Appendix B
The Approval Process

B.1 Introduction

In the Federal Aviation Act of 1958, a complex multistep approval/certification process was established for the FAA to follow to ensure that civil aircraft meet minimum safety requirements. These regulations are found in 14 Code of Federal Regulations (CFR), which comprise the Federal Aviation Regulations (FARs). 14 CFR Parts are commonly referred to as FAR Parts.

The regulatory requirements that civil aircraft must meet depend on the type of aircraft involved (i.e., light airplanes, large multipassenger airplanes, helicopters, etc.) and the aircraft’s intended use (i.e., private, crop dusting, airline, external load-bearing helicopters, etc.). A detailed description of the approval steps and procedures is beyond the scope and needs of this Handbook. However, a general description is given with appropriate details relevant to approval steps and procedures requiring flammability testing.

The basic premise of the regulations is that each aircraft must be approved. Except for “public aircraft” (i.e., those operated by the federal, state, or local government), all civil aircraft must be approved by the FAA before they can be placed into any service. To acquire the necessary approvals, it must have been demonstrated to the FAA via the multistep approval process that the aircraft complies with appropriate regulatory requirements.

The FAA is not setup nor intended to have responsibility for carrying out the various steps in the approval process. The FAA’s function is essentially to review and approve designs, test and production hardware, test plans, and to witness tests and approve test data. The primary responsibility for carrying out the necessary demonstrations of compliance lies with aircraft manufacturers and operators. Manufacturers perform some of the approval steps and aircraft operators perform the others.

B.2 Approval Steps Manufacturers

The manufacturer of each aircraft produced must receive FAA approval for that aircraft before it can be operated by its owner/operator. The regulatory requirements are covered in the FAR Parts dealing with Airworthiness Standards. The procedures are defined in FAR Part 21, Certification Procedures for Products and Parts.

Manufacturers are responsible for carrying out and receiving FAA approval of the several steps involved with the design and manufacture of aircraft.

B.2.1 Certification Requirements

Airworthiness Standards contain performance requirements for the certification of aircraft. The FAR Parts dealing with Airworthiness Standards are

FAR Part 23, Airworthiness Standards: Normal Utility and Acrobatic Category Airplanes
FAR Part 25, Airworthiness Standards: Transport Category Airplanes
FAR Part 27, Airworthiness Standards: Normal Category Rotorcraft
FAR Part 29, Airworthiness Standards: Transport Category Rotorcraft
FAR Part 33, Airworthiness Standards: Aircraft Engines
FAR Part 35, Airworthiness Standards: Propellers

Airworthiness Standards are amended from time to time to modify (upgrade, clarify, etc.) the requirements. The regulatory requirements that a specific aircraft must comply with are established by the amendment level of the applicable FAR Part that applies to that aircraft, plus any special conditions that may be levied by the FAA on that aircraft for its certification. These requirements are known as the “regulations incorporated by reference,” which are identified on the aircraft’s Type Certificate data sheet (see section B.2.2.1).
B.2.2 Certification Procedures

The basic item that the FAA approves is the aircraft. Aircraft parts are not “approved” in the same sense, since a review of aircraft components for compliance to a set of requirements is only done in conjunction with the approval of an aircraft. It is possible to have test data generated by testing a part “approved” (as by a Designated Engineering Representative [DER] using an 8110-3 form [see figure B-1]) but such “approval” alone does not approve the use of the part itself.

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**Figure B-1. FAA Form 8110-3 (Statement of Compliance)**

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<th>IDENTIFICATION</th>
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**PURPOSE OF DATA**

**APPLICABLE REQUIREMENTS (List specific sections)**

**CERTIFICATION** - Under authority vested by direction of the Administrator and in accordance with conditions and limitations of appointment under Part 183 of the Federal Aviation Regulations, data listed above and on attached sheets numbered have been examined in accordance with established procedures and found to comply with applicable requirements of the Federal Aviation Regulations.

I (We) Therefore [ ] Recommend approval of these data [ ] Approve these data

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<tr>
<th>SIGNATURE(S) OF DESIGNATED ENGINEERING REPRESENTATIVE(S)</th>
<th>DESIGNATION NUMBER(S)</th>
<th>CLASSIFICATION(S)</th>
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FAA Form 8110-3 (11-98) SUPERScedes PREVIOUS EDITION

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FAR Part 21, Certification Procedures for Products and Parts, contains the procedures required for manufacturers to receive FAA approval of aircraft or aircraft parts.

The approval process for aircraft and aircraft parts involves three separate sequential steps, each of which requires FAA approval:

1. Approval of design of aircraft
2. Approval of quality control of production of aircraft
3. Approval of each aircraft produced

B.2.2.1 Certification of Design

Approval of the design of the aircraft is the first step in the total multistep approval process. This requires that the manufacturer demonstrate to the FAA that the design of the aircraft meets the relevant Airworthiness Standards.

It is important to recognize that FAA approval of the design of an aircraft does not by itself constitute approval of either the production of that aircraft nor the service use of manufactured duplicates of that aircraft. The FAA must approve production and service use of aircraft in separate steps.

FAA approval of a design is the responsibility of the Aircraft Certification Offices (ACOs). No other section of the FAA has the authority to issue design approval.

The ACOs do not have adequate manpower to carry out all the reviews and inspections necessary for design approval of aircraft. The ACOs have been authorized by statute to delegate certain inspection and certification responsibilities to DERs who are properly qualified private persons not employed by the FAA. DERs may be employees of manufacturers involved with aircraft (material suppliers, holders of Production Certificates, Technical Standard Order [TSO] Authorizations, Part Manufacturer Approvals [PMAs], etc.). In determining whether an aircraft complies with FAA regulations, DERs are guided by the same requirements, instructions, and procedures as ACO personnel.

