ORDER 8110.4B

TYPE CERTIFICATION

April 24, 2000

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

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Initiated By: AIR-110

RECORD OF CHANGES DIRECTIVE NO. **8110.4B**

CHANGE TO BASIC	SUPPLEMENTS			OPTIONAL	CHANGE TO BASIC	SUPPLEMENTS			OPTIONAL

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 Aircraft Certification Service personnel, Flight Standards Service personnel, persons designated by the administrator and organizations associated with the certification processes required by the Federal Aviation Regulations. Obviously, it is impractical to cover all situations or conditions that may arise and, hence, these instructions must be supplemented by good judgement in handling the particular problems involved.

Forward any deficiencies, clarifications needed, or suggested improvements regarding the content of this order to the Aircraft Certification Service, Automated Systems Branch, AIR-520, Attention: Directives Management Officer, for consideration. Your assistance is welcome. Federal Aviation Administration (FAA) Form 1320-19, Directive Feedback Information, is located on the last page of this order for your convenience. If you urgently need an interpretation, 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.

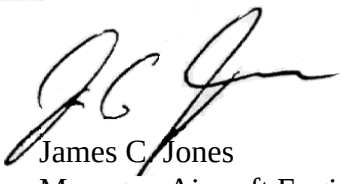

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TABLE OF CONTENTS

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

CHAPTER 6. ADDITIONAL INFORMATION ON SELECTED TOPICS

APPENDIX 1. FORMS AND GUIDANCE FOR TC PROJECTS

LIST OF ILLUSTRATIONS

CHAPTER 1. GENERAL

1-1. PURPOSE. This order prescribes the responsibilities and procedures for Federal Aviation Administration (FAA) aircraft certification personnel responsible for the certification process required by Title 14 of the Code of Federal Regulations for civil aircraft, aircraft engines, and propellers.

1-2. 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, all Aircraft Evaluation Groups (AEG) and to all Designated Engineering Representatives (DER).

1-3. CANCELLATION. Order 8110.4A, Type Certification Process, dated March 2, 1995, is canceled.

1-4. EXPLANATION OF CHANGES. This revision contains the following changes:

a. Paragraph 1-5 updates Aircraft Certification Service and Flight Standards Service office responsibilities for type certification.

b. Paragraph 2-1, 2-4, and 4-2 describe how Aircraft Certification Offices (ACO) will communicate and work together on certification projects.

c. Paragraphs 2-3, 2-11, and 4-2 address the use of foreign registered aircraft in certification programs.

d. Paragraph 2-4 addresses the requirements of the electronic Certification Project Notification (CPN) and CPN electronic bulletin board.

e. Paragraph 2-4, 3-3, 4-4, and Appendix 1 address the Aircraft Certification Office Subsystem (ACOS) project and certificate numbering system.

f. Paragraph 2-5 allows increased flexibility for Type Certification Board (TCB) meetings, further defines their purpose, and establishes the Aircraft Evaluation Group representatives as board members.

g. Paragraph 2-10 addresses current policy on establishing certification basis.

h. Paragraph 2-11 identifies a certification plan and compliance checklist as useful project tools that are the responsibility of the applicant and require the applicant to notify FAA Air Traffic Control before flying their aircraft.

i. Paragraphs 2-12h, 6-4b, and 6-4d address the flight test risk management process.

j. Paragraph 2-13b addresses the AEG TCB member's responsibilities.

k. Paragraph 2-13e addresses Maintenance Review Board (MRB) establishment and functions.

l. Paragraph 2-14c addresses flight manual supplement approval.

m. Paragraph 2-15c is expanded to address Instructions for Continued Airworthiness (ICA).

n. Paragraph 2-16 was added to address data retention by the FAA and applicant/certificate holder.

o. Paragraph 3-2h modifies the procedures for releasing data from surrendered type certificates and 3-2j deleted procedures for when the type certificate holder cannot be located.

p. Paragraph 3-3 specifies the requirement for a "TC Holder Record" paragraph on the Type Certificate Data Sheet (TCDS) and updated various TCDS requirements.

q. Paragraph 4-2 is modified to address single Supplemental Type Certificates (STC) applicable to more than one type certificated product, STC's applicable to one aircraft only, AEG responsibilities on STC's, revisions to performance data, non-interference STC's, and STC's involving foreign registered aircraft.

r. Paragraph 4-4 addresses the limitations and conditions to be stated on the STC such as the STC holder's responsibility to provide written evidence or permission for another person to use the STC and limitations and conditions for STC's that install provisions for equipment but don't install the equipment.

s. Paragraph changed Canadian Supplemental Type Approval (STA) to STC.

t. Chapter 5 was modified to address requests for conformity outside the project office and from Foreign Civil Aviation Authorities (FCAA) and to expand on completion of the Type Inspection Report (TIR) and Supplemental Type Inspection Report (STIR).

u. Chapter 6 provides guidance for restricted category certification procedures utilizing the focal point ACO for the model, airworthiness directive applicability, and continued airworthiness.

v. Paragraph 6-3e addresses approval of equivalent noise certification procedures by the office of Environment and Energy (AEE).

w. Appendix 1 incorporates forms and guidance for establishing TC projects.

x. Appendix 2 addresses issuance of certificates.

y. Appendix 4 addresses forms related to conformity.

1-5. BACKGROUND AND DISCUSSION.

a. Order 8110.4B, Type Certification, is published to provide updated guidance to the FAA and industry on procedures and policy for type certification of aircraft products.

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 regulations and to maintain certificate integrity (continued airworthiness). Appendix 11 provides a historical background of aircraft airworthiness regulations. The Aircraft Certification Service is composed of three headquarters divisions, an International Airworthiness Programs Staff, four certification directorates, and an Aircraft Certification Division located in Brussels, Belgium. The three headquarters divisions are: the Aircraft Engineering Division, the Production and Airworthiness Certification 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). Appendix 9 shows an organizational diagram of the Aircraft Certification Service. 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) Title 14 of the Code of Federal Regulations (14 CFR) Part 21, Certification Procedures for Products and Parts;

(c) 14 CFR Part 39, Airworthiness Directives;

(d) 14 CFR 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 and airworthiness certification portions of the Aircraft Certification Regulatory Program;

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

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

(d) 14 CFR 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 Planning and Program Management Division is responsible for:

(a) Coordination of the Service's strategic and tactical planning initiatives and processes.

(b) Service technical, general, and managerial training requirements.

(c) Administrative and program management guidance, coordination, and support for Service headquarters organizations.

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

(a) 14 CFR Part 23, Airworthiness Standards: Normal, Utility, Acrobatic, and Commuter Category Airplanes;

(b) 14 CFR 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.

(f) Part 23, Glider and airship import TC projects from Europe, Africa and Israel.

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

(a) 14 CFR Part 25, Airworthiness Standards: Transport Category Airplanes; and

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

(c) Part 25 import TC projects from Europe, Africa and Israel.

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

(a) 14 CFR Part 27, Airworthiness Standards: Normal Category Rotorcraft;

(b) 14 CFR Part 29, Airworthiness Standards: Transport Category Rotorcraft;

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

(d) Powered lift aircraft; and

(d) Technical guidance for Primary Category Rotorcraft.

(e) Part 27 and part 29 import TC projects from Europe, Africa and Israel

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

(a) 14 CFR Part 33, Airworthiness Standards: Aircraft Engines; and

(b) 14 CFR Part 35, Airworthiness Standards: Propellers.

(c) Technical guidance on Auxiliary Power Units (APU's).

(8) The International Airworthiness Programs Staff (AIR-4) is responsible for policy guidance on bilateral agreements, import and export of aeronautical products, and other international airworthiness issues, programs, and procedures.

(9) Aircraft Certification Office (ACO). Each directorate incorporates three or more ACO's within their geographical areas that 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.

(10) Aircraft Evaluation Group (AEG). A Flight Standards group that is co-located with each directorate and is responsible for determining operational acceptability and continuing airworthiness requirements of newly certified or modified aircraft, engines and propellers 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), 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) The office of primary responsibility for this order is the Certification Procedures Branch, AIR-110, under the Aircraft Certification Service Engineering Division, AIR-100.

CHAPTER 2. TYPE CERTIFICATION PROCESS

2-1. GENERAL.

a. This chapter describes the type certification process for U.S. applicants under 14 CFR section 21.21. For imported products, see Advisory Circular 21-23, Airworthiness Certification of Civil Aircraft, Engines, Propellers, and Related Products Imported to the United States. Certification of products designed/manufactured in Joint Aviation Authority (JAA) member countries was addressed in Notice 8110.70, FAA/JAA Type and Post-Type Validation Principles. The permanent policy of this notice will be incorporated in an order that is scheduled to be issued by Mid-2000. The process prescribe in this chapter 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 between the Aircraft Certification Office (ACO) and Manufacturing Inspection District Office (MIDO). The MIDO may actually be a Manufacturing Inspection Satellite Office (MISO), Certificate Management Office (CMO), or Certificate Management Unit (CMU), as applicable.

b. Each aircraft certification directorate has an established AEG, which is part of the Flight Standards Region and is directly responsible 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. Certificate Management ACO (CMACO) is the ACO that manages the original type certificate project. The CMACO also manages the continued airworthiness of a product as long as it is in service.

d. Project ACO (PACO) may be any ACO working a certification project. If the project is a follow-up certification activity such as Supplemental Type Certificate (STC) or Parts Manufacturer Approval (PMA), coordination with the CMACO may be required.

e. PACO and CMACO Relationship. The CMACO will assist the PACO on certain follow up certification activity since the CMACO is most familiar with the certificated product and maintains contact with the certificate holder.

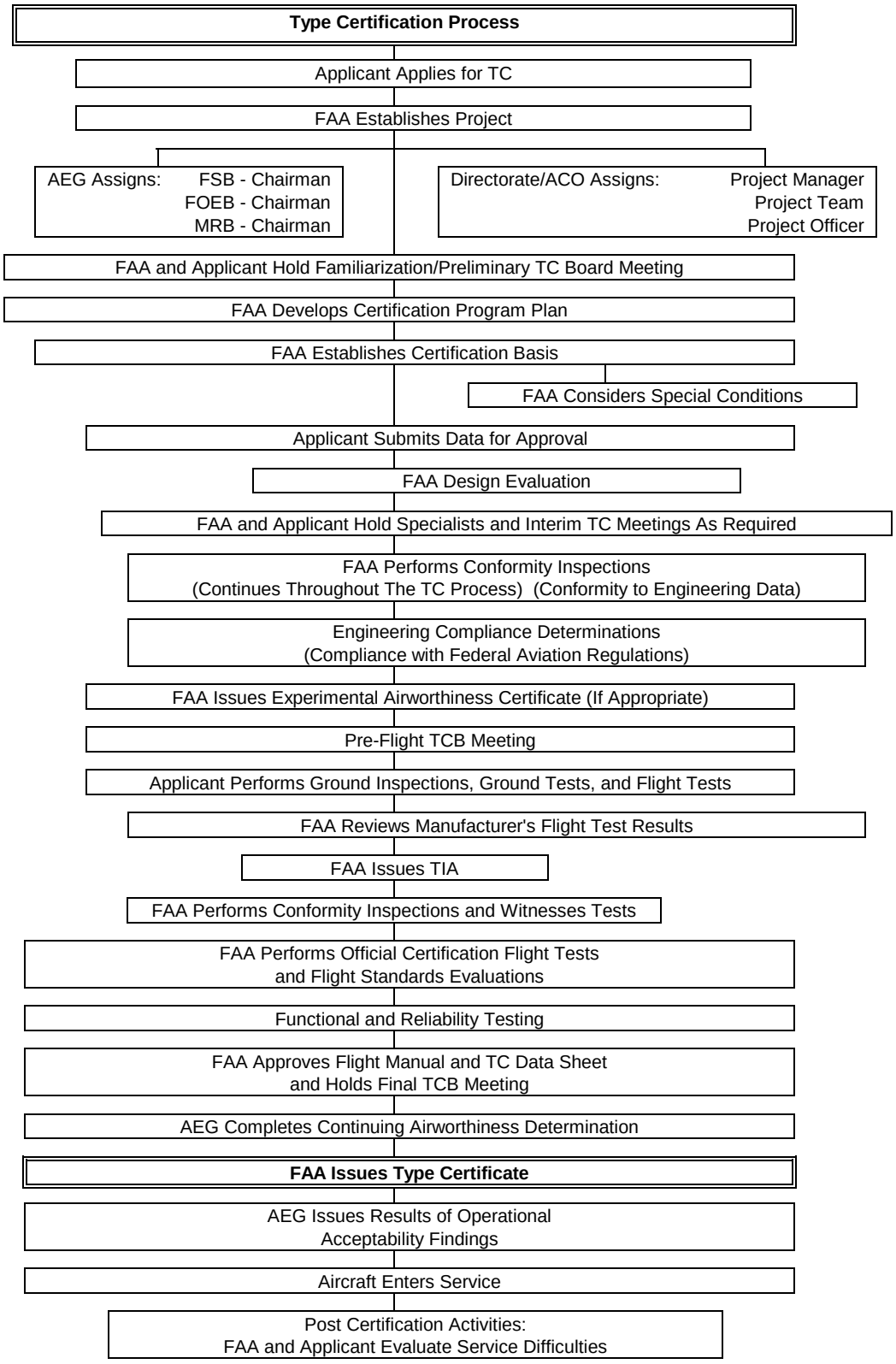


Figure 2-1. Type Certification Process

2-2. 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 an STC (reference § 21.113).

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, an STC, or to a licensee of a TC or STC holder, who meets the requirements of §§ 21.135, 21.139, and 21.143.

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

2-3. 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, Figure 2). Complete blocks 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, Figure 2). 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 blocks 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 (PMA) unless the installation represents a major change in type design or special instructions are necessary for safe installation.

(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.

(3) STC applications for projects using foreign-registered aircraft should include a letter from the civil aviation authority responsible for the aircraft (State of Registry) regarding their involvement with and acceptance of the proposed modification. Also if installation outside the U.S. is planned, the details of that installation should be included in the application package.

(4) To ensure the effective use of FAA resources when undertaking an STC project, ACOs should determine where manufacturing is occurring. If an applicant does not have manufacturing capability in the United States and plans to use foreign manufactured parts, the ACO should not accept the STC project (Reference 21.43).

c. Production Certificate Application. Complete blocks 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 or STC.

2-4. ESTABLISHMENT OF TC PROJECT.

a. General. An applicant submits a TC, amended TC, or STC application to the geographically responsible ACO (reference AC 20-126, Aircraft Certification Service Field Office Directory).

b. Certification Project Notification. The ACO is responsible for assigning a project number, a project manager, and electronically notifying the accountable directorate of each project by completing a standardized Certification Project Notification (CPN) form as shown in Appendix 1, Figure 4. The CPN includes a brief description of the project, states the project's significance, and identifies whether or not NRS and AEG involvement is requested. The accountable directorate standards staff is responsible for posting the CPN on an FAA electronic bulletin board for NRS review. 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, Aircraft Certification Directorate Procedures, paragraph 400).

c. ACO to ACO Coordination. If the project is for an STC, PMA, or repair and the project ACO (PACO) is different from the certificate management ACO (CMACO) for the affected product, the project ACO must determine if the project is of a type listed in Appendix 1, Figure 6. If the project is of a type listed in Appendix 1, Figure 6, the PACO must also send the CPN to the CMACO and the project manager/project engineer must coordinate the project with the CMACO assigned engineer for that project. The PACO project manager/project engineer will discuss with the CMACO assigned engineer all issues involving the project and establish the level of involvement the CMACO will have, i.e. submission of data, attendance at meetings, etc. and assure that all technical issues are addressed. It will be the responsibility of the CMACO assigned engineer to obtain technical support from his/her office to assist in dealing with the PACO on the assigned project. The CMACO assigned engineer will participate in the TC board meetings and will coordinate on the certification program plan.

d. Project Number. The Aircraft Certification Office Subsystem (ACOS) is the automated system used to assign project numbers and track and manage certification programs. The ACOS assigned number reflects the type of project and the project ACO. (See Appendix 1 Figure 5, ACOS PROJECT, TC, AND STC NUMBERING SYSTEM, for details of the numbering system.) The assigned ACOS project number should be used by all personnel in all correspondence, reports, and other documents pertaining to the project. If the project is either cancelled or closed before completion, the assigned ACOS project number should be marked closed or cancelled.

e. 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 certification 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 and CMACO if necessary. 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 consists of the following:

(a) A project manager;

(b) Engineers or technical specialists;

(c) Pilots and/or flight test engineers;

(d) Manufacturing inspectors;

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

(f) Project Officer and other persons at the discretion of the Accountable Directorate.

(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.

f. 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 certification project in accordance with the CPP. The project officer provides project-specific rules and policy to the project team and is the focal point with the accountable Directorate for policy.

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

2-5. TYPE CERTIFICATION BOARDS (TCB).

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) Depending on the type and/or size of the project, all of the TCB meetings may not be necessary. Some meetings may be combined, and some meetings may be duplicated or divided by discipline or system as necessary. If the number of meetings is decreased or combined or the meetings are divided by discipline or system, the board chairman will be responsible for determining that all elements of the process were addressed, integrated, and completed.

