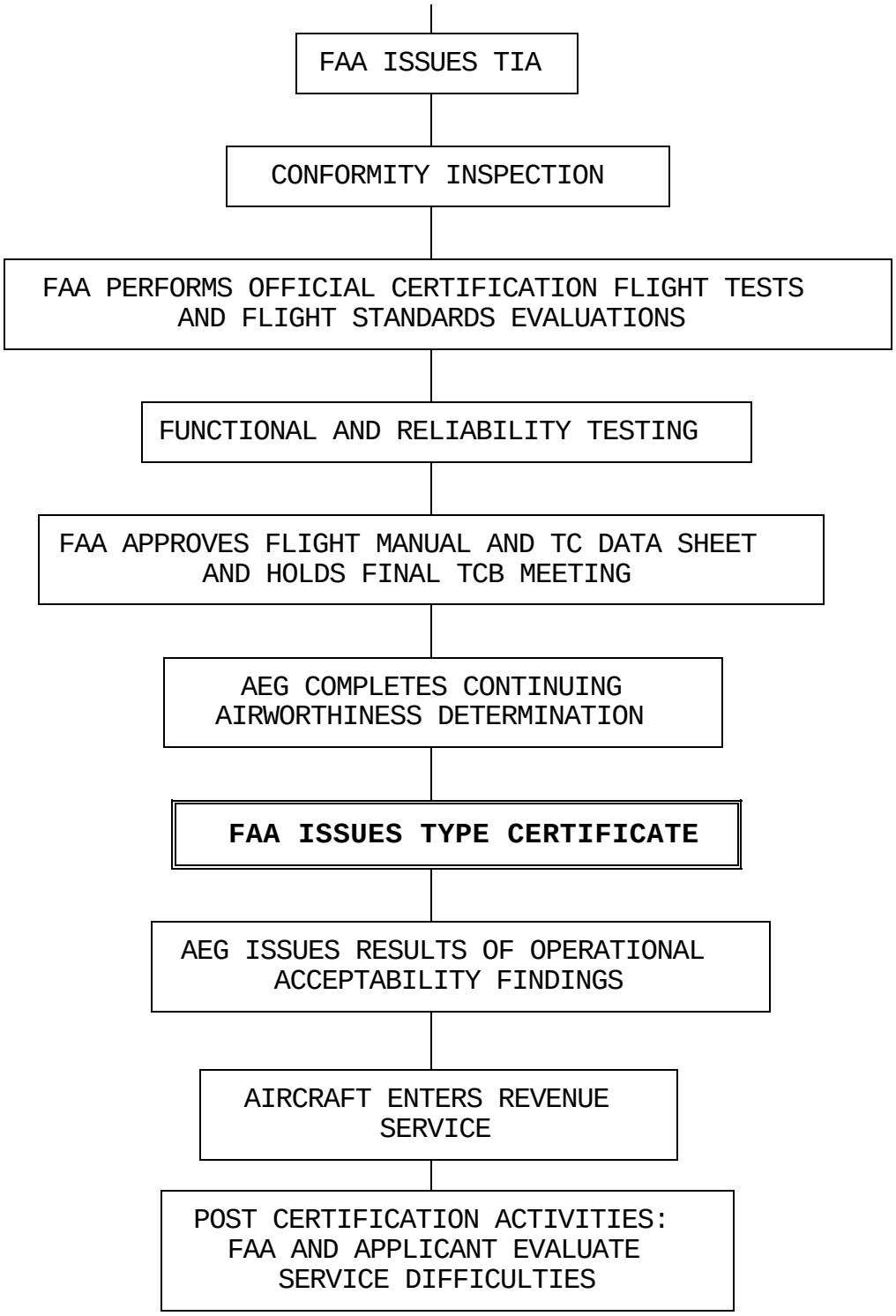


Figure 2-1. Type Certification Process - continued

6. CERTIFICATE DEFINITIONS

a. Type Certificate. A TC, as defined by § 21.41, includes the type design, the operating limitations, the type certificate data sheet (TCDS), the applicable regulations, and any other conditions or limitations prescribed by the Administrator.

b. Provisional Type Certificate A provisional TC may be issued when all requirements for a TC are not complete but the applicant can show compliance with § 21.81 for a Class I, or § 21.83 for a Class II, provisional TC.

c. Amended TC. The holder of a TC may apply for an amendment of the original TC when the change to the type design is not so extensive as to require a new TC (reference § 21.19), and is classified as "major," as defined by § 21.93(a). Only a TC holder may apply for a TC amendment.

d. Supplemental Type Certificate An STC is issued for major design changes to a TC when the change is not so extensive as to require a new TC (reference § 21.19). Minor changes do not require an STC. Minor and major changes are classified in § 21.93. Any person may apply for a STC.

e. Production Certificate. A PC is an authorization by the FAA for a manufacturer to manufacture a product in compliance with the Federal Aviation Regulations. A PC may be issued to either the holder of a TC, a STC, or to a licensee of a TC holder, who meets the requirements of §§ 21.135, 21.139, and 21.143.

f. Product. A product is an aircraft, an aircraft engine, or propeller. In regards to export airworthiness approvals, it includes components and parts of aircraft, of aircraft engines, and of propellers; also parts, materials, and appliances, approved under the Technical Standard Order (TSO) system.

7. APPLICATION FOR TC, AMENDED TC, STC, AND PC

a. Type Certificate Application An aircraft TC application must be accompanied by a three-view drawing of that aircraft and available basic data. An aircraft engine TC application must have a description of the engine design features, operating characteristics, and the proposed operating limitations. A TC application is made on FAA Form 8110 -12, Application for Type Certificate, Production Certificate, or Supplemental Type Certificate (reference appendix 1). Complete sections 1, 2, 3, 4, and 7 of the TC application in each of the following situations:

(1) Submit a TC application for design approval of a new model(s) aircraft (airplane, glider, rotorcraft, balloon,

airship), aircraft engine, or propeller (reference §§ 21.15 and 21.19), or for extension(s) of time in accordance with § 21.17(d).

(2) Submit an amended TC application for approval of change(s) in model designation; for addition(s) of a new model(s) prior to the original issuance of the TC; and for approval of follow-on models after the initial issuance of the TC (reference §§ 21.91 through 21.101).

(3) Submit an application for a provisional TC (class I or II) when the provisional TC is desired before the standard TC is issued (reference §§ 21.75, 21.81, and 21.83).

(4) Submit an application for an amendment to a provisional TC for a follow-on model or a major change to a type certificated model, after a TC has been issued (reference §§ 21.25 and 21,85); and for changes to class I or II provisional TC (reference §§ 21.75, 21,83, and 21,85).

b. Supplemental Type Certificate Application An STC application is made on FAA Form 8110-12, (reference appendix 1). Submit an STC application to the geographically responsible ACO as listed in appendix 7. Arrangements for technical support with other ACO's are made as required by the local ACO. Complete sections 1, 2, 3, 6, and 7 for each of the following situations:

(1) Submit an STC application when a product is to be altered by introducing a major change in the type design in accordance with §§ 21.111 through 21.119. Supplemental type certificates are **not** issued for minor changes or for approval of replacement and modification parts meeting the provisions of § 21.303.

(2) An STC holder may submit an application for an amended STC to include additional product models to the STC or to introduce significant changes in the modification or alteration previously approved.

c. Production Certificate Application Complete sections 1, 2, 3, 5, and 7 of FAA Form 8110-12 (reference appendix 1) when applying for a PC. Application for a PC may be made at the same time application is made for a TC, an amended TC, or an STC, however, a PC cannot be obtained prior to issuance of the TC.

8. ESTABLISHMENT OF TC PROJECT

a. General. Submit a TC, amended TC, or STC application to the geographically responsible ACO (reference AC 20-126, Aircraft Certification Service Field Office Directory). The ACO is responsible for assigning a project number, a project manager, and notifying the accountable directorate for each project

(normally done by the Certification Program Notification as illustrated in appendix 1, Order 8100.5, Aircraft Certification Directorate Procedures). The assigned ACO project number should be used by all personnel in all correspondence, reports, and other documents pertaining to the project. The accountable directorate assigns a project officer for significant projects. The project manager and the project officer are the focal points for the ACO and the accountable directorate, respectively. The applicant should direct all correspondence on the project to the ACO where application is made (reference FAA Order 8100.5, paragraph 400).

b. Assignments and Duties of the Project Manager

(1) The term "project manager" (reference FAA Order 8100.5, paragraph 103e) means an assigned individual in the ACO who is responsible for planning, reviewing, evaluating, and coordinating all aspects of a TC project in accordance with the Certification Program Plan (CPP).

(2) The project manager is responsible for initiating the CPP and coordinating with the project officer. The final CPP is not prepared until the Preliminary Type Certification Board (TCB) meeting where detailed roles and responsibilities can be discussed with the applicant.

(3) Certification program notification procedures are delineated in FAA Order 8100.5, paragraph 400a.

(4) A project team is established for all projects that require significant involvement by technical personnel. The project manager coordinates with the appropriate manager(s) in the selection of other team members. The project team normally consist of the following:

(a) A project manager;

(b) Engineers or technical specialists;

(c) Pilots and/or flight test engineers;

(d) Manufacturing inspectors; and

(e) Operations and/or airworthiness inspectors from the AEG.

(5) An acknowledgment letter must be sent to the applicant identifying the project number and the project manager by name, unit identification, and telephone number.

c. Assignments and Duties of the Project Officer

(1) The term "project officer" (reference FAA Order 8100.5, paragraph 103d) means the person in the accountable directorate designated to monitor a significant TC project in accordance with the CPP.

(2) The project officer works with the project manager in development of the CPP.

9. TYPE CERTIFICATION BOARDS

a. General.

(1) A TCB is established for all aircraft and engine projects in which complete type certification is involved; for propellers, except fixed pitch; for projects involving changes to the type design; and for all significant projects (reference FAA Order 8100.5, paragraph 103j). Depending on the complexity of the project, TCB's are not always required for STC projects.

(2) The purposes of a TCB are to acquaint the applicant and the FAA with the certification project, resolve significant problems, and establish a schedule for the overall accomplishment of the type certification program.

b. Type Certification Board Members The ACO manager or her/his representative serves as chairman. The chairman convenes the TCB as necessary and notifies the appropriate representatives as to the time, date, and location of the meeting. A member, with concurrence of the chairman, may designate an employee to represent her/him at TCB meetings. The project manager is responsible for requesting technical assistance or guidance, if necessary for the project, from the accountable directorate. Such a request should be made as far in advance as possible to facilitate work scheduling. Members of the TCB should be familiar with the project during the development stages and in advance of TCB meetings. This ensures having knowledgeable participants in the TCB meetings. Members participate in specific phases of the TCB activity, as required by the project under consideration. It is not mandatory that members participate in every meeting. Members are:

(1) The ACO manager;

(2) The project officer (for significant projects);

(3) The project manager; and

(4) The managers or supervisors of appropriate engineering disciplines, flight test, manufacturing inspection, and AEG.

c. Additional TCB Participants A list of participants, other than the TCB members, who may be invited to participate on an advisory basis in the TCB meetings follows:

(1) ACO engineers, flight test pilots, and manufacturing inspectors;

(2) Washington Headquarters specialists;

(3) National Resource Specialists;

(4) AEG personnel;

(5) The project officer from the accountable directorate (if not serving as a board member);

(6) Representatives of other ACO's and/or directorates; and

(7) The applicant and their representatives.

10. TYPE CERTIFICATION BOARD MEETINGS

a. Meetings. The following TCB meetings are discussed in this chapter.

(1) Familiarization TCB meeting;

(2) Preliminary TCB meeting;

(3) Interim TCB meeting;

(4) Pre-flight TCB meeting; and

(5) Final TCB meeting.

b. Minutes of a TCB meeting should be transmitted to the applicant and contain the following:

(1) Subject: Minutes of (Familiarization, Preliminary, Interim, Pre-flight, or Final) TCB Meeting;

(2) Manufacturer;

(3) Model and Project Number;

(4) Location and Date of Meeting;

(5) Personnel Present at Meeting;

(6) Purpose of Meeting;

(7) Discussion of Agenda Items; and

(8) Specialty Items: Include major problems and actions to be taken. Each item or subject discussed should be identified and summarized under a separate heading with the appropriate Federal Aviation Regulation referenced. The item should include a discussion and conclusion. Individuals participating in discussions should be identified by titles only.

c. Familiarization TCB Meeting The Familiarization TCB meeting between the FAA and the applicant is held to explain the following:

(1) The need for certification;

(2) An overview of the certification process;

(3) The FAA's role; and

(4) The applicant's responsibilities.

The Familiarization TCB meeting may be combined with the Preliminary TCB meeting.

d. Preliminary TCB Meeting The Preliminary TCB meeting is held to:

(1) Acquaint FAA pe rsonnel with the project;

(2) Establish the certification basis;

(3) Permit discussion of design details and possible problem areas with specialists;

(4) Identify areas needing the formation of special compliance teams to attain the earliest possible resolution of potential problems;

(5) Identify novel or unique design features, materials, or processes; and

(6) Establish a schedule for the certification program.

e. Interim TCB Meeting Interim TCB meetings may be required to resolve problems that arise during the type certification program. Interim meetings may be requested by the FAA or the applicant and need only involve the necessary participants, including specialists from the accountable directorate, needed to resolve problems. The project manager is

responsible for setting up the meeting(s) and informing the necessary participants.

f. Pre-flight TCB Meeting. The Pre-flight TCB meeting is held to discuss and clarify any questions the applicant may have relative to the required flight testing of the aircraft, or the engine and propeller type testing program. This would be called the pre-type inspection authorization meeting for engines and propellers. This meeting, like an interim meeting, may be requested by either the ACO or the applicant.

g. Final TCB Meeting. The Final TCB meeting is held when the ACO determines that the applicant has demonstrated compliance with all applicable airworthiness standards (certification basis) in accordance with technical policies established by the accountable directorate and the aircraft engineering division. The final TCB meeting is held to:

(1) Review all outstanding items, such as the TCDS, Aircraft Flight Manual, continued airworthiness program, and items on which there may be some question of compliance with the established airworthiness standard;

(2) Determine the status of any outstanding technical data;

(3) Decide on issuance of the TC; and

(4) Issue the TC, amended TC, or STC. The TC is signed when the ACO and the accountable directorate concur that all items are resolved.

11. CERTIFICATION PROGRAM PLAN. The CPP defines the working relationship between the accountable directorate and the geographic directorate, or within an accountable directorate during a specific TC project (reference FAA Order 8100.5, paragraphs 103g and 400b). The CPP is the principal program coordination tool and is updated throughout the program by the project manager, as required. The final CPP is not prepared until the Preliminary TCB meeting where detailed relationships can be discussed with the applicant. Approval of the CPP is through the ACO manager to the accountable directorate.

12. ISSUE PAPER. An issue paper (reference FAA Order 8100.5, appendix 3) provides a means for the identification and resolution of significant technical, regulatory, and administrative issues that occur during the certification process. Issue papers are primarily intended to provide an overview of significant issues, a means of determining the status of issues, and a post-certification summary statement on how issues were resolved.

13. ISSUES BOOK. The project manager assembles issue papers and publishes them in the form of an Issues Book. The Issues Book is distributed to the TCB members, project team members, applicant, and the accountable and geographic aircraft certification directorate. The Issues Book can be revised to add new issue papers or update existing papers without holding a formal TCB meeting, provided that the new or updated issue paper can be coordinated through the applicant and TCB.

14. TYPE CERTIFICATION BASIS

a. General. The proposed certification basis is established by the FAA at the beginning of a TC program. Every effort is made to assure the certification basis is correct, and the applicant is advised of all aspects at the beginning of the program, including operational requirements.

b. Special Classes of Aircraft Special classes of aircraft include airships, gliders, motor gliders, very light airplanes, and other non conventional aircraft for which airworthiness standards have not been issued under part 21 (reference § 21.17(b)). The procedures necessary to establish and receive approval for the certification basis for special classes of aircraft are provided in Advisory Circulars AC 21.17-1A, Type Certification - Airships; AC 21.17-2A, Type Certification - Fixed Wing Gliders (Sailplanes), Including Powered Gliders; and AC 21.17-3, Type Certification of Very Light Airplanes Under § 21.17(b). AC 21.17 -1A also referen ces a design criteria, FAA P-8110-2, Airship Design Criteria, which provides an airworthiness criteria for airships. AC 21.17-2A references Joint Aviation Requirements 22 (JAR 22), Joint Airworthiness Requirements Sailplanes and Powered Sailplanes, which provides an airworthiness standard for sailplanes and powered sailplanes. AC 21.17-3 references Joint Aviation Requirements for Very Light Aeroplanes (JAR-VLA), which provides an airworthiness standard for very light airplanes. Powered Lift Aircraft are another special class of aircraft for which airworthiness standards have not been issued under part 21.

c. Changed Aviation Products This procedure is applicable to changed aircraft, aircraft engines, and propellers that contain type design changes of a previously certificated product whose change is significant but not so extensive as to require a new TC under § 21.19. This procedure applies to all changed products regardless of approval method such as amended TC or STC. The objective of this procedure is to enhance safety of changed products through the use of later amended airworthiness standards. It should be emphasized that the applicant is responsible for the whole product as altered, and not just for the change itself. The type certification basis for changed aviation products is established as follows:

(1) Except as provided in paragraphs (2) and (3) below, the certification basis for the changed product should consist of

the certification basis of the model being changed (defined as the basic certification basis) plus those requirements effective on the date of the application that are generally related to the components or areas affected by the change. These components and areas are those where there is a need for resubstantiation that include the change, components affected by the change, systems affected by the change, and all other matters relevant to certification which are affected by the change.

(2) The applicant may elect to comply with the applicable regulations in effect on the date of application, plus any other amendments the Administrator finds to be directly related.

(3) Requirements of the later standards, required by paragraph (1) above, need not be considered if the basic certification basis together with applicable service experience, provide a level of safety equivalent to that of the later standards. Applicable service experience is that reflecting the history of the existing components that are being changed or that are directly affected by the change. Additionally, the changed components must be sufficiently similar to the existing components, both in design and usage, so that it can be determined that the service history is applicable.

(4) The determination of which other amendments are applicable should be conducted and documented by the applicant, approved by the FAA, and placed in the project file. This documentation should include the rationale for not complying with later standards.

(5) Because restricted category and limited category aircraft do not meet an applicable airworthiness standard that is published in the Federal Aviation Regulations, compliance with this procedure may not be effective in enhancing the level of safety of changes to products of these categories. Therefore, this procedure should be used for these categories only where warranted. Additionally, this procedure should apply equally to applications for changes to type certificated products for both United States (U.S.) and non U.S. manufactured products.

(6) In accordance with § 21.19(a), aircraft certification engineers must determine whether proposed changes, such as these, are "so extensive that a substantially complete investigation of compliance with the applicable regulations is required". The following design changes are examples of changes to type designs which, individually, do not necessarily require application for a new aircraft type certificate. An application for a new aircraft type certificate may, however, be required after consideration is given to the extent, number, and cumulative effect of these changes.

(a) A design change that constitutes a new design or a substantially complete redesign of a component, equipment installation, or system installation. Such a change extensively invalidates the compliance demonstration of the original design.

(b) A design change that significantly affects the basic loads.

(c) A design change that introduces novel or unusual methods of construction or new materials, e.g., composites. If the later airworthiness regulations do not provide adequate standards with respect to the proposed change, special conditions may be necessary.

(d) A design change that includes new state-of-the-art systems or components which have not been previously certificated.

(e) A design change that alters the kinematics, dynamics, or substantially alters the configuration of either the flight controls or rotorcraft rotor drive system.

(f) A design change to replace reciprocating engines with the same number of turbopropeller engines.

(g) A design change that affects the integrity of the basic load-bearing structure necessary for continued safe flight and landing or operation of the aircraft within approved limits.

(h) A design change that would substantially alter the aircraft flight characteristics, or performance from the type design being changed.

(i) A design change that affects compressor/turbine rotor integrity, kinematics, or dynamics of an engine.

(j) A design change that constitutes a substantial flight deck change.

(k) A design change that substantially increases power.

(l) A design change that alters the crashworthiness features.

(7) The following design changes will normally not be considered extensive and need not be evaluated under this procedure:

(a) Installation of an alternate engine, using the same principles of operation (e.g., reciprocating replacing reciprocating, turbopropeller replacing turbopropeller, etc.), that does not appreciably increase power, and has a minimum of installation changes.

(b) The installation of Electronic Flight Display Systems if installed on relatively modern aircraft where changes are not substantial.

(c) The installation of an autopilot.

(d) A design change that incurs a small weight change increase.

(e) Small design changes that constitute production improvements.

(8) Because design changes vary in complexity and magnitude, each proposed change to a product must be evaluated on an individual case-by-case basis. In reviewing an application, no consideration should be given to the way in which the changed product is identified.

(9) An applicant may be required to show that the product meets additional standards in order to receive type certification in a foreign country or to be eligible to operate under the provisions of 14 CFR part 91 (part 91), 14 CFR part 121 (part 121), or 14 CFR part 135 (part 135), or a foreign equivalent.

d. Applicable Regulations. The certification basis is established by the FAA in accordance with §§ 21.17, 21.101, and 21.115, as appropriate.

e. Additional Requirements.

(1) Special conditions deemed necessary under § 21.16;

(2) Equivalent level of safety findings (reference § 21.21);

(3) Applicable requirements of 14 CFR part 36 (part 36);

(4) Fuel Venting and Emission requirements of 14 CFR part 34 (part 34); and

(5) Exemptions (reference 14 CFR part 11 (part 11)).

f. Special Conditions.

(1) Basis for Issuance. The basis for issuance and amendment of special conditions is § 21.16. Under the provisions of § 21.16, a special condition is issued only if the existing applicable airworthiness standards do not contain adequate or appropriate safety standards for an aircraft, aircraft engine, or propeller because of novel or unusual design features of the product to be type certificated. The phrase "novel or unusual" applies to design features of the product to be certificated when compared to the applicable airworthiness standards. Special conditions will not be used to upgrade the applicable airworthiness standards when novel or unusual design features are not involved. Whenever the FAA determines that an upgrading of the airworthiness standards is warranted, the upgrading should be accomplished through the rulemaking process to amend the Federal Aviation Regulations.

(2) Issue papers. Issue papers are most often used for development of the basis, need, and wording of special conditions. A special condition contains only such airworthiness standards as are necessary to establish a level of safety equivalent to that established by the applicable regulations. A past example of a need for special conditions was the installation of turbine engines on a small airplane when there were no requirements directed to turbine engine installation in Civil Aeronautics Regulations (CAR) 3. Special conditions are unique to the specific certification program in which they are issued. The Administrator has delegated authority for their issuance to the directorates or to the Aircraft Engineering Division for areas of responsibility not assigned to a directorate.

(3) Procedures for Issuance.

(a) Detailed procedures for processing special conditions are contained in FAA Order 8100.5, paragraph 803. Proposed special conditions are drafted by an ACO in conjunction with an application for a TC, an amended TC, or an STC. The proposal is formulated with full participation by the applicant, the accountable directorate, and with any other interested persons deemed appropriate. The proposals, with full particulars and justification for each special condition, are forwarded to the accountable directorate. In cases where the design feature is covered by a specific objective rule, do not use a special condition as a particular method or technique to show compliance with the rule. In those cases where the FAA determines a special condition is appropriate, and the applicant indicates that they have or will voluntarily comply, the special condition nonetheless will be proposed. It is essential that the list of special conditions be complete. This establishes the

certification basis and forms an exact record of the rules applicable to the product. When the application is for an amended TC or an STC, § 21.101(b) is applicable.

(b) An applicant requesting a change to a TC or an STC will comply with either the regulations incorporated by reference in the TC, or the applicable regulations in effect on the date of the application and any other amendments the FAA finds to be directly related. If the FAA finds the regulations do not provide adequate standards with respect to the proposed change, the applicant will comply with the applicable provisions of part 21 and any special conditions, and amendments to those special conditions, prescribed by the FAA to provide a level of safety established in the regulations.

(4) Urgency of Action. At the time of the Preliminary TCB meeting, the ACO initiates the setting of a deadline date for establishing the initial special conditions. These special conditions may be modified and/or additional ones issued as technical information is developed during the type certification program. In certain cases, the importance or urgency of the program will require faster handling than is ordinarily scheduled. When the ACO believes it has such a case, it will recommend that arrangements be made to expedite the procedure by a meeting between the ACO, the accountable directorate, and the applicant. With the input from this meeting the accountable directorate should be able to expedite the rule making procedure for the special conditions.

(5) Justification. Incomplete information or insufficient justification can delay the processing of special conditions. Complete information from the ACO is needed in covering the general characteristics of the aircraft or other products and their unusual design features. The ACO preparing the special conditions includes all the needed details and justification when forwarding the special conditions to the accountable directorate. The following is information which should be included:

(a) The full certification basis, indicated in a manner similar to that which would be shown on the TCDS;

(b) A general description of the product, e.g., for an airplane, location of the wings, number and type of engines, maximum weight, speeds, seating capacity, etc.;

(c) Description of features requiring the issuance of special conditions;

(d) For an amended TC and a STC, a statement of the extent and features of the modification;

(e) The exact nature of the novel or unusual design feature, including an evaluation where appropriate, that the design feature would produce an unsafe condition unless the proposed special conditions were applied;

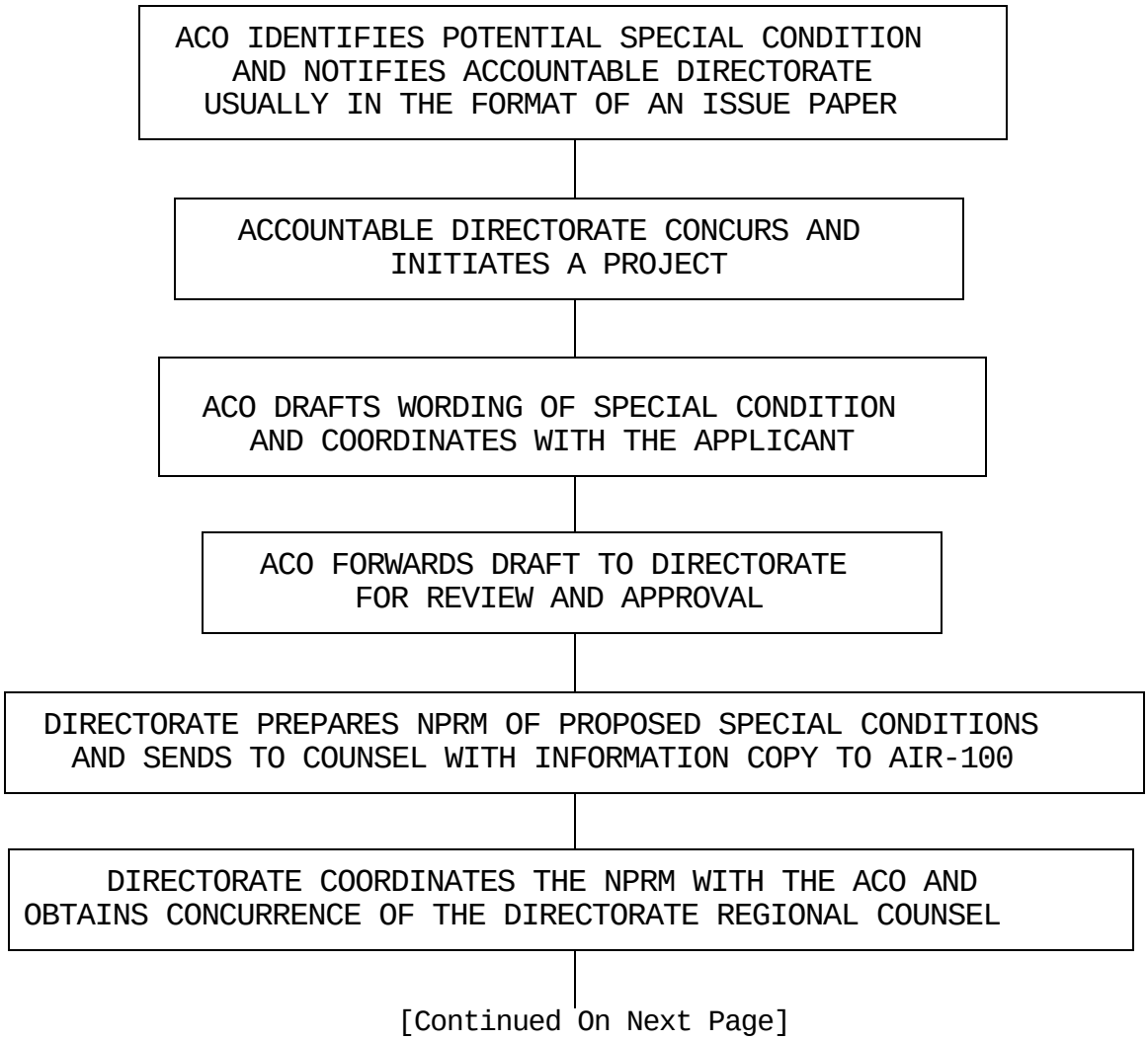
(f) The relationship between the design feature and the applicable regulations indicating how the standard is inadequate or inappropriate; and

(g) An evaluation that the proposed special condition establishes a level of safety that neither raises nor lowers the standard set in the applicable regulations.

(6) Changes. As technical information is developed during the design and testing of a product, it may become appropriate to modify a previously issued special condition or to adopt a new one. The same procedure is followed in amending a special condition or adding a new one, as is used for an original issuance.

(7) General Applicability. Special conditions, in their final format for a product, are to be referred to the respective accountable directorate for study to determine whether they are generally applicable. Periodically, special conditions which are found to be generally applicable are published in a Notice of Proposed Rulemaking (NPRM) as proposed amendments to the Federal Aviation Regulations. Pending adoption of amendments, a special condition may be proposed by an ACO for application to any subsequent design case for which they would be appropriate.

(8) Flow Chart. The flow in the processing of a special condition, from the inception of the design feature by the applicant, to the action taken by the accountable directorate, is shown in figure 2-2, Special Conditions.



[Continued On Next Page]

Figure 2-2. Special Conditions.

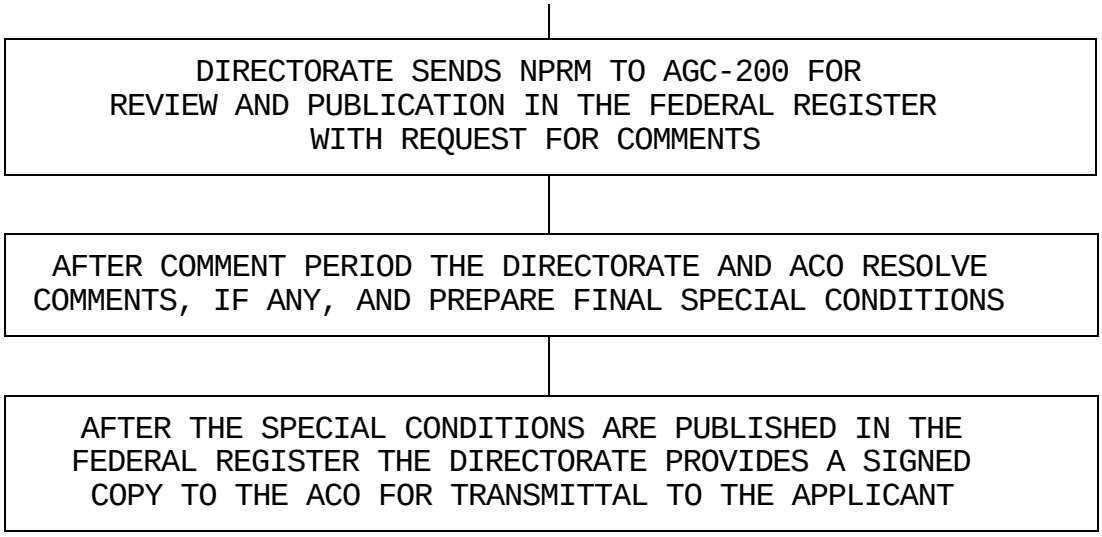


Figure 2-2. Special Conditions - Continued

g. Equivalent Level of Safety Finding

(1) Equivalent level of safety findings are made when literal compliance with a certification regulation cannot be shown and compensating factors exist which can be shown to provide an equivalent level of safety (reference § 21.21(b)(1) and Order 8100.5, paragraph 408)).