(3) The purposes of a TCB are to acquaint the applicant and the FAA with the certification project, resolve significant problems, establish milestones and schedules for the overall accomplishment of the type certification program, review the applicant’s certification plan, review proposed certification basis, and assure all outstanding certification issues are resolved. Clear expectations and assignments will be an outcome of the TCB.

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. The project manager will coordinate with the cognizant AEG manager when establishing the TCB membership. The AEG manager will in turn, provide the project manager with the name of the AEG inspectors who will be assigned to the TCB. 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;

(4) The managers, supervisors, or senior personnel from the appropriate engineering disciplines, flight test, manufacturing inspection, and AEG; and

(5) Assigned AEG personnel.

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) Additional AEG and FSDO 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.

2-6. 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. These items should include a discussion, expectations, and conclusion.

Expectations should include action item assignment and a schedule for completing any actions items, as required. 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 establish partnership with the applicant. It is an opportunity to develop mutual understanding of the type certification process as it applies to the applicant's design. The meeting should 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 the initial formal meeting that establishes the basis for the Certification Plan. The meeting at a minimum should do the following:

(1) Acquaint FAA personnel with the project;

(2) Work to 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 should identify any outstanding conformity inspection issues and engineering compliance determinations. If all issues are resolved, the TIA is normally issued at this meeting. 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) Formalize the decision to issue 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.

2-7. CERTIFICATION PROGRAM PLAN. The CPP defines the working relationship between the accountable directorate and the geographic ACO, 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. An applicant's certification plan may take the place of the CPP if it includes all information that would be addressed in the CPP and is coordinated with the project officer.

2-8. 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.

2-9. 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 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.

2-10. 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. Once the certification basis has been established and agreed to by the FAA and the applicant new policy will not be introduced unless an unsafe condition is found to exist in a product that has design features affected by that policy.

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 references 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 Aviation 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. Applicable Regulations. The regulations that address certification basis are §§ 21.17, 21.101, and 21.115.

d. Changed Aviation Products. This procedure is applicable to changes to the type design of previously certified aircraft, aircraft engines and propellers 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.

(1) Changes that Require an Updated Certification Basis. In accordance with 21.101(b)**,** If the Administrator finds that a proposed change consists of a new design of a component, equipment installation, or a system installation and that the original certification basis for the product does not provide adequate standards with respect to the proposed change, the applicant must comply with the regulations in effect on the date of the application for the change that the Administrator finds necessary to provide a level of safety equal to that provided in the certification basis for the product. The applicant must also comply with any special conditions, and amendments to those special conditions that the Administrator determines necessary to provide a level of safety equal to that provided in the certification basis for the original product.

(2) Changes that do not Require an Updated Certification Basis . In accordance with Section 21.101(a), if the change is such that it does not require an updated certification basis as described in paragraph (1) above, the applicant is given the choice of complying with the original certification basis for the product or with the latest requirements plus any other amendments the Administrator finds to be directly related.

(a) Except as provided in paragraph (c) below, the FAA will encourage the applicant to update the certification basis for the changed product to the greatest extent practical for those portions of the design that are new. These later airworthiness standards reflect aviation safety knowledge gained over the years and enhance the level of safety. The certification basis should consist of the certification basis of the model being changed 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 re-substantiation 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.

(b) FAA personnel should recognize the difference between an unsafe condition and upgrading a level of safety. The FAA can require correction of an unsafe condition for existing type designs. However, for those same type designs the FAA can only encourage an upgraded level of safety beyond that required for type certification.

(c) Updating to the requirements of the later standards, described by paragraph (a) 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.

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

(e) Because restricted category and limited category aircraft do not meet standard category airworthiness standards, 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.

(f) 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 but should be evaluated for requirements of later standards in accordance with (1) above. If the later standards are not required an updated certification basis is still encouraged. 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.

1 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.

2 A design change that significantly affects the basic loads.

3 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.

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

(3) 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, focus on the magnitude of the change, not on the way in which the changed product is identified by name or model number.

(4) 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.

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. 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. 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 past example of a need for special conditions was the use of composites for primary structure on part 23 airplanes in the 1980's. In 1993, part 23 was revised to include appropriate standards so composite special conditions are no longer appropriate. 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 shall include all the needed details and justification when forwarding the special conditions to the accountable directorate. The following is information which shall 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.

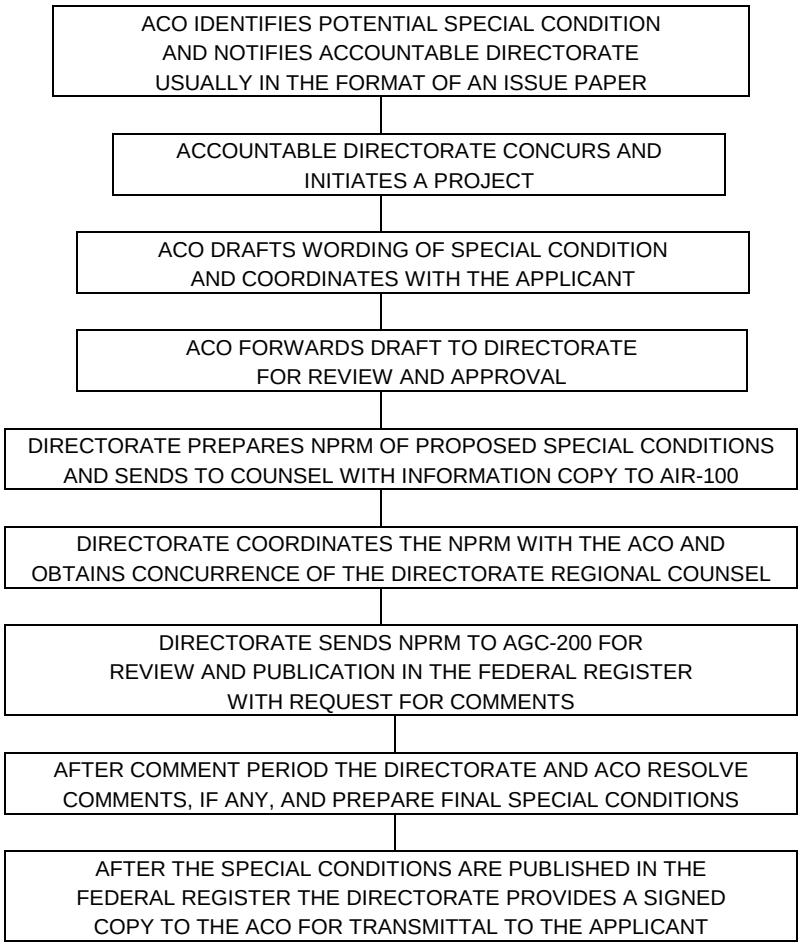


Figure 2-2. Special Conditions.

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)).

2-11. 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, noise, and emission requirements of the Federal Aviation Regulations and any special conditions prescribed by the FAA. The FAA examines the data submitted by the applicant, makes inspections and test, 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 6-3 of this order).

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 that is not possessed by the current applicant but was submitted by a previous applicant or certificate holder, must 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. If the FAA minimizes or waives the need for the applicant to provide substantiating data for specific requirements based on prior FAA knowledge, a brief rationale explaining these findings will be made by the FAA and included in the project file. Substantiating data from a previous project file will not be copied and put in a current file to support findings.

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, aircraft noise, and emissions 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 also includes any other data necessary to allow, by comparison, the determination of the airworthiness, noise characteristics, fuel venting, and exhaust emissions (where applicable) of later products 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) No specific format is prescribed by the FAA for submitting technical data, however, if data is to be submitted in any form other than original paper copy, the format must be acceptable to the FAA. This will require a memorandum of agreement (MOA) between the applicant and the FAA.

(d) It is strongly recommended that an applicant make and submit to the FAA a certification plan for all type certification projects. The plan should be submitted early in the project and updated throughout the project. As a minimum, the Certification Plan should contain the following information:

1 General information including identification of the applicant, application date, model designation, etc.

2 A general description of the concept, system, etc. including sketches and schematics.

3 The certification basis including applicable Federal Aviation Regulation paragraphs and sub- paragraphs, exemptions, and special conditions.

4 How compliance will be shown (ground test, flight test, analysis, similarity, equivalent means of compliance, etc. and what will be submitted to show compliance.) This can be accomplished using a compliance checklist that addresses each section of the Federal Aviation Regulations applicable to the product. Using this tool, the applicant and FAA can identify certification basis problem areas early in the program.

5 Project schedule, including major milestones, preliminary hazard analysis submittal, detail submittals, when conformity and testing are required, and when final certification is expected.

> **NOTE:** The applicant is responsible to meet their milestones in their certification schedule contained in the Certification Plan. Any slippage in the milestone dates may result in a delay in the program.

6 Identify all DER's, who will sign the FAA Form 8110-3 if required, their specialties, and if the DER will be approving the data or recommending approval of the data.

7 Identify all DMIR's and DAR's expected to be used for conformities or airworthiness certifications

(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).

(5) If an applicant presents a foreign registered aircraft as an article for inspection or test, the applicant must also provide evidence that the responsible civil aviation authority agrees to the modification of the aircraft.

(6) Prior to flying the aircraft the applicant will provide the following information to the Procedures Division, ATP-100, 800 Independence Avenue, SW, Washington D.C., 20591 FAX (202)267-5120:

(a) Aircraft Type Designator (777, A340 etc.)

(b) Number and type of powerplant (Piston, Jet Turboprop, Jet)

(c) Aircraft weight or weight classification (Heavy, Large, Small)

(d) Average rate of climb or descent (Feet per minute)

(e) Top cruising and landing speeds (MPH or MACH)

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

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

(2) Coordinating and accepting the Applicant's Certification Plan;

(3) Establishing the certification basis;

(4) Establishing special conditions;

(5) Processing petitions for exemptions;

(6) Determination of Equivalent Levels of Safety;

(7) Approving drawings, reports, data, test plans, and flight manuals;

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

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

(10) Issuing certificates; and

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

f. Evaluation and Approval of Design Data by the FAA.

(1) Review of Drawings, Specifications, and Reports. 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 submitted early enough to allow the FAA a reasonable amount of time to review and approve the test plan 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 Required conformities of the test article and test setup;

5 A list of the specific airworthiness standards and description of how compliance will be shown prior to the test; and

6 A test procedure written in a step-by-step format with pass/fail criteria defined.

(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 5-5) 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, pilot, or authorized DER 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 5-2a).

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.

2-12. TYPE INSPECTION AUTHORIZATION (TIA).

a. General. The TIA is prepared by the ACO on FAA Form 8110-1 and is used to authorize official conformity, airworthiness inspections, and ground 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 and Issuance 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.

NOTE: To assist the manufacturing inspector/designee the following information should be included in Block 18 part 1 of the 8110-1

Point of contact at conformity site:_____

Phone number of point of contact: ____-_____

Location of aircraft/conformity site:_____

DAR requested by the applicant:_____(as applicable)___

c. Letter of Notification. At the time of TIA issuance a letter of notification to the applicant should also be sent notifying the applicant that authorization for type inspection has been issued. A copy of the TIA should be provided to the applicant.

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 and geographic MIDO. 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 5-2).

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 is to be conducted by FAA personnel outside the geographic area of the project MIDO, the project MIDO should make request of the geographically appropriate MIDO to perform the conformity inspection. If the TIA test is to be conducted by FAA personnel outside the geographic area of the responsible ACO, the ACO may delegate the witnessing at their discretion.

h. Flight Test Risk Management Process. The signed TIA should reflect adherence with ACO/Directorate established Flight Test Risk management Process in accordance with FAA Order 4040.26, Aircraft Certification Service Flight Safety Program, in order to ensure that the associated flight test risks are acceptable.

2-13. 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 evacuation 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 operations and airworthiness personnel will communicate directly with ACO

personnel to carry out their assignments. The project manager is responsible for notifying AEG personnel of significant project milestones, progress, and meetings. The AEG TCB members will meet with each engineering TCB member to coordinate the maintenance and operations requirements for each of their disciplines, particularly those that are required for maintaining the continued airworthiness and operation of the type certified product.

(3) The AEG TCB members will meet with the applicant's Technical Publications department as often as necessary to monitor the progression of the ICA publications; and to advise the applicant, as appropriate, on any noncompliance with the airworthiness standards and appendixes. These efforts will be coordinated with the ACO project manager.

(4) The AEG TCB members will report the status of the ICA and flight manuals to the project manager during the regular FAA internal meetings, and whenever there is a need or awareness of concerns. The AEG TCB members will also provide a status briefing on the ICA and flight manuals at each formal TCB Meeting.

(5) During the Type Certification process, the AEG airworthiness TCB member will, from known/past experience and current maintenance practices, select, when available, scheduled maintenance activities to validate the maintenance processes and the ICA. Intentional maintenance may be performed in order to validate a proposed maintenance procedure or document.

(6) The process for the issuance of STC is not as formal as the TC process; however, the requirements for determining the acceptability of ICA and flight manual supplements are unchanged. The project manager for the STC project will advise the AEG manager at the initiation of the project that AEG participation will be required. The duties of the AEG airworthiness and operations inspectors will mirror those in the Type Certification program.

(7) 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 capability;

(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. For those aircraft intended primarily for use in an air carrier environment, a manufacturer may use the procedures described in AC 121-22A, Maintenance Review Board (MRB), to develop and produce tasks and associated time-in-service intervals for the initial maintenance time limitations in an air carrier's continuous airworthiness maintenance program. In addition, the manufacturer may use the appropriate tasks and time intervals produced by the MRB process to show compliance with the inspection program requirements of the certification rules. However, the manufacturer is not required to use the MRB process to produce either the inspection program tasks and time limitations required by type certification or the air carrier initial time limitations. As described in AC 121-22A, an MRB is comprised of FAA Flight Standards Inspector personnel, as well as Aircraft/Engine Certification Office (A/ECO) engineering personnel from the controlling FAA Directorate.

> **NOTE:** The FAA Maintenance Review Board should not be confused or even associated with a manufacturer's Material Review Board. These two entirely separate boards each perform a completely separate, as well as different function.

(1) The ACO engineer(s) assigned to the MRB will include the project engineer assigned to the type certification program for the particular model airplane.

(2) It is the responsibility of the MRB ACO engineer(s) to provide the appropriate engineering expertise with regard to design, inherent reliability, and required function information.

(3) It is the responsibility of the ACO engineer(s) to solicit expert engineering assistance for the MRB when needed, such as:

(a) The Aging Aircraft program and the associated specific AD and 14 CFR requirements.

(b) The Corrosion Prevention and Control Program (CPCP) and the associated specific AD and 14 CFR requirements.

(c) The management of Certification Maintenance Requirements in accordance with AC 25-19.

(d) The management of Airworthiness Limitations.

(e) The management of Damage Tolerance requirements in accordance with AC 25.571-1.

(4) ACO engineers, assigned as MRB members, are also expected to perform the following functions:

(a) Provide engineering guidance and advice to the FAA MRB chairperson, Working Group advisors and Working Group members.

(b) Attend MRB meetings.

(c) Attend Industry Steering Committee meetings, as invited by the MRB Chairperson.

(d) Review Working Group meeting minutes and provide comments to the MRB chairman, if appropriate. This review should encompass an assessment of the engineering aspects of Working Group activities, including a notification of any potential problem areas.

2-14. 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 project 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 AEG 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 will be accomplished by the use of a flight manual supplement. Flight manual supplement approval will be handled by the ACO responsible for the project and in the same manner as the original manuals.

2-15. 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 transport 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 ground and flight tests conducted as authorized on the TIA, to show compliance with the applicable regulations (21.33 and 21.35). 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 inspector's and designee's 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 records, the results of the teardown inspection, and copies of the memoranda pertaining to the inspections should also be included in the TIR.

(c) FAA Form 8110-26, Supplemental Type Inspection Report (STIR), 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 will be completed in the same manner as the TIR.

(3) Type Inspection Report, Part II, Flight Test Report. FAA, applicant, or DER flight test personnel may totally or partially prepare Part II of the TIR in a format established by the ACO. Locally

approved formats, narrative reports, or applicable pages from the appropriate flight test guide are acceptable, provided all TIA items are addressed. The FAA engineering and flight test personnel will review the TIR to ensure adequate documentation is provided. In addition to test documentation, the following information should be presented in the TIR:

(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 functional 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 rules, instrument flight rules, 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 Airworthiness Limitations section of the Instructions for Continued Airworthiness (ICA) 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 ICA are prepared in accordance with §§ XX.1529, 31.82, 33.4, or 35.4. The ICA are reviewed by AEG and engineering personnel but, only the airworthiness limitations section and the instructions for installing and operating the engine or propeller or only the airworthiness limitations section for other category products are FAA approved. The responsibilities of the AEG Airworthiness TCB members include determining the acceptability of ICA for operational and maintenance requirements. It should be noted that the ACO, per § 21.50, is responsible for the compliance findings for requirements of ICA as well as the manufacturer's maintenance manuals having airworthiness limitations. It is the AEG's role to assist the ACO in establishing the adequacy of the ICA and determining compliance with 14 CFR. This will also allow Flight Standards personnel during post type certification activities to determine 14 CFR Parts 91 and 121 operators' compliance with the applicable operational rules. As allowed in the applicable Federal Aviation Regulations, the ICA 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 ICA must be in final printed form when the first standard airworthiness certificate is issued, or prior to delivery of first product, whichever 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 ICA.

(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 (DAS) when accomplished by an STC;

(d) A repair station, 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 determinations 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 product's 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. If an SCR is deemed necessary for an imported product, representatives of the original certifying civil aviation authority will also be invited.

(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. 46104. 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.

2-16. DATA RETENTION

a. Project File. A project file will be established by the project manager and maintained by the ACO at an FAA facility for each type certification project. The file will contain only records associated with the project. Records are defined as documents showing a decision or action taken by the FAA on the project. The project file will contain, as a minimum, the documents listed in Figure 1 of Appendix 10.

b. Type Design and Substantiating Data. Data critical to type certification, such as type design and substantiation data, may be maintained by the FAA or the applicant/TC holder at the ACO manager's discretion. In either case it must be recognized that type design records are permanent and may not be destroyed. Data maintained by the applicant/TC holder must be made available to the FAA for such routine activities as production inspection, surveillance, design change reviews, or for any other reasons deemed necessary by the FAA. An appropriate and coordinated Memorandum of Agreement between the FAA and the applicant/TC holder must be established prior to entering into such an arrangement. Data that is eligible to be maintained by the applicant/TC holder under these conditions is

listed in Figure 2 of Appendix 10. Refer to Chapter 3 of this document for procedures when the TC holder surrenders the TC.

c. Working Papers. Other information such as personal notes, issue papers, schedules, or correspondence that does not document an FAA decision, action, or position are considered working papers and may be retained after the TC is issued at the ACO manager's discretion. This information would be considered "corporate memory" and no longer part of the project file. Data that falls into this category is listed in Figure 3 of Appendix 10.

2-17. 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 Airplane Flight Manual (AFM) or Rotorcraft Flight Manual (RFM);

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.

CHAPTER 3. TYPE CERTIFICATES

3-1. 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.

3-2. 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 will utilize ACOS to assign a TC number which reflects the type of product and the issuing ACO. (See Appendix 1, Figure 5, ACOS PROJECT, TC, AND STC NUMBERING SYSTEM, for details of the numbering system.)

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. A copy of the TC is also sent to the Regulatory Support Division, Attention: Airworthiness Programs Branch, AFS-610.

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 a TC 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 TC holder, 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 "Reissued on (date) to supersede the original TC which has been lost or misplaced." 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 a holder in another geographic area requires the holding ACO to prepare a new TC in the name of the new holder. When a TC is transferred the TC files are simultaneously transferred to the ACO for that area, and all correspondence is referred to the receiving ACO which now becomes the CMACO. An entry under "Date of Issuance" 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 holder and the record of previous holders. For an STC, the date reissued should be put in the "Date Reissued" block.

(5) Transfers to or from a non-U.S. entity require special coordination with AIR-4.

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

(7) 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 documenting 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, Airworthiness Programs Branch (AFS-610), 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) The FAA will have custody of all information that constitutes the TC (reference § 21.41) 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.

(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, Airworthiness Programs Branch (AFS-610), Oklahoma City, Oklahoma 73125.

i. Procedures When Certificate Holders Cannot Be Located. 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 may also come into question. The decision to release data in these situations is the responsibility of FAA headquarters and therefore AIR-110 should be contacted so that they can arrange for AGC-200 assistance in such instances.

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).

3-3. TYPE CERTIFICATE DATA SHEET (TCDS).

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 TC 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 and AFS-610 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) A paragraph entitled “Type Certificate Holder Record”. The purpose of the paragraph is to identify the original holder and any subsequent holders of the TC. This will be a cumulative record so that each revision continues to show all previous transfers. Information should be provided in the form: "ABC Corporation transferred TC 123 to XYZ Corporation on January 1, 1999". When a TCDS is revised for any reason, all known transfers will be added to the Holder Record paragraph at that time. An example of the first page of a TCDS with the Holder Record is shown in Appendix 2 Figure 5.

(6) One or more sections follow the identification of the TC holder and holder record. 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, Special flange 6.75" bolt circle, etc. Reference should be made to Note 1 when applicable.

(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) Number of Blades. List the number of blades.

(6) Hub Models or Propeller Model Designations. List hub model, propeller model, or designations and reference Note 1 when applicable. 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.

(7) 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)	Approximate Propeller 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 propeller 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 "Approximate Propeller Weight." Include hub, blade, and spinner weight and reference appropriate notes.

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

(8) Certification Basis. List the following:

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

(b) Any special conditions, equivalent level of safety findings or exemptions;

(c) Foreign certification basis for imported propellers;

(d) TC number and date issued; and

(e) Date of application for TC.

(9) Approval Basis for Import Propellers. Information for the airworthiness acceptance of aircraft 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 Imported into the United States. Include the following statement on the type certificate data sheet for import propellers:

> "To be considered eligible for installation on U.S. registered aircraft; each propeller to be exported to the U.S. shall be accompanied by a certificate of airworthiness for export or a certifying statement endorsed the exporting cognizant civil airworthiness authority that contains the following language:
>
> (1) This propeller conforms to its U.S. type design (Type Certificate Number) and is in a condition for safe operation; and
>
> (2) This propeller has been subjected by the manufacturer to a final operational check and is in a proper state of airworthiness. "

(10) Production Basis. List the PC number.

(11) **Notes.** The same numbering system and subject heading must be used for Notes on all propeller data sheets, for Notes 1 through 12. 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 12 follow:

(a) NOTE 1. Hub Model Designation or Propeller 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 pitch control components substantiated by the applicant. Indicate if the substantiated pitch control components are included or not included in the propeller type design. The pitch control components should be identified by name as well as model designation. For Integrated control systems the following statement should be added to establish the relationship between the propeller and engine manufacturer. The engine TCDS should have a similar statement.

> The propeller model xxx complies with the propeller airworthiness requirements when used with yyy engine only. Any change to the engine, including its control system, which affects or may affect the propeller approval must be substantiated to demonstrate that the propeller, as integrated with the changed engine, including its control system, still complies with the propeller certification basis. Also, any change to the engine resulting from a change to the propeller must be substantiated to demonstrate that the engine still complies with the engine certification basis.

(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, reference Note 5 in the "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. Include all relevant information regarding limitations associated with interchangeability such as; interchangeable in one direction only, aerodynamic similarity, structural similarity.

(g) NOTE 7. Accessories. Describe the accessories such as spinners, governors, deicing and anti-icing equipment substantiated by the applicant. Indicate if the substantiated accessories are

included or not included in the propeller type design. Accessories that are not included in the propeller type design, but are included in the propeller approved parts list are to be substantiated by the propeller manufacturer.

(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 conventional aluminum bladed propeller model is eligible vibration-wise in any normal 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 in a format appropriate to the data on TC from the country of origin or as follows:

Approved Installations

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

Propeller Model	Aircraft Model	Engine Model	Maximum Takeoff Weight	FAA Data Sheet Aircraft Engine

(j) NOTE 10. Some components required to operate the propeller system may be approved as part of the propeller TC, engine TC, or aircraft TC. These components typically include governors, spinners, and deicing systems. These components may require additional compliance with the applicable engine/airplane airworthiness requirements in order to complete the approval process. Include the following statement:

> The propeller installation must be approved as part of the aircraft type certificate to demonstrate compliance with the applicable aircraft airworthiness standards.

(k) NOTE 11. Special Limits. List or include by appropriate reference all propeller life limits and airworthiness limitations as identified by Appendix A - Instructions for Continued Airworthiness, A35.4 Airworthiness Limitations Section. Include the following statement:

> The propeller installation must be evaluated by the propeller CMACO for each new aircraft installation to assess possible changes in the airworthiness limitations.

(l) NOTE 12. 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 - Describe the basic material and fabrication of the propeller;

(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	Takeoff Max. Cont.			Standard	Hub Drilling			Diameter. Pilot	Hub Dimensions		Weight (lb.)
(See NOTE 2)	HP	RPM	Diameter	Pitch	No. holes	Dia. holes	Dia. Bolt circle	Hole	Dia.	Thickness	(Max. Dia.)

(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. List or include by appropriate reference all propeller life limits and airworthiness limitations as identified by Appendix A - Instructions for Continued Airworthiness, A35.4 Airworthiness Limitations Section. Include the following statement:

> The propeller installation must be evaluated by the propeller CMACO for each new aircraft installation to assess possible changes in the airworthiness limitations.

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 description 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 as necessary.

(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. If the description of the maximum movement or the specified means of measuring control surface movement is too complicated to be included in the TCDS a reference may be made to an FAA accepted maintenance manual or FAA approved drawing that specifies the maximum movement and method of measurement.

(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) The U.S. airworthiness certification basis for an aircraft originally type certificated under 21.21 but transferred outside the United States is § 21.183(d)

(f) 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 applicable 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 aircraft 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 4-6).

(25) Service Information. For import products only, add a statement on the TCDS to reflect how service information will be handled. For example:

"Service bulletins, structural repair manuals, vendor manuals, aircraft flight manuals, and overhaul and maintenance manuals, which contain a statement that the document is approved by the [INSERT NAME OF THE FOREIGN CIVIL AIR AUTHORITY], are accepted by the FAA and are considered FAA approved. (These approvals pertain to the design data only)."

(26) 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 NOTE 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 statement 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.

3-4. 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 ACO and transmitted electronically to the Regulatory Support Division, Attention: Airworthiness Programs Branch, AFS-610. AFS-610 prepares a monthly publication which is forwarded to the Government Printing Office and subsequently distributed to paid subscribers in paper and microfiche format. Additional electronic distribution is made via bulletin boards and web sites.

(1) For the hard copy format, certain measures must be followed to ensure that the quality product is economically reproduced. Recommended font styles are Times New Roman or Universal, in size 9 or 10. Paper size must be 8-1/2 by 11, with 1" margins on each side to allow for a 3-hole application. The pages are reproduced two-sided and allow for insertion in 3-ring binders.

(2) 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. The page numbers should be inclusively consecutive, i.e., "2 of 34." This is an automatic function in WORD™; select INSERT, FIELD, NUMPAGES. Headers should be used for the page numbering with the .5 default spacing.

Example for even page:

XX3SO	2 of 34	

Example for odd page:

	3 of 34	XX3SO

Page breaks should be inserted.

b. Type Certificate Data Sheet Revision. It is important for the user to know the revision status of the TCDS; therefore, 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. Example:

	XX1123XX
	Revision 1
	BLACK
AA-11	
BB-22	
CC-33	
	December 4, 1998

(1) Identify the revised material by placing a border mark (a vertical black line) along the margin of the printed matter that was changed. 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. Revision page grids at the bottom of the first page are optional.

3-5. CHANGING A SPECIFICATION DOCUMENT TO A TCDS.

a. General. Prior to the adoption of the use of the TCDS, approval of an aircraft, engine, or propeller type design resulted in the publication of a "specification" document by the FAA's predecessor, the Civil Aeronautics Administration (CAA).

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.

CHAPTER 4. SUPPLEMENTAL TYPE CERTIFICATES

4-1. 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 order. In general, the same procedures apply for approval and issuance of an STC as those for a TC.

4-2. SUPPLEMENTAL TYPE CERTIFICATE.

a. Purpose of an STC.

(1) An STC is issued for major design changes to a type certificated product 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.

(4) A single STC applicable to more than one type certificated product is permitted if the following conditions are met:

(a) The STC data package consists of a principal design and certification data package for the change, and either a master installation package for all eligible TC'd products or a separate installation package for each eligible TC'd product;

(b) Any design or installation differences between eligible products are identified in the design and installation data;

(c) Installation complexity is similar on all eligible products;

(d) The change does not require a substantial reevaluation of the TC'd product's airworthiness;

(e) The flight and/or operational characteristics of the TC'd product remain unchanged;

(f) The change does not create an acoustical change to the TC'd product;

(g) The eligible TC'd products and FAA approved documents are listed on a special page known as the approved model list (AML) attached to the STC;

1 Whenever a TC'd product is added or one of the documents is amended, deleted, or added, the AML is amended and approved, not the STC.

2 An airworthiness directive will be required in order to remove a product from an AML unless the STC holder can prove no installation was made, or the product was mistakenly listed on the AML.

3 An STC with an AML can be transferred in total to another holder but cannot be split into more than one STC.

b. Requirements for an STC.

(1) The applicant must submit data adequate to show compliance with the applicable certification basis (reference paragraph 4-3). 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.

(5) An STC may be issued as a "one-only " STC for a particular aircraft by make, model, and serial number if it has been determined that the descriptive data pertaining to the change are inadequate for duplication on other aircraft. All subsequent approvals of the modification must be handled via a multiple STC. A one-only STC cannot be amended and the holder is not eligible for issuance of any FAA production approval including Parts Manufacturer Approval.

(6) A foreign registered aircraft may not be presented for inspection or test unless the State of Registry has agreed to and identified its requirements for acceptance of the modification, in accordance with ICAO Annex 6, para. 8.6

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, 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. The substantiating data in support of a one-only STC shall have the same requirements of a multiple STC, i.e. compliance findings to the same airworthiness standards.

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. The appropriate ACO engineer will conduct these inspections or may delegate them to an ASI 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.

(3) The project ACO will consult with the original type certificate issuing ACO/certificate management ACO when a change to a product results in any unusual, complex, or novel features (reference Appendix 1 Figure 6). This will allow the project ACO to obtain necessary insight into important aspects of the original certification which should be considered during the STC project.

(4) The applicant must evaluate the effect of the proposed alteration on compliance with airworthiness directives (AD) that are applicable to the product. Where alterations would affect AD compliance, applicants must obtain approval for alternative methods of compliance (AMOC) in accordance with the AD. The project ACO must verify that the applicant's review of applicable AD's is complete and accurate and should coordinate this with the CMACO before issuing the STC. If approval for AMOC's is required, a note should be added to the STC referencing the AMOC approval letter issued by the ACO specified in the AD.

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. 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 is responsible for the operational and maintenance aspects of the aircraft supplemental type certification process and becomes the coordination point for activities involving Flight Standards. As in type certification programs, the AEG has the primary responsibility for evaluation of the changes to an aircraft and its systems for

operational suitability and continued airworthiness (such as change in crew requirements, changes in flight instrument displays, minimum equipment list relief, changes that would impact FOEB, FSB, and MRB reports). During the certification process, the AEG conducts operational suitability evaluations by analysis of type design data and by participation in the aircraft certification engineering compliance inspections and flight test programs. The AEG should be notified at the start of the STC process, via the Certification Notification Program (CPN), see Appendix 1

i. Revisions to Performance Data. Existing published performance data for the TC'd product must be reviewed by the applicant to determine if the change adversely affects any aspect of performance. Existing performance data that could mislead the operator due to changes in performance caused by the STC must either be corrected in the applicant's proposed flight manual supplement or, if a supplement is not required, the data in the original flight manual must be marked as invalid. The ACO may approve the continued use of existing performance data that remains correct or becomes more conservative as a result of the change. The STC will not be issued until the ACO approves the proposed supplement to the performance data.

j. Non-Interference STC's. Non-interference STC's are modifications to products that provide a convenience or function that is not required by the applicable airworthiness standards. Therefore, they offer no relief from airworthiness standards or from the product's operating limitations. They are installed and approved on a non-interference or no hazard basis. When non-interference STC's are approved, explicit limitations are required in the "Limitations and Conditions" section of the STC (Form 8110-2) to preclude any misunderstanding or misinterpretation that may be implied by incorporation of the non-interference STC.

k. STC Projects Involving Foreign Registered Aircraft and Import Products. Projects which modify foreign registered aircraft or develop modifications for products where the United States is not the original state of design have special requirements which must be considered. An applicant should notify the ACO as soon as possible when considering such projects in order to minimize delays in the project.

(1) Foreign Registered Aircraft.

(a) An applicant may develop an STC by using aircraft registered in another country, so long as the modification is done in accordance with the airworthiness requirements of that country, in accordance with ICAO Annex 6. Applicants should be encouraged to (a) present U.S.-registered aircraft to the FAA for modification, and (b) approach the foreign CAA who was the original certificating authority for approval of the modification of an imported product, prior to applying to the FAA for modification to an imported product, especially one that is to be operated under foreign registry.

(b) If an applicant does not provide the FAA with evidence of the agreement of the CAA of the country of registry to the proposed modification, the ACO must notify this CAA and invite their participation in the project. The ACO must obtain written authorization from the CAA stating that it concurs with the modification, before formally accepting an application and initiating a project.

(c) If a foreign registered aircraft is being used as a test article to substantiate the modification, the applicant must ensure that the aircraft conforms to its approved type design. The FAA will not be able to issue an experimental airworthiness certificate for flight testing a foreign registered aircraft. Order 8130.2, chapter 7, provides guidance on the issuance of Special Flight Authorizations for foreign registered aircraft.

(2) Import Products. Proposed STC's to import products may require consultation with the foreign CAA who was the original certificating authority for the product. The ACO should determine if the complexity of the STC requires consultation with the CAA and should coordinate their involvement through the appropriate CMACO/certificate management standards staff.

4-3. CERTIFICATION BASIS FOR AVIATION PRODUCTS MODIFIED BY STC. Refer to the procedure in paragraph 2-10 for determining certification basis for changed products.

4-4. PREPARING FAA FORM 8110-2, SUPPLEMENTAL TYPE CERTIFICATE.

a. Supplemental Type Certificate Numbers. The certifying ACO will utilize ACOS to assign an STC number which reflects the type of product and the issuing ACO. (See Appendix 1 Figure 5, ACOS PROJECT, TC, AND STC NUMBERING SYSTEM, for details of the numbering system.)