(2) The applicant submits to the ACO the proposed equivalent level of safety. The ACO then submits to the directorate the proposed equivalent level of safety with recommendations. The accountable directorate makes all equivalent level of safety findings.

(3) In documenting an equivalent level of safety:

(a) List the applicable regulation;

(b) Describe the features of the design that require the equivalent level of safety findings;

(c) Describe any design changes, limitations, or equipment imposed to make the equivalency; and

(d) Provide an explanation of how the actions taken provide an equivalent level of safety to that intended by the regulation.

(4) All equivalent level of safety findings must be listed on the TCDS or on the STC.

h. Exemptions. In a type certification program, any interested person may petition the FAA for a temporary or permanent exemption from a Federal Aviation Regulation. The petition for exemption is made to the accountable directorate through the ACO. The exemption petition is submitted as prescribed in § 11.25(b)(1) and (2), and includes information required by § 11.25(b)(3), (4), and (5). The FAA procedures for processing the petition for exemption are detailed in FAA Order 8100.5 paragraph 804. In a case where certification basis compliance is in question, the possibility of an equivalent level of safety finding should be considered prior to submitting a petition for exemption from those rules (reference § 21.21(b)(1)).

15. TYPE CERTIFICATION PROGRAM.

a. General. An applicant for a TC, amended TC, or STC submits to the FAA the type design, test reports, and computations necessary to show that the product to be certificated meets the applicable airworthiness and noise requirements of the Federal Aviation Regulations and any special conditions prescribed by the FAA. The FAA examines the data submitted by the applicant and determines if it meets the airworthiness and noise requirements of the Federal Aviation Regulations. To be entitled to a TC, amended TC, or STC for an aircraft, the FAA must find that no feature or characteristic makes it unsafe for the category in which certification is being requested (reference § 21.21).

b. Noise Control Act Finding. In addition to the noise requirements of part 36, a Noise Control Act Finding must be made by the FAA, prior to issuance of any original TC (see paragraph 53c of this handbook).

c. Release and Reference to Technical Data

(1) Disclosure of Technical Data. The policy for disclosure of FAA information is contained in FAA Order 1200.23, Public Availability of Information. Descriptive and substantive data received from applicants are proprietary and are **not** to be released by the FAA.

(2) FAA Use of Technical Data. FAA personnel may use an applicant's or certificate holder's data for reference or evaluation of any other applicant's submitted data as long as the information is used solely for that purpose. The FAA uses the data solely to minimize the time and effort needed for FAA's evaluation of data. This information will **not** be disclosed to

third parties who have not obtained written permission for access from the applicant or certificate holder (reference § 21.49).

(3) Authorized Use of FAA Approved Data. An applicant who applies for a TC, amended TC, or an STC, and desires to make use of data submitted by a previous applicant or certificate holder, should obtain and submit to the FAA a written consent from the previous applicant or certificate holder. If the applicant does not obtain such consent, prior FAA approved data will not be considered.

(4) Applicant Provided Data. An applicant showing compliance to the applicable requirements may submit previously approved data without showing further compliance if the applicant:

(a) Provides sufficient evidence to substantiate that the data presented was in fact approved by the FAA;

(b) Establishes that the previously approved data are applicable to the applicant's design to the extent that any design deviations will have no effect on the airworthiness of the design or on showing compliance with the applicable regulations;

(c) Provides sufficient substantiation and descriptive data of its own alteration that a finding of compliance can be made; and

(d) Has sufficient engineering data necessary to provide continued airworthiness information should the alteration be the subject of a service difficulty or airworthiness directive (AD) and to produce duplicate detail parts and installations if multiple STC approval is requested.

(e) The FAA representative will not question the source or the method by which an applicant for a design approval obtains data submitted with an application.

(5) To reduce unnecessary administrative burdens upon the applicant and the FAA, once one applicant has demonstrated that a design change meets the airworthiness requirements necessary for FAA approval, subsequent applicants for a similar alteration may not be required to conduct all the same tests required of the previous applicant. This may permit a subsequent applicant to benefit from the work of a previous applicant. While needless duplication of testing and data gathering should be avoided, the agency's primary responsibility is to determine the airworthiness of the altered product. The FAA will not supply a subsequent applicant with information submitted by a previous applicant, either directly or indirectly.

d. Responsibility of the Applicant An applicant is responsible for showing compliance to the Federal Aviation Regulations applicable to the specific product or operation. These requirements are as follows:

(1) An applicant submits the type design and substantiating data necessary to show that the product to be certificated meets the applicable airworthiness and aircraft noise requirements of the Federal Aviation Regulations and any special conditions prescribed by the FAA (reference § 21.21).

(a) The type design consists of drawings and specifications; information on dimensions, materials, and processes; airworthiness limitations; and any other data necessary to describe the design of the product. Type design data may allow by comparison the determination of the airworthiness and noise characteristics (where applicable) of a later product of the same type (reference § 21.31).

(b) Substantiating data is additional data which is necessary to show compliance with the certification basis, e.g., test and analysis reports, ground and flight test reports, etc.

(c) It is strongly recommended that an applicant make and submit to the FAA a compliance checklist which addresses each section of the Federal Aviation Regulations applicable to her/his product. In this manner, an applicant can identify certification basis problem areas early in the type certification program.

(2) An applicant submits a statement of conformity to the FAA for each aircraft engine and propeller presented for type certification, and for each aircraft or part presented for testing (reference § 21.53).

(3) An applicant must allow the FAA to make any inspection and any flight or ground test necessary to determine compliance with the applicable requirements of the Federal Aviation Regulations. However, the applicant makes all inspections and tests necessary to show compliance prior to presenting the product to the FAA for testing (reference § 21.33).

(4) The applicant accomplishes the requirements of § 21.35(a) prior to making flight tests, and upon showing compliance makes all flight tests that the FAA finds necessary. The applicant must provide a person holding an appropriate pilot certificate to make the flight tests (reference §§ 21.35 and 21.37).

e. Responsibility of the FAA The FAA is responsible for:

(1) Providing guidance to an applicant in the certification process;

(2) Establishing the certification basis;

(3) Establishing special conditions;

(4) Processing petitions for exemptions;

(5) Determination of Equivalent Levels of Safety;

(6) Approving drawings, reports, data, and flight manuals;

(7) Performing type inspection authorization (TIA) inspections and tests needed to verify compliance with the Federal Aviation Regulations and conformity with the type design;

(8) Preparing the type inspection report (TIR) and the TCDS;

(9) Issuing certificates; and

(10) Developing the Flight Standards Board (FSB), Flight Operations Evaluation Board (FOEB), and Material Review Board (MRB) documents.

f. Evaluation and Approval of Design Data by the FAA

(1) Review of Drawings, Specifications, and R eports. Design data consists of drawings, specifications, and reports necessary to define and substantiate the product. This includes information on configuration, materials, and processes. Data submitted for approval by an applicant should be complete and in a logical format for review by the FAA. The FAA may reduce its own participation in the project to the minimum necessary to substantiate compliance with the airworthiness requirements. For example, instead of making a complete evaluation, the FAA may make spot-check comparisons of the later applicant's data with the first applicant's data. The FAA is only responsible for the review of the data submitted by the applicant, **not** for the development of methods or calculations.

(2) Data Approval. An applicant should submit data as soon as it is complete so FAA review can be accomplished during the normal course of a certification program. During this review, the FAA determines compliance with specific paragraphs of the applicable airworthiness standards. The data is approved when completion of all inspections and necessary tests are accomplished in showing that the product conforms to the type

design and complies with the applicable airworthiness and aircraft noise requirements. Data can be approved by an ACO or a designee within her/his authorization limitations.

(3) Applicant Test Plan and FAA Concurrence.

(a) The applicant should prepare a test plan when testing is necessary to show compliance to the Federal Aviation Regulations for design or modifications. The test plan should be prepared and approved as early in the program as possible, but as a minimum, prior to the start of the test.

(b) The test plan is used as documentation to assure that orderly and complete testing is accomplished.

(c) As a minimum, the following items should be contained in the test plan:

1 A description of the item(s) to be tested;

2 A list of all test equipment necessary to conduct the test;

3 A description of how the equipment will be calibrated (calibration is required) and approved prior to the test;

4 A description of how the compliance will be shown prior to the test; and

5 A test procedure written in a step -by-step format.

(4) Conformity and Witnessing of Tests.

(a) The conformity of the test article, test setup, test procedures used, and the validity of the test results must be established for each test conducted to show compliance with a type certification requirement. If the test is lengthy, at least the initial part of the testing should be witnessed and a post-test examination conducted. If the cognizant FAA engineer is unable to witness the test, the engineer authorizes another qualified FAA engineer, Designated Engineering Representative (DER), or FAA inspector (reference paragraph 36) to witness the test.

(b) Upon FAA approval of the test plan, the cognizant engineer requests an FAA conformity inspection of the test specimen and test setup to assure conformance to the engineering drawing and test plan. The minimum participants for witnessing the test are:

1 An FAA engineer, FAA pilot, or authorized DER; and

2 An applicant's knowledgeable personnel capable of performing the test.

(c) After the FAA engineer witnesses the test, she/he should write a report for the FAA files containing the following:

1 A description of the test;

2 A description of the results obtained;

3 The decisions reached; and

4 The recommendations which have been made to the applicant.

(d) The applicant should prepare a test report detailing the data for each test and an explanation of the calculations necessary to evaluate the data. The report should include conclusions and recommendations and be presented to the FAA for approval, or DER approval, if delegated.

(e) Operational issues required for tests should be identified by AEG personnel and specified in an appropriate FAA document.

g. Conformity Inspections. A conformity inspection is required to ensure that the product being certificated complies with the type design. It is the responsibility of FAA engineering personnel to request required conformity inspections. Because of the complex nature of the conformity process and the necessity for parts conformity inspections early in the certification program, the responsible MIDO should be consulted early in the program. This will assure that necessary inspections are requested and scheduled at appropriate times. It is the responsibility of FAA manufacturing inspectors, designated manufacturing inspection representatives (DMIR's), or designated airworthiness representatives (DAR's) to determine that the product conforms with drawings, specifications, and special processes. An FAA conformity inspection should be successfully conducted before any official FAA tests (ground or flight) are conducted. Conformity inspections are requested by FAA engineering using FAA Form 8120-10, Request for Conformity; a memorandum; or FAA Form 8110-1, Type Inspection Authorization (reference paragraph 33a).

h. Engineering and AEG Compliance Inspections by the FAA

(1) Any aspect of product design, for which compliance with the certification requirements cannot be ascertained through the review of drawings or reports, should receive an engineering compliance inspection.

(2) An engineering compliance inspection is to assure that an installation complies with the Federal Aviation Regulations. This inspection should not be confused with a conformity inspection done by manufacturing inspectors. A conformity inspection is done to determine conformity to engineering data, while an engineering compliance inspection is done to determine compliance to the Federal Aviation Regulations. An engineering compliance inspection provides an opportunity to review an installation and its relationship to other installations on a product.

(3) The product should conform to the type design prior to conducting the engineering compliance inspection. Findings are to be documented and included in the type design data file. Engineering compliance inspections may be delegated to DER's, however, they should be provided proper guidance in order to effectively make the findings on behalf of the FAA.

(4) Engineering compliance inspections for aircraft interiors are generally more complex than other compliance inspections. This is primarily due to the many varied Federal Aviation Regulations paragraphs that must be complied with, e.g., emergency lighting, emergency exit arrangement, ordinance signs, aisle widths, cockpit controls, waste containers, placards, and occupant protection. In accomplishing an interior compliance inspection, the certification team will make many determinations and, therefore, should be very familiar with current regulations and policy. Engineering compliance inspections for interiors are generally not delegated.

(5) Control system compliance inspections are accomplished to determine ease of control operation, strength of components, and detection of interference or deflection of control system linkages.

(6) Flammable fluid fire protection compliance inspection. The Federal Aviation Regulations require separation and isolation of flammable fluid carrying lines from ignition sources. A physical inspection of installations is required to assure compliance.

(7) Hydraulic/electrical system routing requires inspection to assure that proper support and separation is maintained.

(8) Determination of operational and maintainability acceptability to the Federal Aviation Regulations is done by AEG compliance inspections and may be conducted concurrently with engineering compliance inspections.

i. Notification of Noncompliance An ACO will notify the applicant in writing when noncompliance items are found during ground or flight inspections and the type certification tests are not discontinued. The notification will include reference to the specific Federal Aviation Regulations. The applicant must satisfactorily resolve all noncompliance prior to the FAA issuing the TC, amended TC, or STC.

j. Discontinuance Letter. An ACO will notify the applicant by letter when it becomes necessary to discontinue official FAA type certification tests for any reason. The letter should cite the applicable Federal Aviation Regulations and advise the applicant to notify the ACO when the cause of the discontinuance has been corrected and a resumption of the type certification test is desired.

16. TYPE INSPECTION AUTHORIZATION

a. General. The TIA is prepared by the ACO on FAA Form 8110-1 and is used to authorize official conformity, airworthiness inspections, and flight tests necessary to fulfill certain requirements for TC, STC, and amended TC certification. In addition the TIA may contain a section (Operational and Maintenance Requirements) that provides for certain other operational evaluations identified by the AEG.

b. Preparation of TIA The TIA is not prepared until coordination is accomplished with each appropriate engineering discipline such that all required information relative to the engineering discipline's portion of the inspection or authorization is included. The TIA is issued when the examination of the technical data required for type certification is completed or has reached a point where it appears that the aircraft or component being examined will meet the pertinent regulations.

c. Letter of Notification At the time the TIA is prepared a letter of notification to the applicant should also be prepared. The letter of notification informs the applicant that authorization for type inspection has been issued and includes a copy of the TIA for their information.

d. Coordination. The TIA and the letter of notification should be coordinated with the accountable directorate (for significant projects) and all persons concerned in the

originating ACO. When appropriate the AEG will be included in the coordination process.

e. Inspections. Conformity inspections are accomplished by FAA manufacturing inspection personnel or an FAA designee prior to official FAA certification flight tests (reference paragraph 33).

f. Tests. Official certification tests are conducted or witnessed by FAA personnel or FAA designees, when authorized, after the applicant has complied with § 21.35(a).

g. Outside ACO Requests. If the TIA conformity and/or tests are to be conducted by FAA personnel outside the geographic area of the responsible ACO, the responsible ACO should make request of the geographically appropriate ACO/MIDO.

17. OPERATIONAL AND AIRWORTHINESS EVALUATIONS

a. Aircraft Evaluation Group

(1) The AEG's were established per FAA Order 8100.5 to provide all of the applicable Flight Standards technical services to elements of the directorate. The AEG's are responsible for the operational and maintenance aspects of the aircraft type certification process and, once the aircraft enters service, become the coordination point for activities involving Flight Standards.

(2) The AEG's are comprised of operations and airworthiness inspectors who work directly with FAA aircraft certification personnel to contribute an operational perspective to engineering activities. The AEG's advise manufacturers of pertinent operational and maintenance requirements during the design and certification process. The AEG's have the primary responsibility for evaluation of the aircraft and its systems for operational suitability and continued airworthiness. During the certification process, the AEG's conduct operational suitability evaluations by analysis of type design data and by participation in the aircraft certification engineering compliance inspections and flight test programs.

(3) The AEG makes recommendations to FAA field offices regarding operations specifications, training and maintenance programs, and airmen qualification through management of several FAA boards such as the Flight Standardization Board (FSB), Flight Operations Evaluation Board (FOEB), and Maintenance Review Board (MRB).

(4) The AEG in accomplishing their responsibilities for operational and maintenance evaluations for TC products, perform the following functions related to certification:

(a) Participation in compliance and TIA testing to evaluate operational suitability of the aircraft and its systems;

(b) Review maintenance programs for continuing airworthiness and develop the MRB Report;

(c) Review flight manuals and revisions;

(d) Develop master minimum equipment lists (MMEL's);

(e) Establish type rating requirements;

(f) Participate in crew complement determinations;

(g) Participate in emergency evacu ation demonstrations;

(h) Establish acceptance of flight crew sleeping quarters;

(i) Establish any unique or special training requirements;

(j) Participate in functional and reliability testing;

(k) Manage the FSB, FOEB, and MRB; and

(l) Serve as member of the TCB and Flight Review Board.

b. AEG Liaison.

(1) Each directorate AEG is responsible for those AEG functions dealing with the TC product for which its directorate has responsibility. The accountable directorate AEG may delegate some functions to another AEG or Flight Standards personnel in other Flight Standards District Offices (FSDO's).

(2) Following notice of a certification project's initiation and a determination on the degree of AEG participation, AEG personnel will communicate directly with ACO personnel to carry out their assignments. The project manager is responsible for notifying AEG personnel of significant projects milestones, progress, and meetings.

(3) It is possible that an aircraft could be type certificated and not be determined to be operationally acceptable for operations under the applicable Federal Aviation Regulations. These inconsistencies are avoided by proper and timely AEG involvement. The AEG responsibility in evaluation of operational

suitability and type rating requirements require that the AEG pilots fly the aircraft through prescribed type rating maneuvers using flight manual procedures. This may be accomplished during the certification flight test program and will require the allocation of flight time so that appropriate findings can be made.

c. Flight Standardization Board An FSB determines the aircraft type rating requirement for both new and modified models of aircraft requiring type rating and develops the minimum training requirements used in flight crew member qualification. Board membership includes operations inspectors from district offices; representatives from the Air Transportation Division, FAA Headquarters; an alternate chairman; and a board chairman from AEG-Operations who performs/directs the tasks of the FSB. Some of the functions and responsibilities of the FSB are:

(1) Determination of operational suitability of the aircraft and its systems;

(2) Determination of flight crew training aids requirements;

(3) Determination of pilot type rating requirements;

(4) Determination of any unique/special training requirements;

(5) Determination of jumpseat, flight crew rest and sleeping quarters suitability;

(6) Determination of emergency evacuation capabilit y;

(7) Determination of flight standards issue papers closure; and

(8) Other tasks as appropriate.

d. Flight Operations Evaluation Board FOEB is a group of specialists responsible for matters related to a type of aircraft. The board's main responsibilities are developing a MMEL and accomplishing an operational evaluation of the aircraft. Board membership typically includes airworthiness inspector(s), an operations inspector, a flight test pilot, an FAA Headquarters representative, and, as chairman, an AEG operations inspector.

e. Maintenance Review Board A MRB approves initial maintenance/inspection requirements for new large type design aircraft. It provides guidance to industry maintenance steering groups engaged in establishing maintenance standards by assigning specialists to specific working groups as observers, to provide counseling, as needed, during their deliberations. These

standards are used in the development of each operator's FAA approved maintenance program and exert considerable safety, as well as economic impact, upon future operations of the aircraft. Board membership includes airworthiness inspectors and specialists.

18. FLIGHT MANUAL.

a. General. A flight manual for each new aircraft is required (reference §§ XX.1581 and 21.5).

b. Flight Manual Approvals The ACO responsible for the TC approves flight manuals, including revisions and supplements. The flight manual should not be approved until:

(1) The FAA project flight test pilot and/or flight test engineer, the operations specialist, and appropriate FAA engineers concur with the operational limitations and normal and emergency procedures;

(2) The FAA flight test engineer recommends approval of the performance section of the flight manual; and

(3) AEG has reviewed and coordinated on the flight manual.

c. Flight Manual Revisions or Supplements Changes to flight manuals submitted by the TC holder will be handled by the FAA in the same manner as original manuals. Each revised page should bear a revision date or symbol so that required revisions may be properly identified. Changes to flight manuals submitted by other than the TC holder should be accomplished by the use of a flight manual supplement.

19. POST CERTIFICATION ACTIVITIES

a. Certification Summary Report

(1) The purpose of the certification summary report is to provide a single source document which summarizes the record of the FAA examination of a type design, discusses significant safety issues, and describes how the applicable airworthiness, noise, and emission requirements were complied with. The FAA prepares the certification summary report. Details of what is contained in the summary report are in FAA Order 8100.5. Not all projects require a summary report and the accountable directorate is responsible for determining which projects do. Summary reports should generally be prepared for:

(a) All new airplane models over 75,000 pounds maximum gross weight and significant modifications to those airplanes;

(b) All new t ransport category rotorcraft and significant modifications to those rotorcraft;

(c) Aircraft which involve significant technology issues;

(d) Aircraft which have unusual or novel features, or are of controversial design; or

(e) Projects that have potential for unusual public interest.

(2) The certification summary report, if required, should be in an acceptable draft form at the time of issuance of the TC, Amended TC, or STC.

b. Type Inspection Report

(1) General. The TIR provides a record of the inspections and tests conducted, as authorized on the TIA, to show compliance with the applicable regulations. The TIR also provides a record of other information pertinent to each project for which a TIA has been issued. The TIR should:

(a) Be completed within 90 days after certificate issuance;

(b) Contain the results of all TIA inspections and tests;

(c) Contain a chronological list of all changes made to the prototype product during the test program and identified as "made by the applicant" or "required by FAA as a result of type certification tests showing noncompliance";

(d) Be approved by appropriate supervisors;

(e) Be retained by the certificating ACO for reference purposes. (Except when the certificate and control of the project is transferred to another ACO); and

(f) Be provided to the certificate holder (courtesy copy).

(2) Type Inspection Report, Part I, Ground Inspection. Manufacturing inspection personnel prepare the TIR, Part I, Ground Inspection. The TIR provides a means of recording and reporting the configuration of the product and reporting all significant unsatisfactory conditions found as a result of the inspectors and designees activities during the type inspection.

All unsatisfactory items will normally be resolved prior to accomplishing Part II, Flight Test Report, of the TIA.

(a) Part I of the TIR should be completed as soon as possible after accomplishing all TIA inspections. The original TIR is filed in the project file and one copy of Part I is forwarded to the accountable directorate, if requested.

(b) FAA Form 8110-6, Type Inspection Report--Engines, and FAA Form 8110-7, Type Inspection Report--Propellers as applicable, are to be completed as soon as possible upon conclusion of the endurance testing and teardown inspections. The conformity inspection reports, the results of the teardown inspection, and copies of the memoranda pertaining to the inspections should also be included in the TIR.

(3) Type Inspection Report, Part II, Flight Test Report. Flight test personnel prepare the flight test report with the format being left to their discretion. Locally approved formats, narrative reports, or applicable pages from the appropriate Flight Test Report Guide are acceptable, provided all TIA items are addressed.

(4) The applicant or DER flight test personnel may totally or partially write Part II of the TIR. The FAA engineering and flight test personnel will review the TIR to ensure adequate documentation. In addition to test documentation, the following information should be presented:

(a) Cover Page. The cover page should include, as a minimum, the following information:

1 Aircraft make and model;

2 Applicant;

3 Type Certificate number and date;

4 TIA number and date;

5 List of supporting documents/reports, unless the list is too extensive for inclusion on the cover page, in which case it should be listed in the administration portion of the TIR; and

6 Name and signature of person(s) preparing, reviewing, and approving the TIR.

(b) Administrative Information. Sufficient administrative or general flight test information should be presented to show compliance with part 21 requirements. The information should include, but not be limited to, the following:

1 Serial number and data sheet number (if applicable) of aircraft tested;

2 Where and when the aircraft was tested;

3 Details of alterations made during FAA flight testing;

4 Flight test log (excluding functiona l and reliability test and ferry time) with total official FAA flight test time; and

5 Total number of flight hours of functional and reliability test, if required, and an explanation for credit given to other than FAA flight time.

(c) Certification Information. Sufficient information should be presented to indicate:

1 Operation limitations including category (normal, utility, acrobatic) and type operations (visual flight rating, instrument flight rating, day, night, icing, etc.). Approved maneuvers may be presented if appropriate;

2 Equipment required for each type operation. This should agree with the limitation section of the flight manual;

3 Limitations for weight, center -of-gravity, airspeeds, powerplant operations, etc.; and

4 Recommended airspeeds for climbs, auto-rotations, approaches, etc.

(d) Compliance Information. Sufficient information should be presented to show compliance with TIA and Federal Aviation Regulations requirements. If the procedures deviate from an approved test plan or established test methods, the procedures used to show compliance should be documented. For type certification or extensive STC projects, the TIR may be divided into sections such as:

1 Equipment and flight operation;

2 Powerplant operation;

3 Performance; and

4 Handling qualities.

(e) Additional Information. Information necessary to show compliance with TIA and Federal Aviation Requirements

should be presented as appendixes or attachments to the TIR and referenced on the TIR table of contents. The supporting information may include, but not be limited to, the following:

1 Flight test data;

2 Approved test plans;

3 Flight manual or supplement; and

4 TIA.

c. Continued Airworthiness.

(1) The Instructions for Continued Airworthiness are required for type certification because it is part of the type design defined in § 21.31 and also part of the TC as defined in § 21.41.

(2) The Instructions for Continued Airworthiness are prepared in accordance with §§ XX.1529, 31.82, 33.4, or 35.4. The Instructions for Continued Airworthiness are reviewed by AEG and engineering personnel but, only the airworthiness limitation section and the instructions for installing and operating the engine or propeller or only the airworthiness limitation section for other category products are FAA approved. As allowed in the applicable Federal Aviation Regulations, the Instructions for Continued Airworthiness may be incomplete at the time of type certification. However, the airworthiness limitations are required (reference § 21.31) and must be FAA approved at the time of type certification (not necessarily in the final printed form). The Instructions for Continued Airworthiness must be in final printed form when the first airworthiness certificate is issued, or prior to delivery of first product, which ever is later. Certification maintenance requirements (i.e. systems and powerplant maintenance requirements developed during the certification process which contain frequency and extent of inspections) should be included as part of the maintenance instructions portions of the Instructions for Continued Airworthiness.

(3) Data such as stress analysis, damage tolerance assessment, or process specifications used to substantiate a major repair to primary structure can only be approved by:

(a) An ACO;

(b) A DER with authorization in the necessary engineering discipline;

(c) A designated alteration station when accomplished by an STC;

(d) A repair s tation, air carrier, or commercial operator authorized under Special Federal Aviation Regulations 36 (major repair only); and

(e) Holders of a delegation option authorization (DOA).

(4) All approvals are based on substantiation data which is retained by the approving person/organization. In the case of DER approvals, a copy of FAA Form 8110-3, Statement of Compliance With the Federal Aviation Regulation, is submitted to the ACO which appointed the DER.

d. Post Certification Evaluations

(1) Special Certification Review (SCR).

(a) An SCR is an in-depth comprehensive review of complex, controversial, or potential unsafe aircraft design features, or aircraft component problems associated with airworthiness determinations. It is a means of evaluating past type certification programs or potential unsafe design features on previously approved products. The accountable directorate may initiate an SCR after the certification program or as service experience dictates (14 CFR part 13 (part 13) § 13.19)).

(b) Potential safety problem areas for which an SCR may be appropriate include:

1 Complex or unique design features;

2 Advanced state-of-the-art concepts in design and manufacturing;

3 Potential unsafe features used on similar previous designs requiring further analysis and evaluation;

4 Compliance areas critical to safety and operational suitability which require evaluations;

5 Unsafe operational or maintainability characteristics;

6 Equivalent level of safety deter minations with potential major effects on safety; and

7 Complicated interrelationships of unusual features.

(c) Results of an SCR include:

1 A detailed review and evaluation of the products pertinent airworthiness and operational certification requirements;

2 Recommendations for revisions, if appropriate; and

3 Improvement in effecting uniform application of the certification rules throughout the FAA.

(d) The accountable directorate establishes the SCR team. The team may be comprised of FAA personnel from the certifying ACO, the accountable directorate, AEG personnel, and/or other FAA personnel as appropriate. The team may utilize assistance, as necessary, from governmental agencies, outside consultant firms, and industry to obtain the technical expertise for conducting a thorough evaluation.

(e) Evaluation procedures used during the SCR include:

1 Examination of the applicant's or certificate holder's data;

2 Discussion with FAA personnel and the applicant's or certificate holder's personnel;

3 Inspection of the prototype or production article(s); and

4 Any other means available to the team to perform a complete and comprehensive evaluation consistent with the purpose of the review.

(f) Every significant aspect and ramification of the potential safety problem in question should be fully explored. This includes the adequacy of the pertinent regulations and policy material.

(g) The SCR chairman is responsible for preparing a report of the team's findings and recommendations. The accountable directorate may use the report in developing regulatory changes or guidance material.

(h) The certifying ACO is responsible for appropriate action on the SCR team's findings and recommendations.

(2) Fact Finding Investigations.

(a) The fact finding investigation is authorized under 49 U.S.C. 40101 et seq., and the Administrative Procedure Act, section 556(b). This is an investigation in which the compulsory processes of the Federal Aviation Act, section 1004, are instituted and used to assist the agency in finding material facts to exercise the agency functions. This procedure is not used either as a substitute for a routine investigation or to investigate violations which constitute felonies under federal law.

(b) Reports or allegations of certification basis noncompliance may be received after a TC is issued. Complainants should be requested to furnish full facts to support any allegations of noncompliance. Depending on the circumstances and the extent of factual substantiation of the allegations, a fact finding investigation may be necessary to develop evidence. The objective of a fact finding investigation is to obtain information necessary to decide what agency action, if any, should be taken. Even without an external complaint, the agency may determine that this type of investigation is necessary.

20. DOCUMENTS REQUIRED OF THE TC/STC HOLDER AND LICENSEE OF A TC HOLDER. The holder of a TC, STC, or the licensee of a TC must supply the following documents at the time of aircraft delivery:

a. A current approved aircraft flight manual;

b. A current weight and balance statement;

c. Instructions for Continued Airworthiness;

d. Compliance status of AD's (reference § 91.173); and

e. Other appropriate documents as necessary.

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CHAPTER 3. TYPE CERTIFICATES

21. GENERAL. Chapter 3 provides guidance for preparation of FAA Form 8110-9, type certificate, and the TCDS. The TCDS, which is a part of the TC, provides a concise definition of the configuration of a type-certificated product. Therefore, a standard format for the TCDS is necessary to allow one to easily find information about a specific product.