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-610 so the address will be correct on the STC summary.

c. Certification Basis. The complete certification basis should be shown on the Continuation Sheets unless it is identical to that shown on the TCDS of the TC product and referenced on the STC. If the certification basis differs in any way, it should include the following:

(1) The applicable portions of the certification basis as shown on the TCDS of the TC product;

(2) Other amendments found to be directly related. If other amendments are also involved, the STC certification basis should reflect the combination of 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. This section of the STC is the area that is used to identify those specific limitations and conditions required for full compliance to the STC. At a minimum the following should be listed in this section:

(1) Reference to previously incorporated design changes that are necessary to enable the newly altered product to be airworthy, or are required to complete the installation, must be clearly indicated.

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

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

"If the holder agrees to permit another person to use this certificate to alter the product, the holder shall give the other person written evidence of that permission"

(3) If the approval is for one product only, a statement will be made 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. _____. This STC does not permit manufacturing of parts for multiple installations."

(4) If the STC is to make provisions for equipment installation but does not install the equipment, include a statement similar to the following to prevent completion of the installation without further approval or use of the equipment provisions for other purposes:

"The equipment for which these provisions are intended has not been certified. Additional FAA approval is required for the installation of this equipment and must be evaluated to assure satisfactory compliance with the applicable airworthiness standards."

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

h. Date of Issuance. This is the date of the initial issuance of the STC. The STC or STC number shall **not** be released or given to the applicant prior to this date.

i. Date Reissued. Only the FAA may reissue an STC. 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 holder'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. This is the date that indicates when the STC has been 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 for changes in the Original Product, Description of Change, and Limitation and Conditions sections of the STC.

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 TCDS (reference paragraph 3-4).

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 additional 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". Type "END" below the last sentence on the continuation sheet.

(2) Number all continuation sheets, and indicate the latest effective date of the STC, either the date of issuance or the last amendment date. 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 3-2f).

o. Duration of an STC.

(1) An STC is effective until surrendered, suspended, revoked, or a termination date is otherwise established by the Administrator.

(2) The procedures for surrender, suspension, or revocation of an STC are identical to the respective procedures for a TC (reference paragraphs 3-2g 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 or delegated person to issue the STC. The ACO will notify the STC holder of the requirement to provide written evidence if the holder permits another person to use the STC data to modify an aircraft, aircraft engine, propeller, or appliance. This written evidence will be known as the "Permission Statement". The form of the permission statement, to be acceptable to the Administrator, will as a minimum contain the following:

(1) a written statement of the agreement specifying product(s) to be altered;
(2) the STC number;
(3) the person(s) who is being given consent to use the STC.

More information may be listed if the STC holder so desires. An example is provided in Appendix 2, Figure 4.

q. Import Notification. If the STC is being approved in accordance with part 21.29, use the preparation instructions above but place the word "IMPORT" immediately below "Supplemental Type Certificate".

4-5. 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 U.S. registered product to service when an altered product has been tested and approved by the issuance of an STC. (reference AC 43-9)

4-6. 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 Airworthiness Programs Branch (AFS-610). 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.

4-7. CANADIAN SUPPLEMENTAL TYPE CERTIFICATE (STC).

a. Request for Canadian STC. A United States resident and holder of a Unites States STC issued by the FAA may apply for Canadian STC 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 Canadian STC. A Canadian STC 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. Canadian STC Application Procedures.

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

(2) The Canadian STC application will be forwarded by the cognizant ACO to the Transport Canada Regional Airworthiness Engineer (RAE) (see Appendix 5, Figure 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, Figure 3 for sample letter):

(a) Canadian STC application;

(b) Copy of U.S. STC;

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

(d) Aircraft flight manual supplement;

(e) Master drawing list;

(f) Manufacturing and installation instruction drawings;

(g) Instructions for continued airworthiness;

(h) Weight and balance data; and

(i) Maintenance/repair manual supplements, etc.

(j) A statement from the ACO is required stating that compliance has been found to the applicable Transport Canada regulations.

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

4-8. OTHER FOREIGN CAA SUPPLEMENTAL TYPE CERTIFICATES

a. Request for STC Validation. A U.S. holder of an STC may apply for validation of the STC by another civil aviation authority so long as there is a bilateral agreement in place with the United States. Applications should be forwarded through the local ACO and be accompanied by a transmittal letter from the ACO manager. The documents to be provided may be specified in the applicable bilateral agreement implementation procedures. If not, then documents similar to those listed in paragraph (c) 4 above should be forwarded to the appropriate FCAA office. Note that in some countries, STC's will not be accepted unless the applicant can demonstrate linkage to the original type certificate holder.

b. Additional requirements of the FCAA will be provided to the ACO and assistance may be sought from the FAA to witness additional tests or review data on behalf of the FCAA. The ACO will cooperate fully with any FCAA request.

c. When all requirements of the importing authority are met, an STC or equivalent will be issued to the applicant by the FCAA. The STC will be forwarded 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

5-1. FAA AVIATION SAFETY INSPECTORS (MANUFACTURING INSPECTORS).

a. General. This chapter provides procedures and methods that shall be followed by manufacturing inspectors. The applicant is responsible for conducting 100 percent satisfactory conformity to the 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. This chapter will refer to the manufacturing inspection project office as a MIDO. In actuality, the project office may be a Manufacturing Inspection Satellite Office (MISO), Certificate Management Office (CMO), or Certificate Management Unit (CMU), as applicable.

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 and be under the supervision of the assigned FAA Principal Inspector.

5-2. REQUEST FOR CONFORMITY AND TYPE INSPECTION AUTHORIZATION.

a. General. FAA Form 8120-10, Request for Conformity, (reference Appendix 4 Figure 1 for completion instructions) and/or FAA Form 8110-1, Type Inspection Authorization, (reference Appendix 4 Figure 6) 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 applicant's 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 (reference Appendix 4 Figure 5), 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 who holds a responsible position in the manufacturing organization 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 applicant 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 who holds a responsible position in the manufacturing organization 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 important 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 Characteristics;

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

(b) Does the applicant have a record of these inspections?

(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 Action;

(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 applicable 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. Any nonconformities found as a result

of the conformity inspection require ACO project engineer or authorized DER disposition on FAA Form 8100-1.

5-3. 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. Because 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.

5-4. 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. Consideration should be given to the type of test being conducted, and the calibration expiration date of the test equipment utilized. A re-calibration of the test equipment may be necessary to ensure the equipment is within its calibration expiration date at the time of testing. 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.

5-5. 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 8120-10, 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 FAA Form 8100-1, Conformity Inspection Record, to the ACO describing the test results. A copy of the applicant's test log or report should accompany the manufacturing inspector's conformity inspection record.

5-6. 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 Record.

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. Any nonconformities found as a result of the conformity inspection require ACO project engineer or authorized DER disposition on FAA Form 8100-1. 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.

5-7. 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. The manufacturing inspector should also ensure that the applicant has provided specific aircraft identifier and performance information to FAA air traffic control as required by paragraph 2-11d.(6).

5-8. 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.

5-9. 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.

5-10. 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. DERs who are authorized to disposition unsatisfactory conditions should be mentioned by name in the RFC or TIA. This system should be documented and agreed upon by the FAA and applicant prior to the start of the initial type certification board meetings.

5-11. 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--includes 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 applicant's 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-(4, 5, 6, 7, or 8)), 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.

5-12. 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 then 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 8130.2. 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. 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 FAA Form 8130-3, Airworthiness Approval Tag. The modification work should be performed by or under the personal supervision of a representative of the engine or propeller manufacturer.

5-13. 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.

5-14. 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.

5-15. INSPECTIONS TO BE CONDUCTED OUTSIDE THE DISTRICT OFFICE. When the conformity inspection is to be conducted outside the project MIDO, FAA Form 8120-10, Request for Conformity (with all pertinent information) should be forwarded by the project MIDO 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 project MIDO. FAA Form 8130-3, Airworthiness Approval Tag, 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.

5-16. REQUESTS FOR CONFORMITY INSPECTION FROM FCAAs. When a specific bilateral agreement includes provisions for the U.S. acceptance of conformity certifications, then a request for conformity inspection may be made to the FCAA. Such requests will be in the form of a short ACO cover letter with an FAA Form 8120-10, Request for Conformity attached and must include an FAA point of contact with phone and facsimile information. The responsible FAA ACO will clearly identify on the Form 8120-10 the company, location, part number, drawing and revision level, and other necessary data to conduct the inspection. Also the FAA's request will include any special instructions or items of special emphasis that the FCAA should consider while performing any conformity inspections. For example, the FCAA may be asked to verify critical drawing dimensional, interface dimensional requirements, plating, heating treating, welding, etc. Requests for conformity inspection or other technical assistance under a bilateral agreement must be forwarded by the FAA and cannot be delegated to another organization or FAA designee. The name of an FAA Project Manager must be shown on the Form 8120-10 for project questions.

5-17. 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.

> **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 MIDO 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. If an FCAA identifies an unsatisfactory condition in a conformity inspection that has been delegated, the ACO will disposition and reply to the FCAA in order to resolve the situation

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

5-18. TYPE INSPECTION REPORT (TIR).

a. General. The FAA Form 8110-(4, 5, 6, 7, or 8), Type Inspection Report series is utilized in conjunction with the FAA Form 8110-1, Type Inspection Authorization. The TIR provides a record of the inspections and tests conducted as authorized on the TIA. 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 personnel.

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, Propeller 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.

5-19. COMPLETION OF THE TIR. Each TIR package has pertinent instructions for completing the report within 90 days after certificate issuance. To ensure a detailed and comprehensive report, the manufacturing inspector should, in addition to the instructions of the TIR package, complete the following:

a. Conformity Inspections Record. The manufacturing inspector should initiate an FAA Form 8100-1, Conformity Inspection Record, 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. This block is signed by the manufacturing inspector or designee, if delegated. A TIR prepared by a designee will be reviewed by the supervising inspector and approved by the MIDO/CMO manager. 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/her response in the body of the TIR; and

f. Original FAA Forms 8100-1, Conformity Inspection Record, 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.

5-20. SUPPLEMENTAL TYPE INSPECTION REPORT (STIR). 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 non complex supplemental type certification programs. For complex STC's the appropriate TIR form should be used. This report should be completed in the same manner as the TIR.

CHAPTER 6. ADDITIONAL INFORMATION ON SELECTED TOPICS

6-1. 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. When making these determinations, it may be necessary to coordinate with other accountable directorates in order to maintain standardization. It is recognized that due to differences in types of aircraft, standardization may not be possible or appropriate in all cases. If differences of opinion arise, AIR-110 should be contacted to obtain resolution.

(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 than that envisaged by the appropriate standards.

(4) CAR 8/CAM 8 is not an acceptable airworthiness standard for new 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. The geographic ACO will normally handle all certification issues associated with finding compliance with the regulations; however, prior to issuing a restricted category TC for a military aircraft model, the geographic ACO will coordinate the TC with the appropriate AEG on all issues concerning operation and maintenance, and with the focal point ACO for significant technical issues. The ACO having primary certificate management responsibility for a specific civil model shall normally be the technical focal point for significant certification issues concerning a similar military model of that aircraft. If there is no civil counterpart, the Aircraft Engineering Division, in coordination with the accountable directorate, will assign the focal point ACO based on the type, category, and class of aircraft and the workload normally handled by the ACO's.

(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;

(h) List of Applicable ADs; and

(i) Instructions for Continued Airworthiness for the aircraft, its engines, and appliances.

(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 considered in the AD applicability and the focal point ACO must be notified of the AD activity.

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

(a) All applicable ADs and equivalent military documents will be listed or referenced through a master document on the aircraft model TCDS. Applicable ADs include those issued against parts that are common to a similar civil model product. The geographic ACO will require each applicant to research the appropriate ADs and military documents prior to certification. The focal point ACO should maintain a master list of these documents to provide a basis for the research. The master list of ADs should include ADs issued for the civil counterpart and ADs issued for other restricted TC aircraft of the same model. ADs for the similar civil model should be correlated to equivalent military documents such as time compliance technical orders.

(b) Life-limited parts applicable to the military product model, including engines and/or propellers certificated as part of the aircraft, must be listed or referenced through a document on the TCDS and coordinated with the focal point ACO and appropriate AEG.

(c) To facilitate development of an inspection program to comply with 14 CFR 91.409, a note must be added to the TCDS that directs operators to use specific military documents or a document acceptable to AFS to serve as the basis for developing their maintenance program. Instructions for continued airworthiness that were developed for the similar civil counterpart may be used in conjunction with the military requirements, where appropriate, for life limited replacement programs and as a basis for inspection program development; however, all parts in a system grouping, such as landing gear, flight controls, etc. must be maintained in the same program because of their interdependency. All civil parts used must be traceable to an FAA approval.

(d) The following notes must be incorporated in the TCDS:

NOTE: 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").

NOTE: Restricted category aircraft may not be operated in a foreign country without the express written approval of that country.

NOTE: 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 and the aircraft type must be within the scope of the applicable bilateral agreement.

(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 publication 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 8130.2, 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 conducted, 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.

6-2. TYPE CERTIFICATION OF 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, and applicable retroactive requirements of § xx.2 and the noise and emissions requirements of part 34 and part 36.

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, and the applicable retroactive requirements of § xx.2 and the noise and emissions requirements of part 34 and part 36. 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.

6-3. 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 6-3d.

(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 amended in Section 44715 of Title 49 U.S.C. Paragraph 6-3c 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 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, other private persons, civil aviation authorities, 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). Requests for approval of equivalent procedures shall be processed from the certification office through the Directorate NCS to AEE. Historically, equivalent procedures have proven to be complex and require sufficient time and resources to review. The process may include several discussions between the AEE and the applicant, and supplemental data and information may be required to further substantiate the equivalent procedure validity. Applicants should be advised of the approval process and allocate an appropriate amount of time, depending upon the specific equivalency, to achieving approval of an equivalent procedure. 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 on 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 primary, 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 issued 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 requirements.

(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)).

APPLICABILITY OF PART 36 FOR TRANSPORT CATEGORY LARGE AIRPLANES AND TURBOJET POWERED AIRPLANES

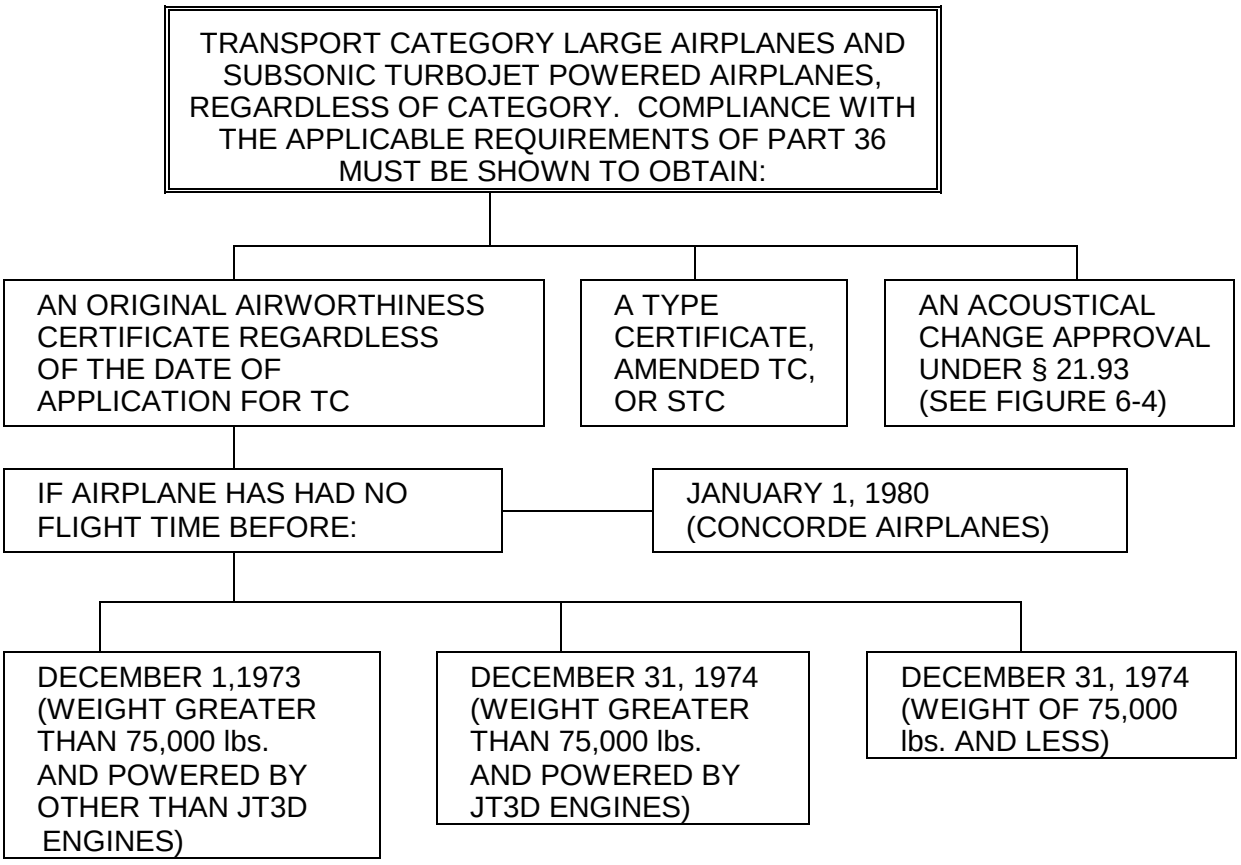


Figure 6-1 - Applicability of part 36 for Transport Category Large Airplanes and Subsonic Turbojet Powered Airplanes

APPLICABILITY OF PART 36 FOR COMMUTER CATEGORY AND SMALL PROPELLER-DRIVEN AIRPLANES

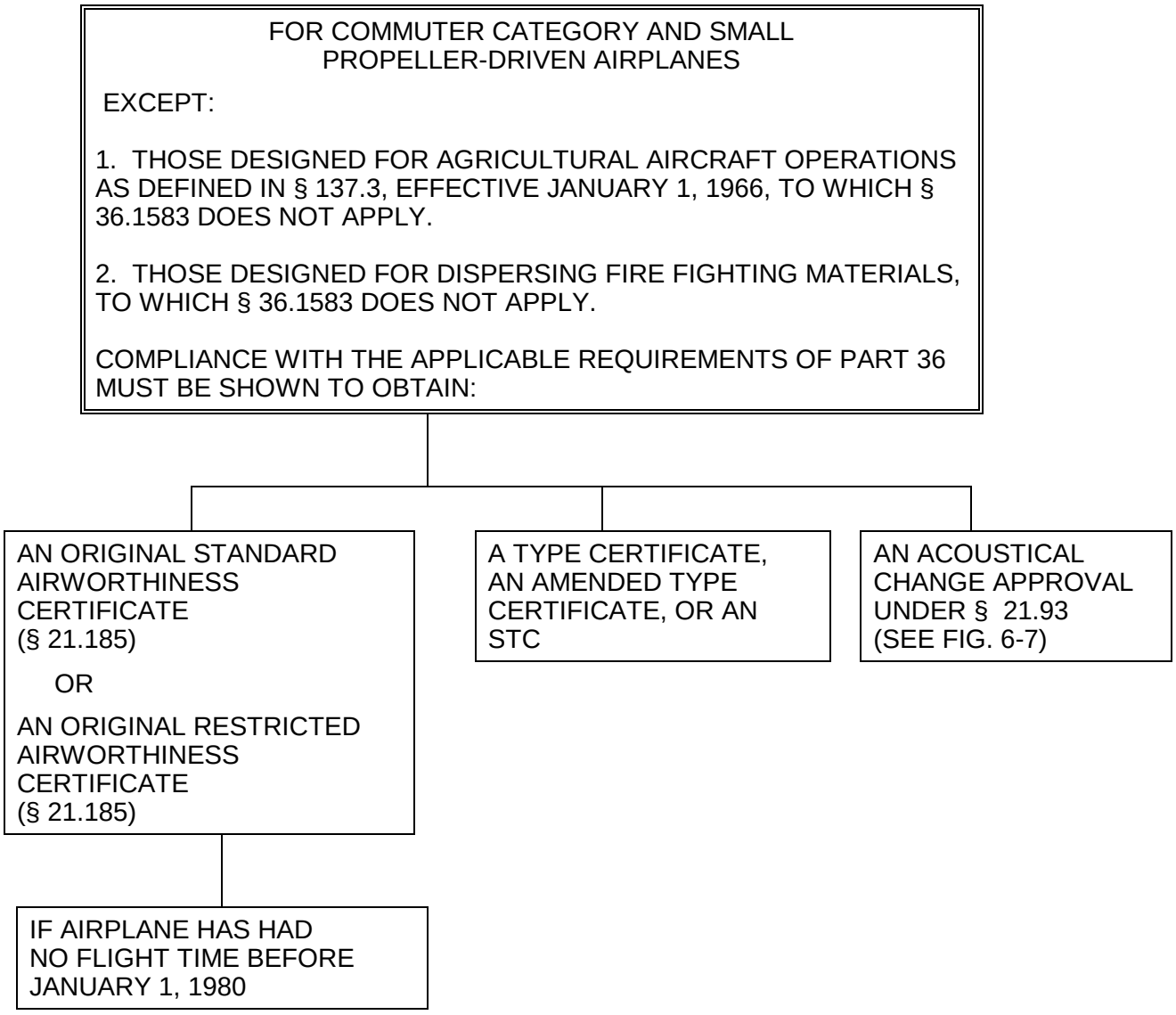


Figure 6-2 - Applicability of part 36 for Small Propeller-Driven Airplanes

APPLICABILITY OF PART 36 FOR HELICOPTERS

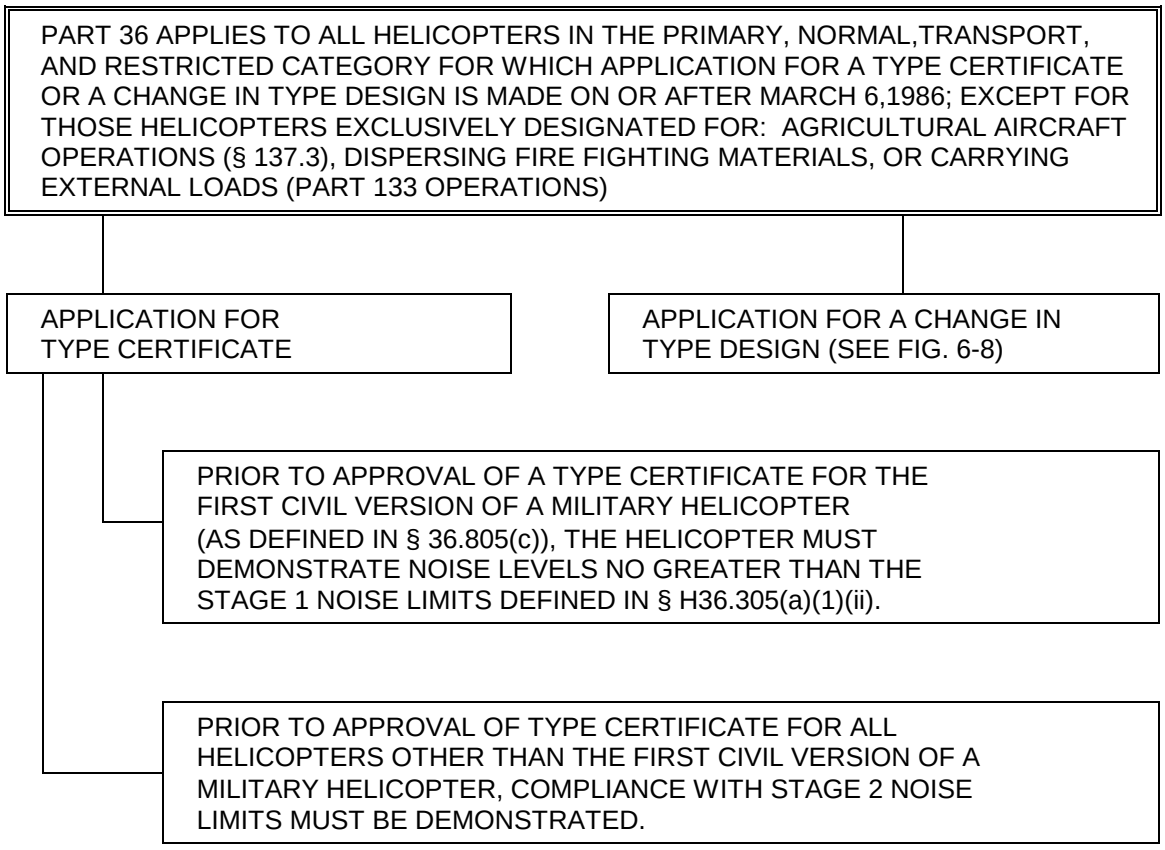


Figure 6-3 - Applicability of part 36 for Helicopters

APPLICABILITY OF PART 36 FOR ACOUSTICAL CHANGES TO SUBSONIC TRANSPORT CATEGORY LARGE AIRPLANE OR TURBOJET POWERED AIRPLANES

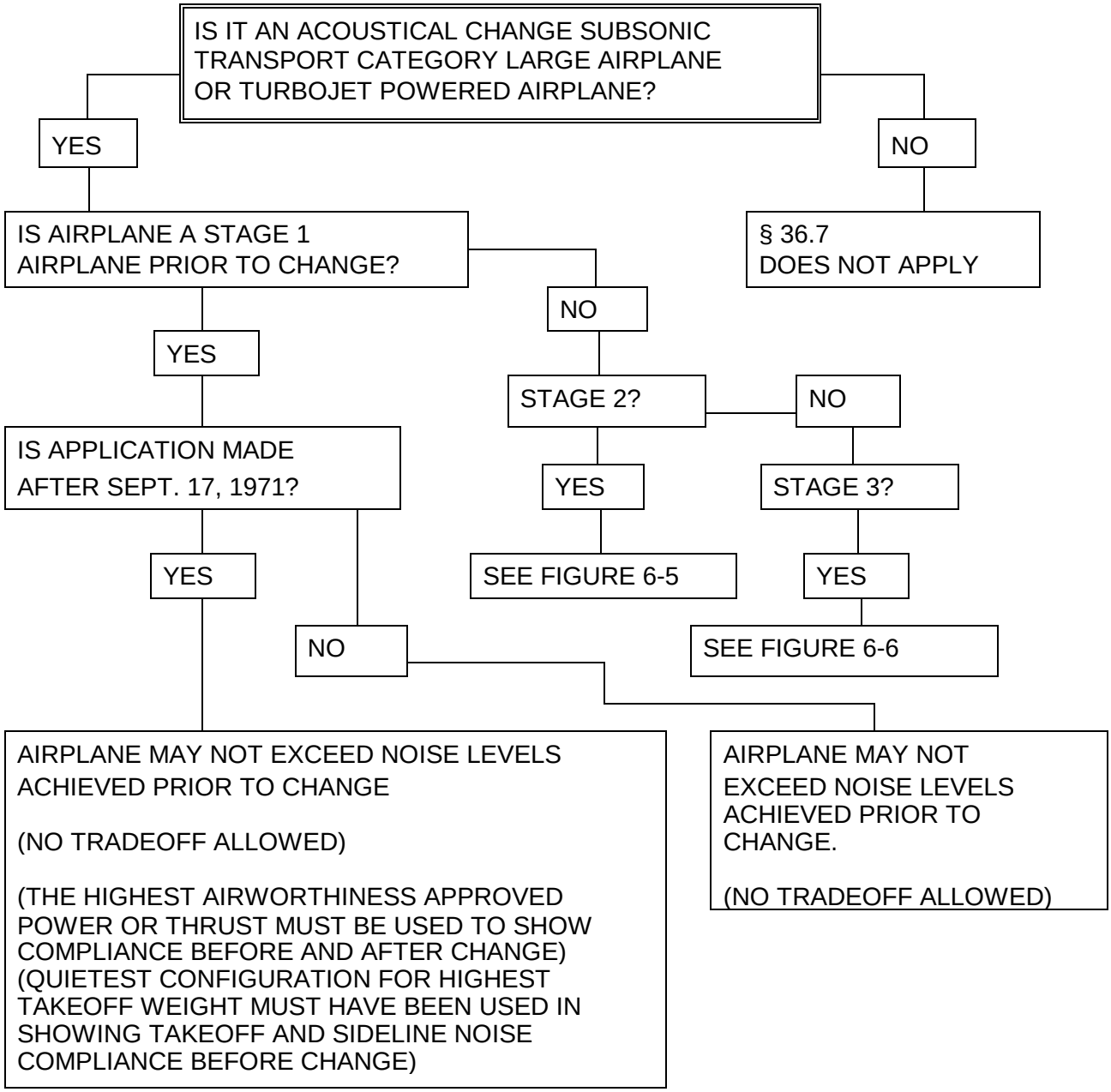


Figure 6-4 - Applicability of part 36 for Acoustical Change, Subsonic Transport Category

APPLICABILITY OF PART 36 FOR ACOUSTICAL CHANGE TO STAGE 2 SUBSONIC TRANSPORT CATEGORY LARGE AIRPLANE OR TURBOJET POWERED AIRPLANE

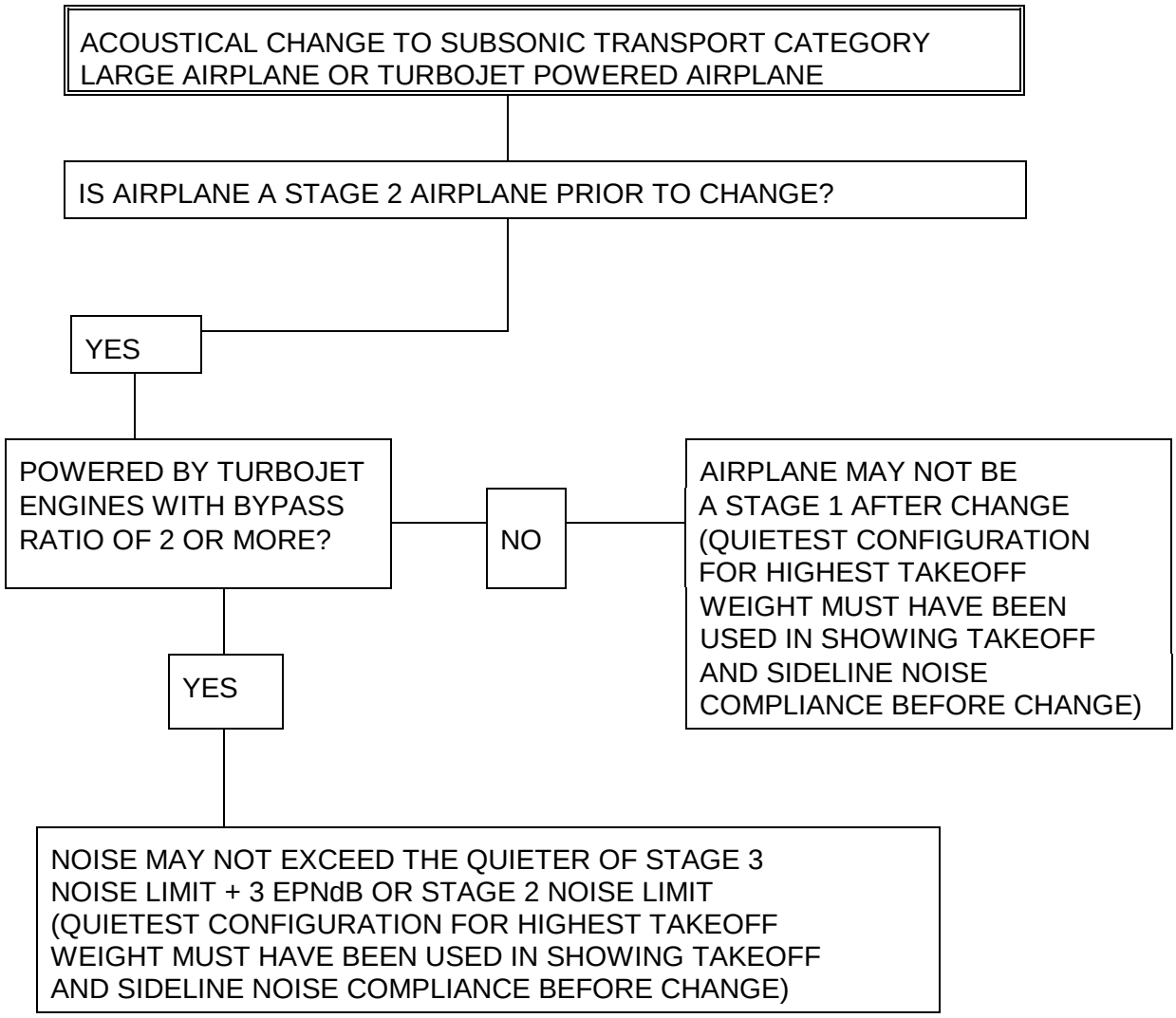


Figure 6-5 - Applicability of part 36 for Acoustical Change, Stage 2 Subsonic Transport Category

APPLICABILITY OF PART 36 FOR ACOUSTICAL CHANGE TO STAGE 3 SUBSONIC TRANSPORT CATEGORY LARGE AIRPLANE OR TURBOJET POWERED AIRPLANE