22. TYPE CERTIFICATE.

a. Issuance of a TC. The certifying ACO issues a TC when an applicant completes the requirements of the Federal Aviation Regulations for the product. Appendix 2 provides a sample FAA Form 8110-9.

b. Type Certificate Numbers The certifying ACO assigns TC numbers that reflect the directorate of the issuing office. They consist of three elements:

(1) Letter(s) for identification of the product:

(a) Airplanes . . . . . A

(b) Helicopters . . . . . H

(c) Airships . . . . . AS

(d) Gliders . . . . . G

(e) Balloons . . . . . B

(f) Engines . . . . . E

(g) Propellers . . . . . P

(h) Others (not to be used on a new TC) . . Z

(2) A number established by the directorate (separate series established for each kind of TC); and

(3) A two-letter designation to indicate the directorate in which prepared:

(a) CE . . Small Airplane Directorate

(b) NE . . Engine and Propeller Directorate

(c) NM . . Transport Airplane Directorate

(d) SW . . Rotorcraft Directorate

c. Amendment to a TC.

(1) A TC holder desiring a type design change for a product may apply for a STC or an amendment of the original TC. Persons other than the TC holder may not apply for an amendment to the TC.

(2) Some type design changes may not require alteration of the TC or TCDS. These changes are normally handled by an FAA approval letter or DER approval.

(3) Application for a TC amendment is made by letter to the appropriate ACO. If the amendment involves a model change of the product, FAA Form 8110-12, Application for Type Certificate, Production Certificate, or Supplemental Type Certificate, should be used.

(4) The completed amendment will be sent to the applicant and the revised TCDS, if required, published as soon as possible.

d. Notification of TC Approval. The certifying ACO sends timely notification to the accountable directorate when the TC is issued, reissued, or amended.

e. Record Requirements. A copy of the TC or STC, with an original signature, is retained by the issuing ACO for official record purposes.

f. Transfer of a TC.

(1) The recipient of a TC through the transfer of a TC as authorized in § 21.47 accedes to all privileges of a TC holder and all responsibilities which includes the continued airworthiness responsibilities for all aircraft produced under that TC inclusive of those aircraft produced by previous TC holders.

(2) When TC ownership is transferred, the TC must be reissued. The TC holder should submit the original TC to the ACO with the transfer endorsement completely filled out on the reverse side of the TC. This changes the ownership, and the effective date is the date of the TC holder's signature. The signature can only be the individual(s) shown as the TC holder. In the case of a TC issued to an organization, it is necessary to submit an affidavit signed by a duly elected officer of the grantor organization (with the corporate seal where the holder is a corporation) certifying that the person signing as grantor is duly authorized and empowered to execute the transfer endorsement on behalf of the TC holder.

(3) The FAA will only recognize transfer endorsements accomplished on the original TC. A TC holder that cannot locate the original TC can obtain a duplicate by making a written request to the ACO and submitting an affidavit attesting that the original TC is lost, misplaced, or destroyed. A duplicate TC will be reissued with a statement under the TC number stating Reissuedon(date)tosupersedetheoriginalTCwhichhasbeenlostormisplaced. The FAA's records will be annotated to show that the original TC is null and void. The original should be surrendered to the FAA if it is subsequently recovered.

(4) Reissue or transfer of a TC to another geographic area requires the holding ACO to prepare a new TC in the name of the new owner. When a TC is transferred to an owner in another geographic area, the TC files are simultaneously transferred to the ACO for that area, and all correspondence is referred to that ACO. An entry under DateofIssuance will show the date reissued, i.e., February 5, 1962 (reissued to Fairchild). All other items on the TC are the same as on the original. Reissue of a TC requires the TCDS to be revised to show the new owner. For an STC, the date reissued should be put in the Datereissued block.

(5) If the TC holder maintains the FAA data file, reissue of the TC should not occur until the new owner and FAA reach an agreement on maintenance and storage of the FAA data file.

(6) A company name change requires that the TC be reissued.

g. Cancellation of a TC.

(1) As herein applicable, a TC is effective until revoked or suspended (reference § 21.51).

(2) Revocation of a TC is a legal action which cancels the TC. For example, such action is taken for cause when the TC holder is unwilling or unable to take the necessary action to assure continued airworthiness. Suspension is a temporary revocation of a TC. Revocation or suspension of a TC may be a basis for invalidating the airworthiness certificates of all the aircraft built under the TC.

(3) Upon revocation or suspension of a TC, the holder must provide the original TC to the FAA. The word canceled is stamped or typed on the body of the original TC as well as the date and the signature of the manager of the accountable directorate. An appropriate notation is also made on the ACO file copy of the TC. The canceled original TC is then returned to the holder. In the case of a suspended TC, when the suspension ends the TC should be reissued to the holder.

(4) A note is added to the TCDS d ocumenting the cancellation date of the TC and advising that the TCDS is not valid for aircraft manufactured after the cancellation date. Changes to the TCDS are forwarded to the Federal Aviation Administration, Mike Monroney Aeronautical Center, Manufacturing Standards Section (AFS-613), Oklahoma City, Oklahoma 73125.

h. Surrender of a TC

(1) The surrender of a TC renders it ineffective (reference § 21.51).

(2) Surrender of the TC is a legal action in which the TC holder relinquishes the TC and the associated privileges (reference § 21.45) to the FAA.

(a) Surrender of a TC precludes further production of the product covered by the TC, but it does not affect the eligibility of the aircraft, produced prior to the surrender, for airworthiness certification.

(b) All information that constitutes the TC (reference § 21.41), including the type design with substantiating data (reference § 21.31), revert to the public domain. The FAA will have custody of this information to conduct follow-on activities related to the product such as STC's, Product Manufacturing Approval (PMA), field approvals, etc. The FAA will retain this information for as long as an aircraft of that type is registered. The records and data will be made available to the public on request.

(3) Upon surrender of a TC, the word "surrendered" is stamped or typed on the body of the original TC as well as the date and the signature of the manager of the accountable directorate. An appropriate notation is also made on the ACO file copy of the TC. The "surrendered" original TC is then returned to the holder.

(4) A note is added to the TCDS documenting the surrender date of the TC and advising that only airplanes manufactured prior to the date of surrender of the TC are eligible for airworthiness certification. Changes to the TCDS are forwarded to the Federal Aviation Administration, Mike Monroney Aeronautical Center, Manufacturing Standards Section (AFS-613), Oklahoma City, Oklahoma 73125.

(5) Persons or entities wishing to manu facture the product from a surrendered TC may:

(a) Obtain copies of the TC data which now resides in the public domain and apply for a new TC through the normal

approval process. Since a new and distinct TC would be issued in this case, the certification basis would be established in accordance with § 21.17 and **not** § 21.101 or;

(b) Request that the TC be reissued in their name. That request will be honored if the requestor is qualified and in possession of all information that would constitute the TC (reference § 21.41). The requestor should be aware that he/she assumes all responsibilities for the product as well as the privileges of a TC holder as defined in part 21, subpart B. The applicable procedures in paragraph 22f for transfer of a TC also apply.

(6) The TC data may not be claimed by a third party as being proprietary, the data remains in the public domain for perpetuity.

i. Procedures When Certificate Holders Cannot Be Located.

(1) Occasionally TC or STC holders go out of business without transferring their certificates, or they cannot otherwise be located. In these situations, a decision is often needed for disposition of approval records and design data. Public access to data for continued airworthiness purposes can also come into question. The following are procedures for disposition and public access of airworthiness approval records:

(a) The FAA will attempt to locate the person or company listed as owner on the TC or STC prior to disposition of airworthiness approval records to the public.

(b) Reasonable means of contact must be employed, and the process must be documented. Means of contact include:

1 Registered letters;

2 Telephone; and

3 Personal visits, including visits to legal representatives, previous employees, or associates.

(c) A notice should be prepared for publication in the Federal Register or at the discretion of the ACO in trade publications or electronic bulletin boards, if the certificate holder cannot be located by using the means of contact listed above. The Federal Register notice or other means of communication should include:

1 The name of the last known owner;

2 The records in question;

3 A statement of intent to make these records public in the interest of continued airworthiness of the product(s); and

4 A 60-day comment period to allow the holder of the approval to contact the FAA. If there is an immediate safety need, the FAA can release the information individually to owners of aircraft or products.

(d) If reasonable means of contact have been made and the owner does not respond to the notice in the Federal Register or other methods used by the ACO, the certificate is considered to be surrendered and should be processed in accordance with paragraph 22h, with the following exceptions:

1 The FAA assumes responsibility for the continued airworthiness of the product in the absence of the former certificate holder.

2 If the provisions of paragraph 22h(5)(b) were not previously exercised, then the FAA may reissue the certificate to the former TC holder or to a third party who presents to the FAA a valid TC transfer endorsement. They reassume continued airworthiness responsibility for the aircraft. After the certificate is reissued the FAA will regard the data as being proprietary and public access to the data ceases.

j. Splitting a TC.

(1) Requests have been received from TC holders to "split out" one or more models (aircraft, engines, or propellers) from a TC to allow the transfer of the type design approval of those models to another party without transferring the complete TC. This practice is **not** allowed. Splitting out models would require the issuance of a new TC to the transferee, and the airworthiness requirements of part 21 would prevail. In particular, the airworthiness requirements specified by § 21.17(a)(1) must be met. If petitions for exemptions from the requirements of § 21.17(a)(1) were allowed, new families of aircraft, engines, or propellers could be developed without showing compliance to the latest airworthiness standards.

(2) This position does not preclude a TC holder from selling or otherwise making its design data available to another party. If the transferee (receiving party) wishes to produce aircraft, engines, or propellers and the designs are eligible for FAA airworthiness certification or acceptance, several alternatives are available. The receiving party may:

(a) Produce the product under license to the extent allowed under part 21 subparts F or G without becoming the holder of the TC.

(b) Produce the product under license pursuant to a program as outlined in AC 21-24, Extending a Production Certificate Bilateral Airworthiness Agreement (BAA), and in accordance with § 21.137.

(c) Obtain a new TC for the aircraft, engine, or propeller under the provisions of part 21, subpart B.

(3) If option (2),(a) or (b) is selected, the holder of the TC remains responsible for the continued integrity of the approved type design and must continue to be the FAA's contact point for resolving safety issues that may require corrective action (e.g., airworthiness directives).

(4) If option (2)(c) is selected, the FAA should allow the new applicant as much credit for previously-approved design data and tests as is practicable in showing compliance with the later requirements. In determining the aircraft certification basis, consideration should be given to equivalent safety findings and exemptions where clearly documented evidence is presented by the applicant that shows the objectives of the later requirements have been met. However, the certification basis should remain those requirements set forth by part 21, subpart B.

(5) Under option (2)(c), if the applicant for the new TC is located outside of the U.S., a new TC will not be issued unless the applicant is located in a country that has a BAA with the U.S. In these cases, the applicant must seek a new FAA TC through the airworthiness authority of its country, and the FAA will work through that authority to agree on equivalent safety findings and exemptions.

k. Provisional TC. FAA Form 8110-9, Type Certificate, is used for issuance of a provisional TC. The same TC number is used for both the provisional and the final TC. The word "PROVISIONAL" should be typed above the line "TYPE CERTIFICATE." The line near the bottom of the form relative to transfer of the certificate should be obliterated since a provisional TC is not transferable. A provisional TC is appropriate and necessary for the following aircraft uses:

(1) Flight crew training;

(2) Demonstration flights by the manufacturer for prospective purchasers;

(3) Market surveys by the manufacturer;

(4) Flight checking of instruments, accessories, and equipment; and

(5) Service testing of the aircraft (part 21, subpart C; § 91.317; and § 121.207 for regulations of issuance and operation limitations).

23. TYPE CERTIFICATE DATA SHEET

a. Definition. The TCDS is the part of the TC which documents the conditions and limitations necessary to meet the airworthiness requirements of the Federal Aviation Regulations.

b. Approval of TCDS. The FAA approves the TCDS and prepares the TCDS which is a part of the TC, as required by § 21.41, by using data and information required of the applicant in showing compliance with the Federal Aviation Regulations. The contents of the TCDS are described in this chapter.

c. Completion of the TCDS. The TCDS should be completed as soon as possible after approval of the engineering data. The TCDS can be in a partial state of completion at the time of issuance of the TIA. However, the TCDS must be completed by the time the TC is issued. An information copy of the TCDS should be sent to the accountable directorate within 2 weeks after issuance of the TC.

d. Format of the TCDS. The format of the TCDS should be consistent for any type-certificated product, although the information will be pertinent for that particular product.

(1) The following information, in the order listed, is included in a title box in the upper right-hand corner of page 1 of the TCDS:

(a) The TCDS number (which is the same as the TC number);

(b) The revision number;

(c) The name of the TC holder, in abbreviated form (For military surplus aircraft do not use the original manufacturer's name, use only the current TC holder's name.);

(d) All of the approved models listed in alphabetical or numerical order for convenience in filing; and

(e) The issue date.

(2) The ACO will update a TCDS to reflect the name of the new TC holder when a TC is sold. The name should be changed both in the title box and on the TCDS opposite the item "TC Holder."

(3) The title of the document appears in the center of the page as "TYPE CERTIFICATE DATA SHEET NO. XXX."

(4) The applicant's name and address are inserted opposite the words "TC Holder" and should agree exactly with that shown on the application for TC.

(5) One or more sections follow the identification of the TC holder. Each section is confined to an individual model of the general type covered by the TC.

(a) The section covering each model is headed by a roman numeral followed by the model designation which is taken from the application for TC.

(b) The category or categories in which the aircraft may be certificated is included in parenthesis following the model designation. This is followed by the approval date, which is the date shown on the TC.

(c) The differences between the new model added to the TCDS and a previously approved model should be indicated immediately below the heading for the new model. This information is to assist in determining the eligibility of a conversion from one model to another.

e. Information Required for an Engine TCDS Refer to AC 33-2, Aircraft Engine Type Certification Handbook, for details needed on an engine TCDS.

f. Information Required for a Propeller TCDS

(1) Type. A brief description of the propeller, e.g., ground adjustable; manually controllable; mechanical; two position hydraulic; constant speed; electrical; etc. Pitch control is covered in Note 3 and feathering and reversing in Note 4. Reference should be made to these notes when applicable.

(2) Engine Shaft. Describe the type of engine mounting necessary for the propeller, e.g., SAE No. 50, SAE No. 60, SAE No. 2 flange, etc.

(3) Hub Material. Describe the basic material used for fabrication of the hub.

(4) Blade Material. Describe the basic material for fabrication of the blades.

(5) Hubs. List hub model designations and reference appropriate notes. Suffixes may be added to the basic hub model designation to denote hub drillings and/or special design

features. For instance, an "L" may designate one size bolt circle and a "K" another, or a "60" may be included to indicate that the propeller fits an SAE No. 60 shaft, and a "50" to indicate that it fits an SAE No. 50 shaft. An explanation of what the suffixes mean should be included here or in a Note of the TCDS.

(6) Blades.

(a) The blades approved for use in the hub or hubs listed are shown on the data sheet in tabular form, as follows:

Blades (See Note 2)	Maximum Continuous HP	RPM	Takeoff HP	RPM	Diameter Limits (See Note 2)	Hub, Blade, and Spinner Weight	Notes

(b) In cases where the blades listed have been approved at different ratings in more than one hub model, separate tabulations should be made under each pertinent hub model. The information that should be tabulated under each of the headings follows:

1 List the approved pr opeller blade in the column marked "Blades." The model designation of the blade which will result in a propeller of the largest diameter approved with that particular blade will be listed first. Next list the model designation of the blade which will result in a propeller of the smallest diameter approved with that particular blade. The preposition "to" will be inserted in between. The method used by the applicant to denote a reduction in diameter is explained in Note 2, therefore, this note is referenced by placing "(See Note 2)" below "Blades."

2 List the maximum continuous horsepower and revolutions per minute ratings for which the propeller is approved under the appropriate headings.

3 List the takeoff ratings under the appropriate headings.

4 List the diameter limits which represent the maximum and minimum propeller diameters as indicated by the corresponding blade model designations. An applicant may use the same blade model in several propeller models, but, in each case the resulting propeller diameter should be checked since it cannot be assumed that the resulting propeller diameters are identical. This is because the blade socket of one hub may be further from the hub center line than the blade socket of another hub. The diameter limits are nominal limits as explained in

Note 2, therefore, Note 2 will be referenced under the heading of "Diameter Limits." Nominal propeller diameter limits are not included in an aircraft data sheet or specification. Instead, the appropriate manufacturing tolerance is added to the maximum permissible diameter and subtracted from the minimum permissible diameter.

5 List the total weight of the propeller under the column headed "Hub, Blade, and Spinner Weight. (Max. Dia.)."

6 List the number of any appropriate note in the column headed "Notes."

(7) Certification Basis. List the following:

(a) Federal Aviation Regulations Part number and date (including latest amendment) at the time the application was submitted;

(b) TC number and date issued; and

(c) Date of application for TC.

(8) Approval Basis for Import Propellers. Information for the airworthiness acceptance of aircraft engines or propellers manufactured outside the U.S. for which a U.S. TC has been issued is found in § 21.500. Additional guidance is contained in AC 21-23, Airworthiness Certification of Civil Aircraft Engine, Propellers, and Related Products. Each propeller exported to the U.S. shall be accompanied by a certificate of airworthiness for export or a certifying statement endorsed by the exporting cognizant civil airworthiness authority which contains the following language:

(a) "This propeller conforms to its United States type design (Type Certificate Number _____) and is in a condition for safe operation;" and

(b) "This propeller has been subjected by the manufacturer to a final operational check and is in a proper state of airworthiness."

(9) Production Basis. List the PC number.

(10) Notes. The same numbering system and subject heading must be used for Notes on all propeller data sheets. Insert opposite the number of the note involved "not applicable," when one of a series of notes is not pertinent. The explanation for Notes from 1 to 10 follow:

(a) NOTE 1. Hub Model Designation. Describe the hub or propeller model designation, whichever is pertinent. Numerals or letters composing the hub or propeller model designation usually identify such features as basic design, number of blades, blade shank size, size for engine flange or spline required for mounting the propeller. A series of suffixes may be used to denote minor changes not affecting eligibility and/or major design features such as feathering. The use of a diagram has been found suitable to indicate the significance of each numeral or letter appearing in the model designation. In some cases where the propeller is also used by military agencies, the propeller is identified by means of a suffix to the hub model designation. In such a case, Note 1 is entitled "Propeller Model Designation" and the appropriate suffix is explained. The propeller blade model must be added to this designation when included in the pertinent aircraft data sheet. Otherwise, a parts list would be needed to determine the blade model and propeller diameter involved.

(b) NOTE 2. Blade Model Designation. Use a diagram similar to that used for the hub model designation to indicate the significance of any numerals or letters and to describe the system used to denote propeller diameter reductions. Include, when pertinent, a description below the diagram to outline the system used by the applicant to identify telescoped blades or blades with square cutoffs. The following note will be included to explain "Diameter Limits" in the "Blades" table:

> "Diameter limits are nominal diameters of the assembled propeller and do not include the + or - 1/8-inch manufacturing tolerance permissible for propellers with basic diameter less than 14 feet or + or - 1/4-inch permissible for propellers with basic diameter 14 feet or larger."

(c) NOTE 3. Pitch Control. Describe the propeller pitch control substantiated by the applicant. The governors should be identified by name as well as model designation.

(d) NOTE 4. Feathering and Reversing. Identify any models that feather and/or reverse and indicate any special type of control that is approved.

(e) NOTE 5. Left-Hand Models. Indicate the approval status of the left-hand blade model of an approved right-hand blade model. When applicable, the digit 5 will be placed under "Notes" in the "Blade" table opposite the model designation of the approved left-hand blade. The following note is used rather than repeating the ratings, diameter limits, etc., for the left-hand model:

"The left-hand version of an approved propeller model is eligible at the same rating and diameter limitations as listed for the right-hand model."

(f) NOTE 6. Interchangeable Blades. List interchangeable blades in groups. The note will be revised accordingly when blades are interchangeable in one direction only due to a change in alloy, surface treatment, or use of a blade vibration damper. Such blades will have different model designations but will be otherwise similar as outlined in the following sample Note 6:

> "Only blades listed in the same group of the following listed groups have sufficiently similar aerodynamic and vibration characteristics to permit interchangeability in the same diameter without a flight test. Group (a), Group (b), etc."

(g) NOTE 7. A ccessories. Identify accessories such as spinners, governors, deicing and anti-icing equipment.

(h) NOTE 8. Shank Fairings. Indicate when a blade has been modified to incorporate shank fairings or cuffs. If the blade model includes shank fairings or cuffs when originally certificated, Note 8 is not required because the blade model designation will be sufficient identification in this respect.

(i) NOTE 9. Special Limits. List the propeller-engine combinations approved considering vibration for use on normal category single-reciprocating engine tractor aircraft or approved installations of § 21.29 propellers.

1 A propeller model is eligible vibrationwise in any standard category single-reciprocating engine tractor aircraft when it is installed on the same engine model used for the vibration approval of the particular propeller-engine combination. If the propeller vibration stress survey was conducted on a multi-engine or pusher aircraft, any placard found applicable in such a survey will be applied to the single-reciprocating engine tractor installation until a vibration resurvey shows that the placard is not required on the single-reciprocating engine tractor application. Approvals of this type should be listed under Note 9 as follows:

Table of Propeller-Engine Combinations
Approved Vibrationwise for Use on Normal Category
Single-Reciprocating Tractor Aircraft

> The maximum and minimum propeller diameters that can be used from a vibration standpoint are shown below. No reduction below the minimum diameter listed is

permissible, since this figure includes the diameter reduction allowable for repair purposes.

Hub Model	Blade Model	Engine Model	Max. Dia. (Inches)	Min. Dia. (Inches)	Placards

2 The approval of most import propellers (§ 21.29) includes the vibration and performance approval of the propeller for use on a particular engine-airplane combination. These approvals should be listed under Note 9 as follows:

Approved Installations

Propeller s listed in this data sheet are approved only for use in the engine-aircraft combinations shown below:

Propeller Model	Aircraft Model	Engine Model	FAA Data Sheet Aircraft Engine

(j) NOTE 10. When governors, spinners and deicing systems are approved as part of the propeller TC, Note 10 should include a statement which clarifies that these accessories are approved as part of the propeller TC. This statement should indicate that the aircraft installation requires compliance with the applicable engine/airplane airworthiness requirements to complete the approval process.

(k) NOTE 11. Special Notes. Use when a special note is applicable. For example, the TC may occasionally be granted before the applicant has completed the required service manual. Note 11 will be used in such an instance to indicate that the propeller is not eligible for installation until the manual becomes available. After approval of the manual, Note 11 will be deleted from the data sheet.

g. Data Sheet for Fixed-Pitch Propellers. Data sheets for fixed-pitch propellers will be similar to those for propellers with detachable blades except as follows:

(1) Type - Fixed-Pitch (Single-Piece);

(2) Engine Shaft - Omit;

(3) Material - Aluminum Alloy, Laminated Wood, or Composite;

(4) Number of Blades;

(5) Hub Models Applicable - Omit;

(6) In lieu of the table of "blades," the following table of models will be used:

Model (See NOTE 2)	Takeoff & Max. Cont. HP	Takeoff & Max. Cont. RPM	Std. Dia.	Std. Pitch	Hub Drilling No. Holes	Hub Drilling Dia. Holes	Hub Drilling Dia. Bolt Circle	Dia. Pilot Hole	Hub Dimensions Dia. (Max. Dia.)	Hub Dimensions Thickness	Weight (lb.)

(7) Notes. The following notes will be used:

(a) NOTE 1. Installation. A typical note follows:

> "These models are for installation on flanged propeller shaft ends (See NOTE 2). The front plate supplied by the engine manufacturer is not to be used. Installation is to be made with special steel bolts which are either furnished or specified by the propeller manufacturer."

(b) NOTE 2. Model Designation. A diagram will be used to indicate the significance of the digits and letters in the propeller model designation. This diagram encompasses the data given in Notes 1 and 2 for detachable blade propellers.

(c) NOTES 3, 4, 5, 6, 7, and 8. Not applicable. (So marked on data sheet.)

(d) NOTE 9. Special Limits. In the table of propeller-engine combinations, the "hub model" and "blade model" columns are replaced by a "propeller model" column. The table applies only to fixed-pitch metal propellers.

h. Information Required for Each Model Aircraft TCDS Each of the items listed herein appear in the TCDS exactly as entitled. Where several models are included under the same TC, items are repeated under each section with the exception of the datum, mean aerodynamic chord, leveling means, control surface movements, and production basis, which, if common to all models, may be listed under "Data Pertinent to All Models." Detailed information for each item may be referenced if that information is maintained in an approved FAA document and readily available (e.g., information contained in the aircraft flight manual could be referenced for an item where copying that information on the TCDS would be voluminous).

(1) Engine. Show the abbreviated name of the manufacturer, the engine TC number, and the complete model designation for all engines which the manufacturer obtained approval. Show the number of installed engines.

(2) Fuel. Show the minimum fuel grade to be used in the basic engine, and list approved alternate fuels. Include the fuel grade with the pertinent limits where optional engines are included.

(3) Engine Limits. Show the installed maximum continuous and takeoff limits of the engine(s), including power setting parameters (e.g,. manifold pressure, engine pressure ratio), r.p.m., and power or thrust output. The limits may be less than, but must never exceed, the rating for the engine as shown on the pertinent engine TCDS. Any reduction may be dictated by other requirements such as structural, vibrational, or performance. In the case of altitude engines, i.e., supercharged engines, the limits are shown for sea level and for critical altitude or altitudes. Include a statement regarding variation between altitudes such as "straight line manifold pressure variation with altitude to 10,000 feet."

(4) Propeller and Propeller Limits. Show the name of the manufacturer, the propeller TC number, and the model designation for each propeller which the manufacturer has obtained approval together with the propeller limits and any operating restrictions peculiar to the propeller or propeller -engine combination.

(a) Show the static r.p.m. limits and diameter limits for fixed-pitch propellers. If the TIR indicates in a given case that the r.p.m. limits are 2200-2350, the TCDS indicates as follows: "Static r.p.m. at permissible throttle setting, not over 2350, not under 2200. No additional tolerance permitted." Thus, all tolerance permitted is indicated in the basic limits.

(b) Show the diameter limits and blade angle settings (feathering, high, low, and reverse, as applicable) for adjustable, two-position, controllable, and automatic propellers. The applicable static r.p.m. limits (with tolerances) may also be shown if considered desirable. The diameter limits should include both the maximum and minimum allowable limits for repairs with the notation: "No further reduction permitted."

(c) Additional information is required in certain circumstances such as:

1 The model designation of both the hub and the blades when propeller blades are not an integral part of the hub.

2 When interchangeable blades are listed, include a note indicating where the listing of the other eligible blades may be found.

3 The reference blade station at which the angle is measured for propellers which permit the blade angle setting to be varied.

(5) Rotor Speed Limits. Include helicopter rotor speed limitations, power on and power off.

(6) Transmission Torque Limits. Include helicopter transmission torque limits.

(7) Airspeed Limits. Show all pertinent airspeed limits in both m.p.h. and knots. Include information to indicate whether the airspeed limits are indicated or calibrated airspeeds. The terminology for each speed is the same as that used in the Civil Aviation Regulations/Federal Aviation Regulations under which the aircraft is type certificated.

(8) Center of Gravity (C.G.) Range. The C.G. ranges approved for the extreme loading conditions of the aircraft are given in inches from the datum. Dimensions are carried out only to the nearest tenth of an inch. Where the landing gear is retractable, values should be given in terms of landing gear extended and a statement added to that effect. Include the moment change (in inch pounds) due to the retracting of the landing gear. No specific standard for presentation can be set in the case of aircraft where the C.G. limits vary with loaded weight.

(9) Empty Weight C.G. Range. An empty weight C.G. range may be established. If no range exists, the condition is indicated by inserting the word "none" after the heading. The range is given as forward and aft limits in inches from the datum. Include a full explanation when the C.G. range is affected by items of equipment. Include the following statement, with the wording modified to suit the individual case, where an empty weight C.G. range is established.

> "When the empty weight C.G. falls within the range given, complete computations of critical forward and aft C.G. positions are unnecessary. Range is not valid for nonstandard arrangements."

(10) Datum. The datum, designated by the applicant, is a definite, unmistakable, and unchangeable point. It is defined in such a manner that it may be readily identified.

(11) Leveling Means. Include the descripti on of the means provided for leveling the aircraft with information for location and accessibility of a leveling point. The leveling point is always a definite, unmistakable, and unchangeable point.

(12) Maximum Weights. Include all pertinent maximum weights such as ramp, landing, takeoff, zero fuel (must show if fuselage fuel is included as part of zero fuel weight), zero oil, and antidetonant injection fluid gross weights. Include engine out ferrying operation weight, if available. If the explanatory material appears cumbersome, it may be included in a note which is cross-referenced under the item.

(13) Minimum Crew. Include the minimum crew required for normal operation when established by regulation. Identify pilot-in-command station location.

(14) Number of Seats. The following are some of the design considerations which may limit the number of seats:

(a) The passenger capacity of transport category aircraft may be limited by either the emergency exit requirements, oxygen requirements (when applicable, i.e., above 25,000 ft.), demonstration of emergency evacuation procedures, or the structural strength of the floor. Other considerations may also be applicable. For example, cabin attendants are not included in the maximum number of passengers.

(b) Indicate the number of seats and the moment arms of the seats for aircraft other than transport category. The seat moment arms are ordinarily those of the occupants of the seats rather than the seats. The occupant's C.G. may be assumed at a point 8.5 inches forward and 10.5 inches above the intersection of the seat back and the seat bottom with the upholstery compressed approximately the same as when the seat is occupied. Ordinarily, the moment arms of adjustable seats are given for the mean or average location, but where the C.G. range is critical, the extreme positions may be defined.

(c) Show the number of seats if the aircraft is approved for cargo only as:

"None. Approved for cargo only."

(15) Maximum Baggage. Show the maximum capacity and moment arm of each baggage compartment, and list the floor loading densities, as appropriate.

(16) Fuel Capacity. Indicate the total capacity of each fuel tank installed in the aircraft and its moment arm. List the amount of usable and unusable fuel with a reference to see the appropriate Note for the requirement to add the unusable fuel to the certificated empty weight of the aircraft.

(17) Oil Capacity. Same considerations as fuel capacity.

(18) Maximum Operation Altitude. (When appropriate).

(19) Control Surface Movements. Include the total travel in each direction of each movable control surface on the aircraft. This information is included as a convenience to overhaul and repair stations, as well as FAA representatives and is not intended to prescribe control movements as an item of inspection unless a specific statement to that effect is included. Where the flight characteristics of the aircraft require close tolerance on the control movements, it is necessary to have a method of measuring the movements such that the individual using the information may make accurate measurement. In such cases, it is generally satisfactory to list the maximum movements in terms of inches from some well-defined point rather than in degrees. Specify the point of measurement when degrees are used.

(20) Manufacturer's Serial Numbers. Include the manufacturer's serial numbers for each aircraft under a particular model. List the number that appears on the manufacturer's aircraft data plate in exactly the same form. If the aircraft is being manufactured under more than one production approval, the serial numbers should be separated according to manufacturer.

(21) Import Requirements.

(a) For imported aircraft, describe the document used by the country of manufacture in certifying that the individual aircraft conforms to the type design and is in a condition for safe operation (reference § 21.183(c)). This document is the basis for determining the eligibility of an imported aircraft for a U.S. airworthiness certificate. It is essential that the description be clear and complete. An acceptable import statement follows:

> "A United States airworthiness certificate may be issued on the basis of [INSERT NAME OF COUNTRY] Certificate of Airworthiness for Export signed by a representative of [INSERT NAME OF THE FOREIGN CIVIL AIR AUTHORITY], containing the following statement: 'The aircraft covered by this certificate has been examined, tested, and found to comply with [INSERT DOCUMENT IDENTIFIER, TITLE REVISION, ETC.] approved under U.S. Type Certificate No. [INSERT TYPE CERTIFICATE NUMBER] and to be in a condition for safe operation.'"

(b) The U.S. airworthiness certification basis for aircraft type certificated under § 21.29 and exported by the country of manufacture is §§ 21.183(c) or 21.185(c).

(c) The U.S. airworthiness certification basis for aircraft type certificated under § 21.29 exported from countries

other than the country of manufacture (e.g., third party country) is §§ 21.183(d) or 21.185(b).

(d) The U.S. airworthiness certification basis for the issuance of an airworthiness certificate for aircraft type certificated under § 21.21 and manufactured in a foreign country under a licensing arrangement is §§ 21.183(d) or 21.183(b).

(e) Additional guidance is contained in FAA AC 21-23, Airworthiness Certification of Civil Aircraft, Engines, Propellers, and Related Products Imported into the United States.

(22) Certification Basis.

(a) Define the ap plicable regulations and amendments, special conditions, and effective date of the pertinent Federal Aviation Regulations. Record applicable regulations under this heading for each change in the TC which is accomplished in accordance with regulations other than those recorded at the time of issuance of the TC.

(b) Include a notation if the manufacturer has obtained a TC under the delegation option authorization.

(c) Indicate where compliance with pertinent ditching provisions and ice protection criteria for aircraft has been demonstrated.

(d) Identify all exemptions issued pursuant to part 11, together with "equivalent safety findings" made in accordance with § 21.21(b)(1).

(e) Include the TC number and date issued.

(f) Include the date of application for the TC.

(23) Production Basis.

(a) If a PC has been issued to the TC holder, listing of the PC and number is sufficient except when the PC is issued under the delegation option procedure. In this case, the following statement is included:

> "A production certificate was issued and the manufacturer is authorized to issue airworthiness certificates under the delegation option provisions of 14 CFR part 21."

(b) If no PC has been issued, the following entry should be made:

"None. Prior to original certification of each aircraft, an FAA representative must perform a detailed inspection for workmanship, materials, conformity with the approved technical data, and a check of the flight characteristics."

(c) If the airc raft is being manufactured by a licensee of the TC holder, the licensee's name and PC number should be listed along with the aircraft serial numbers produced by the licensee.

(d) If the PC is canceled and the TC remains active, the production status is defined as follows:

"None. Prior to original certification of each aircraft manufactured subsequent to (date of cancellation of PC), an FAA representative must perform a detailed inspection for workmanship, materials, conformity with the approved technical data, and a check of the flight characteristics."

(24) Equipment.

(a) Use the following statement:

"The basic required equipment as prescribed in the applicable airworthiness regulations (see Certification Basis) must be installed in the aircraft for certification."

(b) List the additional or special equipment found necessary for type certification, as well as the exceptions to the prescribed minimum equipment. List alternates to equipment found necessary for certification. Do not list on the TCDS the optional items of equipment, except engines and propellers for which the aircraft manufacturer obtains approval. Show the equipment list supplied by the manufacturer with each aircraft. Approvals of equipment installations obtained by parties other than the TC holder may be listed in the FAA publication, "Summary of Supplemental Type Certificates," (reference paragraph 30).

(25) Notes.

(a) Avoid the overuse of notes whenever possible. Include pertinent explanatory material with the item to which it refers. Follow this practice even though it becomes necessary to repeat the information several times. If it is impractical to include the explanatory material with the item to which it refers because of its length or complexity, the information may be included in a separate note. In this case, the pertinent items would include a reference to the note.

(b) Indicate the material which is found in the note when a note is referenced. An example of cross-reference would be the following notation inserted after the fuel capacity:

"See NOTE 1 for data on weight and balance."

(c) The need for care in choosing the language used cannot be overemphasized in the preparation of notes. Many difficulties have arisen in the past due to misinterpretation of information included in the notes. Examine material carefully to ensure that the meaning is unmistakable.

1 Reserve NOTE 1 for the "weight and balance note." This note pertains to weight and balance data, equipment lists, and loading instructions. It is standardized except for special considerations regarding weight and balance, e.g., information on unusable fuel, system fuel and oil, variations in C.G. ranges, or removable ballast. The standardized part of this note reads as follows:

"A current weight and balance report including list of equipment included in the certificated empty weight, and loading instructions when necessary must be provided for each aircraft at the time of original certification."

2 Reserve NO TE 2 for a list of required placards including the one regarding operation in compliance with the operating limitations when applicable. All placards required in the approved airplane flight manual must be installed in the appropriate locations. If any required placard is not listed in the manual, it should be listed in the note.

3 Reserve NOTE 3 for reference to the Instructions for Continued Airworthiness required under § 21.50 for service life limits on components, required inspections and inspection intervals, and certification maintenance requirements, as appropriate.

4 When an applicant has developed advisory information for restricted category operation of an aircraft, the following information should be included in a note on the TCDS.

(aa) Restricted category weights, speeds, ranges, and altitudes at which the applicant has shown compliance with § 21.25.

(bb) Additional operating restrictions for individual restricted operations approved under § 21.25.

(cc) A statem ent that all parts of the standard category airworthiness standards are not necessarily complied with for restricted category operation.

5 Additional miscellaneous notes may be required to convey necessary information not provided for elsewhere.

24. PREPARATION OF TCDS AND SPECIFICATIONS FOR PRINTING.

a. Type Certificate Data Sheet Master Within 2 weeks after issuance of a TC, the TCDS master is typed in final form by the issuing region and forwarded to or transmitted electronically to the Regulatory Support Division, Attention: Manufacturing Standards Section, AFS-613. The master is processed by AFS-613 for printing by the U.S. Government Printing Office (GPO). All material received by the 12th of the month is included in the publication for that month.

(1) The text should be letter quality, uniform density throughout, and suitable for reproduction and microfilming. It should be on one side only on smooth paper of sufficient weight and substance to withstand frequent handling. The paper size can be either 8 1/2 by 11 inch (10 or 12 pitch) or 11 by 15 inch (10 pitch only). When corrections are required in the process of preparing the master, correction-fluid, -paper, or -tape is permitted.

(2) The TCDS and specifications are published with a final trim size of 8 1/2 by 11 inch paper and in loose-leaf form for insertion in standard 3-hole binders. Therefore, when using 8 1/2 by 11 inch paper the allowable typing area cannot exceed 6 1/2 by 9 inches. The allowable typing area cannot exceed 9 3/4 by 14 inches when 11 by 15 inch paper is used. The latter size paper will be photo-reduced to 7 by 9 1/2 inches for publication. Space may be left between sections of equipment, when preparing the masters, where it is anticipated that new items may be added.

(3) The master is used by AFS-613 for preparing negatives. The master is returned to the controlling ACO after the negatives have been made.

(4) The TCDS and specifications are printed by GPO, consequently, abbreviations and compound words must be as indicated in the GPO Style Manual and those contained in the Federal Aviation Regulations.

(5) The first page of the TCDS or specification does not have a page number. The succeeding pages are numbered consecutively in the center at the top of the page with the TCDS or specification number included on the same line, flush with the right-hand margin on odd numbered pages, and flush with the left-hand margin on even numbered pages.

b. Type Certificate Data Sheet Revision It is important for the user to know the revision status of the TCDS, therefore, include the revision number on each page revised.

(1) Add the revision number directly below the TCDS or specification number in a box in the upper right -hand corner of the first page. Enter the revision date inside the box at the bottom of the box.

(2) Include the revision number directly below the TCDS or specification number on succeeding pages which are affected by a revision.

(3) Identify the revised material by placing a change mark (a vertical black line) along the left-hand margin of the printed matter that was changed. A vertical black line may be placed along all the printed matter on that page if the page contains a significant number of change marks. When a new model is approved, the model designation should be inserted in proper order and a change mark used to designate the new model.

(4) Add a revision grid to the bottom of the first page, e.g.,

Page No.	1	2	3	4	5	6
Rev No.	1	-	2	6	1	-

Place additional grids, if needed, underneath the first one. Insert the page number in the upper block and enter the revision number for that page in the lower block. Place a dash (-) in the lower block for those pages which have not been revised.

(5) Revisions to TCDS and specifications are published monthly. The master of each page revised, the first or title page, and the reverse side of each of these pages are forwarded to or transmitted electronically to AFS-613 for preparing negatives. Do not send the entire TCDS except when necessary to print all pages. The master is returned to the issuing office after the negatives have been made. A page control chart is prepared by AFS-613 for each monthly supplement advising of the pages removed and pages added by the revision.

25. CHANGING A SPECIFICATION DOCUMENT TO A TCDS

a. General. Prior to use of the TCDS, specification documents were issued for engines, propellers, and aircraft by the FAA.

b. Engine and Propeller Specifications When new models of engines and propellers are to be added to the TC, the specification document should be changed to a TCDS.

c. Aircraft Specifications Aircraft specification documents may be changed to a TCDS. However, the conversion is complicated because of the equipment lists involved and should be made only if the TC holder provides an equipment list to be referenced in the TCDS or if the equipment listed on the specification document is compatible with the TCDS concept.

d. Changing a Specification Document to a TCDS Pay particular attention to the information required under "Certification Basis," i.e., applicable regulations, date the TC was issued, and date of application for the TC. The date of application for a new model added to the TCDS need not be shown under the "Certification Basis" unless the regulations applicable to the new model are different from those under which the original model was approved.

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CHAPTER 4. SUPPLEMENTAL TYPE CERTIFICATES

26. GENERAL. Chapter 4 provides guidance for preparation of a STC, FAA Form 8110-2. It also includes additional information pertaining to an STC which is not in chapter 2 of this notice. In general, the same procedures apply for approval and issuance of an STC as those for a TC.

27. SUPPLEMENTAL TYPE CERTIFICATE

a. Purpose of an STC.

(1) An STC is issued for major design changes to type-certificated products when the change is not so extensive as to require a new TC (reference § 21.19). A TC holder may apply for an amendment to the TC rather than apply for an STC. Any person may apply for an STC. Minor changes do not require an STC. Minor and major changes are classified in § 21.93.

(2) An STC will normally be required to authorize the installation of replacement parts only if the installation represents a major change in type design. However, even for installation of replacement parts not constituting a major change, an STC may be deemed necessary because of the existence of some unique circumstance. One example of this is a situation where special instructions are necessary for installation of the replacement part.

(3) An STC will **not** be issued to:

(a) Approve minor changes, or for approval of identical replacement parts (unless the installation of such parts constitutes a major change to the type design);

(b) Approve design changes to TSO approved articles unless the TSO is invalidated for the modified article. An STC which modifies a TSO article must provide for installation;

(c) Combine two or more STC's without additional showing of compliance; or

(d) Manufacturers or applicants outside of the U.S. unless the product receiving the initial alteration can be made available at a suitable location for FAA personnel to complete the necessary conformity and compliance inspections (except the items covered by reciprocal agreement).

b. Requirements for an STC

(1) The applicant must submit data adequate to show compliance with the applicable certification basis (reference paragraph 15). It is the applicant's responsibility to develop and provide the required data. The applicant may develop the data or may employ an FAA DER to develop the data. Use of a DER may be advantageous because of her/his prior experience and knowledge of FAA procedures. A list of consultant DER's is available in AC 183.29 -1, Designated Engineering Representatives.

(2) If an applicant desires to incorporate any change resulting in an increased passenger seating configuration for transport category airplanes, compliance with later amendments to the Federal Aviation Regulations may be required.

(3) An STC can be issued when the FAA determines that the design change meets the applicable regulations.

(4) An STC will be issued only if the pertinent technical data have been examined and found satisfactory, all necessary tests and compliance inspections have been completed, and the alteration has been found to conform with the technical data.

c. Acceptance of Data. Major changes in a type design are approved after receipt of descriptive and substantiating data for inclusion in the type design.

(1) For multiple STC's (for more than one aircraft of a specific model), all drawings or other data accepted must be adequate for reproduction of parts and/or installation of subsequent modifications. Photographs made from permanently marked negatives are acceptable, provided they or the report in which they are included contain all the information which otherwise would be found on engineering drawings.

(2) For a one-only STC (for only one aircraft of a specific model), the submitted drawings or other descriptive data need not be satisfactory for reproduction of parts and/or the installation and may consist of marked photographs, sketches, and word description. All other data must be the same as that required for a multiple STC.

d. Compliance Inspection

(1) Compliance inspections are physical inspections of the prototype alteration to determine compliance with Federal Aviation Regulations/Civil Aviation Regulations requirements which cannot be determined adequately from an evaluation of the technical data. These inspections will be conducted by the appropriate ACO engineer or DER.

(2) As part of the compliance inspections, flight tests may be required when flight characteristics, performance, and/or systems are affected. If an STC flight test is required, a TIA is prepared.

e. Compatibility Examination

(1) A new design change should be compatible with related previous design changes to assure continued compliance with applicable airworthiness requirements. Reliance on any previously approved changes should be described in the approved data.

(2) The accountable directorate should be consulted when a proposed major design change is likely to affect critical characteristics (i.e., stall characteristics, aft C.G. limits, etc.) of a product.

f. Issuance of Experimental Certificate Experimental certificates required for flight tests are issued in accordance with part 21, subpart H. An experimental certificate may not be required for aircraft modified in conformity with a previously approved STC or other approved data, or when equipment installation changes have been made, provided that prior determination has established that such modifications or changes, when properly made, will not adversely affect structural integrity, flight characteristics, or performance. The inspector may make a determination as to whether an experimental certificate is required; however, if there is any question about the need for an experimental certificate, coordination with FAA engineering is required.

g. Compliance Determination The methods of determining compliance with applicable requirements are the same as those used for basic type certification except as provided herein.

h. Aircraft Evaluation Group (AEG) Responsibility The AEG should be involved in the areas of operational suitability and continued airworthiness of the aircraft which have incorporated STC modifications that would affect operational suitability and continued airworthiness (i.e., change in crew requirements, changes in flight instrument displays, minimum equipment list relief, changes that would impact FOEB, FSB, and MRB reports).

28. PREPARATION OF AN STC, FAA FORM 8110-2

a. Number. The STC number consists of two alpha digits to identify the product, five numerical digits issued in sequential order to identify the serial number assigned by the directorate or ACO, and two alpha digits to identify the directorate or ACO which issued the STC.

(1) The STC product identifiers are divided into the following ten categories: SA - Small normal category, ST - Transport category, SE - Engine, SR - Rotorcraft, SP - Propeller, SB - Balloon, SG - Glider, SS - Airship, SI - Experimental, and SQ - Other.

(2) The issuing office identifiers are divided into the following twelve categories: BR - Brussels, AT - Atlanta, CH - Chicago, WI - Wichita, NY - New York, AN - Anchorage, EN - Boston Engine Certification, BO - Boston Aircraft, AI - Southwest Aircraft, RO - Southwest Rotorcraft, SP - Southwest Special, and NM - Seattle, Long Beach, and Denver.

(3) As an example, SA00125AT would be the 125th STC issued by the Atlanta ACO on a small airplane.

b. Certificate Issued To. The name of the party, corporation, or organization to whom the STC is issued will be shown **exactly** as indicated on FAA Form 8110 -12, Application for Type Certificate, Production Certificate, or Supplemental Type Certificate. If the address is not also shown on the Form 8110-2, that information must be transmitted to AFS-613 so the address will be correct on the STC summary.

c. Certification Basis. The certification basis should include the following:

(1) Reference to the certification basis identified on the TCDS of the TC product;

(2) Other Regulations. If other regulations are also involved, the STC should indicate that the certification basis is a combination of the pertinent regulations;

(3) Special Conditions. If STC special conditions exist, they must be indicated and explained on the STC and STC data sheet, if appropriate, by number and date;

(4) Equivalent Level of Safety Findings; and

(5) Exemptions.

d. Original Product. Include the TC number and the TC holder's name of the product being altered as shown on the aircraft specification or TCDS. All applicable models should be listed with model designations identical to that on the TCDS.

e. Description of Change. Include a description of the design change and the controlling document. Include references to flight manual supplements, loading instructions, drawings, and/or FAA sealed drawings lists, etc., that are required as part of the design change. Separate the installation and

manufacturing data in cases where parts or kits are to be sold. If the installation data list is specified on the STC, the installer knows what data is required to properly install the design change.

f. Limitations and Conditions

(1) If previously incorporated design changes are necessary to enable the newly altered product to be airworthy, this fact must be clearly indicated.

(2) Include the following note in every multiple STC:

"Compatibility of this design change with previously approved modifications must be determined by the installer."

(3) If the approval is for one product only, a statement should be made on FAA Form 8110-2 under "Limitations and Conditions" to read as follows:

"Descriptive data pertaining to this design change are considered inadequate for duplication in other products. This approval is limited to only the installation made in (Make of product) _____ Model Serial No. _____."

(4) If the STC is to make provisions for equipment installation but does not install the equipment, suitable limitations should be included to prevent completion of the installation without further approval or use of the equipment provisions for other purposes.

g. Date of Application. Include the date of application from FAA Form 8110-12.

h. Date of Issuance. The STC shall **not** be given to the applicant prior to this date.

i. Date Reissued. A STC may be reissued only by the FAA. Add the new date to those already shown every time the STC is reissued. The date reissued is the date when the STC is transferred and reissued to another company or individual. An STC may be reissued to change the owner's name, address, to correct administrative errors, or to replace a lost or destroyed original. Any other changes to the certificate will be considered amendments.

j. Date Amended. Add the amended date to those already shown every time the STC is amended. The date amended is the date when the STC is revised to update the model number, etc.

k. Signature and Title. The STC is signed by the manager of the issuing ACO or a delegated person.

l. Revision Control. If the STC is more than one page, use a revision control system like that used for a TC (reference paragraph 24).

m. Continuation Sheets.

(1) Use FAA Form 8110 -2-1, Supplemental Type Certificate Continuation Sheet, when additional space is needed to describe the design change and/or to include all the limitations and conditions, such as operation limitations, equipment installations, weights, etc. The STC should reference the continuation sheets by a note under the applicable paragraph, e.g., "See continuation sheets 3 through x".

(2) Number all continuation sheets, and indicate the latest effective date of the STC, either the date of issuance or the last date revised. Any data required that would be included on a TCDS for a TC should follow the same format as a TCDS but should be included on the continuation sheets.

n. Transfer of an STC. The procedures for transfer or amendment of an STC are the same as those for a TC (reference paragraph 22f).

o. Duration of an STC.

(1) An STC is effective until surrendered, suspended, or revoked.

(2) The procedures for surrender, suspension, or revocation of an STC are identical to the respective procedures for a TC (reference paragraphs 22g and h).

p. STC Issuance. When a determination is made that the design change complies with the regulations, the project manager will recommend to the ACO manager to issue the STC.

29. RETURN TO SERVICE. An applicant must have FAA Form 337, Major Repair and Alteration (Airframe, Powerplant, Propeller, or Appliance) prepared in duplicate in accordance with 14 CFR part 43 (part 43) or another method approved by the FAA, to return a product to service when an altered product has been tested and approved by the issuance of an STC. (reference AC 43-9)

30. AIRCRAFT CERTIFICATION OFFICE REPORT OF STC.

a. STC Summary. An STC summary is published every 2 years with revisions published every 6 months. The summary includes

only those STC's eligible for multiple installations. The holders of STC's eligible for multiple installations will make the STC design and, if applicable, parts available to other parties. Because of the large number of STC's issued, the descriptive information in the summary must be kept to a minimum.

b. Information Required for the STC Summary The information necessary for the STC Summary is extracted from monthly reports prepared by the ACO. The monthly report may consist of copies of the STC's issued and should be sent to the Manufacturing Standards Section (AFS-613). If the address is not on the face of the STC, it must be supplied. The information extracted is:

(1) Make, model, and original TC number of product;

(2) Name and address of STC holder;

(3) STC number and issuance date; and

(4) A brief description of the design change, limited to one sentence, if possible.

31. CANADIAN SUPPLEMENTAL TYPE APPROVAL (STA).

a. Request for Canadian STA A United States resident and holder of a Unites States STC issued by the FAA may apply for STA under the auspices of the United States/Canada Bilateral Airworthiness Agreement (reference United States/Canada Bilateral Airworthiness Agreement Schedule on Implementation Procedures).

b. Applicability of STA STA can only be issued against an aeronautical product which has either a Canadian Type Approval, an accepted FAA TC or an equivalent approval document which is recognized by Transport Canada.

c. STA Application Procedures

(1) An applicant for an STA will apply through the FAA ACO that has cognizance over the STC. See appendix 5, Item 1 for STA application request format. This is a multi-purpose form for use by United States and Canadian applicants. The STA/STC number and issue date are to be filled in by the granting authority.

(2) The STA application will be forwarded by the cognizant ACO to the Transport Canada Regional Airworthiness Engineer (RAE) (see appendix 5, Item 2 for address list) in the region in Canada where the aeronautical product will be modified. The applicant should identify the address of the location of the aeronautical product, and this information should be forwarded to the RAE.

(3) In the case where an aeronautical product is not being presently modified (e.g., no current Canadian customer for the modification) the application will be forwarded to Transport Canada Headquarters in Ottawa, Canada.

(4) The following documents will normally be required to be submitted with the letter to Transport Canada (see appendix 5, Item 3 for sample letter):

(a) STA application;

(b) Copy of STC;

(c) Compliance checklist--include any special conditions, equivalent safety findings or special policy applied to the STC;

(d) Aircraft flight manual supplement;

(e) Master drawing list;

(f) Manufactu ring and installation instruction drawings;

(g) Instructions for continued airworthiness;

(h) Weight and balance data; and

(i) Maintenance/repair manual supplements, etc.

d. Document Review. After Transport Canada reviews the documents, it may request additional reports and documents or request a familiarization meeting with the applicant to assist in processing the STA application. Transport Canada may also require special conditions, additional airworthiness requirements or conduct familiarization flights of the modified aircraft. If this occurs, the cognizant ACO should cooperate fully with Transport Canada and provide all documents and assistance consistent with the United States/Canada Bilateral Airworthiness Agreement as discussed in the Schedule of Implementation Procedures.

e. Issuance of STA. After satisfactory completion of the familiarization by Transport Canada an STA will be issued to the applicant. The STA will be forwarded by Transport Canada to the cognizant ACO which in turn will forward the original to the applicant.

CHAPTER 5. MANUFACTURING AND ENGINEERING RESPONSIBILITIES AND FUNCTIONS RELATIVE TO INSPECTION AND TEST

32. FAA AVIATION SAFETY INSPECTORS (MANUFACTURING INSPECTORS).

a. General. This chapter provides procedures and methods that should be followed by manufacturing inspectors. The applicant is responsible for conducting 100 percent satisfactory conformity to his proposed type design data. The manufacturing inspector is responsible for conducting inspections to determine the applicant's compliance to § 21.33(b) and that products (e.g. aircraft, engines, propellers, or components thereof) conform to the approved design drawings and specifications. Additionally, the manufacturing inspector is responsible for coordinating tests and evaluations when requested by the responsible ACO.

b. Functions and Responsibilities The manufacturing inspector should be alert for any detail design feature which does not appear to comply with the pertinent regulation. Particular attention should be given to fits, tolerances, clearance, interference, ventilation, drainage, compatibility with other installations, servicing, and maintenance. Although the final design responsibility is vested in the appropriate ACO, the manufacturing inspector determines that the applicant has satisfactorily established that the final product configuration conforms to the type design and is in a condition for safe operation including, as applicable, issuance of an airworthiness approval. Accordingly, coordination with the ACO project engineer concerning questionable design features and airworthiness considerations should be accomplished in an expeditious manner. When the manufacturing inspector is requested to witness conformity inspections, necessary instructions in accordance with procedures set forth in this chapter should be provided by the cognizant ACO.

c. Designees. Under the provisions of part 183, subpart A, qualified FAA designees may be authorized to act on behalf of the Administrator in performing duties and responsibilities of the manufacturing inspector as provided in part 183, subpart C. For the purpose herein, designees acting on behalf of the manufacturing inspector in performing type/supplemental type certification inspections, should follow the reporting and inspection procedures of the current guidance material (reference FAA Order 8130.2B, FAA Order 8000.62, and AC 183.33B) and be under the supervision of the assigned FAA Principal Inspector.

33. REQUEST FOR CONFORMITY AND TYPE INSPECTION AUTHORIZATION

a. General. FAA Form 8120-10, Request for Conformity, (reference Appendix 4 Exhibit 4-1 for completion instructions) and/or FAA Form 8110-1, Type Inspection Authorization, (reference

Appendix 4 Exhibit 4-2 for completion instructions) are internal FAA documents which are used by the ACO to request conformity inspections. FAA Form 8120-10, Request For Conformity, should be used as an interim request prior to the issuance of a TIA. The manufacturing inspector should not conduct a conformity inspection without receiving proper documentation. A copy of the applicants purchase order or letter from the ACO without FAA Form 8120-10 is not acceptable.

b. Statement of Conformity Submittal.

(1) Applicants should be encouraged at type certification meetings to submit FAA Form 8130-9, Statement of Conformity, as early as possible in the program to prevent delays in the type certification approval process. Except for inprocess evaluations, such as process review, hidden inspections, etc, a Statement of Conformity should be submitted to the FAA prior to the start of conformity inspections.

(2) The applicant or an authorized individual should sign the Statement of Conformity.

(3) In cases where the conformity inspection is conducted away from the applicant's manufacturing facility, the applicant may choose to utilize one of the following procedures for signing the Statement of Conformity.

(a) Procedure #1. The a pplicant may send an authorized representative to the manufacturers facility to inspect the prototype article and sign the Statement of Conformity; or

(b) Procedure #2. The applicant may delegate, in writing, a representative of the supplier to act as her/his agent. In this case, a copy of the authorization letter will be attached to FAA Form 8130-9 when it is submitted.

c. Conformity Determination

(1) Conformity determination may vary depending upon circumstances. An applicant's policies, quality control procedures, experience, inspection personnel, equipment, and facilities will dictate the extent of conformity inspections to be conducted or witnessed by the manufacturing inspector. Due to those differences between applicants, the conformity program should be adjusted to fit existing conditions. For example:

(a) In the case of an inexperienced applicant whose ability is unknown, it maybe necessary to conduct a high percentage of conformity inspections until such time as the manufacturing inspector has confidence that they can safely rely to a greater degree upon the company inspectors. The

manufacturing inspector may then gradually reduce her/his own inspection witnessing accordingly. However, applicants who have previously demonstrated the acceptability of their quality control system and subject the prototype to these controls, should benefit by greater FAA confidence. In such cases, conformity determination may be reduced by a form of sampling inspection of products and records by the manufacturing inspector. If sampling procedures are used, they should be based on nationally recognized standards which establish a confidence level of 90 percent or greater. A complete description of the procedure used should be part of the FAA files.

(b) Some applicants direct experimental and prototype parts through inspection channels which are distinct from the normal quality control system for production articles. In such cases, the applicant should provide the manufacturing inspector with detailed information on this inspection system, how it will provide assurance for conformity, and documentation of design changes for maintaining configuration control. This type of information is essential so the manufacturing inspector may develop the necessary conformity verification program.

(c) Another factor which determines the degree of inspection and evaluation by the manufacturing inspector is the complexity of the product and its effect on air safety. This takes into consideration, for example, product designs using relatively new materials or methods of construction, manufacturing technologies, and destructive and nondestructive inspection techniques. In these cases, there may not be well-established or industry-wide recognized standards for assuring process and quality control. Consequently, the FAA conformity verification program should be adjusted accordingly.

(2) Based upon the aforementioned circumstances, the manufacturing inspector should develop, in coordination with the applicant, an appropriate conformity verification plan. The plan should focus on:

(a) Verifying the conformity of the critical and major characteristics of materials, parts, and assemblies;

(b) Evaluating process controls to assure production of consistent and uniform products. Statistical quality control methods may be utilized for process evaluation. Records of such activity and complete descriptions of such statistical methods should become part of the FAA file; and

(c) Observing tests of importa nt functional parameters of systems, modules, components and completed products.

d. Areas of Consideration Regardless of the applicant's experience, the manufacturing inspector is responsible for determining that a complete conformity inspection has been performed by the applicant and that the results of that inspection are properly recorded and reported on FAA Form 8130-9, Statement of Conformity. In witnessing conformity inspections, the manufacturing inspector should consider the following:

(1) Materials;

(a) Were raw materials used in the fabrication process in conformity with the design data?

(b) Is evidence available to assure that chemical and/or physical properties were identified and checked as appropriate?

(c) Is there documented evidence to show traceability from the raw material to the prototype part?

(d) Are there any part or process deviations recorded against the submitted design data (including material review dispositions)?

(2) Processes and Processing;

(a) Is there a process specification for each special process?

(b) Has the process specification been submitted for FAA engineering review?

(c) Does a check of the articles processed indicate that the process will produce consistent parts during production in accordance with the type design? Is there statistical or other evidence to indicate this?

(d) Is the process being operated in accordance with the process specification? Are any deviations recorded?

(3) Critical and Major Characteristic s;

(a) Has the applicant identified and inspected all of the critical and major characteristics?

(b) Does the applicant have a record of these

(c) Does witnessing the reinspection and surveillance indicate that the above inspections were accurate and adequate?

(d) Are there any deviations recorded against the submitted design data (including material review disposition)?

(4) Workmanship;

(a) Does the workmanship contribute to the quality of the product?

(b) Could the workmanship be duplicated under production conditions?

(c) Have criteria been established to identify workmanship practices?

(5) Adequacy of Drawings and Related Change Records;

(a) Can the part be produced and inspected using the information on the drawing?

(b) Are drawing tolerances practicable and attainable under production conditions? What evidence supports this?

(c) Have all of the changes been incorporated into the drawing submitted for FAA approval (including one-time only deviations in the prototype article submitted for FAA testing)?

(d) What procedure is used to ensure the incorporation of an engineering change in the production part, and on the drawing?

(e) Did the drawing include all of the characteristics necessary to inspect the part, the material to be used, the treatment of the material such as hardness, finish, and any special process specifications?

(f) Did the drawing include applicable test specifications? Were these test specifications reviewed by the ACO project engineer?

(6) Adequacy of Inspection Records;

(a) Do the inspection records show all inspections that are conducted?

(b) Do they show who conducted the inspection?

(c) Do they indicate the results of the inspection and disposition of unsatisfactory conditions?

(d) Are procedures adequate to ensure reinspection of any parts that are reworked or replaced? (This includes inspection of installation of new parts as well as inspection of the parts.)

(7) Material Review Ac tion;

(a) Is the material review procedure documented and adequate to ensure disposition for nonconformities?

(b) Is there adequate corrective action for observed nonconformities to prevent reoccurrence?

(c) Have "use as is" or "repair" dispositions for nonconformances been submitted to FAA engineering for review, and have they been incorporated in the type design (one-time only engineering orders)?

(8) Previously Produced Parts; and

(a) If the design specifies parts of previously type-certificated products and such parts are taken from production stock, were precautions taken to determine whether such parts may have been subjected to material review action? Nonconforming parts should not be used unless it can be shown that they will have no adverse effects or they are reinspected to record all deviations for FAA engineering evaluations.