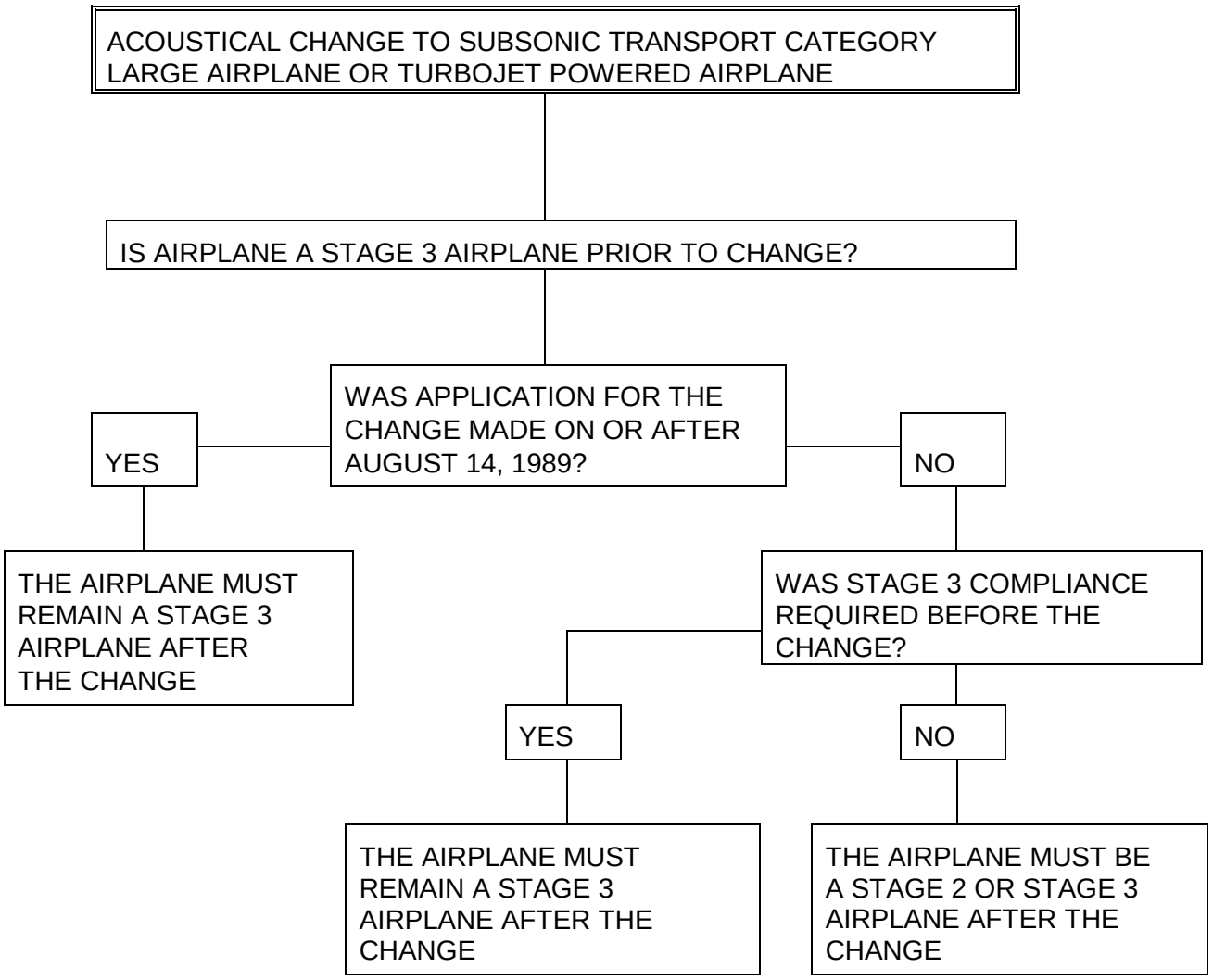


Figure 6-6 - Applicability of part 36 for Acoustical Change, Stage 3 Subsonic Transport Category

APPLICABILITY OF PART 36 FOR ACOUSTICAL CHANGE TO COMMUTER CATEGORY AND PROPELLER DRIVEN SMALL AIRPLANE

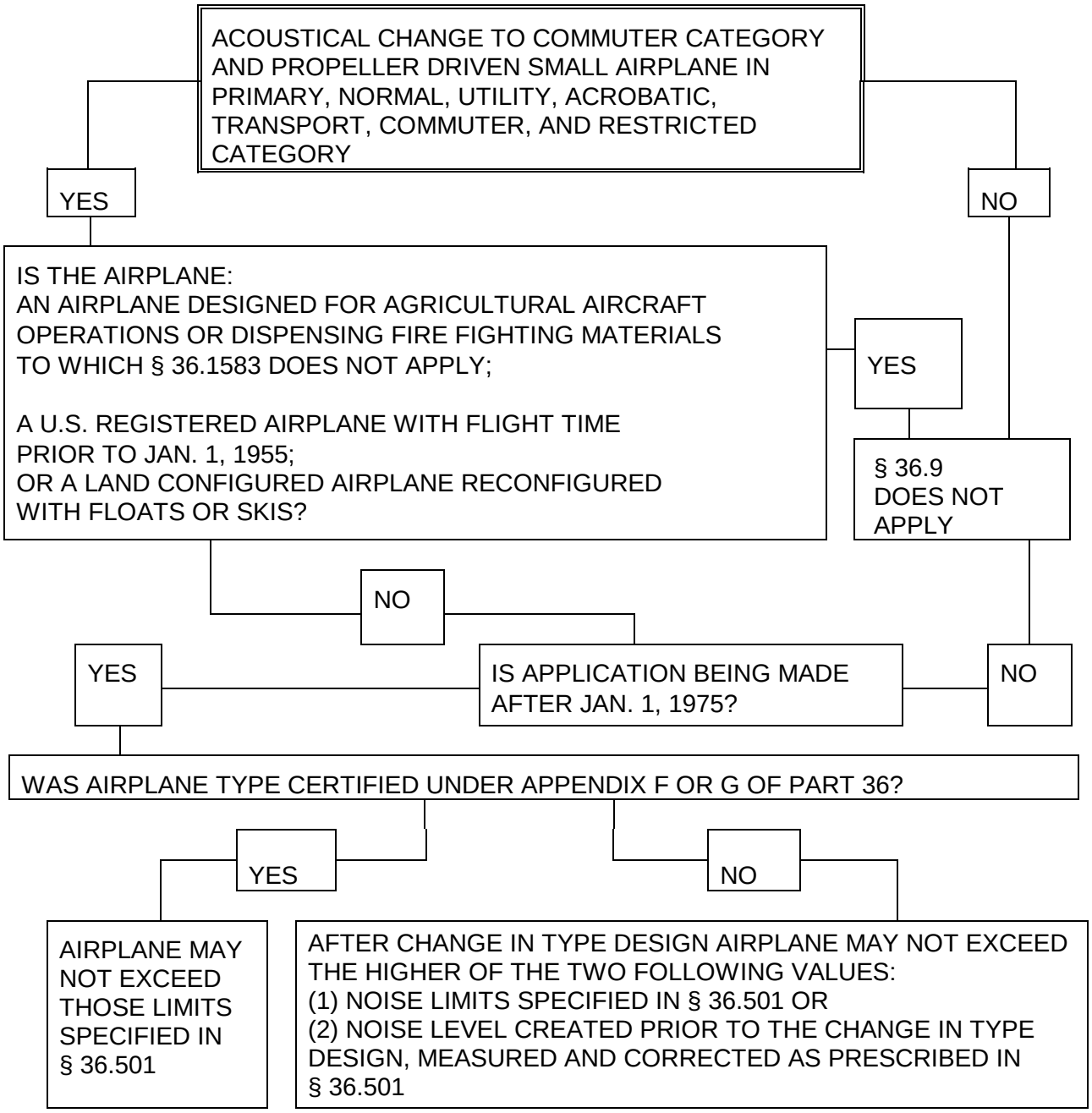


Figure 6-7 - Applicability of part 36 for Acoustical Change, Small Propeller Driven Airplanes

APPLICABILITY OF PART 36 FOR ACOUSTICAL CHANGE TO HELICOPTER

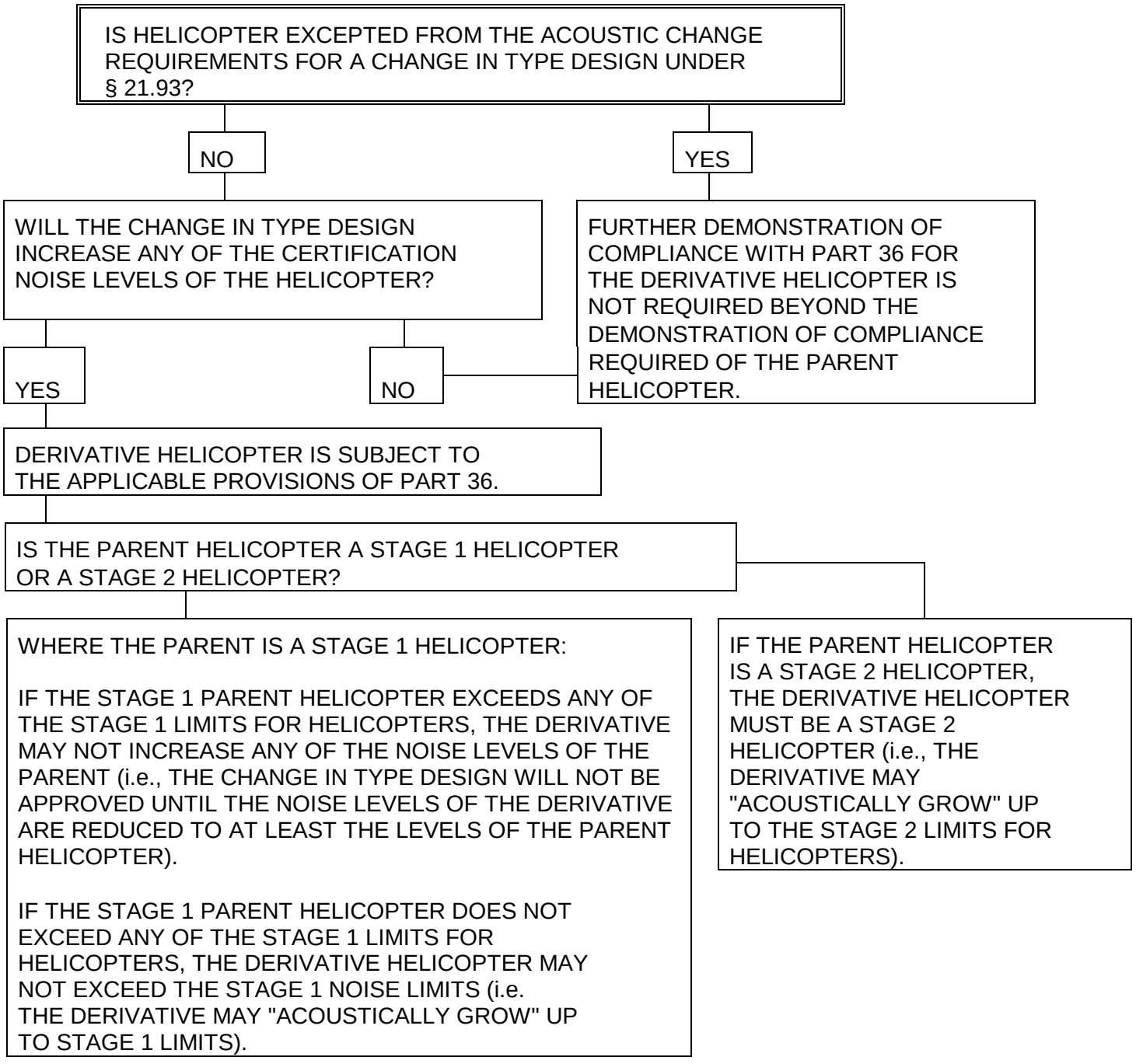


Figure 6-8 - Applicability of part 36 for Acoustical Change, Helicopters

6-4. 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.

(13) Ensuring that a Flight Test Risk Management process is followed in accordance with FAA Order 4040.26

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 Type 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.

(7) Aircraft Characteristics for Air Traffic Control. The project test pilot should ensure that the applicant has provided specific aircraft identifier and performance information as required by paragraph 2-11d.(5).

(8) Risk management Process. The signed TIA should reflect adherence with ACO/Directorate established Flight Test Risk management Process in accordance with FAA Order 4040.26 to ensure that the associated flight test risks are acceptable.

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. FORMS AND GUIDANCE FOR TC PROJECTS

FIGURE 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 and address 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 authorization.)

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 holder or the person duly authorized to sign for the holder, company, or corporation.

APPENDIX 1. FORMS AND GUIDANCE FOR TC PROJECTS (CONTINUED)

FIGURE 2. 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 1. FORMS AND GUIDANCE FOR TC PROJECTS (CONTINUED)

FIGURE 3. STANDARDIZED CERTIFICATION PROJECT NOTIFICATION PROCEDURES

Standardized CPN procedures:

1. Each ACO will ensure that within 10 working days from the time the project number has been issued, a copy of the standardized CPN will be forwarded by electronic mail to the Accountable Directorate Standards Staff CPN focal point.

2. Each Directorate Standards Staff CPN focal point will be responsible for posting the data received from the ACO on the bulletin board as a CPN within 10 working days from the time the information is received. For all projects judged significant by the accountable directorate, regardless of whether the ACO agrees or disagrees, the accountable directorate will assign a project officer and notify the ACO of the assignment telephonically within 2 working days from receipt of the certification program notification.

3. The subject line on the bulletin board for each CPN will begin with either the letter N, for non significant, or the letter S, for significant CPNs, and the project number. They are followed by the product make/model and then a brief description of the project. Typical examples:

S, ST2922SE-T, &#&/100/200/300/400/500, Winglets

N, TD2943SE-T, 777 Radio Tuning Panel

4. The ACO will indicate NRS and AEG involvement in the certification program by using the standardized CPN form.

Note: This is considered a supplementary means of alerting AEG of their potential involvement in a particular program. Direct contact between the project manager and the appropriate AEG office still remains the primary means of coordinating activities.

5. The initiator/project manager of the CPN will be electronically copied at the time the CPN is posted to the CPN bulletin board.

6. All CPNs over 60 days old will be purged from the bulletin board..

7. A copy of the standardized CPN form is shown on the following page. It replaces the form identified in FAA Order 8100.5 Appendix 1. ACOS will generate the form and automatically inserts the proper titles and information.

APPENDIX 1. FORMS AND GUIDANCE FOR TC PROJECTS (CONTINUED)

FIGURE 4. STANDARDIZED CERTIFICATION PROJECT NOTIFICATION FORM

Subject: **ACTION:** Certification Program Notification **Date:**
From: Manager, (ACO)
To: Manager, XXX-110
Part A: (To be completed by office receiving application)

1. ACOS Project No.:
2. Model Designation:
3. Applicant:
4. Address:
5. Date of application:
6. Type of project:
7. Expected completion date:
8. Project Mgr:
9. Project Engineer:
10. Description:
11. NRS Involvement? Yes_____ No_____ Not Determined_____
12. AEG Involvement? Yes_____ No_____ Not Determined_____

We **DO NOT** consider this a significant program as defined in Paragraph 103j of Order 8100.5

_____
Manager, (project, or ACO, etc.)

_____

Part B: (To be completed by accountable directorate)
Date:
From: Manager, XXX-110
To: Manager, (ACO)
We ( ) do / ( ) do NOT consider this program to be significant and have assigned as our Project Officer.
Please ( ) do / ( ) do NOT submit a draft Certification Program Plan.
Signature authority ( ) is / ( ) is NOT delegated to your office.
Directorate ACOS Project No.:

APPENDIX 1. FORMS AND GUIDANCE FOR TC PROJECTS (CONTINUED)

FIGURE 5. ACOS PROJECT, TC, AND STC NUMBERING SYSTEM

PROJECT NUMBERING SYSTEM

Project Number = AA nnnnn YY-X
Where:

AA = Two alpha digits to identify the type of project; i.e.,

TC = New Type Certificate (TC)
ST = New Supplemental Type Certificate (STC)
AT = Amended Type Certificate
SA = Amended Supplemental Type Certificate
TD = Type Design Change
SP = Special Project
PM = Parts Manufacturer Approval (PMA)

nnnnn = ACOS assigned number; e.g., 00146

YY = Two alpha digits to identify the project Aircraft Certification Office (ACO); i.e.,

AC = ASW-150, Ft. Worth Airplane Certification Office
AK = ACE-115N, Anchorage Aircraft Certification Office
AT = ACE-115A, Atlanta Aircraft Certification Office
BO = ANE-150, Boston Aircraft Certification Office
CH = ACE-115C, Chicago Aircraft Certification Office
DE = ANM-100D, Denver Aircraft Certification Office
EN = ANE-140, Engine Certification Office, Boston
LA = ANM-100L, Los Angeles Aircraft Certification Office
NY = ANE-170, New York Aircraft Certification Office
RC = ASW-170, Ft. Worth Rotorcraft Certification Office
SE = ANM-100S, Seattle Aircraft Certification Office
SC = ASW-190, Ft. Worth Special Certification Office
WI = ACE-115W, Wichita Aircraft Certification Office

X = An alpha digit to identify the type of product

A = Small Airplane
B = Balloon
E = Engine
G = Glider
P = Propeller
R = Rotorcraft
S = Airship
T = Transport Airplane
I = Experimental
Q = Other, or not product

As an example, TC00125AT-A would be a TC project assigned by the Atlanta ACO on a small airplane with the assigned number 00125.

APPENDIX 1. FORMS AND GUIDANCE FOR TC PROJECTS (CONTINUED)

FIGURE 5. ACOS PROJECT, TC, AND STC NUMBERING SYSTEM (CONTINUED)

TYPE CERTIFICATE (TC) & SUPPLEMENTAL TYPE CERTIFICATE (STC) NUMBERING SYSTEM

Certificate Number = SX nnnn YY-D
Where:

S indicates a supplemental type certificate (blank if a type certificate)

X = An alpha digit to identify the type of product; i.e.,

A = Small Airplane
B = Balloon
E = Engine
G = Glider
P = Propeller
R = Rotorcraft
S = Airship
T = Transport Airplane

nnnnn = ACOS assigned number; e.g., 00146

YY = Two alpha digits to identify the issuing Aircraft Certification Office (ACO)

AC = ASW-150, Ft. Worth Airplane Certification Office
AK = ACE-115N, Anchorage Aircraft Certification Office
AT = ACE-115A, Atlanta Aircraft Certification Office
BO = ANE-150, Boston Aircraft Certification Office
CH = ACE-115C, Chicago Aircraft Certification Office
DE = ANM-100D, Denver Aircraft Certification Office
EN = ANE-140, Engine Certification Office, Boston
LA = ANM-100L, Los Angeles Aircraft Certification Office
NY = ANE-170, New York Aircraft Certification Office
RC = ASW-170, Ft. Worth Rotorcraft Certification Office
SE = ANM-100S, Seattle Aircraft Certification Office
SC = ASW-190, Ft. Worth Special Certification Office
WI = ACE-115W, Wichita Aircraft Certification Office

D = indicates Designated Alteration Station (DAS) issued STC (blank if not DAS issued)

As an example, SA00125AT would be an STC issued by the Atlanta ACO on a small airplane with the assigned number 00125.

APPENDIX 1. FORMS AND GUIDANCE FOR TC PROJECTS (CONTINUED)

FIGURE 6. PROJECT SIGNIFICANCE FOR ACO TO ACO COORDINATION

The Project ACO (PACO) must coordinate the types of projects listed below with the Certificate Management ACO (CMACO). Examples are as follows:

General

-Any STC/PMA or repair that affects or replaces a critical or life limited structural or engine part, such as landing gear, thrust reversers, gear boxes, rotating engine parts, pistons, connecting rods, engine block and head.
-Modifications to empty/zero fuel weight.
-Externally mounted equipment. (excluding antennas)

Engine/Prop/Fuel System/APU

-Change in type or power rating of engine
-Propeller/propeller control replacement.
-Propeller installations that affect gear box/changes to mass balance.
-APU and APU compartment modifications.
-Fuel system modifications.
-Change to electronic engine controls or instruments.
-Nacelle modifications.

Electrical/Avionics/Software

- Software modifications that affect critical systems.
-Electrical modifications to aircraft with FADEC engines.
-Single pilot IFR certification modifications.
-New/novel avionics packages (glass cockpit, ECAS, etc.)
-Enhanced GPWS.
-Electrical modifications powered from systems having automatic load shedding features.

Systems

-Major changes to fire detection/suppression systems.
-Hydraulic flight controls/ASAS.
-Icing protection systems.

Rotorcraft

-Rotorcraft mods affecting loads/vibration/fatigue/damage tolerance characteristics of main and tail rotor system/transmission system/gear box/main and tail rotor blades.

Structural

-Installation of cargo doors, passenger to cargo conversions.
-Changes to any primary or critical structure, including flight control surfaces.
-Assessment of flyable cracks in structure.

APPENDIX 2. ISSUANCE OF CERTIFICATES

FIGURE 1. INSTRUCTIONS FOR PREPARATION OF FORM 8110-9, TC

Area 1 - Enter the type of product, using CAPITAL LETTERS, i.e., AIRCRAFT, ENGINE, or PROPELLER.

Area 2 - Enter "IMPORT", if issued for a product in accordance with part 21.29. 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 holder 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. ISSUANCE OF CERTIFICATES (CONTINUED)

FIGURE 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)_____

⑨

(Title) _____

This certificate may be transferred if endorsed as provided on the reverse hereof.

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. ISSUANCE OF CERTIFICATES (CONTINUED)

FIGURE 2. SAMPLE TYPE CERTIFICATE, FAA FORM 8110-9 (CONTINUED)

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. ISSUANCE OF CERTIFICATES (CONTINUED)

FIGURE 3. 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 reissued:

Date of issuance: Date amended:

By Direction of the Administrator

(Signature)

(Title)

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 8110-2 (10-68)(Representation)

APPENDIX 2. ISSUANCE OF CERTIFICATES (CONTINUED)

FIGURE 3. SAMPLE SUPPLEMENTAL TYPE CERTIFICATE, FAA FORM 8110-2 (CONTINUED)

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):* _____

APPENDIX 2. ISSUANCE OF CERTIFICATES (CONTINUED)

FIGURE 4. SAMPLE WRITTEN PERMISSION STATEMENTS FOR STC

The following sample statements are acceptable means of providing written evidence of permission when the holder of an STC agrees to permit another person to use the certificate to modify an aircraft, aircraft engine, propeller or appliance:

(Name of person given consent) may hereby use STC# _____ to modify (aircraft, aircraft engine, propeller, or appliance (per Serial Number)).

(STC holder signature)

Date

or,

Date

Starting on (effective date), (name of person given consent) is authorized to use STC#_____ to modify (product types) for (specific number of products, identified by serial number).

(STC holder signature)

APPENDIX 2. ISSUANCE OF CERTIFICATES (CONTINUED)

FIGURE 5. SAMPLE TYPE CERTIFICATE DATA SHEET FIRST PAGE WITH TC HOLDER RECORD PARAGRAPH

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

TC123
Revision 3
XYZ
100
February 15, 1998

TYPE CERTIFICATE DATA SHEET NO. TC123

This data sheet which is part of Type Certificate No. 123 prescribes conditions and limitations under which the product for which the type certificate was issued meets the airworthiness requirements of the Federal Aviation Regulations.

Type Certificate Holder	XYZ Aircraft Company P. O. Box 1 Nowhere, Kansas 67677
Type Certificate Holder Record	AAA Corporation transferred TC 123 to ABC Corporation on July 4, 1997 ABC Corporation transferred TC 123 to XYZ Corporation on February 15, 1998

I - Model 100, Ovation and Ovation I, (Transport Category), Approved September 9, 1991

Engines	Two Pratt and Whitney Aircraft of Canada, Ltd. (formerly United Aircraft of Canada, Ltd.) JT15D-1 turbofans, or Pratt and Whitney Aircraft JT15D-1 turbofans. Engines may be interchanged in any combination. (S/N 100-0001 through 100-0349) (See NOTES 9 and 11)
	Two Pratt and Whitney Aircraft of Canada, Ltd. JT15D-1A turbofans. (S/N 100-0350 through 100-0664 except 100-0417 and 100-0654)
Fuel	Jet A, Jet A-1, Jet B, JP-4, JP-5 or JP-8. For required use of anti-icing additives and emergency use of aviation gasoline, refer to the FAA Approved Airplane Flight Manual.
Engine Limits	Static thrust, standard day, sea level:

Takeoff (5 min.)	2200 lb.
Max. continuous	2090 lb.

Max. permissible engine rotor operational speeds:

N_1 (Fan) JT15D-1 99 percent	15,840 r.p.m.
N_1 (Fan) JT15D-1A 102.1 percent	16,336 r.p.m.
N_1 (Fan) JT15D-1B 103.4 percent	16,540 r.p.m.
N_2 (Gas gen.) 95 percent	31,120 r.p.m.

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 Record
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
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. CONFORMITY

FIGURE 1. COMPLETION OF FAA FORM 8120-10, REQUEST FOR CONFORMITY

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. CONFORMITY (CONTINUED)

FIGURE 1. COMPLETION OF FAA FORM 8120-10, REQUEST FOR CONFORMITY (CONTINUED)

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. In “Remarks:” If applicable, enter the name of the DER authorized to disposition unsatisfactory condition(s) found during conformity inspection. If applicable, enter the name of the DAR requested by the applicant.

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/STIR (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. CONFORMITY (CONTINUED)

FIGURE 2. REQUEST FOR CONFORMITY, FAA FORM 8120-10

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. CONFORMITY (CONTINUED)

FIGURE 3. COMPLETION OF FAA FORM 8100-1

CONFORMITY INSPECTION RECORD. Completion instructions are as follows (refer to numbered blocks on the form):

Block #1: List the FAA assigned project number along with the date of TIA or Request for Conformity, as applicable
Block #2: Page identification and number of pages, example: (Page 1 of 1).
Block #3: List the applicant or the manufacturer, or both (Information can be obtained from Conformity Request, FAA Form 8120 -10.)
Block #4 and #5: Period during which the inspection was performed.
Block #6: If inspecting an aircraft, list the make, model, registration number, and serial number. For an engine or propeller, list the make, model, and serial number.
Block #7: Manufacturing Inspectors must type or print name and FAA office number and then sign. Designees must type or print name and designee number and then sign.
Assign consecutive numbers for each item inspected.
Block #9: List the name or description of the part, appliance, assembly, drawing, document, specification, or name of the process being evaluated and as referenced on Conformity Request, FAA Form 8120-10, and or Type Inspection Authorization (TIA) FAA Form 8110-1.
Block #10: List the technical data that describes the item listed in block #9. I.e., drawing number, document number, process specification number.
Block #11: List the revision level and date of the technical data in block #9 and #10.
Block #12: List the number of items that were determined satisfactory or unsatisfactory. Do not record individual characteristics. NOTE: An item is a single article or unit containing one or more dimensional characteristics or features.
Block #13: Enter comments that will support any information given in Blocks 8 through 12 i.e., unsatisfactory conditions, corrective actions taken, reference to other item numbers listed, serial numbers, type of inspection accomplished, destination of exported products, buyer furnished equipment, parts processed through manufacturer's maintenance facility, part new or newly overhauled, condition of part or assembly etc. Leave several spaces for corrective action effort. Attach additional sheets if necessary.
Unsatisfactory conditions/nonconformities will be reentered in block #9 with corrective action described in block #13.
When corrective action is completed, the unsatisfactory block is lined through and initialed.
This block can also be used for remarks, serial numbers, part numbers, work order numbers, special processes, and to list FAA forms.

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. If FAA Form 8100-1 is issued for TIA attachment, record TIA number and attachment number.

APPENDIX 4. CONFORMITY (CONTINUED)

FIGURE 3. COMPLETION OF FAA FORM 8100-1 (CONTINUED)

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. CONFORMITY (CONTINUED)

FIGURE 4. STATEMENT OF CONFORMITY, FAA FORM 8130-9 FROM APPLICANT

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: W. A. Smith W.A.Smith	Title: Quality Control Manager
Organization: Aircraft Company	Date: 10/27/87

FAA Form 8130-9 (11-88) Use Previous Edition (Representation)

APPENDIX 4. CONFORMITY (CONTINUED)

FIGURE 5. STATEMENT OF CONFORMITY, FAA FORM 8130-9 FROM AGENT FOR APPLICANT

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		Date
Aircraft Company		10/27/87

FAA Form 8130-9 (11-88) Use Previous Edition (Representation)

APPENDIX 4. CONFORMITY (CONTINUED)

FIGURE 6. TYPE INSPECTION AUTHORIZATION, FAA FORM 8110-1

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. 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.

1. Type Inspection Authorization: Enter the FAA Flight Test and/or Manufacturing office which is requested to perform the flight test and/or ground inspection.
2. Project No. Enter the FAA project number established for the project.
3. Date: Enter the current date.
4. Name of applicant: As shown on the project application.
5. Address: As shown on the project application.
6. Block 1 Inspection Authorized For: Identify type of product, whether new or altered, and if altered, the original type certificate number.
7. Block 2 Certification Basis: List the complete certification basis for the project. A reference may be made to additional pages as required.
8. Block 3 Category: For aircraft only, identify the proper category.
9. Block 4 Description of Alteration: For alteration include a complete description of the alteration being made. A reference may be made to additional pages as required.
10. Block 5 through 10 and 12: Reference page that identifies approved limitations or reference to approved flight manual.
11. Block 11: Identify location and maximum loads of cargo and baggage compartments.
12. Block 13: Identify engine information and operating limitations and type certificate data sheet number. For turbine engine operating limitations, reference supplemental page that identifies approved limitations or reference to approved flight manual or engine operating instructions.
13. Block 14: Identify propeller information and type certificate data sheet number. Reference supplemental page that identifies approved limitations or reference to approved flight manual.
14. Block 15: For rotorcraft identify rotor rpm limits.
15. Block 16: Identify if 100 hr inspection has been completed.
16. Block 17: Identify if equipment list has been verified for correct weight and moment arm of each item of installed equipment. Indicate if equipment list is attached and identify the manufacturer's report number if appropriate.
17. Block 18 (Part 1): Indicate if the Manufacturing inspector is requested to accomplish ground inspection in support of Type Inspection Report part 1. Identify on supplemental page the specific instructions for inspections to be accomplished. Include the following information at the beginning of Block 18:

NOTE:
Point of contact at conformity site:_____
Phone number of point of contact: ____-_____
Location of aircraft/conformity site:_____
DAR requested by the applicant:_____(as applicable)_____

18. Block 18 (Part 2): Indicate if the Flight Test office is requested to accomplish flight test in support of Type Inspection Report part 2. Identify on supplemental page the specific instructions for tests to be accomplished.
19. Block 18 (special): The TIA may contain a section titled "Operational and Maintenance Requirements" that provides for certain other operational evaluations identified by the AEG.
20. Originated By: Indicate the project office symbol.
21. Concurrences: Identify the office symbol of all participating offices. Initials are evidence of office concurrence.
22. Approval: Identify date and title of approval authority. This may be ACO manager or he/she may delegate to appropriate branch or project manager.

APPENDIX 4. CONFORMITY (CONTINUED)

FIGURE 6. TYPE INSPECTION AUTHORIZATION, FAA FORM 8110-1 (CONTINUED)

TYPE INSPECTION AUTHORIZATION | PAGE 1 OF ____ PAGES | PROJECT NO.

TO: ☐ FLIGHT _____ (Routing Symbol) ☐ MANUFACTURING _____ (Routing Symbol) | DATE

NAME OF APPLICANT | ADDRESS (Number, street, city, state, and ZIP code)

1. INSPECTION AUTHORIZED FOR

☐	AIRPLANE	OTHER (Specify)	☐	NEW MODEL (Give model no.)	
☐	ENGINE				
☐	PROPELLER		☐	ALTERED MODEL (Give name of original manufacturer and model no.)	ORIGINAL T.C. DATA SHEET NO.
☐	ROTORCRAFT				

2. CERTIFICATION BASIS

3. CATEGORY—FOR AIRCRAFT ONLY (Check all applicable items)

☐	NORMAL	☐	UTILITY	☐	ACROBATIC	☐	TRANSPORT	☐	RESTRICTED	☐	OTHER (Specify)

4. DESCRIPTION OF ALTERATION

5. DESIGN SPEEDS - MPH (EAS) — SEE PAGE _____	6. MAXIMUM MACH NO. (DESIGN) — SEE PAGE _____	7. DESIGN WEIGHTS — SEE PAGE _____
8. MAXIMUM OPERATING ALTITUDE (Feet)	9. MAXIMUM CABIN PRESSURE DIFFERENTIAL (p.s.i.)	10. CG. LIMITS — SEE PAGE _____
11. CARGO AND BAGGAGE COMPARTMENTS - LOCATION AND MAXIMUM LOADS — SEE PAGE _____	12. STRUCTURAL/MANEUVERING LIMITS — SEE PAGE _____	

13. OPERATION LIMITATIONS

ENGINE MAKE AND MODEL (FOR TURBINE ENGINE SEE PAGE _____) | ENGINE DATA SHEET NO.

ITEM	ON TAKEOFF (Specify) _____ (Minutes)	LOW RATIO SUPERCHARGER: SEA LEVEL	LOW RATIO SUPERCHARGER: ALT. HEIGHT (Specify) _____ (Feet)	HIGH RATIO SUPERCHARGER: ALT. (MIN) (Specify) _____ (Feet)	HIGH RATIO SUPERCHARGER: ALT. (MAX) (Specify) _____ (Feet)
IN. HG.					
RPM					
HP					

MAXIMUM ALLOWABLE TEMPERATURE °F.

CYLINDER HEAD (OR COOLANT OUTLET)	WASHER	
	BAYONET	
CYLINDER BASE		
OIL INLET		
MINIMUM CARBURETOR HEAT RISE REQUIRED AT _____ % MC POWER		

14. PROPELLER

MAKE AND MODEL | DATA SHEET NO. | DIAMETER

HUB MODEL NO. | BLADE MODEL NO. | LIMITATIONS — SEE PAGE _____

15. ROTORCRAFT	MAXIMUM	MINIMUM
POWER ON ROTOR LIMITS—RPM		
POWER OFF ROTOR LIMITS—RPM		

16. INSPECTION REPORT: 100-HOUR INSPECTION COMPLETED ☐ YES ☐ NO

17. EQUIPMENT LIST: IS EQUIPMENT LIST CORRECT AS TO WEIGHT AND ARM OF EACH ITEM ☐ YES ☐ NO

EQUIPMENT LIST ATTACHED ☐ YES ☐ NO | MFGR. REPORT NO.