(b) Have the previously accepted deviations been made a part of the current design data submitted? Are they listed by the applicant on FAA Form 8130-9, Statement of Conformity?

(9) Software.

(a) Are all software products (version description document, source code, object code, documentation, test procedures, loaded hardware/firmware, etc.) properly identified, including revision levels, when compared to the hardware and software engineering drawings?

(b) Have all software problem reports been properly dispositioned?

(c) Do the records indicate that all software products, including support software, and procedures have been placed under configuration control?

(d) Have the verification and acceptance tests been successfully executed, to approved test procedures, and recorded?

(e) Are there records which indicate that the object code was compiled from released source code by approved procedures?

(f) Do records indicate technical acceptance of the software, prior to loading into the system or product?

(g) Does the product load correctly with released object code to released procedures?

(h) Is the load verified per applicab le procedures, e.g. checksums, cycle redundancy checks, load maps?

(i) Does the software successfully execute the initialization procedure?

(j) Are there any indications of non-compliance with the manufacturer's procedures?

e. Conformity Discrepancies If the manufacturing inspector finds discrepancies, he/she may be justified in requesting a complete reinspection by the applicant. It is not intended nor recommended that the manufacturing inspector personally conduct a complete conformity inspection of each part they record on FAA Form 8100-1, Conformity Inspection Record. They should, however, witness the applicant's inspection of critical characteristics previously identified. Inspection of large assemblies and subassemblies may be witnessed on a progressive basis to ensure that inspection of critical areas are witnessed by the manufacturing inspector, prior to final assembly.

34. PROCESSES.

a. General. Design regulations require fabrication methods that will consistently produce conforming parts and that all methods requiring close control to attain this objective must be covered by approved process specifications. All such process specifications should be identified on the related drawings and thoroughly evaluated by the manufacturing inspector and ACO project engineer.

b. Method of Presenting Information. Process specifications should present information in an orderly and complete manner. The following outline can be used as a guide for checking the content of a typical process specification:

(1) Scope;

(2) Applicable documents;

(3) Quality requirements;

(4) Materials used in the process;

(5) Manufacturing; and

(a) Manufacturing operation

(b) Manufacturing controls

(c) Test specimen (construction)

(d) Tooling qualifications

(e) Tooling control

(6) Inspection.

(a) Process inspection

(b) Inspection records

(c) Inspection test

(d) Inspection controls

NOTE: The data submitted in any process for approval should not contain terms which are subject to various degrees of interpretation such as, adequate, as necessary, as required, room temperature, periodically, etc. Also any tolerances that are required to control the process, should be clearly defined.

c. Operations Within Processes Since the usage of process specifications varies greatly in the industry, the manufacturing inspector should note those operations within processes which will require surveillance during conformity checks. The process controls that are used to ensure that the quality of the articles being produced is within the type design limits should be evaluated. Any deviations in these areas should be approved before they are used in processing articles.

d. Evaluation of Processes In evaluating processes, the manufacturing inspector is primarily concerned with performance and conformity. Process performance should be capable of consistently producing articles that meet the requirements as specified in the type design.

(1) Process conformity is determined by checking the articles being processed to determine that they are being processed in accordance with the process specification and that the materials, tools, and equipment called for therein are being utilized. Since the end results depend on strict adherence to

the process instructions, any deviation or discrepancy should be corrected on the initial runs. Use of statistical data is recommended to determine process capability.

(2) Product conformity is determined by inspecting the processed articles. A determination should be made by the applicant that the process operations are capable of consistently producing articles in conformity with the design requirements. The method used in determining this fact should be measurable and required by the process specification.

e. Process Submittal

(1) Applicants should be encouraged, at type certification meetings, to develop and submit their process specifications for approval early in the program. They should also be reminded that the TC cannot be issued until all processes are reviewed.

(2) Process specifications, called for in the type design data, may be submitted on a separate listing for approval by the appropriate engineering section.

(3) Major changes, amendments, etc., to the process should be carefully evaluated by the ACO project engineer and the manufacturing inspector to determine what effect they will have on the quality of the end products before they are approved. In some cases, this may require a reinspection of the operations depending upon the extent of the changes.

f. Process Phase Evaluation The manufacturing inspector in connection with the FAA Engineer can recommend approval or rejection of the process after the five phases that follow have been completed.

(1) Phase I. The manufacturing inspector should evaluate the basic information of the process. It is important to see that the process information is presented in an orderly and complete manner. Otherwise, it may lead to misinterpretation and confusion, thereby causing the quality of the end articles to vary outside of the type design limits.

(2) Phase II. The manufacturing inspector should review the actual process and the process specification for the variables which must be controlled to ensure a conforming and consistent product. Variables may exist in many of the factors which affect the product quality such as: raw materials used to fabricate the end item, equipment used to fabricate the part, production facilities and environment, inspection and test equipment, and production operators.

(3) Phase III. The manufacturing inspector should verify that the process specification identifies the necessary controls over the variables. These controls should establish the unit of measure and acceptance limits, a description of the measurement techniques, and action to be taken when the actual measurement does not meet acceptance standards.

(4) Phase IV. The manufacturing inspector should verify that the articles being processed are in fact being processed in accordance with the process specification and that the material, methods, tools, and equipment called for therein are being utilized. Since the end results depend on strict adherence to the process instructions, any deviation or discrepancy should be corrected on the initial runs.

(5) Phase V. Since the inspection of the processed articles is the main point of any process evaluation, the manufacturing inspector should make a determination that the process operations are capable of consistently producing articles in conformity with the type design requirements. The method used in determining this fact should be the method as called for in the quality plan; therefore, if the process is followed all parts produced should be of equal quality.

g. Nondestructive Inspection Method Evaluation. The procedure for evaluating a nondestructive inspection (NDI) method is similar to the above. However, the applicant should demonstrate to the manufacturing inspector's satisfaction that the NDI method used has the capability to detect the allowable defect size and location specified by the engineering drawing, that the inspection results are repeatable, and that instruments required to perform the inspection meet the procedural acceptability requirements.

35. TEST ARTICLES - GENERAL Prior to initiating conformity inspection activity for test articles, it is essential that the applicant, the ACO project engineer, and the manufacturing inspector have a clear understanding as to the test article configuration, test equipment configuration and expected results. This information should be submitted by the applicant to the ACO in test proposal reports. An FAA Form 8120-10, Request for Conformity Inspection, may be issued by the cognizant ACO referencing these reports. The TIA should reference the final test flight article configuration.

36. WITNESSING OFFICIAL TEST. Official FAA tests, such as static, endurance, operational, pressure, environmental etc., may be witnessed by a manufacturing inspector as requested by the ACO project engineer. Test requirements may be included in the FAA Form 8110-1, Type Inspection Authorization, or in the FAA Form 8110-10, Request for Conformity. In all cases, the ACO project engineer should provide the manufacturing inspector with the

appropriate instructions and a reference to the applicant's test proposal report. The manufacturing inspector should not witness any test without prior coordination with the ACO project engineer. When witnessing official tests as delegated by the ACO project engineer, the manufacturing inspector should determine that the instructions and test schedule described in the applicant's test proposal report are followed and submit a memorandum report to the ACO describing the test results. A copy of the applicant's test log or report should accompany the manufacturing inspector's memorandum report.

37. STRUCTURAL TEST ARTICLES - AIRCRAFT

a. Conformity Determination Determining conformity of structural test articles is an essential phase of the type certification program. In witnessing these inspections, the manufacturing inspector should detect and report any nonconformities. All nonconformity conditions should be recorded on FAA Form 8100-1, Conformity Inspection Report.

b. Conformity Inspection Part 21, subpart B requires the applicant to allow the manufacturing inspector to perform conformity inspections on structural test articles during fabrication and assembly, and that a FAA Form 8130-9, Statement of Conformity, be submitted to the FAA prior to testing. Additionally, subpart B requires that the final design submitted for FAA approval must reflect all changes which have been found necessary as a result of the test and that the configuration control system assures that all changes are incorporated into the production drawings. Only in this manner can the FAA be certain that subsequent production articles conform to the tested articles.

c. Nonconformities. It is strongly recommended, due to the different effects of nonconformities on structural test articles versus flight articles, that parts and assemblies destined for official structural testing should be clearly identified. This should be necessary only in those cases where structural test articles are being fabricated concurrently with prototype flight articles. It is important that, once parts and assemblies have been subjected to structural testing beyond limit load testing, they be clearly and permanently identified to prevent their use in production products.

38. PROTOTYPE FLIGHT TEST ARTICLES - AIRCRAFT Determining conformity of prototype flight test articles, including system checks, should begin during fabrication. It is important that flight test articles conform to the data specified in the TIA and the applicant's statement of conformity. Section 21.33 requires that the FAA Form 8130-9, Statement of Conformity, must be submitted to the FAA before prototype flight articles are released for FAA flight test. Any nonconformities described

under deviations should be brought to the attention of the ACO project engineer for evaluation and decision as to their effect on safety and the validity of the test under consideration.

39. ENDURANCE TEST ARTICLES - ENGINES AND PROPELLERS

a. Conformity Determination As in the case of aircraft, determining the conformity status of test engines and propellers is likewise an important phase of the type certification program. Normally, only parts subject to distortion, fatigue, and wear are inspected for conformity and witnessed by the manufacturing inspector prior to and after the endurance test. Prior to the endurance test, the manufacturing inspector should coordinate with the ACO project engineer to identify the parts subject to inspection. The manufacturing inspector should note the condition of all surfaces subject to distortion, fatigue, and wear and the actual dimensions recorded. In addition, these and other critical parts should be serialized or otherwise positively identified for pretest and post-test comparison. Part 21, subpart B require that FAA Form 8130-9, Statement of Conformity, be submitted prior to the start of FAA test.

b. Conformity Inspection At the conclusion of the endurance test and teardown inspection, the manufacturing inspector should spot check conformity of major and critical parts by witnessing the applicant's inspection, giving particular attention to critical characteristics.

40. TEARDOWN INSPECTION. Teardown inspection of test articles after structural testing may be required. Teardown inspection of test articles after endurance testing is a specific requirement of parts 33 and 35. These activities should be witnessed by the manufacturing inspector and the ACO project engineer. The applicant should not clean or disassemble the test article until the authorized manufacturing inspector is present, at which time the applicant's inspection should be conducted as follows:

a. Step 1 - The manufacturing inspector should verify that the applicant carefully notes the appearance of subassemblies during the teardown and before complete disassembly. The applicant should specifically note any abnormal leakage in valves, seal, fittings, etc.; indication of excessive or lack of lubrication; excessive coking; metal or foreign particles in the oil screens or passages; sticking or breakage of parts; lack of freedom of moving parts; breakaway torques; and any other condition which may not be noticeable after complete disassembly and cleaning.

b. Step 2 - The manufacturing inspector should verify that all parts are thoroughly cleaned and visually inspected for indications of galling, metallic pickup, corrosion, distortion, interference between moving parts, and cracks. Highly-finished

surfaces should be checked for condition and discoloration due to excessive heat and lack of lubrication. Special attention should be given to bearings, gears, and seals. Engine pistons, cylinder heads, and turbine assemblies should be carefully inspected for indications of cracking or burning.

c. Step 3 - The manufacturing inspector should verify that both ferrous and nonferrous stressed parts are inspected for incipient failures by suitable nondestructive testing methods such as magnetic particle inspection, x-ray, penetrant, ultrasonics, etc., in accordance with the test plan.

d. Step 4 - The manufacturing inspector should verify that all parts subject to wear or distortion are dimensionally inspected to determine the extent of change during the test. This may be done by pretest and post-test dimensional comparisons. The results should be suitably recorded by the applicant.

e. Step 5 - Upon completion of steps (1) through (4), the applicants inspection report, as verified by the manufacturing inspector, should be submitted to the ACO project engineer as an attachment to FAA Form 8100-1. This report should contain the results of the inspection, giving a comprehensive description of all defects, failures, wear or other unsatisfactory conditions including photographs as required. Since the report is used for ACO evaluation, its importance cannot be overemphasized.

f. Step 6 - The manufacturing inspector should also ensure that questionable parts are identified and retained by the applicant in safe storage for review by FAA engineering.

41. USE OF ENGINEERING DATA Applicants should be encouraged to submit, for conformity inspection purposes only, those drawings that may readily be expanded into final production drawings. However, when a product is undergoing development, it is realized that this may not always be practical and it may be necessary to inspect engineering layouts or even sketches. In such cases, the applicant should be advised that it may be necessary to conduct a complete conformity inspection on the first production article using not only approved production drawings, but also original sketches and layouts prior to TC or STC approval. As an alternative, if the applicant can show that he/she has a system whereby the original sketches and layouts are incorporated into the production drawings, then this double conformity inspection would not be required prior to type design approval. The manufacturing inspector may require additional validation when products are submitted for airworthiness certification or approval to ensure that they are representative of the test articles.

NOTE: Where a DER may be involved, it should be accepted practice to conduct conformity inspections utilizing DER approved drawings. A copy of FAA Form 8110-3 submitted by the DER to the ACO project engineer, listing drawings approved by the DER, can be accepted as having engineering approval if the DER has been properly authorized. A program may also be created to allow DER's to issue request for conformity inspections and to disposition nonconforming hardware recorded on FAA Form 8100-1. This system should be documented and agreed upon by the FAA and applicant prior to the start of the initial type certification board meetings.

42. GROUND INSPECTION--AIRCRAFT

a. Purpose. The basic purpose of the ground inspection is to physically determine that the aircraft submitted for FAA flight test meets the minimum requirements for quality, conforms with the technical data, and that it is safe for the flight tests intended. The results are recorded together with any other data requested by FAA engineering and flight test personnel.

b. Phases. The ground inspection is normally a progressive inspection performed in three phases, depending upon the complexity of the project.

(1) Phase I. Preliminary Ground Inspection--i ncludes all inspections of the prototype that can be performed satisfactorily during the course of development and construction. Arrangements should be made with the applicant to promptly notify the manufacturing inspector whenever changes are made to components, systems, or installations previously cleared through the manufacturing inspector. The manufacturing inspector should then witness such reinspection as is necessary. When reinspection creates undue duplication of effort due to numerous development changes, it may be deferred to Phase II if practicable. Part 21, subpart B requires that an FAA Form 8130-9, final Statement of Conformity will be obtained from the applicant prior to test.

(2) Phase II. Official Ground Inspection--is the final inspection of the complete prototype and should be performed just prior to FAA flight test. Detailed procedures for conducting inspections and test for both phases should be worked out as far in advance as possible. They should also be coordinated with the applicant to preclude unnecessary delays and duplication of effort and to assure that all required inspections and tests are properly accomplished. Upon notification from the applicant that the aircraft is ready for inspection, FAA Form 8130-9, Statement of Conformity, should be obtained from the applicant. This is

the applicants notification and commitment that the aircraft is ready for FAA inspection and flight test.

(a) To give FAA flight test personnel sufficient time to prepare for the flight test program, they should be notified by the manufacturing inspector when the Official Ground Inspection, Phase II is to be started.

(b) The applicant should prepare the aircraft for inspection, providing all necessary assistance, equipment, and data essential for the inspection. The applicant should perform no work on the aircraft after completion of the Phase II inspection without concurrence from the manufacturing inspector.

> **NOTE**: FAA personnel or designees are not authorized to perform any mechanical work on the aircraft.

(c) The manufacturing inspector can witness the inspection using the TIR (pertinent FAA Form 8110), as a guide, the Federal Aviation Regulations or Civil Aviation Regulations as a basic reference, and follow the applicable TIA instructions. If unsatisfactory conditions are revealed, they should be referenced to and discussed with the applicant's representatives. The manufacturing inspector should exert every reasonable effort to promote communication and coordination of the activity with the applicant and the ACO. The manufacturing inspector should witness all ground operable systems as required by the TIA. Actual operation of the particular system should only be accomplished by applicant personnel. The manufacturing inspector should also witness the weighing of the aircraft and verify scale accuracy as required by the TIA. Equipment installed, including test equipment, should be verified during each flight test to determine flight loadings. The weight and balance report, showing the actual empty weight center of gravity together with the list of equipment installed, should be verified and a copy retained by the manufacturing inspector and flight test engineer.

> **NOTE**: During this phase, it may be necessary to verify weights and moment arms of equipment items.

(d) Almost invariably there will be inspection items left over which cannot be determined at this time, such as instrument markings, placards, unusable fuel, etc. These inspections can be completed during Phase III when an opportunity arises and prior to type certification.

(3) Phase III. (Coordinated Ground-flight Inspection)

(a) When the aircraft has been returned to flight status after completion of Phase II, it is the manufacturing

inspector's responsibility to assure that the aircraft is airworthy and ready for flight testing. This includes a determination that all unsatisfactory items requiring correction prior to FAA flight test are corrected. All nonconformities should be coordinated with the ACO project engineer prior to releasing the aircraft to FAA flight test. It is important that the assigned manufacturing inspector be knowledgeable of the TIA requirements and the operation of the aircraft and its systems to ensure the safe completion of the TIA mandated flight test. The MIDO manager is responsible for determining that the manufacturing inspector has the appropriate knowledge, experience, skills and proficiency to assess the condition of the aircraft before flight testing. The initial acceptance of the test aircraft for FAA flight testing should be made by the manufacturing inspector based upon the determination of the aircraft condition for safe operation and the testing to be conducted. The manufacturing inspector and the flight test pilot should establish a mutually agreeable system for informing the ACO project engineer of daily changes to the aircraft and any problems encountered during flight test. Cooperation between the assigned manufacturing inspector and flight test pilot is crucial to the safe and professional completion of the flight testing. The FAA flight test pilot should not fly a test aircraft without coordinating with the assigned manufacturing inspector or the ACO project engineer, as previously approved by the manufacturing inspector, to assure that the aircraft is released for flight. This should not be construed to prohibit multiple flights so long as the assigned manufacturing inspector has reviewed all of the planned aircraft configurations for the desired test, conducted any necessary inspections, and has coordinated this information with the FAA flight test pilot. The final acceptance of the test aircraft for flight is made by the FAA flight test pilot, as it relates to the operation of the aircraft and the integrity of the test. In this phase, coordination with the FAA flight test specialist is emphasized.

(b) Instrumentation-Instruments, gauges, recording devices, etc., which are used in official flight test should be in current calibration by a qualified agency and affidavits furnished. Copies of the affidavits should be given to the flight test pilot prior to flight. In addition, it is the manufacturing inspector's responsibility to determine that the foregoing equipment is properly installed and safe for operation. Additional functional test may be required after installation.

(c) Flight Loadings--The manufacturing inspector should determine the various loading conditions specified by the flight test specialist are carried out by the applicant. This includes a determination that the ballast used is accurately weighed, located, and safely secured.

(d) Periodic Safety Checks--Throughout the FAA flight test program, the manufacturing inspector should determine that the applicant has a plan to ensure that the aircraft is given adequate inspection to reveal any unsafe conditions that may develop and to require their correction prior to further FAA flight test participation. The frequency and extent of such checks should be coordinated with the manufacturing inspector who should participate in the checks whenever practicable to determine compliance. The manufacturing inspector and flight test specialist should have a system of informing each other of daily changes to the airplane and problems encountered during flight test.

43. AIRWORTHINESS CERTIFICATION OF PROTOTYPE PRODUCTS

a. General. When a potential type certification project becomes known, the manufacturing inspector should determine whether the applicant will eventually seek an airworthiness certificate for the prototype product. If so, the applicant should provide for FAA conformity inspection at the start of parts fabrication. The applicant should also be informed that part 21, subpart B requires all changes found necessary as a result of the test program must be incorporated in the prototype, and complete conformity with the type design will be required.

> **CAUTION**: If this is not done progressively, extensive disassembly, modification, and inspection may be necessary prior to airworthiness approval.

b. Aircraft. The airworthiness certification of an aircraft should be processed in accordance with part 21 and Order 8130.2B. In addition, the manufacturing inspector should assure that the prototype satisfactorily incorporates all required changes and that an FAA Form 8130-9, final Statement of Conformity, is obtained. When applicable, the manufacturing inspector should also review the final Type Certification Board Report to determine that all outstanding items recorded therein have been resolved. Airworthiness approval of prototype engines and propellers should be handled in a similar manner in that an FAA Form 8130-9, final Statement of Conformity, should be required for each product prior to test.

c. Engines and Propellers Engines or propellers that are not yet type certificated and are supplied for use on experimental aircraft may need to be modified to conform to their approved type design and to be properly identified in accordance with 14 CFR part 45 (part 45). Under these circumstances, the manufacturing inspector at the engine or propeller manufacturer's plant should be fully aware of the approval status of the engines or propellers originally supplied as well as the modifications necessary to bring them up to fully approved status. If the work

is to be performed at the aircraft manufacturer's plant, a list of these modifications (with copies to the FAA offices concerned) should be furnished directly to the manufacturing inspector responsible for certificating the aircraft. The modification list should bear a statement signed by the manufacturer at the source, certifying that the engine or propeller originally supplied was modified in accordance with the manufacturer's instructions, has been satisfactorily inspected, and conforms to the type design. In addition, any replacement or newly-designed parts furnished to the aircraft manufacturer should be accompanied by Airworthiness Approval Tags, FAA Form 8130-3. The modification work should be performed by or under the personal supervision of a representative of the engine or propeller manufacturer.

44. ACCOUNTING FOR ENGINEERING CHANGES The applicant should establish a procedure to inform the manufacturing inspector of all changes that are made to parts, assemblies or complete products during the type certification program. This is especially important once such items have received manufacturing inspector inspection clearance so that the manufacturing inspector should have the opportunity to witness conformity of the changes as necessary. When changes to previously inspected items are checked for conformity, they should be reported on an FAA Form 8100-1, Conformity Inspection Record. When checked in connection with a ground inspection, the results should be reported on the TIR if it is affected. For example, if the previously inspected TIR items were originally found to be unsatisfactory and change renders them satisfactory, that fact should be reported. Conversely, if the previously inspected TIR items were originally found satisfactory and the change appears to make them unsatisfactory, that likewise should be reported together with a suitable explanation of the condition. In addition, the manufacturing inspector should determine that satisfactory procedures are in effect for assuring that all changes required in the test and prototype articles are incorporated into production drawings.

45. FUNCTION AND RELIABILITY TESTING

a. Responsibility. Function and reliability testing is the responsibility of all elements of the Aircraft Certification Directorate. Each branch has a responsibility in the determination of the airworthiness of aircraft under test.

b. Monitoring and Evaluation The manufacturing inspector is responsible for monitoring the functioning of all cabin installations, and the evaluation of maintenance and refueling at each stop. The manufacturing inspector should:

(1) Conduct a check of critical parts and components so far as possible at each landing;

(2) Ensure the accuracy of the weight and balance, and the loading schedule;

(3) Determine that the product being tested conforms to the approved data;

(4) Perform other duties and inspections assigned by the Type Certification Board;

(5) Maintain a record of all demonstrations witnessed and all inspections conducted. In addition, the manufacturing inspector should obtain records from the applicant of all maintenance performed;

(6) Report all information obtained during function and reliability testing on the pertinent FAA Form 8110, TIR, and furnish a copy to the FAA flight test engineer for inclusion in the consolidated report of the test; and

(7) Advise the FAA flight test pilot/specialist or the alternate of any special inspections or observations that are to be made.

46. INSPECTIONS TO BE CONDUCTED OUTSIDE THE CERTIFICATION DIRECTORATE OR DISTRICT OFFICE. When the conformity inspection is to be conducted outside the certificating directorate, FAA Form 8120-10, Request for Conformity (with all pertinent information) should be forwarded by the Manufacturing Inspection Office to the MIDO being requested to conduct the conformity. After the conformity request has been forwarded, direct contact between the ACO project engineer and the manufacturing inspector may expedite the resolution of questionable items. The FAA Form 8100-1, Conformity Inspection Record, should be used to record the inspections and then forwarded to the Manufacturing Inspection Office of the certificating directorate. FAA Form 8130-3, Export and/or Conformity Certification Form, should be attached to the prototype parts showing the part number, the drawing change to which it was inspected, and the serial number or other identifications. Conformity requests may be coordinated directly between district offices within the certificating region.

47. CONFORMITY INSPECTION RECORD REPORTING

a. General. All conformity inspections conducted or tests witnessed by the manufacturing inspector should be reported on FAA Form 8100-1, Conformity Inspection Record, and include all discrepancies, nonconformities and corrective actions. This form can be computer generated from the Manufacturing Inspection Management Information System.

NOTE: When nonconformities or discrepancies are found to exist, a copy of the applicable documents should be forwarded to the ACO project engineer in accordance with previously agreed upon procedures for disposition. All documentation should be coordinated through the responsible MIDO for retention in the MIDO project file, for recording of ACO disposition and subsequent corrective action.

b. Notification. Where expeditious action is necessary to conclude the project, the Manufacturing Inspection Office should be notified verbally by the manufacturing inspector that a satisfactory inspection has been accomplished. The date of the verbal notification should be entered on the FAA Form 8100-1, FAA Conformity Inspection Record.

c. Disposition. The manufacturing inspector should receive a report stating the disposition of, or corrective action required on each irregularity reported on an FAA Form 8100-1.

d. Determination. The Manufacturing Inspection Office should determine that all unsatisfactory or nonconformity items reported have been satisfactorily resolved prior to coordination on the final approval document.

48. TYPE INSPECTION REPORT.

a. General. The FAA Form 8110, Type Inspection Report series is utilized in conjunction with the FAA Form 8110-1, Type Inspection Authorization. The TIR provides a means for the manufacturing inspector to report the results of the Ground Inspection, which is part one of the TIA. Part two of the TIA should be completed by FAA Flight Test.

b. TIR Packages. The TIR is a complete package which should be utilized during certification of aircraft, engines and propellers. A list of TIR packages follows:

(1) FAA Form 8110-4, Rotorcraft Ground Inspection.

(2) FAA Form 8110-5, Airplane Ground Inspection.

(3) FAA Form 8110-6, Engine Ground Inspection.

(4) FAA Form 8110-7, Prop eller Ground Inspection.

(5) FAA Form 8110-8, Balloon Ground Inspection.

c. Responsibility. The manufacturing inspector should complete Part 1 of the applicable TIR after completion of the ground inspection.

49. COMPLETION OF THE TIR Each TIR package has pertinent instructions for completing the report. To ensure a detailed, comprehensive report the manufacturing inspector should, in addition to the instructions of the TIR package, complete the following:

a. Conformity Inspections Report The manufacturing inspector should initiate an FAA Form 8100-1, Conformity Inspection Report, listing each inspection. Unsatisfactory items listed on Form 8100-1 should be resolved between the manufacturing inspector, the responsible ACO and the applicant prior to the completion of the TIR. All corrective actions should be listed on FAA Form 8100-1 and it should become a part of the TIR as an attachment;

b. Statement of Conformity. FAA Form 8130-9, Statement of Conformity, should be attached to the TIR, with the TIA project number recorded in the top margin;

c. Request For Conformity Inspection. FAA Form 8120-10, Request For Conformity, that were issued prior to the TIA should become a part of the TIR along with the reporting data for the request, i.e., FAA Form 8100-1, 8130-9, etc. In the event a Conformity Inspection Request is issued after the TIA for the same project, it should also become an attachment to the TIR as "other inspections deemed necessary";

d. All Applicable Pages. The TIR package should be filled out as required, and submitted;

e. "Prepared By" Block. If more than one manufacturing inspector is involved in the completion of the TIR, the manufacturing inspector other than the inspector that signs the "prepared by" block should initial adjacent to his response in the body of the TIR; and

f. Original FAA Forms 8100-1, Conformity Inspection Report, and 8130-9, Statement of Conformity should be attached to the TIR. All other supporting data may be copies, i.e., weight and balance report, etc.

50. SUPPLEMENTAL TYPE INSPECTION REPORT FAA Form 8110-26, Supplemental Type Inspection Report, provides a means for the manufacturing inspector to record the results of inspections and tests conducted on modified products presented for supplemental type certification. This report should be completed in the same manner as the TIR.

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CHAPTER 6. ADDITIONAL INFORMATION ON SELECTED TOPICS

51. RESTRICTED CATEGORY AIRCRAFT

a. General. Restricted category aircraft are certificated by the FAA in order to conduct certain special purpose operations defined by the FAA. Sections 21.25(a)(1) and (2) provide for the issuance of TC's in the restricted category for civil aircraft and for surplus military aircraft respectively.

(1) Section 21.25(a)(1) addresses civil aircraft that meet the airworthiness requirements of an aircraft category except those requirements found inappropriate for the particular special purpose operation for which the aircraft is to be used. The type certification and production certification procedures for these aircraft are the same as those for other types of civil aircraft. FAA approval of these aircraft is based on compliance with the applicable airworthiness standards.

(2) Section 21.25(a)(2) addresses surplus military aircraft modified for a special purpose operation, that were manufactured in accordance with the requirements of and accepted for use by an Armed Force of the United States. Both functions are required to ensure that individual aircraft were designed to military design requirements and also are in conformity with the accepted configuration. These aircraft may be manufactured either in the United States or in a foreign country. Type certification of surplus military aircraft is primarily based on military records and service history.

(3) The aircraft may be manufactured for the restricted category, may be aircraft that have been type certificated in another category and altered for a special purpose operation, or may be a surplus military aircraft altered for a special purpose operation. Surplus military cargo aircraft may not need an alteration when the special purpose is the carriage of cargo.

(4) Because these aircraft have not been shown to meet standard category airworthiness standards, they have numerous restrictions placed on them. These restrictions are implemented through the operating limitations attached to the airworthiness certificate, as well as operating limitations in the regulations themselves. These regulatory operating limitations include prohibitions against operating over densely populated areas, in congested airways, or near a busy airport where passenger transport operations are conducted, and prohibition of carriage of persons or the carriage of property for compensation or hire. The only persons allowed on board are those that are required for the flight being conducted under the special purpose operation for which the aircraft is approved.

b. Type Certification of Civil Aircraft, § 21.25(a)(1). Aircraft manufactured for the restricted category or aircraft that have been type certificated in another category and altered for a special purpose operation must meet the applicable airworthiness standards, the applicable noise requirements of part 36 and it must be shown that no feature or characteristic of the aircraft makes it unsafe when operated under the limitations prescribed for its intended use. These aircraft are type certificated in the restricted category under § 21.25(a)(1). The type certification procedures for standard aircraft apply here except for the guidance provided below:

(1) The levels of certitude and the levels of safety may be reduced from that for aircraft meeting the airworthiness requirements of an aircraft category. However, through operating limitations and operating rules, such as aircraft flight manuals and § 91.313, equivalent levels of safety must be maintained for the public. This policy is not intended to eliminate any type certification procedural requirements, such as the need to address continued airworthiness.

(2) The basic airworthiness requirements that are inappropriate for the special purpose operation for which the aircraft is to be used may be waived or modified. The accountable directorate is responsible for determining those airworthiness requirements that are inappropriate for the special purpose operation for which the aircraft is to be used.

(3) Any reduction in the level of safety from that defined by the appropriate airworthiness standards must be based on requirements found inappropriate for the special purpose; modified requirements, which are not entirely appropriate; or an operating environment less stringent then that envisaged by the appropriate standards.

(4) CAR 8/CAM 8 is not an acceptable airworthiness standard for current type certification programs. It is only acceptable when the requirements are appropriate for alterations of small agricultural airplanes which were originally type certificated to CAR 8.

(5) For aircraft type certificated in dual categories (such as restricted and normal), the certification activity for the restricted category must not permit degradation of the aircraft for use in the normal category.

(6) The certification basis for an aircraft, being altered for a special purpose operation that was previously certificated in a standard category, is the original certification basis, except for the airworthiness requirements the FAA determines are inappropriate for the special purpose operation. Exceptions are made to the extent that an appropriate

level of safety for the public is maintained. It is never acceptable to waive a rule merely because the applicant cannot show compliance.

c. Type Certification of Surplus Military Aircraft, § 21.25(a)(2). The type certification program for surplus military aircraft being type certificated in the restricted category consists of evaluating the type of aircraft to determine that they are acceptable for civil certification. In addition, the following items need to be considered:

(1) The following data are required:

(a) Complete historical and modification records;

(b) Original identification plate;

(c) Technical Orders (TO's);

(d) Maintenance Manuals including current list of life-limited parts;

(e) Flight Manuals;

(f) Structural Repair Manuals;

(g) Illustrated Parts Catalogs; and

(h) Continued airworthiness instructions for the aircraft.

(2) The alteration for the special purpose operation must be approved in accordance with the type certification procedures for major changes. The certification basis for this alteration could be that provided by § 21.27 or the appropriate airworthiness standards in accordance with § 21.101, and any special conditions pursuant to § 21.16 as necessary.

(3) The aircraft must comply with the applicable noise requirements of part 36, and it must be shown that no feature or characteristic makes it unsafe when operated under the limitations prescribed for its intended use.

(4) The aircraft must be in conformity with the data presented for both the basic aircraft and the alteration.

(5) There must be provisions for the continued airworthiness of the aircraft. When an AD is issued for a restricted category surplus military aircraft, all of the restricted category TC holders of that model should be listed on the AD as applicable.

(6) When issuing a restricted category TC for a surplus military aircraft, provisions for the continued airworthiness of the aircraft and the following notes must be incorporated into the TCDS:

(a) This aircraft is prohibited from carrying cargo for compensation or hire. Carriage of cargo is limited to such cargo that is incidental to the aircraft owner/operator's business which is other than air transportation. (This note applies to aircraft that have the special purpose, "carriage of cargo").

(b) Restricted category aircraft may not be operated in a foreign country without the express written approval of that country.

(c) This aircraft has not been shown to meet the requirements of the applicable comprehensive and detailed airworthiness code as provided by Annex 8 to the Convention on International Civil Aviation.

d. Imported Aircraft.

(1) Foreign manufactured aircraft may be imported and type certificated in the restricted category by following the procedures provided in § 21.29. However, because there are not any published airworthiness standards, the certification basis has to be established prior to initiation of the project. All other procedures provided by § 21.29 need to be complied with. For example, the aircraft must be certified by the country of manufacture to conform to the approved type design.

(2) Foreign manufactured aircraft that are type certificated in the standard category, are considered the same as domestic aircraft, and are eligible for a restricted category type certificate.

e. Special Purpose Operation.

(1) Section 21.25(b)(7) provides for special purpose operations that are not already listed in § 21.25(b). Proposals for establishing new special purpose operation under § 21.25(b)(7) should be submitted to the ACO. Each proposal should include information, views, and arguments to substantiate the need for the proposed special purpose operation. The ACO will include comments and arguments and send the proposals to the Aircraft Engineering Division (AIR-100). The Aircraft Engineering Division has the responsibility for:

(a) Evaluating the proposal;

(b) Soliciting comments through pub lication in the Federal Register;

(c) Making a determination; and

(d) Notifying the ACO and the accountable directorate of the results.

(2) Advisory Circular, (AC) 21-17, Carriage of Cargo in Restricted Category Aircraft and Other Special Purpose Operations, provides an acceptable special purpose operation approved under § 21.25(b)(7). This AC also provides guidance for issuance to type and airworthiness certificates.

f. Additional Factors. Aircraft operating with multiple airworthiness certificates, standard and restricted, are addressed in Chapter 4 of FAA Order 8130.2C, Airworthiness Certification of Aircraft and Related Approvals. Conversion instructions should be provided during the type certification program. When converting the aircraft from restricted to standard category, the continued airworthiness including life-limited parts, AD's, and corrosion or structural damage must be addressed. Factors that may be important for this evaluation are:

(1) Areas and types of operation condu cted, including unusual operating environments/conditions;

(2) Surface conditions of the airports used;

(3) Nature of the cargo carried; and

(4) Aircraft operations with maximum weights exceeding that of the standard category.

52. TYPE CERTIFICATION SURPLUS MILITARY AIRCRAFT, § 21.27 Surplus military aircraft of the U.S. Armed Forces may receive type certification in normal, utility, acrobatic, commuter, or transport categories.

a. Compliance, § 21.27(a). The applicant must show compliance with the Civil Air Regulations or Federal Aviation Regulations requirements in effect when the aircraft was accepted for operational use by the United States Armed Forces.

b. Compliance, § 21.27(b). The applicant must show compliance with the regulations governing the original civil aircraft type certificate for the surplus aircraft of the Armed Forces of the United States that is a counterpart of a previously type certificated civil aircraft. Some surplus military aircraft have civil counterparts and may be listed on the civil TCDS with

information concerning modifications required to make them eligible under the civil TC.

c. Special Conditions. Special conditions and later requirements may be imposed under § 21.27(e).

d. Engine, Propellers, and Related Accessories Approval. Engines, propellers, and their related accessories will be approved for use on these aircraft if the applicant shows that on the basis of military qualification, acceptance, and service record the product provides substantially the same level of airworthiness as would be provided by parts 33 and 35.

e. Equivalent Level of Airworthiness. The FAA may relieve the applicant of strict compliance with appropriate Civil Air Regulations/Federal Aviation Regulations under § 21.27(d) if the method of compliance proposed by the applicant provides the same level of airworthiness as the Civil Air Regulations/Federal Aviation Regulations. The FAA may use Armed Forces experience in making such a determination.

53. NOISE CERTIFICATION.

a. General. Compliance with part 36, Noise Standards: Aircraft Type and Airworthiness Certification, is required for issuance of certain TC's, amended TC's, STC's, and airworthiness certificates as specified by various sections of part 21 and Special Federal Aviation Regulations 41.

(1) Some type certification actions require that the FAA conduct an environmental analysis in accordance with FAA Order 1050.1D, Policies and Procedures for Considering Environmental Impacts. This requirement is discussed further in paragraph 53d.

(2) Regardless of whether part 36 compliance or a finding in accordance with the National Environmental Policy Act (NEPA) is required for a particular aircraft, before issuance of an original TC's, the FAA is required to conduct a finding in accordance with the Noise Control Act of 1972 (as implemented by section 611 of the Federal Aviation Act of 1958, as amended). Paragraph 53c provides additional guidance on the conduct of Noise Control Act findings.

b. Noise Certification Basis. The regulatory basis for compliance with part 36 noise certification is the effective amendment on the date of certification. Therefore, the cognizant ACO specialist and/or project engineer should make every attempt to notify the noise certification applicant of any pending regulatory changes that may effect the project in order to reduce any adverse impact.

c. Noise Control Act Finding.

(1) The Noise Control Act of 1972 provides that the FAA, before issuing an original TC's for any aircraft of any category, and regardless of whether part 36 applies to the aircraft, must determine whether:

(a) Substantial noise abatement cannot be achieved for that aircraft by prescribing standards and regulations consistent with the limitations of section 611(d) of the Federal Aviation Act; or

(b) Substantial noise abatement may be so achieved in which case the regulatory process must be used to determine the extent of noise reduction to be required before an original TC may be issued.

(2) This finding must be made by the FAA notwithstanding any delegation to companies or other private persons or procedures for type certificating foreign manufactured aircraft. The authority to make noise findings pursuant to the Noise Control Act of 1972 for original type certifications is delegated to the appropriate Directorate depending on the aircraft type, and may not be redelegated. A copy of each finding should be sent to the FAA's Office of Environment and Energy (AEE).

(3) It is legally important that these findings be based on actual examination of each type design. This examination must be initiated as soon as possible after the application for type certification in each original type certification project and reflect noise reduction potentials that become evident during the certification process . The noise finding documentation is not limited to, but should include:

(a) The sources of audible noise, aerodynamic or otherwise, in the particular type design, including any noise measurements made, who made them, whether witnessed by FAA or not and an estimate as to their reliability;

(b) The technical alternatives and means that may be available for reducing such noise, including appropriate recommendations regarding choices of practical technical alternatives which have a potential for reducing noise;

(c) An estimate of the expected degree of potential noise reduction associated with each alternative identified in (b) above;

(d) Investigation and review of the manufacturer's design information, data and tests; and

(e) For each noise reduction technical alternative identified in (b) above (e.g., acoustical lining) that is not

incorporated in the type design, the economic and technical justification for not requiring that it be so incorporated.

(4) If it is concluded that substantial noise reduction can be accomplished by prescribing standards and regulation, the matter should be referred to AEE for appropriate action.

d. National Environmental Policy Act. FAA Order 1050.1D, Policies and Procedures for Considering Environmental Impacts, establishes policy and procedure and assigns responsibility for assuring agency compliance with environmental procedures as set forth in the Council on Environmental Quality (CEQ) regulation for implementing the procedural provisions of NEPA. Compliance with NEPA requires that the FAA publicly assess and analyze the potential environmental consequences of its actions. Appendix 4 (section 3.a.) of Order 1050.1D identifies the requirement for environmental analysis (EA), including a decision as to whether to prepare a finding of no significant impact (FONSI) or environmental impact statement (EIS) for type certification actions (new, amended, or supplemental) for aircraft types for which part 36 compliance is not required (e.g., airship, restricted category propeller driven large airplane). Appendix 4 (section 4) of Order 1050.1D identifies actions that are categorically excluded from the requirement for an EA.

e. Acceptable Means of Compliance.

(1) The federal aircraft noise certification regulations require that the demonstration of compliance must be made by the set of specified procedures under part 36 or an FAA approved equivalent procedure which may be substituted for one or more of the part 36 specifications. In general, equivalent procedures may be proposed for any of the specifications under the noise measurement and the evaluation portions of part 36. Equivalent procedures are not permitted for any of the specifications under the noise limits portion of part 36.

(2) FAA approved equivalent procedures are those procedures which are shown to yield the same noise levels as if the specified part 36 test or analyses were fully performed as prescribed. The FAA does not grant prior approval of generic equivalent procedures. Equivalent procedures must be identified by the applicant in the applicant's Noise Compliance Demonstration Compliance Plan, and approved by the FAA prior to use during the noise certification demonstration.

(3) Approval of equivalent procedures is vested in the AEE. The handling of equivalent procedures requiring review and approval by AEE should include coordination with the appropriate Directorate (transport, small airplane, or rotorcraft) Noise Certification Specialist (NCS). As experience is gained with the application of a particular equivalent procedure, AEE may

identify that equivalent procedure as available for use without additional approval from AEE. This would effectively mean that AEE had delegated approval authority for that specific procedure to the Aircraft Certification Service field offices.

(4) FAA Advisory Circular (AC) 36-4, Noise Certification Handbook, outlines test, analysis, and documentation procedures for subsonic turbojet airplanes that are acceptable to the FAA in demonstrating compliance with part 36. Some equivalencies identified in AC 36-4 (e.g. family plan, tone corrected perceived noise level (PNLT) time history merging techniques, use of analytical procedures, etc.) are conceptual in nature and the specific application of the equivalency must be approved by AEE prior to use. An ACO specialist who is in doubt about his/her authority to approve a particular equivalency should contact the appropriate Directorate Noise Certification Specialist for guidance.

f. Witnessing of Tests.

(1) All flight and other tests conducted in support of noise certification need to be witnessed by FAA personnel, a representative of a foreign civil aviation authority with which the U.S./FAA has an agreement that specifically addresses noise certification, or by an acoustical DER appointed under Order 8110.37. Under that Order, acoustical DER's may:

(a) Witness and approve noise certification tests conducted in accordance with an FAA approved test program, when specifically authorized to do so by the FAA; and

(b) Approve noise analysis techniques and computer programs and certify the noise values reduced by these computer programs that were measured and evaluated as prescribed in part 36 or by an equivalent procedure previously approved for that noise test series by AEE.

(2) Prior FAA approval is required for the re-delegation by acoustic DER's of the authority to witness tests. In addition, acoustic DER's may not determine whether a type design change is an acoustic change under § 21.93(b). Acoustical DER's also may not approve:

(a) Test plans or equivalent procedures;

(b) Operating limitations or other aircraft flight manual information; or

(c) Certificated aircraft noise levels.

g. Correction Procedures Evaluation.

(1) To promote uniformity of implementation of the noise certification requirements of part 36, the FAA has a policy of evaluating the measurement and analysis practices of applicants for aircraft noise certification, including independent DER's. Implementation of this policy includes an audit of an applicant's part 36, subpart B and/or H correction procedures and analysis methods as compared to the current regulations and approved procedures. This audit is conducted for the FAA by the U.S. Department of Transportation Volpe National Transportation Systems Center (VNTSC). In order to facilitate the VNTSC evaluation, the cognizant ACO specialist must instruct all applicants not previously approved to forward the appropriate information to the VNTSC. The cognizant ACO specialist must make the appropriate Directorate NCS aware of the evaluation initiation, and may obtain a description of the required information from the Directorate NCS. To determine the VNTSC checkout status for a particular applicant, the ACO specialist should contact the appropriate Directorate NCS.

(2) In addition to the VNTSC evaluation, it is recommended that applicants develop software control procedures which enable the applicant and the FAA to be assured that the integrity of the validated software is being maintained, and that any subsequent audit of this nature would not find changes in the evaluation or analysis procedures. The FAA reserves the right to re-inspect applicants' measurement and analysis procedures at any time, however periodic audits will be performed based the following criteria.

(3) Future amendments that are made to part 36 will be evaluated by VNTSC to ascertain whether or not previously approved correction procedures and analysis methods will be subject to re-evaluation. If re-evaluation is required, notices will be sent to each entity which has previously undergone an evaluation, requesting that a new evaluation be performed. Guidelines for the re-evaluation may be obtained from the appropriate Directorate NCS.

(4) In certain instances foreign applicant's implementation of the part 36 data correction procedures and analysis methods must also be audited. For noise certifications for foreign applicants in which there is involvement by a foreign certification authority with which the U.S. has a noise certification agreement, the foreign certificating authority noise certification specialist must provide written substantiation to the ACO that they have evaluated the applicant's data correction procedures. Otherwise a VNTSC evaluation of the foreign applicant's data correction procedures is required.

h. Noise Related Type Certification Requirements.

(1) An applicant for a TC must show that the aircraft meets the applicable airworthiness requirements, special conditions, and noise standards of part 36. Figures 6-1 through 6-3 present a summary of the part 36 applicability and conditions which require compliance.

(2) A TC may be issued for an aircraft in the prim ary, normal, utility, acrobatic, commuter, transport, or special class of aircraft if:

(a) The product qualifies under § 21.27, Issue of type certificate: surplus aircraft of the Armed Forces; or

(b) The type design and the product meet the applicable aircraft noise and airworthiness requirements of the Federal Aviation Regulations, and it has no feature or characteristic which makes it unsafe.

(3) A TC may be issued for an aircraft in the restricted category for special purpose operations if the applicant shows compliance with the applicable noise requirements of part 36 and the aircraft:

(a) Meets the airworthiness requirements of the aircraft category except those requirements that the FAA finds inappropriate for the special purpose operation for which the aircraft is to be used; or

(b) Is of a type that has been manufactured in accordance with the requirements of and accepted for use by an Armed Force of the U.S. and has been later modified for a special purpose.

(4) A TC may be issu ed for an aircraft that is manufactured in a country other than the U.S. with which the U.S. has an agreement for the acceptance of these aircraft for importation into the U.S. if:

(a) The country in which the aircraft was manufactured certifies that the aircraft:

1 Has been examined, tested, and found to meet part 36 noise and applicable U.S. airworthiness standards and any special conditions that the FAA may prescribe; or

2 The applicable noise and airworthiness standards of the country in which the aircraft was manufactured;

(b) The applicant has submitted the technical data concerning compliance with aircraft noise and airworthiness standards required by the FAA; and

(c) The manuals, placards, listings, and instrument markings required by the applicable airworthiness and noise requirements are presented in the English language.

i. Changes to the Type Design of an Aircraft. Figures 6-4 through 6-8 present a summary of the part 36 applicability for acoustical changes, and conditions for compliance. As specified in § 21.93(b), for the purpose of complying with part 36, any voluntary change in the type design of an aircraft that may increase the noise levels of that aircraft is an acoustical change for:

(1) Transport category large airplanes;

(2) Turbojet powered airplanes (regardless of category). Acoustical changes do not include changes in type design that are limited to one of the following:

(a) Gear down flight with one or more retractable landing gear down during the entire flight; or

(b) Spare engine and nacelle carriage external to the skin of the airplane (and return of the pylon or other external mount); or

(c) Time-limited engine and/or nacelle changes, where the change in type design specifies that the airplane may not be operated for a period of more than 90 days unless compliance with the applicable acoustical change provisions of part 36 is shown for that change in type design.

(3) Helicopters, except for those helicopters that are designated exclusively for agricultural aircraft operations, for dispensing fire fighting materials, or for carrying external loads; and

(4) Propeller driven commuter category and small airplanes in the primary, normal, utility, acrobatic, transport (less than 75,000 lbs.), and restricted categories except:

(a) Airplanes that are designated for agricultural operations as defined in § 137.3 or for dispensing fire fighting materials;

(b) U.S. registered airplanes that had flight time prior to January 1, 1955; or

(c) Land configured airplanes reconfigured with floats or skis.

j. Supplemental Type Certificates. Each applicant for an STC must show that the altered product meets applicable airworthiness requirements as specified in paragraphs (a) and (b) of § 21.101. In the case of an acoustical change, the applicant must show compliance with the applicable noise requirements of §§ 36.7, 36.9, or 36.11.

k. Standard Airworthiness Certificates. In addition to the requirements of paragraphs (a), (b), and (c), and (d) of § 21.183, the following, as required by § 21.183(e), must be complied with the original issuance of a standard airworthiness certificate:

(1) For transport category large airplanes and turbojet powered airplanes without flight time prior to the dates specified in § 36.1(d), the type design must comply with the noise requirements of § 36.1(d) and applicable airworthiness requirements;

(2) For primary, normal, utility, acrobatic, commuter, or transport category propeller driven small airplanes without flight time prior to January 1, 1980, the type design must comply with the noise requirements of part 36 and applicable airworthiness requirements; and

(3) For import airplanes, the country in which the airplane was manufactured must certify and the FAA must find that part 36 or the applicable airplane noise requirements of the country of manufacture and any other requirements prescribed by the FAA provide noise levels no greater than those provided by compliance with part 36.

l. Airworthiness Certificates for Restricted Category Aircraft. Before a restricted category airworthiness certificate can be issued:

(1) For propeller driven small airplanes (except airplanes designed for agricultural aircraft operations as defined in § 137.3 or for dispensing fire fighting materials) that have not had any flight time prior to January 1, 1980, § 21.185(d) specifies that the type design must comply with:

(a) The applicable noise requirements of part 36; and

(b) Applicable airworthiness requirem ents.

(2) For import airplanes, § 21.185(d) specifies that the country in which the airplane was manufactured must certify and

the FAA must find that the applicable requirements of part 36 or the applicable airplane noise requirements of the country of manufacture and any other requirements prescribed by the FAA provide noise levels no greater than those provided by compliance with applicable requirements of part 36.

m. Designated Alteration Station (DAS) Limits. A DAS may not issue a STC involving the acoustical change requirements of part 36 until the FAA finds that those requirements have been met (reference § 21.451(d)).

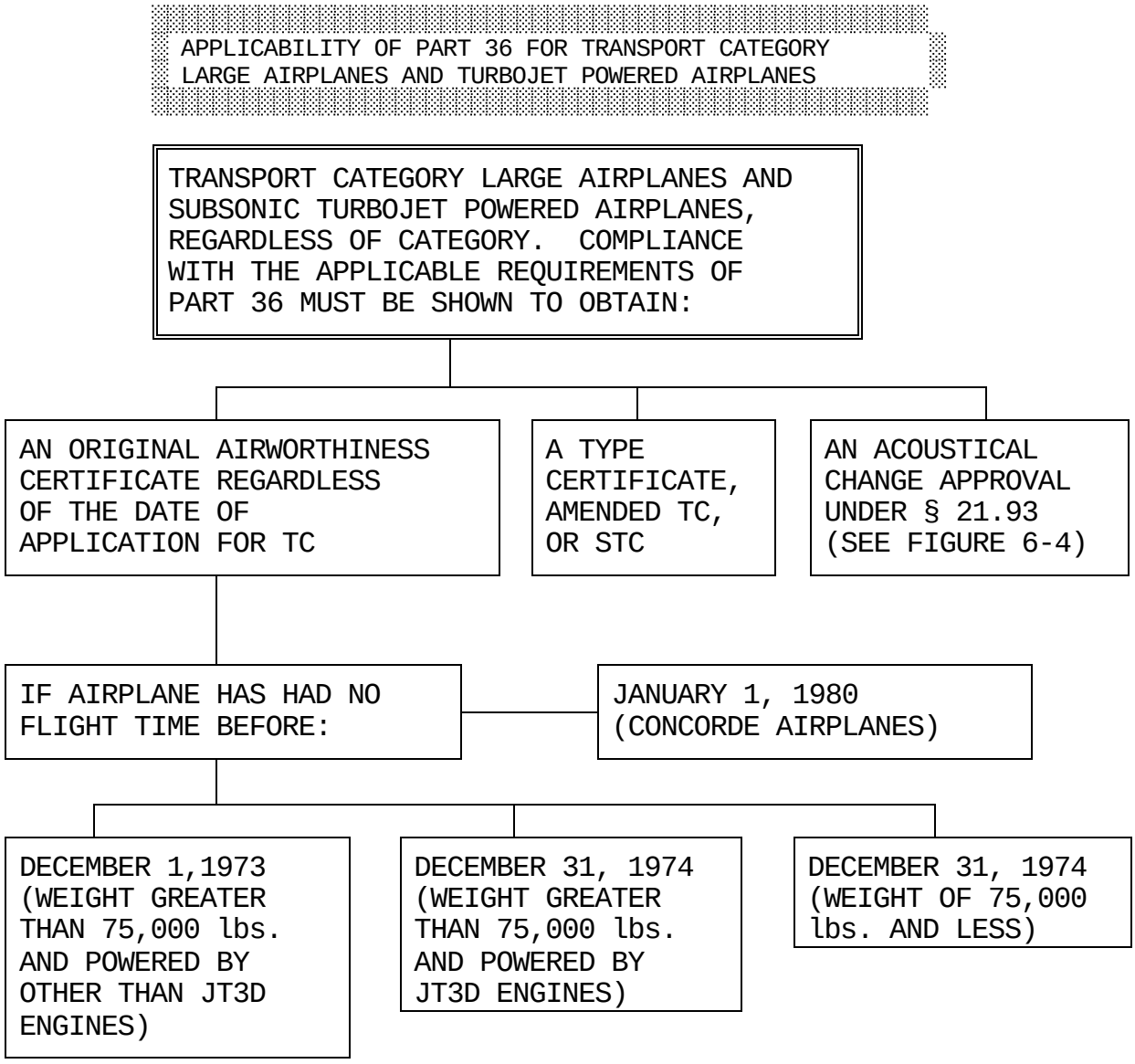


Figure 6-1 - Transport Category Large Airplanes and Subsonic Turbojet Powered Airplanes

APPLICABILITY OF PART 36 FOR COMMUTER CATEGORY AND SMALL PROPELLER-DRIVEN AIRPLANES

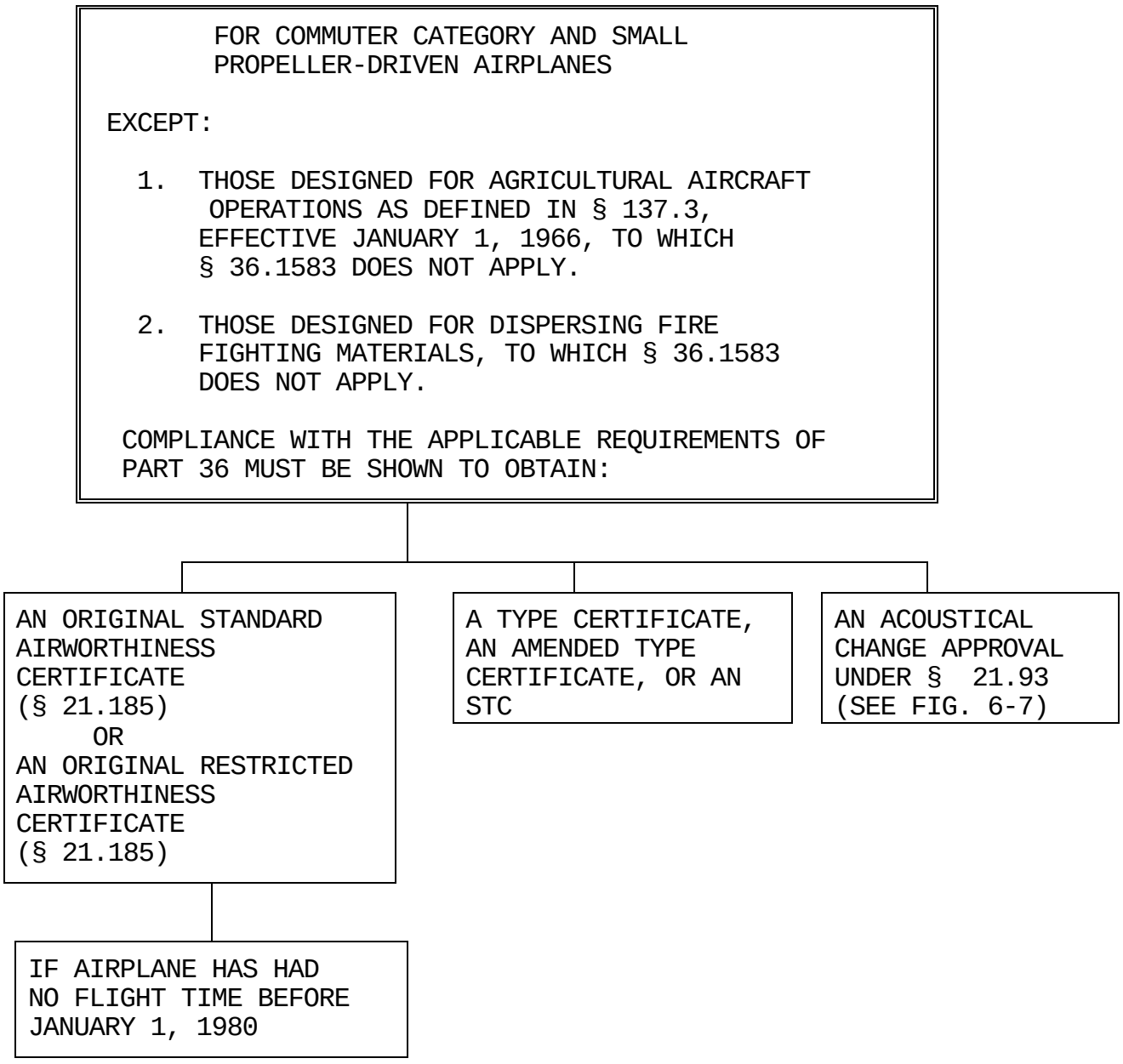


Figure 6-2 - Small Propeller-Driven Airplanes

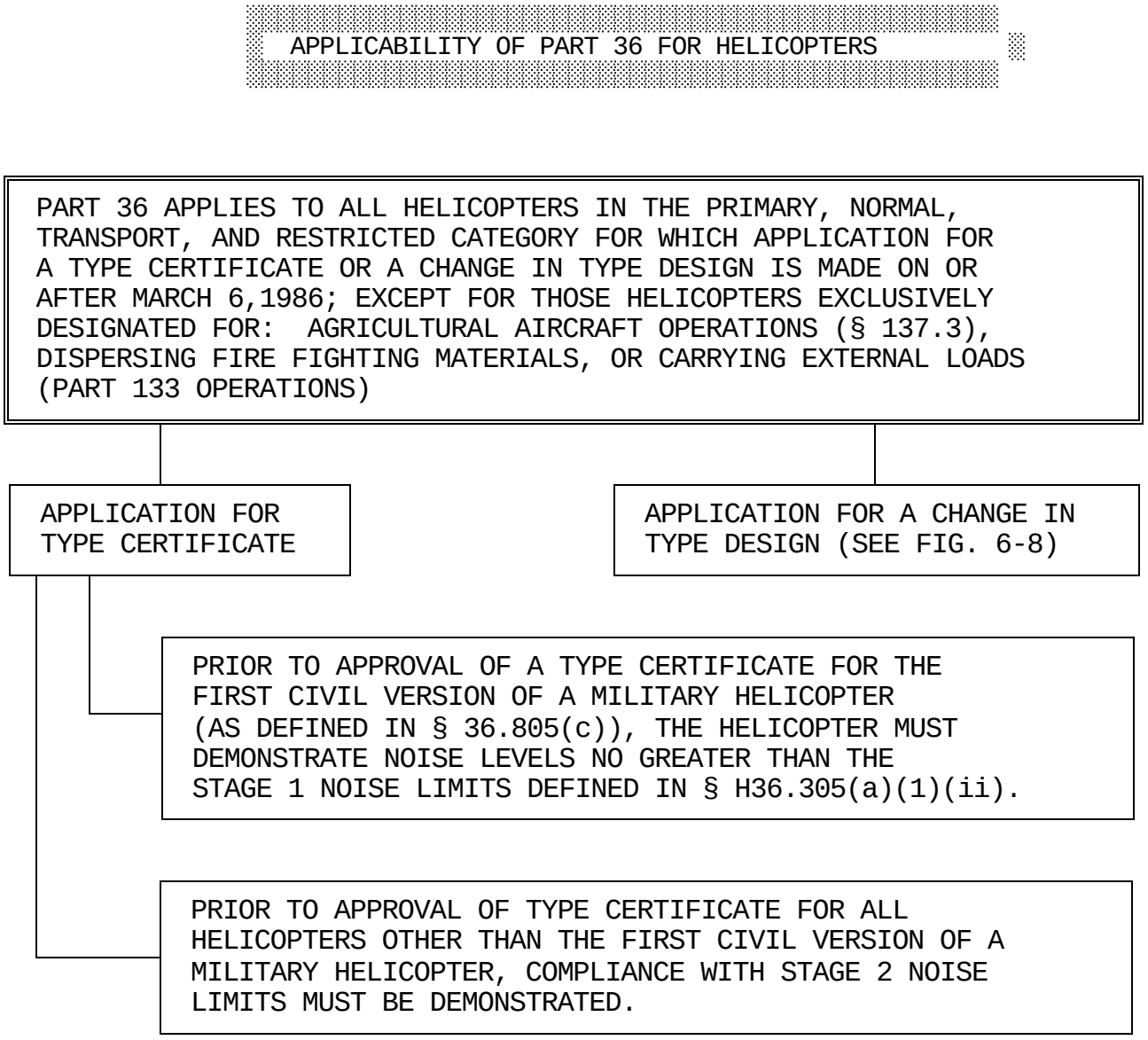


Figure 6-3 - Helicopters

APPLICABILITY OF PART 36 FOR ACOUSTICAL CHANGES TO SUBSONIC TRANSPORT CATEGORY LARGE AIRPLANE OR TURBOJET POWERED AIRPLANE