18. TYPE INSPECTION REPORT
- ☐ COMPLETE APPLICABLE PORTIONS OF TYPE INSPECTION REPORT, PART 1
- ☐ COMPLETE APPLICABLE PORTIONS OF TYPE INSPECTION REPORT, PART 2
- ☐ SEE ATTACHED PAGES FOR INSTRUCTIONS
- ☐ SEE ATTACHED PAGES FOR SPECIAL TESTS (Define divisions of responsibilities)

ORIGINATED BY	CONCURRENCES					
ROUTING SYMBOL	ROUTING SYMBOL	INITIALS	ROUTING SYMBOL	INITIALS	ROUTING SYMBOL	INITIALS

APPROVAL

DATE	TITLE	SIGNATURE

FAA Form 8110-1 (3-66) FORMERLY FAA FORM 316 FAA AC 71-6232 0052-025-2000

APPENDIX 5. CANADIAN STC

FIGURE 1. FORMAL CANADIAN STC APPLICATION REQUEST

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 Yes	Applicable No	Submitted Yes	Submitted 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	☐	☐	☐	☐

APPENDIX 5. CANADIAN STC (CONTINUED)
FIGURE 2. TRANSPORT CANADA REGIONAL AIRWORTHINESS ENGINEERS

PACIFIC REGION

Transport Canada
Regional Airworthiness Engineer
P.O. Box 220
800 Burrard St.
Vancouver, B.C.
V6Z 2J8
Tel: (604) 666-5593

CENTRAL REGION

Transport Canada
Regional Airworthiness Engineer
P.O. Box 8550
125 Garry Street
Winnipeg, Manitoba
R3C 0P6
Tel: (204) 983-4352

QUEBEC REGION

Transport Canada
Regional Airworthiness Engineer
P.O. Box 500
700 Leigh Capréol
Dorval, Quebec
G9R 5P8
Tel: (514) 633-3593

WESTERN REGION

Transport Canada
Regional Airworthiness Engineer
1100, 9700 Jasper Avenue
Edmonton, Alberta
Tel: (403) 420-3855

ONTARIO REGION

Transport Canada
Regional Airworthiness Engineer
4900 Yonge Street
Suite 300
Willowdale, Ontario
M2N 6A5
Tel: (416) 224-3273

ATLANTIC REGION

Transport Canada
Regional Airworthiness Engineer
P.O. Box 42
Moncton, New Brunswick
E1C 8K6
Tel: (506) 851-7114

APPENDIX 5. CANADIAN STC (CONTINUED)
FIGURE 3. SAMPLE LETTER OF REQUEST

Transport Canada
Regional Airworthiness
Engineer
(Address)

Dear Mr._____

We have received from a United States applicant_____, an application for the issue of a Supplement Type Certificate (STC) 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 a Canadian STC 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 STC, dated _____.
c. Compliance Checklist _____.
d. Flight Manual Supplement _____.
e. List any other documentation being forwarded in support of the STC 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
ACOS - Aircraft Certification Office Subsystem
ACRP - Aircraft Certification Regulatory Program
AD - Airworthiness Directive
AEG - Aircraft Evaluation Group
AFM - Aircraft Flight Manual
AML – approved model list
CAA – civil aviation authority
CAR - Civil Air Regulations
CMO - Certificate Management Office
CMU - Certificate Management Unit
CPN - Certification Project Notification
CPP - Certification Program Plan
CMACO - Certificate Management Aircraft Certification Office
DAS - Designated Alteration Station
DER - Designated Engineering Representative
FAA - Federal Aviation Administration
FCAA – Foreign Civil Aviation Authority
FOEB - Flight Operations Evaluation Board
FSB - Flight Standardization Board
GPO - Government Printing Office
JAA - European Joint Aviation Authorities
JAR – Joint Aviation Requirements
MIDO - Manufacturing Inspection District Office
MISO - Manufacturing Inspection Satellite Office
MMEL - Master Minimum Equipment List
MRB - Maintenance Review Board NDI - Non Destructive Inspection
NPRM - Notice of Proposed Rulemaking
PACO - Project Aircraft Certification Office
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

Anchorage Aircraft Certification Office(ACE-115N)
Federal Aviation Administration
222 West 7th Ave #14
Anchorage, AK 99513-7587
Telephone: (907) 271-2668
FAX: (907) 279-6365

Atlanta Aircraft Certification Office(ACE-115A)
Federal Aviation Administration
1895 Phoenix Blvd.Suite 450
Atlanta , GA 30349
Telephone: (770) 703-6035
FAX: (770) 703-6097

Boston Aircraft Certification Office(ANE-150)
Federal Aviation Administration
12 New England Executive Park
Burlington, MA 01803
Telephone: (781) 238-7150
FAX: (781) 238-7199

Chicago Aircraft Certification Office(ACE-115C)
Federal Aviation Administration
2300 East Devon Avenue
Des Plaines, IL 60018
Telephone: (847) 294-7357
FAX: (847) 294-7834

Denver Aircraft Certification Office(ANM-100D)
Federal Aviation Administration
26805 E. 68th Ave., Room 214
Denver, CO 80249
Telephone: (303) 342-1080
FAX: (303) 342-1088

Engine Certification Office (ANE-140)
Federal Aviation Administration
12 New England Executive Park
Burlington, MA 01803
Telephone: (781) 238-7140
FAX: (781) 238-7199

Fort Worth Airplane Certification Office(ASW-150)
Federal Aviation Administration
2601 Meacham Blvd.
Fort Worth, TX 76137
Telephone: (817) 222-5150
FAX: (817) 222-5959

Fort Worth Rotorcraft Certification Office(ASW-170)
Federal Aviation Administration
2601 Meacham Blvd.
Fort Worth, TX 76137
Telephone: (817) 222-5170
FAX: (817) 222-5959

Fort Worth Special Certification Office(ASW-190)
Federal Aviation Administration
2601 Meacham Blvd.
Fort Worth, TX 76137
Telephone: (817) 222-5190
FAX: (817) 222-5959

Los Angeles Aircraft Certification Office(ANM-100L)
Federal Aviation Administration
3960 Paramount Blvd.
Lakewood, CA 90712
Telephone (562) 627-5200
FAX: (562) 627-5210

New York Aircraft Certification Office(ANE-170)
Federal Aviation Administration
10 5th Street, 3rd Floor
Valley Stream, NY 11581
Telephone: (516) 256-7500
FAX: (516) 568-2716

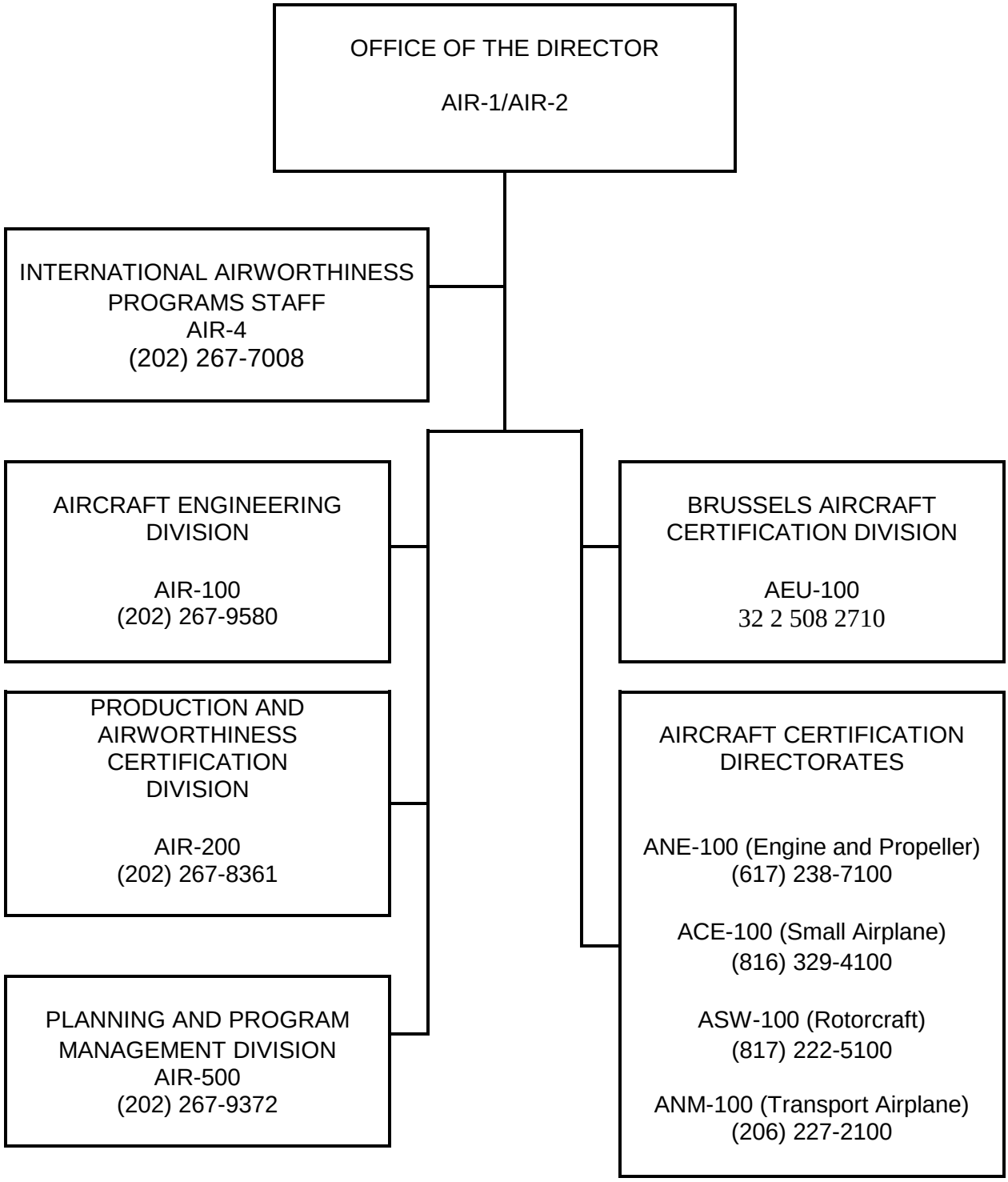
Seattle Aircraft Certification Office(ANM-100S)
Federal Aviation Administration
1601 Lind Avenue SW
Renton, WA 98055-4056
Telephone: (425) 227-2180
FAX: (425) 227-1181

Wichita Aircraft Certification Office(ACE-115W)
Federal Aviation Administration
1801 Airport Road, Room 100
Wichita, KS 67209
Telephone: (316) 946-4100
FAX: (316) 946-4407

APPENDIX 8. AIRCRAFT EVALUATION GROUP

AIRCRAFT EVALUATION GROUP	RESPONSIBLE FOR:
Kansas City Aircraft Evaluation Group, MKC AEG 601 East 12th Street Federal Building Kansas City, MO 64106 Phone -(816) 426-3946	Part 23/ Part 25 Business Jet/ SFAR 41/ Commuter
Fort Worth Aircraft Evaluation Group, FTW AEG 2601 Meacham Boulevard Fort Worth, TX 76137 Phone (817) 222-5270	Part 27/29
Seattle Aircraft Evaluation Group, SEA AEG 1601 Lind Ave. S.W. Renton, WA 98055-4056 Phone (425) 227-1820	Part 25
Los Angeles Aircraft Evaluation Group, LGB AEG 3229 E. Spring Street Long Beach, CA 90806-2425 Phone (562) 627-5270	Part 25
Boston Aircraft Evaluation Group, BOS AEG 12 New England Executive Park Burlington, MA 01803 Phone (781) 238-7887	Part 33, 35, and APUs

APPENDIX 9. AIRCRAFT CERTIFICATION SERVICE



APPENDIX 10. DATA RETENTION

FIGURE 1. PROJECT RECORDS
(Must be maintained by the ACO or MIDO at an FAA facility)

- TC application (8110-12), including all incorporated preliminary data or drawings and cover letter
- Certification Program Notification (CPN)
- Minutes of Type Certification Board (TCB) meetings (preliminary, interim, pre-flight, and final)
- Certification Program Plan
- Equivalent Level of Safety findings
- Special conditions
- Exemptions
- Findings of compliance (8110-3's) and approval letters
- Requests for Conformity (8120-10) and Statements of Conformity (8130-9)
- Conformity Inspection Record (8100-1)
- Airworthiness approval tags (8130-3) issued for conformity
- Certification Plan
- Completed compliance checklist
- Type Inspection Authorization form (8110-1)
- Type Inspection Report (8110-[ ]) and Supplemental Type Inspection Reports (8110-26)
- Application for Airworthiness Certificate (8130-6)
- Special Airworthiness Certificate and Operating Limitations
- Aircraft Evaluation Group (AEG) correspondence
- FAA approval of test and analysis reports
- Flight manual approval page
- Approval letter for Airworthiness Limitations Section
- Approval of referenced Master Drawing List
- TCDS
- TC (8110-9) or STC (8110-2) with original signature

APPENDIX 10. DATA RETENTION (CONTINUED)

FIGURE 2. TYPE DESIGN AND SUBSTANTIATING DATA (May be maintained by ACO or TC Holder)

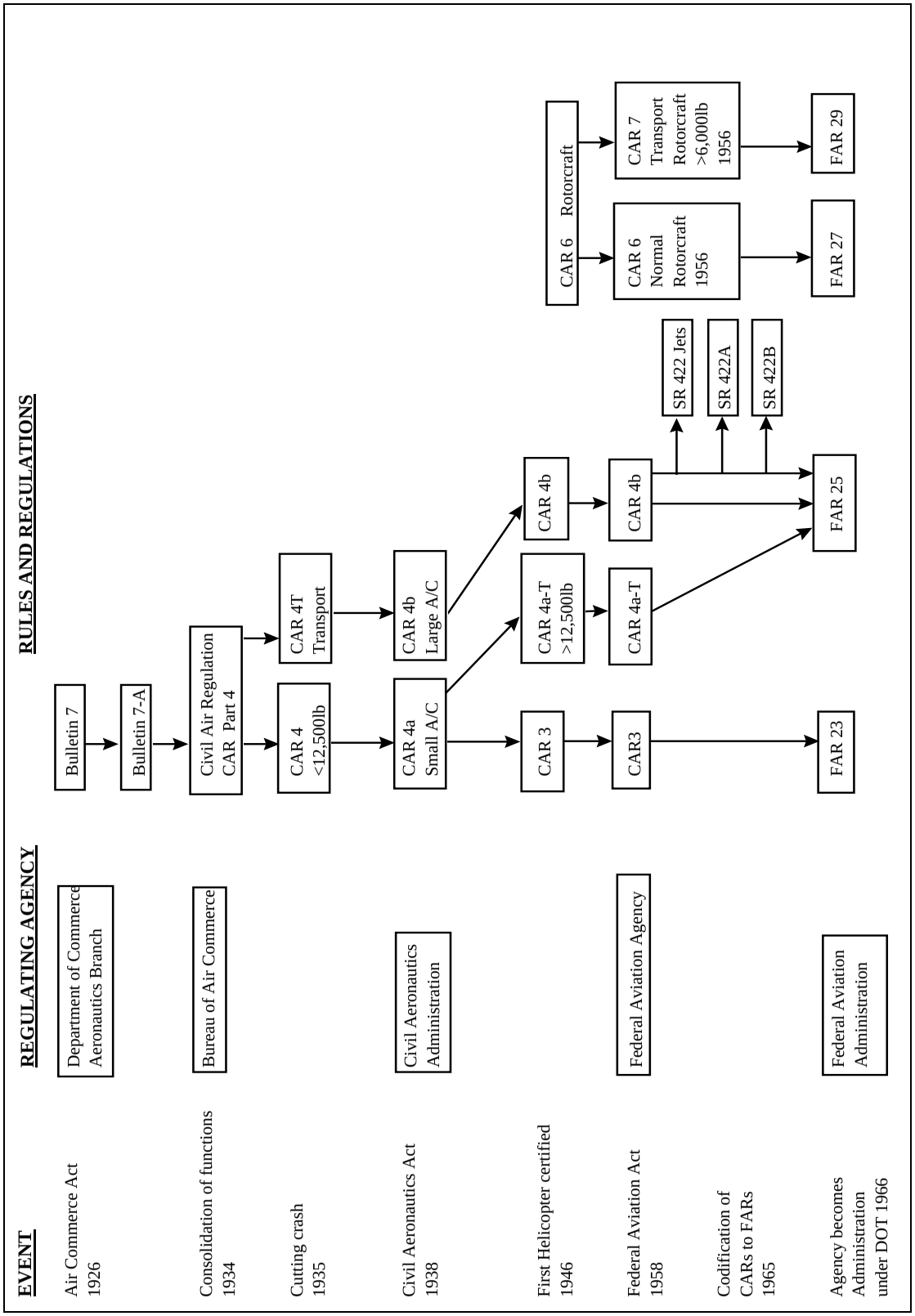
- Type design data, drawings, processes, materials specifications, operations limitations
- Test plans (final approved version, and all approved revisions)
- Test and analysis reports
- Original of approved manuals (Flight manual), and all revisions
- Original of all accepted manuals (ICA, engine or propeller installation)
- Service Bulletins (includes alerts, service letters, all operator letters etc)

APPENDIX 10. DATA RETENTION (CONTINUED)

FIGURE 3. WORKING PAPERS RETAINED AT AN FAA FACILITY AS "CORPORATE MEMORY" (at discretion of the ACO manager)

- Operational project data (e.g. milestones)
- Correspondence not documenting an FAA action or position
- Personal notes from technical meetings
- Issue papers
- Schedules
- Downloaded data or drawings from manufacturer's electronic data base
- Photocopies of submitted data

APPENDIX 11. HISTORICAL BACKGROUND OF AIRCRAFT AIRWORTHINESS REGULATIONS



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 8110.4B

To: Directive Management Officer, AIR-520

(*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: _____

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