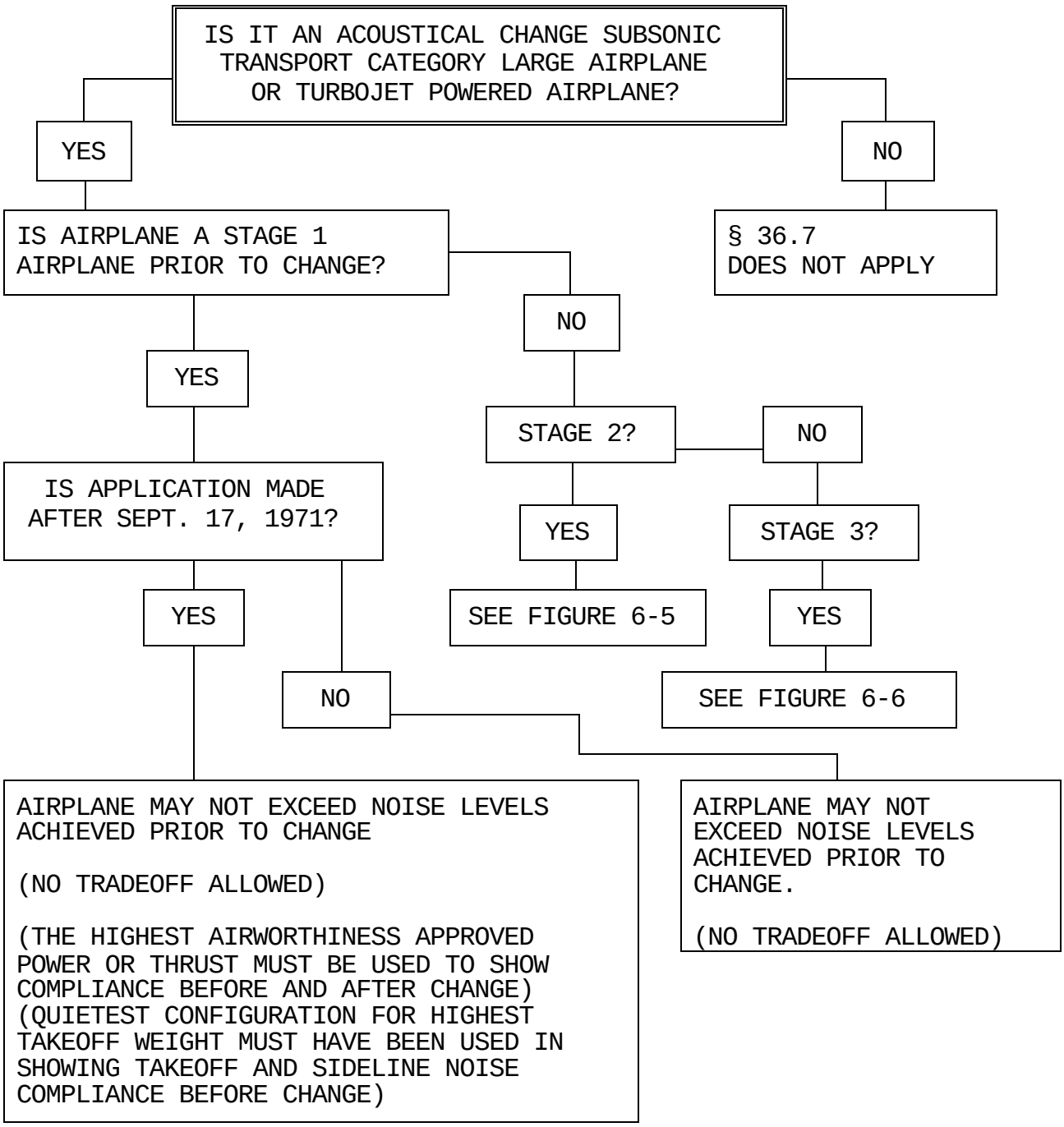


Figure 6-4 - Acoustical Change, Subsonic Transport Category

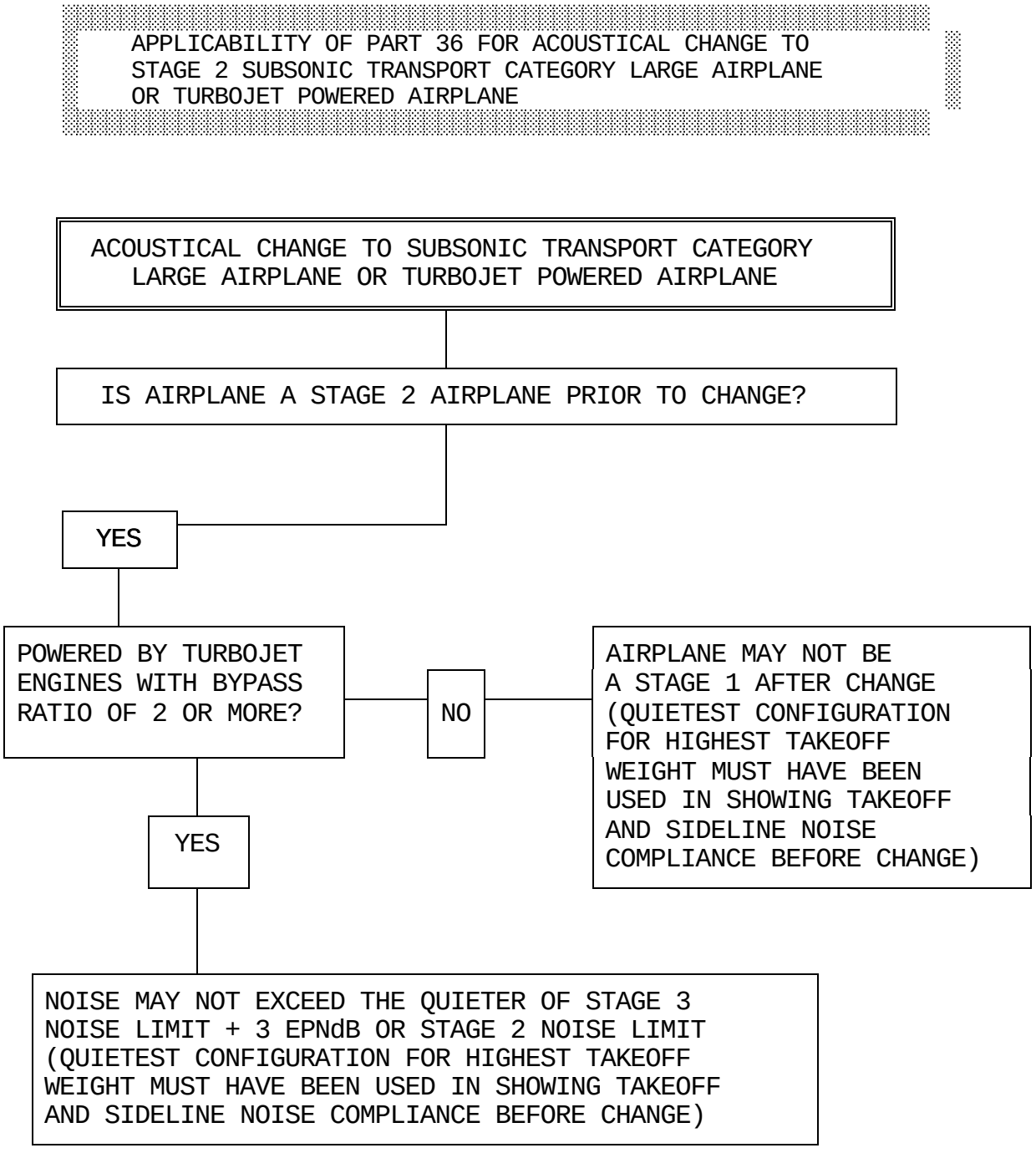


Figure 6-5 - Acoustical Change, Stage 2 Subsonic Transport Category

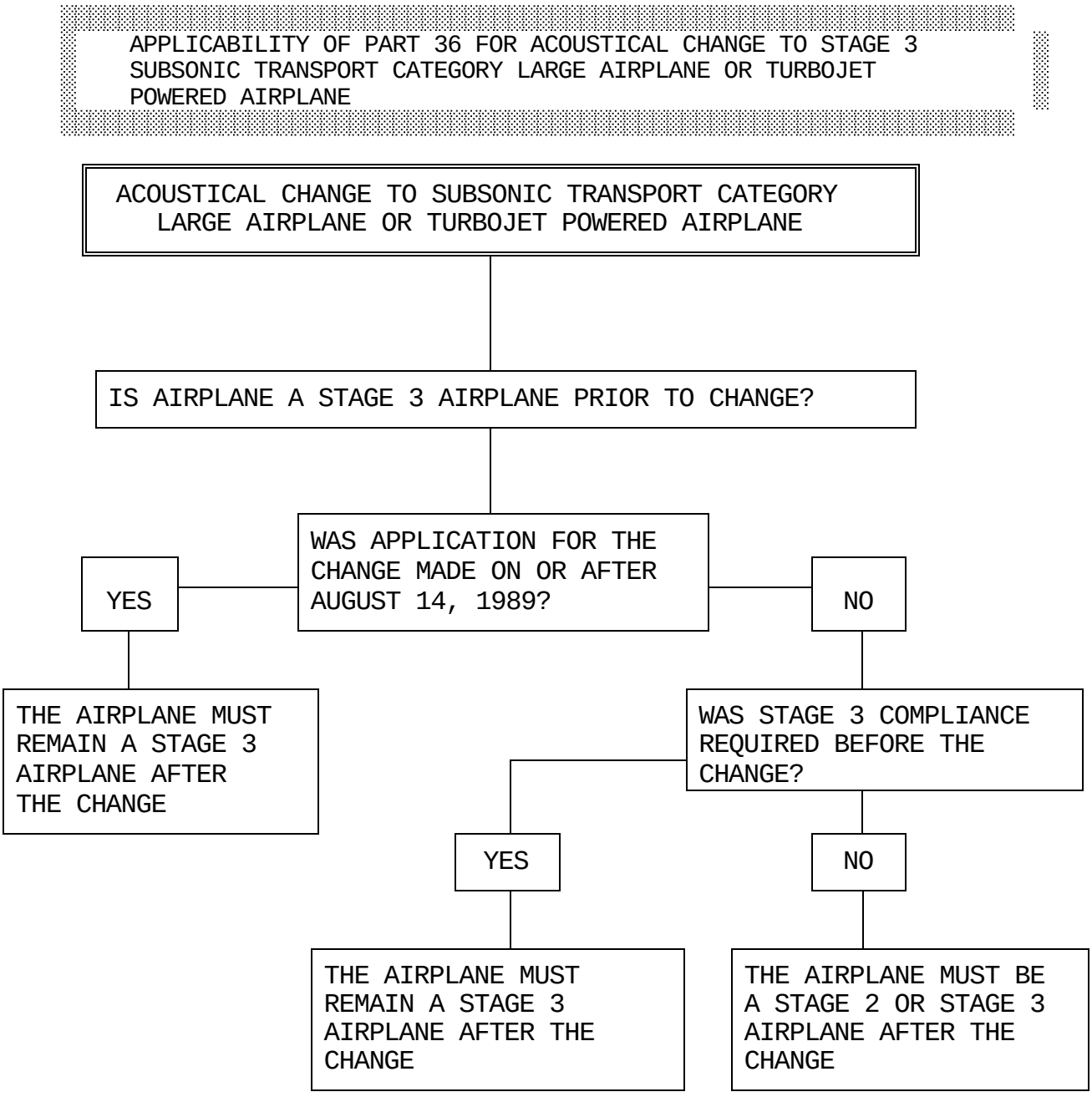


Figure 6-6 - Acoustical Change, Stage 3 Subsonic Transport Category

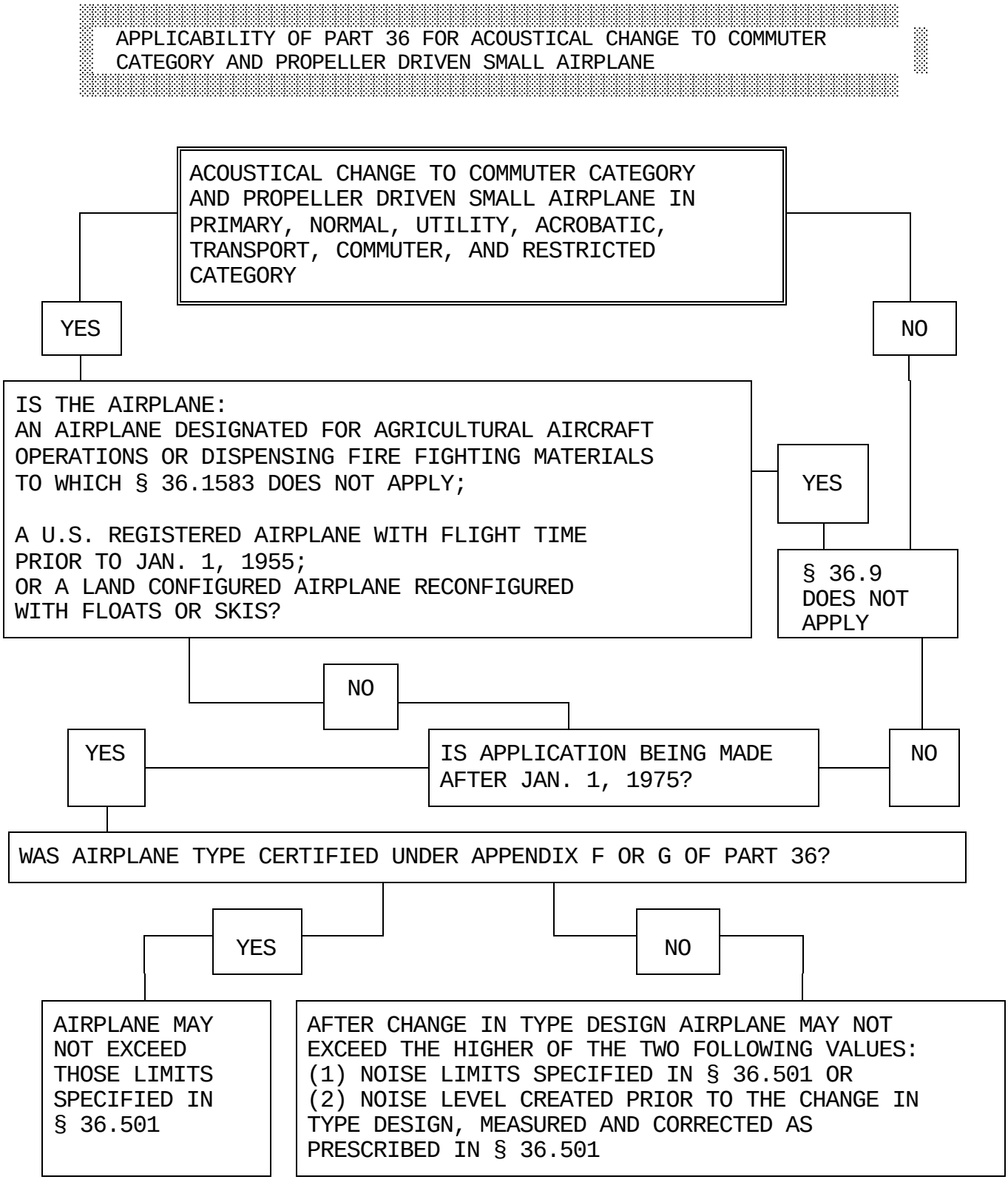


Figure 6-7 - Acoustical Change, Small Propeller Driven Airplanes

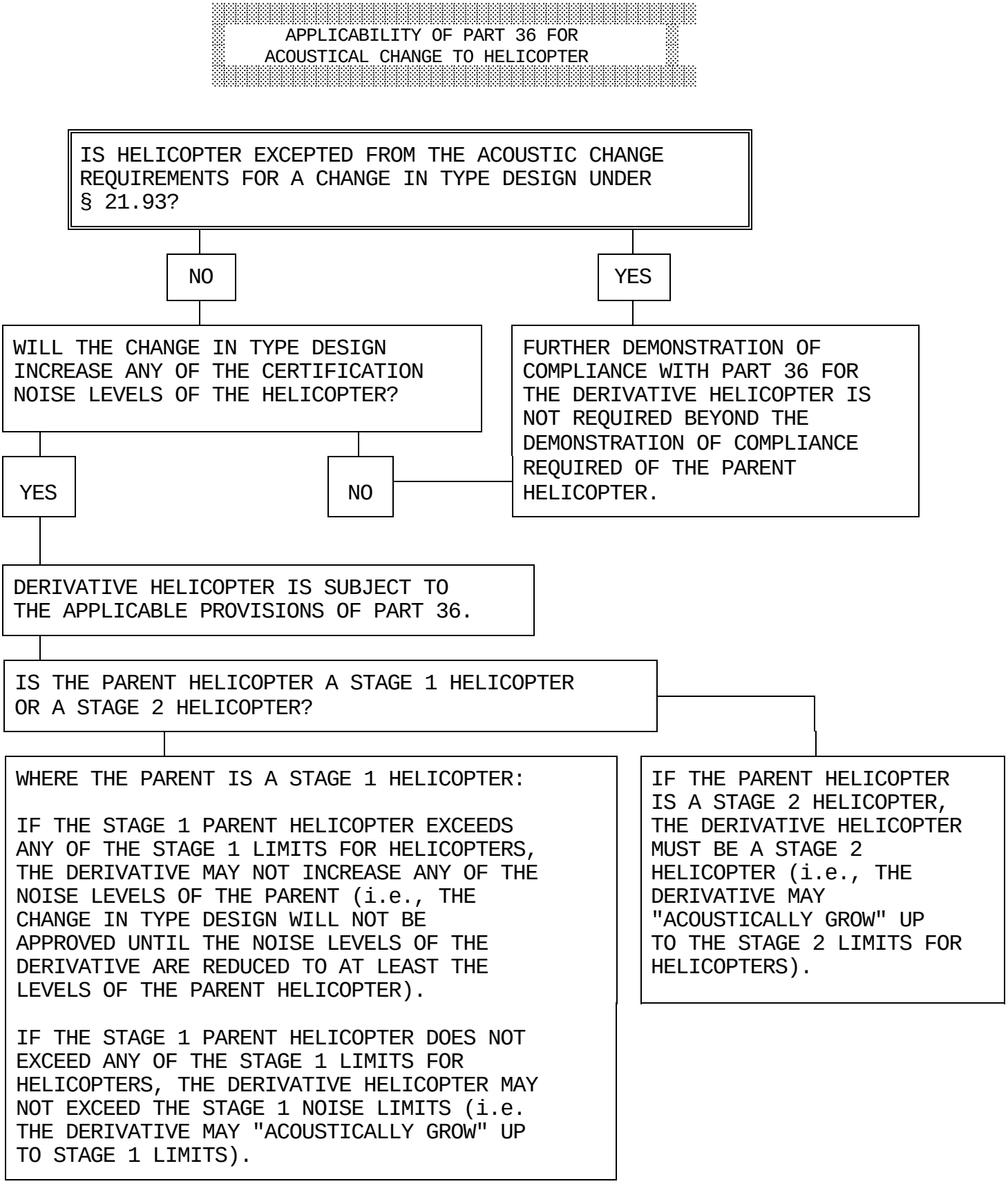

APPLICABILITY OF PART 36 FOR ACOUSTICAL CHANGE TO HELICOPTER
IS HELICOPTER EXCEPTED FROM THE ACOUSTIC CHANGE REQUIREMENTS FOR A CHANGE IN TYPE DESIGN UNDER § 21.93?
NO
YES
WILL THE CHANGE IN TYPE DESIGN INCREASE ANY OF THE CERTIFICATION NOISE LEVELS OF THE HELICOPTER?
FURTHER DEMONSTRATION OF COMPLIANCE WITH PART 36 FOR THE DERIVATIVE HELICOPTER IS NOT REQUIRED BEYOND THE DEMONSTRATION OF COMPLIANCE REQUIRED OF THE PARENT HELICOPTER.
YES
NO
DERIVATIVE HELICOPTER IS SUBJECT TO THE APPLICABLE PROVISIONS OF PART 36.
IS THE PARENT HELICOPTER A STAGE 1 HELICOPTER OR A STAGE 2 HELICOPTER?
WHERE THE PARENT IS A STAGE 1 HELICOPTER:
IF THE STAGE 1 PARENT HELICOPTER EXCEEDS ANY OF THE STAGE 1 LIMITS FOR HELICOPTERS, THE DERIVATIVE MAY NOT INCREASE ANY OF THE NOISE LEVELS OF THE PARENT (i.e., THE CHANGE IN TYPE DESIGN WILL NOT BE APPROVED UNTIL THE NOISE LEVELS OF THE DERIVATIVE ARE REDUCED TO AT LEAST THE LEVELS OF THE PARENT HELICOPTER).
IF THE STAGE 1 PARENT HELICOPTER DOES NOT EXCEED ANY OF THE STAGE 1 LIMITS FOR HELICOPTERS, THE DERIVATIVE HELICOPTER MAY NOT EXCEED THE STAGE 1 NOISE LIMITS (i.e. THE DERIVATIVE MAY "ACOUSTICALLY GROW" UP TO STAGE 1 LIMITS).
IF THE PARENT HELICOPTER IS A STAGE 2 HELICOPTER, THE DERIVATIVE HELICOPTER MUST BE A STAGE 2 HELICOPTER (i.e., THE DERIVATIVE MAY "ACOUSTICALLY GROW" UP TO THE STAGE 2 LIMITS FOR HELICOPTERS).

Figure 6-8 - Acoustical Change, Helicopters

54. FLIGHT TEST.

a. General Responsibilities Flight test personnel are responsible for accomplishment of flight tests and evaluation of engineering data on all new or modified aircraft pertaining to performance, flight characteristics, operational qualities, equipment operations, and the determination of operational limitations, procedures, and information. Particular attention and emphasis are to be given to the entire system in which an airman and his aircraft must operate. The system includes not only the airman and the aircraft but airports, air navigation facilities, the air traffic system, the safety rules and operating procedures as well as environmental factors, such as weather.

b. Specific Responsibilities The FAA flight test personnel are responsible for:

(1) Reviewing the applicant's flight test report (reference § 21.35(a)(4));

(2) Reviewing the applicant's objectives for the flight test to assure a determination of compliance can be made;

(3) Determining that test instrumentation, other required equipment including flight crew safety equipment and emergency egress provisions, and aircraft test configuration are acceptable for the proposed flight tests;

(4) Determining if flight test tasks may be delegated to a DER;

(5) Conducting the preflight briefing to obtain final agreement on test procedures, test cards, and test sequence; to assure that the aircraft is ready for flight test; and to determine that the test environment including weather considerations are satisfactory for flight test;

(6) Conducting and directing flight tests in accordance with the TIA;

(7) Participating in the post-flight debriefing;

(8) Analyzing and approving the flight test data;

(9) Reviewing, coordinating, and approving the AFM or revisions to the AFM;

(10) Preparing and coordinating the TIR;

(11) Serving, when requested, as a member of a FOEB; and

(12) Serving, when requested, as a member of a FSB.

c. Specific Qualifications

(1) Qualification on Test Aircraft. For type certification testing of prototypes, the applicant is expected to provide, as a part of the flight test program, the necessary first pilot checkout qualification flight time for the FAA flight test pilot(s) and AEG pilot(s) assigned responsibility for the project. If additional FAA pilots not assigned directly to the project need qualification flight training in a manufacturer's prototype, or in first production models, arrangements will be made with the applicant.

(2) Familiarization Flight Time on New Models. Familiarization flying may be arranged for additional FAA flight test pilots as a part of functional and reliability testing, production testing, or during extensive type testing provided it does not impose an additional burden on the manufacturer or interfere with the responsible ACO's conduct of the required compliance tests.

(3) Airman Rating Qualification During TC/STC Tests. When determining compliance with the general controllability and maneuverability requirements, include the applicable airman competency tests and maneuvers. These will be required for type certification projects that involve a new design or major STC projects which significantly modify flight characteristics or procedures. The required competence tests and maneuvers are those which are required of a pilot to be competent to operate the aircraft in the kind of operation(s) and atmospheric conditions for which it will be approved.

(4) Airman Competency Maneuvers. The airman competency maneuvers and minimum crew evaluation should be developed in coordination with the assigned AEG inspector during the type certification program, to assure satisfactory determinations of speeds, handling characteristics, procedures, and systems operations for such maneuvers and the adequacy of the proposed minimum flight crew.

(5) Additional Typ e Ratings. During development of the type certification program and in conjunction with the AEG activity, the appropriate flight test pilots shall receive additional certificate or type rating flight checks in the subject aircraft.

d. Actions Prior to Official Type Tests

(1) Official Flight Tests. Official flight tests, including DER flight tests, will not be started until a TIA or an

equivalent flight test authorization has been issued. The FAA flight test pilot shall not fly a test aircraft without coordinating with the assigned manufacturing inspector. All official tests will be conducted in accordance with the restrictions and/or limitations stated in the TIA or the airworthiness certificate that are necessary to safely conduct the tests and to determine compliance with the regulations applicable to the model being tested. The TIA may be phased or issued in increments to ensure basic airworthiness and systems safety has been established before proceeding to the next phase.

(2) Conformity of Test Article with Type Design. Prior to starting any official approving flight tests, the responsible test pilot for the project and ground inspection personnel should verify that a conformity inspection has been conducted to assure that the airplane is in conformity with the type design appropriate for accomplishment of tests and in satisfactory airworthiness condition. Any nonconformities will be documented and flight tests will not be started until a release has been issued by the appropriate TIA issuing office and the flight test pilot has been notified.

(3) Checkout on Test Aircraft. The assigned project test pilot(s) is/are to arrange with a responsible official of the applicant's organization for an adequate and agreed upon checkout in the applicant's airplane. The checkout must be accomplished prior to the FAA pilot(s) conducting any official flight tests requiring action in an official flight test pilot capacity.

(4) Command Pilot. The pilot-in-command is the applicant's pilot (except for single place aircraft). The FAA pilot should emphasize the pilot-in-command responsibility as part of the preflight briefing.

(5) Spin Recovery Parachutes.

(a) Spin recovery parachutes should be installed on all aircraft requiring spin testing for certification. In addition, such installations may be required for other high angle of attack tests on aircraft where inadvertent spins or deep stalls are likely during testing.

(b) Other types of spin recovery devices such as anti-spin rockets may be considered when proposed by the applicant. However, such systems have many unknown characteristics which would require considerable engineering research and wind tunnel testing. The tail mounted spin recovery parachute system has been proven to be an effective spin recovery system and is the preferred system. For assistance in sizing a spin chute refer to NASA Technical Paper 1076, Spin-Tunnel

Investigation of the Spinning Characteristics of Typical Single-Engine General Aviation Airplane Designs, dated November 1977.

(c) Aircraft certification offices must carefully evaluate a spin recovery system installation to determine its structural integrity, reliability, susceptibility to inadvertent or unwanted deployment or jettison, and adequate or redundant jettison capability. The chute size, porosity, riser length, and lanyard length should be designed in accordance with NASA recommended practices to assure that the system is effective in spin recovery. Also, NASA recommendations should be referred to when evaluating the design of the chute deployment and jettison systems. Appropriate NASA recommendations can be found in the following publications:

1 Burk, Sanger M. Jr., Summary of Design Considerations for Airplane Spin-Recovery Parachute Systems; NASA TN D-6866; or

2 Bradshaw, Charles F., A Spin-Recovery System for Light General Aviation Airplanes; NASA CP-2127, 14th Aerospace Mechanics Symposium, May 1980.

3 Stough, Paul H. III, A Summary of Spin-Recovery Parachute Experience on Light Airplanes; AIAA Paper Number 90-1317, AIAA/SFTE/DGLR/SETP Fifth Biannual Flight Test Conference, May 1990.

(6) Emergency Provisions. The project test pilot(s) should make sure all necessary safety equipment is provided and that all crew members know and are briefed in the usage of this equipment. The pilot(s) should anticipate the possible emergencies that could occur for a particular test phase and outline crew duties in the event an emergency is encountered.

e. Test Flight Planning. Each test flight should be carefully planned prior to actual flight. A written schedule of what will be done during the test should be agreed on by the applicant and FAA flight test personnel. The agreed upon schedule should indicate the applicable Federal Aviation Regulations to which the flight tests are being conducted.

f. Hazardous Flight Tests. FAA flight test personnel are not authorized to participate in or conduct potentially hazardous flight tests until the applicant has successfully performed these tests and submitted a written report.

g. Certification Flight Hours.

(1) Certification flight test time is recorded by the FAA flight test crew (pilot and/or engineer) as part of the TIR. The TIR should include all flights during which an FAA crew

member is conducting required evaluations, including flight to and from local test areas, flight in the traffic pattern, etc. The TIR also includes time required to conduct or witness systems evaluations and other certification tests, regardless of whether an FAA pilot is at the controls. Initial pilot familiarization may be considered official test time even though no specific tests are conducted.

(2) Certification flight time does not include ferrying to remote areas or tests conducted for purposes other than determination of compliance, regardless of whether an FAA pilot is at the controls.

APPENDIX 1. INSTRUCTIONS FOR COMPLETION OF FAA FORM 8110-12, APPLICATION FOR TC, PC, OR STC

FAA Form 8110-12 is used for application for a TC, PC, or STC. Application for a TC and a PC may be made at the same time if desired. Only the appropriate blocks, as follows, need to be filled out for each certificate.

Blocks 1, 2, 3, 4, and 7 for a TC;
Blocks 1, 2, 3, 5, and 7 for a PC;
Blocks 1, 2, 3, 6, and 7 for a STC.

Block 1. Enter the name of the party, corporation or organization to whom the TC, PC, or STC will be issued. The name will appear on the certificate exactly as it is entered here.

Block 2. Check appropriate block.

Block 3. Check appropriate block.

Block 4. Complete this block if application is for a TC, leave blank if application is for a PC or STC.

Block 5. Complete parts a, b, and c of this block if application is for a PC. Give PC number if application is for an addition to a PC, leave blank if application is for an original PC. Give TC/STC number if known at time of application, otherwise leave blank. (Note: a PC is usually not required for production of parts for a STC, they are usually manufactured under a PMA a uthorization.)

Block 6. Complete parts a, b, c, and d if application is for a STC.

Block 7. Obtain the signature of the certifying official. The certifying official must be the owner or the person duly authorized to sign for the owner, company, or corporation.

APPENDIX 1. SAMPLE FAA FORM 8110-12

No certificate may be issued unless a completed application form has been received (14 C.F.R.-21)

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

APPLICATION FOR TYPE CERTIFICATE, PRODUCTION CERTIFICATE, OR SUPPLEMENTAL TYPE CERTIFICATE

FORM APPROVED
O.M.B. No. 04-R0078

1. Name and address of applicant	2. Application made for - ☐ Type Certificate ☐ Production Certificate ☐ Supplemental Type Certificate	3. Product Involved ☐ Aircraft ☐ Engine ☐ Propeller

4. **TYPE CERTIFICATE** (*Complete item 4a below)*

a. Model designation(s) (All models listed are to be completely described in the required technical data, including drawings representing the design, material, specifications, construction, and performance of the aircraft, aircraft engine, propeller which is the subject of this application.)

5. **PRODUCTION CERTIFICATE** (*Complete items 5a-c below. Submit with this form, in manual form, one copy of quality control data or changes thereto covering new products, as required by applicable FAR.)*

a. Factory address *(if different from above)*	b. Application is for - ☐ New production certificate ☐ Additions to production Certificate *(Give P.C. No.)*	P.C. No.

c. Applicant is holder of or a licensee under a Type Certificate or a Supplemental Type Certificate *(Attach evidence of licensing agreement and give certificate number)* ——————————> T.C./S.T.C. No.

6. **SUPPLEMENTAL TYPE CERTIFICATE** (*Complete items 6a-d below)*

a. Make and model designation of product to be modified

b. Description of modification

c. Will data be available for sale or release to other persons? ☐ Yes ☐ No	d. Will parts be manufactured for sale? *(Ref. FAR 21.303)* ☐ Yes ☐ No

7. **CERTIFICATION -** I certify that the above statements are true.

Signature of certifying official	Title	Date

FAA Form 8110-12 (3-80) SUPERSEDES PREVIOUS EDITION (REPRESENTATION)

APPENDIX 2. INSTRUCTIONS FOR PREPARATION OF FORM 8110-9, TC

Area 1 - Enter the type of product, using CAPITAL LETTERS, i.e., AIRCRAFT, ENGINE, etc.

Area 2 - Enter "IMPORT", if for an import product. Otherwise, leave blank.

Area 3 - Enter the TC number as assigned by the accountable directorate.

Area 4 - Enter the applicant's name (should agree exactly with that shown on the application for the TC.

Area 5 - Show the applicable Federal Aviation Regulation.

Area 6 - Enter the product type designation, i.e. "Airplane Model 120". Where a second model is later added, the line would be " Airplane Models 120 and 140". If the models added become too numerous to fit into this space, an extra page may be attached to the FAA Form 8110-9. The notation should be added "See attached sheet for additional models".

Area 7 - Enter the date of original application.

Area 8 - Enter the date the TC is issued. When a TC is revised for the purpose of issuing it in the name of a different owner or where a duplicate copy has been requested, the date should not be changed. When models are added later, the original issuance date will still be shown and the new date indicated under it, i.e.,

Date: January 31, 1988
Model 140 approved June 10, 1990

Area 9 - Obtain the signature of the manager of the accountable directorate.

APPENDIX 2. SAMPLE TYPE CERTIFICATE, FAA FORM 8110-9

The United States of America

Department of Transportation

Federal Aviation Administration

①

Type Certificate

②

Number _____ ③

This certificate issued to ④ certifies that the type design for the following product with the operating limitations and conditions therefor as specified in the Federal Aviation Regulations and the Type Certificate Data Sheet, meets the airworthiness requirements of Part ⑤ of the Federal Aviation Regulations.

⑥

This certificate, and the Type Certificate Data Sheet which is a part hereof, shall remain in effect until surrendered, suspended, revoked, or a termination date is otherwise established by the Administrator of the Federal Aviation Administration.

Date of application: ⑦

Date of issuance: ⑧

By Direction of the Administrator

(Signature) _____

(Title) _____ ⑨

This certificate may be transferred if endorsed as provided on the reverse hereof.

An *Any alteration of this certificate and/or the Type Certificate Data Sheet is punishable by a fine not exceeding $1,000, or imprisonment not exceeding 3 years, or both.*

FAA FORM 8110-9 (2-82)(Representation)

APPENDIX 2. BACK SIDE OF FAA FORM 8110-9

TRANSFER ENDORSEMENT

Immediately after transfer the person making the transfer shall notify the Federal Aviation Administration of the name and address of the person to whom the certificate was transferred.

To.....(Name) By.....(Holder) Date.....

.....(Address) .....(Signature)

.....(Title)

To.....(Name) By.....(Holder) Date.....

.....(Address) .....(Signature)

.....(Title)

To.....(Name) By.....(Holder) Date.....

.....(Address) .....(Signature)

.....(Title)

To.....(Name) By.....(Holder) Date.....

.....(Address) .....(Signature)

.....(Title)

To.....(Name) By.....(Holder) Date.....

.....(Address) .....(Signature)

.....(Title)

To.....(Name) By.....(Holder) Date.....

APPENDIX 2. SAMPLE SUPPLEMENTAL TYPE CERTIFICATE, FAA FORM 8110-2

United States of America

Department of Transportation-Federal Aviation Administration

Supplemental Type Certificate

Number

This certificate, issued to

certifies that the change in the type design for the following product with the limitations and conditions therefor as specified hereon meets the airworthiness requirements of Part of the Regulations.

Original Product-Type Certificate Number:

Make:

Model:

Description of Type Design Change:

Limitations and Conditions:

This certificate and the supporting data which is the basis for approval shall remain in affect until surrendered, suspended, revoked, or termination date is otherwise established by the administrator of the Federal Aviation Administration.

Date of application:

Date of issuance:

Date reissued:

Date amended:

By Direction of the Administrator

_____

_

(Signature)

_____

Any alteration of this certificate is punishable by a fine not exceeding $1,000, or imprisonment not exceeding 3 years, or both.

This certificate may be transferred in accordance with FAR 21.47.

FAA FORM 8110-9 (2-82)(Representation) ***An***

APPENDIX 2. BACK SIDE OF FAA FORM 8110-2

INSTRUCTIONS: The transfer endorsement below may be used to notify the appropriate FAA Regional Office of the transfer of this Supplemental Type Certificate.

The FAA will reissue the certificate in the name of the transferee and forward it to him.

TRANSFER ENDORSEMENT

Transfer the ownership of Supplemental Type Certificate Number _____

to *(Name of transferee)* _____

(Address of transferee) _____

_____
(Number and street)

_____
(City, State, and ZIP Code)

from *(Name of grantor) (Print or type)*
_____

(Address of grantor)
_____
(Number and street)

_____
(City, State, and ZIP Code)

Extent of Authority (if licensing agreement): _____

_____

_____

_____

Date of Transfer: _____

Signature of grantor *(In ink):* _____

FAA FORM 8110-9 (2-82)(Representation)

APPENDIX 3. LIST OF FAA FORMS

1. FAA Form 337, Major Repair and Alteration (Airframe, Powerplant, Propeller, or Appliance)
2. FAA Form 8000-4, Air Agency Certificate
3. FAA Form 8000-5, Certificate of Designation
4. FAA Form 8100-1, Conformity Inspection Report
5. FAA Form 8110-1, Type Inspection Authorization
6. FAA Form 8110-2, Supplemental Type Certificate
7. FAA Form 8110-2-1, Type Certification Continuation Sheet
8. FAA Form 8110-3, Statement of Compliance with the Federal Aviation Regulations
9. FAA Form 8110-4, Type Inspection Report - Part 1 - Rotorcraft Ground Inspection
10. FAA Form 8110-5, Type Inspection report - Part 1 - Airplane Ground Inspection
11. FAA Form 8110-6, Type Inspection Report - Engines
12. FAA Form 8110-7, Type Inspection Report - Propellers
13. FAA Form 8110-8, Type Inspection Report - Part 1 - Free Balloons
14. FAA Form 8110-9, Type Certificate
15. FAA Form 8110-12, Application for Type Certificate, Production Certificate, or Supplemental Type Certificate
16. FAA Form 8110-13, Type Certification Project Status
17. FAA Form 8110-14, Statement of Qualifications (DMIR - DER - DPRE - DME)
18. FAA Form 8110-20, Rotorcraft Ground Inspection
19. FAA Form 8110-21, Airplane Ground Inspection

APPENDIX 3. LIST OF FAA FORMS - continued

20. FAA Form 8110-26, Supplemental Type Inspection Report

21. FAA Form 8120-10, Request for Conformity

22. FAA Form 8130-3, Airworthiness Approval Tag

23. FAA Form 8130-9, Statement of Conformity

24. FAA Form 8430-9, Certification of Authority

APPENDIX 4. COMPLETION OF FAA FORM 8120-10, REQUEST FOR CONFORMITY EXHIBIT 4-1

1. Request For Conformity Inspection: Enter the FAA office which is requested to perform the conformity inspection.

2. Project No.: Enter the FAA project number established for the project.

3. Date: Enter the current date.

4. Part Conformity/Installation/Other: Check the applicable blocks.

5. Applicant Name: Enter the name of the applicant as shown on the original project application.

6. Company Name: Enter the name of the supplier, vendor, or test firm where the desired inspection is to occur.

7. Street/City/State/Zip: Address of the company named.

8. Time/Date Available: If it is known when the product, part, assembly, appliance, or test article will be ready, enter the expected date.

9. Type Installation: Enter a brief descriptive statement which encompasses the product, part, assembly, appliance, or test article to be inspected, e.g., landing gear assembly, galley flammability test articles, wing spars, etc.

10. Make/Model: Identify the end product being certificated or modified.

11. Quantity: Enter the quantity of parts requiring inspection, e.g., 1 shipset, 5 test samples, etc.

12. Requesting document (P.O.) and date: Reference the applicant's letter or other correspondence identifying the pending certification test.

13. Design Data: Identify the specific data to be utilized for the inspection, i.e., drawing (including revision and date).

APPENDIX 4. COMPLETION OF FAA FORM 8120-10 - continued
EXHIBIT 4-1

14. Special Instructions: Enter any special instructions as necessary.

15. Contact: Enter the name and title (if known) along with the telephone number of the person to be contacted either with the applicant's or the vendor organization to arrange the desired inspection.

16. FAA Project Manager: Enter the name and telephone number of the FAA project specialist involved in the pending test.

17. "Form Blocks": Place a check mark in each applicable block:

a. TIA Issued: Check this block when the request is being utilized to supplement a previously issued TIA.

b. TIR Required: Check this block to have any related conformity inspection records placed in the pending TIR (when a TIA has been issued).

c. 8130-3 Tags Required: Check this block when the inspection articles will be moved or shipped from the inspection site to a remote testing site and assurance of article inspection is desired. FAA Form 8130-3 is the conformity inspection tag.

d. FAA Form 8100-1 Required: Check this block with every request. FAA Form 8100-1 is the conformity inspection record.

e. FAA Form 8130-9 Required: Check the block with every request. The form is required by § 21.53.

18. Note: Enter "Please return this request for conformity with the FAA conformity document to (ENTER THE ACO BRANCH TO RETURN THE INSPECTION RECORDS, e.g., 'AIRFRAME BRANCH (SPECIALIST'S NAME) VIA THE ANYTOWN MIDO')"

APPENDIX 4. REQUEST FOR CONFORMITY, FAA FORM 8120-10
EXHIBIT 4-1

U.S. Department of Transportation
Federal Aviation Administration

REQUEST FOR CONFORMITY

To: _____ **Attention:** _____

_____

_____

Request for Conformity Inspection **Project No:** _____

☐ Part Conformity _____ **Date:** _____
☐ Installation _____
☐ Other _____

A conformity inspection pertaining to the subject is requested for the following:

Applicant Name: _____

Company Name: _____

Street: _____

City: _____ State: _____ Zip: _____

Time/Date Available: _____ ☐ Applicant will Contact FAA

Type Installation: _____

Make/Model: _____ Quantity: _____

Requesting Document (P.O.) and Date: _____

Design Data: (with Revision/Date): _____

_____

Special Instructions: _____

_____

Contact: _____ at: _____
(Phone Number)

FAA Project Manager: _____ Phone: _____

Remarks: _____

_____

_____

☐ T.I.A. Issued ☐ FAA Form 8100-1 Required
☐ T.I.R. Required ☐ FAA Form 8130-9 Required
☐ 8130-3 Tags Required

Note: Please return this request for conformity with the FAA conformity document to _____

_____

FAA Form 8120-10 (5-90) **(Representation)**

APPENDIX 4. COMPLETION OF FAA FORM 8100-1
EXHIBIT 4-2

CONFORMITY INSPECTION RECORD . Completion instructions are as follows (refer to numbered blocks on the form):

1. Block #1: Type or Production Project No.

2. Block #2 and #3: Information can be obtained from Conformity Request, FAA Form 8120 -10.

3. Block #4: Period during which the inspection was performed.

4. Block #5: Manufacturing Inspectors name, and FAA office number (or DMIR number).

5. Block #6: Title of approved design data or name of part or assembly as shown on drawings referenced on Conformity Request, FAA Form 8120-10, and or Type Inspection Authorization (TIA) FAA Form 8110-1.

6. Block #7: Drawing(s) number related directly to approved design data or nomenclature in item #6.

7. Block #8: Latest date and revision level of data in item #6 and #7.

8. Block #9: Indicate the amount of data/parts/assemblies found to satisfactory or unsatisfactory.

9. Block #10: Describe nonconformities (unacceptable conditions) leave several spaces for corrective action effort. Attach additional sheets if necessary.

   a. Unsatisfactory conditions/nonconformities will be reentered in item#6 with corrective action described in item #10.

   b. When corrective action is completed, the unsatisfactory block is lined through and initialed.

   c. This block can also be used for remarks, serial numbers, part numbers, work order numbers, special processes, and to list FAA forms.

APPENDIX 4. COMPLETION OF FAA FORM 8100-1 - continued
EXHIBIT 4-2

10. The following information should be recorded on the top margin (extracted from the Conformity Request, FAA Form 8120-10).

a. Originator - Engineering office and request date.

b. Page identification and number of pages, example (Page 1 of 1).

c. If FAA Form 8100-1 is issued for TIA attachment, record TIA number and attachment number.

APPENDIX 4. COMPLETION OF FAA FORM 8100-1
EXHIBIT 4-2

To: **ANM-172W** (Add TIR attachment No. if applicable)

Conformity Inspection Record	1. Project Number, TIA/Request Date: ANM-100L - 123 / 10-24-87	2. SHEET 1 of 1 Sheets
3. Applicant/Manufacturer: Aircraft Co. (Air Med. Inc.)	4. Beginning Date: 10/24/87	5. Ending Date: 10/27/87
6. Model: 767	7. Inspected By: Bob Jones NM-MIDO-46 Bob Jones	

8. Item No	9. Nomenclature of Item Inspected	10. Drawing, Document, Specification, etc.	11. Revision and Date	12. No. of Items Determined SAT.	12. No. of Items Determined UNSAT.	13. Comments
1	Air Med. MDL	2001	U 3-6-87		~~1~~ BJ	Parts are being manufactured to Rev. V
2	Air Med. MDL	2001	V 4-6-87	1		C/A coordinated later changes with ANM-172W by telecon 10/27/87.
3	Air Med. Stretcher	2009	M 4-6-87	1		-01 Config. verified critical dim. and heat treat.
						8130-9 obtained 1 each 8130-3 tag issued.

FAA Form 8100-1 (5-92) **Supersedes Previous Edition (Representation)**

APPENDIX 4. STATEMENT OF CONFORMITY, FAA FORM 8130-9 FROM APPLICANT EXHIBIT 4-3

OMB: 2120-0018

STATEMENT OF CONFORMITY

Section I — Aircraft N/A (Parts)

1. Make	2. Model
3. Serial No.	4. Registration No.

Section II — Engine

1. Make	2. Model
3. Serial No.	

Section III — Propeller

1. Make	2. Model
3. Blade Model	4. Hub Serial No.
5. Blade Serial Nos.	

Section IV — Certification

I hereby certify that: Parts are in conformity with Air Medical Inc. Master Drawing List 2001, Rev. V, dated 4/6/87

☒ A. I have complied with Section 21.33(a.).

☐ B. The aircraft described above, produced under type certificate only (FAR 21 Subpart F), conforms to its type certificate, is in a condition for safe operation, and was flight checked on _____ *(Date)*

☐ C. The engine or propeller described above, presented herewith for type certification, conforms to the type design therefor.

☐ D. The engine or propeller described above, produced under type certificate only (FAR 21 Subpart F), conforms to its type certificate and is in a condition for safe operation. The engine or, if applicable, the variable pitch propeller was subjected by the manufacturer to a final operation check on _____ *(Date)*

Deviations: None

Signature of Certifier	Title
W. A. Smith *W.A.Smith*	Quality Control Manager
Organization	**Date**
Aircraft Company	10/27/87

FAA Form 8130-9 (11-88) Use Previous Edition (Representation)

APPENDIX 4. STATEMENT OF CONFORMITY, FAA FORM 8130-9 FROM AGENT FOR APPLICANT EXHIBIT 4-4

OMB: 2120-0018

STATEMENT OF CONFORMITY

Section I — Aircraft N/A (Parts)

1. Make	2. Model
3. Serial No.	4. Registration No.

Section II — Engine

1. Make	2. Model
3. Serial No.	

Section III — Propeller

1. Make	2. Model
3. Blade Model	4. Hub Serial No.
5. Blade Serial Nos.	

Section IV — Certification

I hereby certify that: Parts are in conformity with Air Medical Inc. Master Drawing List 2001, Rev. V, dated 4/6/87

☒ A. I have complied with Section 21.33(a.).

☐ B. The aircraft described above, produced under type certificate only (FAR 21 Subpart F), conforms to its type certificate, is in a condition for safe operation, and was flight checked on _____ *(Date)*

☐ C. The engine or propeller described above, presented herewith for type certification, conforms to the type design therefor.

☐ D. The engine or propeller described above, produced under type certificate only (FAR 21 Subpart F), conforms to its type certificate and is in a condition for safe operation. The engine or, if applicable, the variable pitch propeller was subjected by the manufacturer to a final operation check on _____ *(Date)*

Deviations: None

NOTE: Agent Authorization Letter must be attached to this document (Ref. Paragraph 511, C, 2.)

Signature of Certifier	Title
J. Dent *J. Dent*	Agent
Organization Aircraft Company	**Date** 10/27/87

FAA Form 8130-9 (11-88) Use Previous Edition (Representation)

APPENDIX 5. FORMAL STA/STC APPLICATION REQUEST
Item 1

Request for : (Specify) Date :_____

Supplemental Type Approval ☐
Supplemental Type Approval Revision ☐ STA _____ Issue_____

Limited Supplemental Type Approval ☐

Supplemental Type Certificate ☐
Supplemental Type Certificate Revision ☐ STC _____ Revision____

Supplemental Type Certificate Familiarization ☐ STC_____

Name and Address:
of Applicant :

Aeronautical Product:
Make/Model :

Type Approval-Basis of Approval ..... and/or Type certificate-Basis of Certification .....

Description of Proposed Change :

Proposed Basis of Approval : Same as TA ☐ Same as TC ☐

Other ☐ Specify

Documentation Checklist	Applicable		Submitted	
	Yes	No	Yes	No
- Compliance Program				
- Flight Manual Supplement				
- Maintenance Manual Supplement. . .				
- Repair Instructions.				
- Engineering Reports.				
- Design Drawings				
- Installation Drawings and Instructions				
- Electrical Load Analysis				
- Weight and Moment Change				
- Flight Test Data				
- Other (Specify)				

APPENDIX 5. TRANSPORT CANADA REGIONAL AIRWORTHINESS ENGINEERS
Item 2

PACIFIC REGION

Larry Samoil
Transport Canada
Regional Airworthiness
Engineer
P.O. Box 220
800 Burrard St.
Vancouver, B.C.
V6Z 2J8
Tel: (604) 666-5593

WESTERN REGION

Bill Bruce
Transport Canada
Regional Airworthiness
Engineer
1100, 9700 Jasper Avenue
Edmonton, Alberta
Tel: (403) 420-3855

CENTRAL REGION

Dennis Hoeppner
Transport Canada
Regional Airworthiness
Engineer
P.O. Box 8550
125 Garry Street
Winnipeg, Manitoba
R3C 0P6
Tel: (204) 983-4352

ONTARIO REGION

Henry Wojnicki
Transport Canada
Regional Airworthiness
Engineer
4900 Yonge Street
Suite 300
Willowdale, Ontario
M2N 6A5
Tel: (416) 224-3273

QUEBEC REGION

Bruno Stipetic
Transport Canada
Regional Airworthiness
Engineer
P.O. Box 500
700 Leigh Capréol
Dorval, Quebec
G9R 5P8
Tel: (514) 633-3593

ATLANTIC REGION

Shaun O'Reilly
Transport Canada
Regional Airworthiness
Engineer
P.O. Box 42
Moncton, New Brunswick
E1C 8K6
Tel: (506) 851-7114

APPENDIX 5. SAMPLE LETTER
Item 3

(RAE's Name)
Transport Canada
Regional Airworthiness
Engineer
(Address)

or Mr. J. A. Torck
Director, Airworthiness Branch
Transport Canada
Centennial Towers
200 Kent Street - AARD
Ottawa, Ontario, Canada K1A 0NA

Dear Mr._____

We have received from a United States applicant _____, an application for the issue of a Supplement Type Approval (STA) to cover the installation of _____ on _____.

We have reviewed the applicant's submission, and we hereby certify that this installation complies with the basis of certification as specified in Transport Canada Type Approval ____ _____. We have issued STC _____ dated _____.

Please consider this request as a formal application for the issue of an STA under the terms of the Canada/United States Bilateral Airworthiness Agreement. In support of this application, we have enclosed the following data:

a. Copy of STC _____ dated _____.
b. Application for STA, dated _____.
c. Compliance Checklist _____.
d. Flight Manual Supplement _____.
e. List any other documentation being forwarded in support of the STA application.

Should you require any additional information, please do not hesitate to contact us.

Sincerely,

Signature

Enclosures.

APPENDIX 6. LIST OF ACRONYMS

AC - Advisory Circular

ACO - Aircraft Certification Office

ACRP - Aircraft Certification Regulatory Program

AD - Airworthiness Directive

AEG - Aircraft Evaluation Group

AFM - Aircraft Flight Manual

C.G. - Center-of-Gravity

CAR - Civil Air Regulations

CPP - Certification Program Plan

DAS - Designated Alteration Station

DER - Designated Engineering Representative

FAA - Federal Aviation Administration

FOEB - Flight Operations Evaluation Board

FSB - Flight Standardization Board

GPO - Government Printing Office

MIDO - Manufacturing Inspection District Office

JAA - European Joint Aviation Authorities

MMEL - Master Minimum Equipment List

MRB - Maintenance Review Board

NDI - Non Destructive Inspection

NPRM - Notice of Proposed Rulemaking

APPENDIX 6. LIST OF ACRONYMS - continued

PC - Production Certificate

RAE - Regional Airworthiness Engineer (Canadian)

SCR - Special Certification Review

SFAR - Special Federal Aviation Regulations

STA - Supplemental Type Approval

STC - Supplemental Type Certificates

STIR - Supplemental Type Inspection Report

TC - Type Certificates

TCB - Type Certification Board

TCDS - Type Certificate Data Sheet

TIA - Type Inspection Authorization

TIR - Type Inspection Report

TSO - Technical Standard Order

APPENDIX 7. AIRCRAFT CERTIFICATION OFFICES

Brussels Aircraft Certification Staff

(APO Air Mail Address)
Federal Aviation Administration
c/o American Embassy
PSC 82 Box 002
APO AE New York 09724

(Location Address)
15 rue de la Loi (1st floor)
B-1040
Brussels, Belgium

Boston ACO

Federal Aviation Administration
Boston Aircraft Certification Office, ANE-150
12 New England Executive Park
Burlington, MA 01803

Engine Certification Office

Federal Aviation Administration
Engine Certification Office, ANE-140
12 New England Executive Park
Burlington, MA 01803

New York ACO

Federal Aviation Administration
New York Aircraft Certification Office, ANE-170
10 5th St., 3rd Floor
Valley Stream, NY 11581

APPENDIX 7. AIRCRAFT CERTIFICATION OFFICES - continued

Anchorage Aircraft Certification Office

Federal Aviation Administration
Anchorage Aircraft Certification Office, ACE-115N
605 W. 4th Avenue, Room 214
Anchorage, AK 99501

Atlanta ACO

Federal Aviation Administration
Atlanta Aircraft Certification Office, ACE-115A
1701 Columbia Avenue, Suite 2-160
College Park, GA 30337-2748

Chicago ACO

Federal Aviation Administration
Chicago Aircraft Certification Office, ACE-115C
2300 East Devon Avenue, Rm 232
Des Plaines, IL 60018

Wichita ACO

Federal Aviation Administration
Wichita Aircraft Certification Office, ACE-115W
1801 Airport Road, Rm 100
Mid-Continent Airport
Wichita, KS 67209

Seattle ACO

Federal Aviation Administration
Seattle Aircraft Certification Office, ANM-100S
1601 Lind Avenue, S. W.
Renton, WA 98055-4056

APPENDIX 7. AIRCRAFT CERTIFICATION OFFICES - continued

Denver Aircraft Certification Office

Federal Aviation Administration
Denver Aircraft Certification Office, ANM-100D
5440 Roslyn Street
Denver, CO 80216

Los Angeles ACO

Federal Aviation Administration
Los Angeles Aircraft Certification Office, ANM-100L
3960 Paramount Blvd.
Lakewood, CA 90712

Fort Worth Certification Offices

Federal Aviation Administration
Airplane Certification Office, ASW-150
2601 Meacham Boulevard
Fort Worth, TX 76137-4298

Federal Aviation Administration
Helicopter Certification Office, ASW-170
2601 Meacham Boulevard
Fort Worth, TX 76137-4298

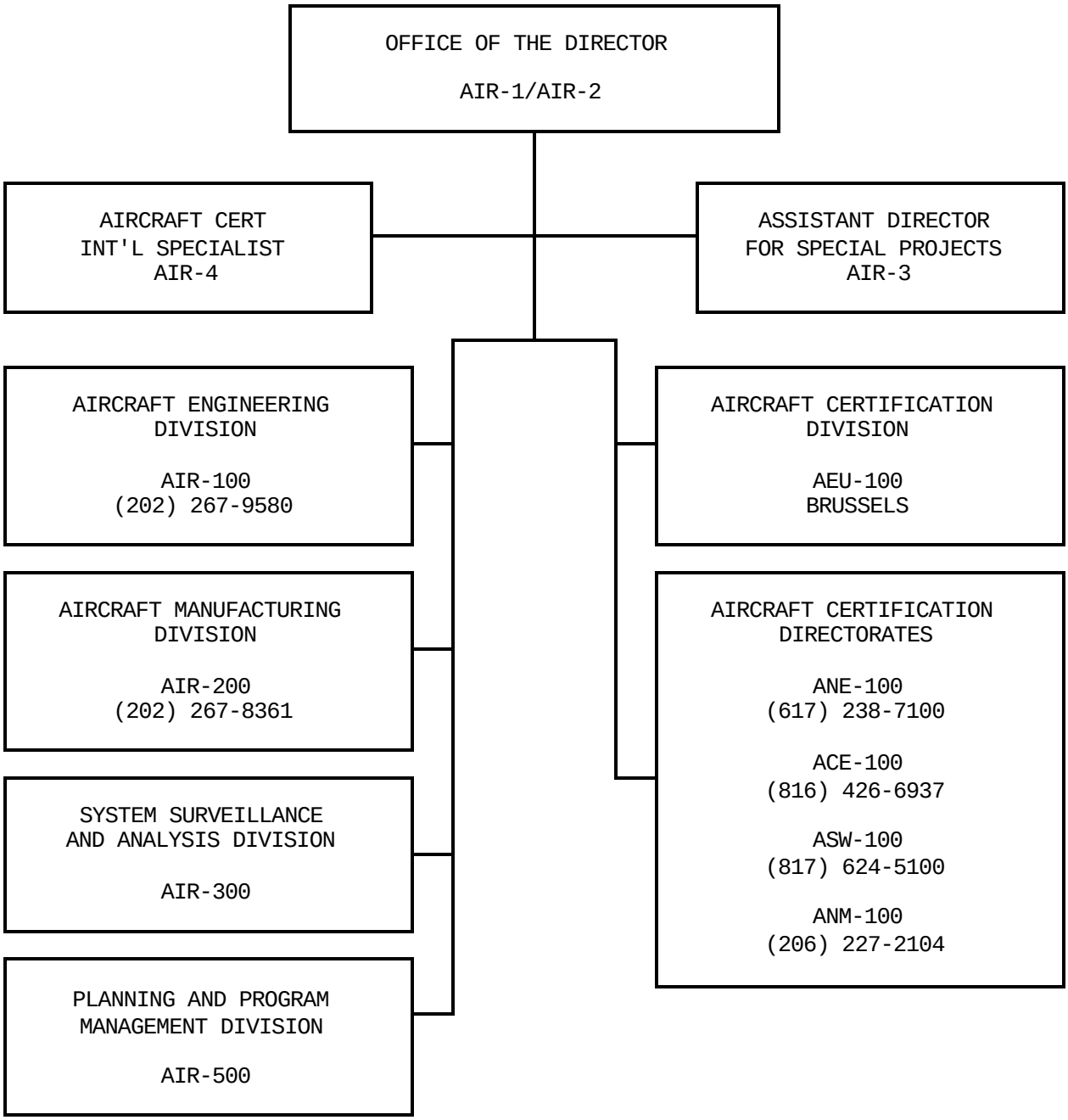
Federal Aviation Administration
Special Programs Office, ASW-190
2601 Meacham Boulevard
Fort Worth, TX 76137-4298

APPENDIX 8. AIRCRAFT EVALUATION GROUP

AIRCRAFT EVALUATION GROUP
RESPONSIBLE FOR:

Mr. Troy Sims Aircraft Evaluation Group, MKC AEG 601 East 12th Street Federal Building Kansas City, MO 64106 Phone (816) 429-3946	Part 23/ SFAR 41/ Commuter
Mr. Wayne Langston Aircraft Evaluation Group, FTW AEG 2601 Meacham Boulevard Fort Worth, TX 76137 Phone (817) 222-5271	Part 27/29
Mr. Tom Anderson Aircraft Evaluation Group, SEA AEG 1601 Lind Ave. S.W. Renton, WA 98055-4056 Phone (206) 227-2289	Part 25
Mr. Ken Erdman Aircraft Evaluation Group, LGB AEG 3229 E. Spring Street Long Beach, CA 90806-2425 Phone (310) 988-5273	Part 25
Mr. William Machado Aircraft Evaluation Group, BOS AEG 12 New England Executive Park Burlington, MA 01803 Phone (617) 273-7023	Engines
Mr. Ross Cusimana Aircraft Evaluation Program Staff, AFS-60 800 Independence Avenue, SW Washington, DC 20591 Phone (202) 267-7759	Headquarters Approval

APPENDIX 9. AIRCRAFT CERTIFICATION SERVICE



U.S. Department
of Transportation

**Federal Aviation
Administration**

Directive Feedback Information

Please submit any written comments or recommendations for improving this directive, or suggest new items or subjects to be added to it. Also, if you find an error, please tell us about it.

Subject: Order _____

To: Directive Management Officer, _____

(*Please check all appropriate line items)*

☐ An error (procedural or typographical) has been noted in paragraph _____ on page _____ .

☐ Recommend paragraph _____ on page _____ be changed as follows:
(attach separate sheet if necessary)

☐ In a future change to this directive, please include coverage on the following subject
(briefly describe what you want added):

☐ Other comments:

☐ I would like to discuss the above. Please contact me.

Submitted by: _____ Date: _____

FTS Telephone Number: _____ Routing Symbol: _____

FAA Form 1320–19 (8-89)(Representation)