Each DER authorization is typically limited to a specific technical area that reflects that person’s expertise, DERs who are employees of manufacturers are, in addition, typically only authorized to approve designs involving that manufacturer’s products. Design approvals by a DER that are outside his or her normal authorization may only be authorized by the cognizant ACO on a case-by-case basis.

B.2.2.1.1 Type Certificates

A Type Certificate (see figure B-2) is issued to an aircraft model that meets all the applicable Airworthiness Standards and special conditions for that model. The model’s Type Design refers to all its individual parts and systems. The Type Design consists of the drawings and specifications necessary to define the configuration and the design features of the aircraft model that are needed to show compliance with applicable Airworthiness Standards and special conditions.

FAA approval of the Type Design requires that the applicant carry out all the tests necessary on conformed prototype individual parts (see section B.2.1.4.1) and systems, as well as flight tests on a confirmed prototype of the aircraft itself.

After the FAA has approved the Type Design, it issues a Type Certificate (TC) for the design of the aircraft model.

B.2.2.1.2 Amended Type Certificates

If a holder of the Type Certificate covering an aircraft model wishes to make a major change in the Type Design (not great enough to require a new Type Certificate) of the aircraft, an Amended Type Certificate covering the revised Type Design is required.
The applicant for an Amended Type Certificate must show that the aircraft continues to comply with the regulations incorporated by reference plus any additional requirements such as amendments to the Airworthiness Standards and/or special conditions that were not included in the original Type Design.
The procedure for obtaining an Amended Type Certificate is basically the same as for obtaining Type Certificates.

B.2.2.1.3 Supplemental Type Certificates

If a party wishes to make a major change in the Type Design of an aircraft model (not great enough to require a new Type Certificate), and the party is not the holder of the Type Certificate for that aircraft model, approval of the change requires a Supplemental Type Certificate (STC). A holder of a Type Certificate who wishes to make a change in the Type Design that is less than that involving the derivative aircraft may also apply for a STC.

STCs, in practice, are used for specific design features of the aircraft and do not, as a rule, involve modifications to other, unaffected design features of the aircraft.

B.2.2.1.4 Individual Aircraft Parts

Individual aircraft parts are not “approved” by the FAA; only the aircraft on which the part is used is approved.

To obtain approval for the use of a part on an aircraft, the applicant must comply with the Type Design of the aircraft on which they are to be installed. The applicant must apply to an FAA ACO for approval of the design of the part. The application must include a complete formal description (e.g., drawing or drawings) of the design and the aircraft on which the part is to be installed. The design must be sufficiently definitive and unambiguous to define the item and the requirements that it must satisfy.

B.2.2.1.4.1 Conformity Inspection

If testing of the part is required, the applicant must provide a fabricated prototype of the part along with an FAA 8130-9 form, Statement of Conformity (see figure B-3), stating that the prototype conforms with the design (i.e., was fabricated using the materials and processes prescribed in the formal description of the design). An FAA Manufacturing Inspector or his or her designee must then examine the prototype (and any required accompanying evidence) to determine whether or not the demonstration of its conformity is satisfactory. If satisfactory, the Manufacturing Inspector (or his or her designee) will effect an FAA 8130-3 form, Conformity Certification (see figure B-4), stating that the prototype is in conformity.

B.2.2.1.4.2 Test Plan Preparation

Any required tests must be performed on a prototype of the part to demonstrate that it complies with applicable regulations. The applicant must prepare a test plan that includes the following information:

a. title, list of active pages, and revision record;

b. the exact part usage, including aircraft model, and FAR flammability requirements, including the amendment level;

c. the test procedure and the FAA-approved test facility to be used (the test date shall be coordinated with the FAA ACO or its designee for test witnessing);

d. detailed and complete identification of material(s) used for part construction (a copy of the conformity inspection approval may be included; see section B.2.2.1.4.1); and

e. an isometric sketch of the part with all individual test constructions/panels numerically identified, if the part to be certified requires that more than one construction be tested, such as a galley.

In order to facilitate completing a test report (see section B.2.2.1.4.3) upon completion of testing, data sheets for each test and each construction may be provided. The data sheet must be completely filled out with the exception of the test results. When the test results are entered and signed by the FAA witness or FAA designee (DER), the test plan may be used as the test report.
## Statement of Conformity

### Section I - Aircraft

1. Make | 2. Model
3. Serial No.

### Section II - Engine

1. Make | 2. Model
3. Serial No.

### Section III - Propeller

1. Make | 2. Hub Model
5. Blade Serial Nos.

### Section IV - Certification

I hereby certify that:

- [ ] 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 operational check on __________ (Date).

Deviations:

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<tr>
<th>Signature of Certifier</th>
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<tr>
<td>Organization</td>
<td>Date</td>
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FAA Form 8130–9 (9–78) USE PREVIOUS EDITION

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*Figure B-3. Statement of Conformity*
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**AUTHORIZED RELEASE CERTIFICATE**

**APPROVAL TAG**

4. Organization

5. Work Order/Contract/Invoice

|---------|----------------|-------------|----------------|---------|---------------------|----------------|

13. Remarks

14. New Parts:
Certificates that the part(s) identified above except as otherwise specified in block 13 was (were) manufactured/inspected in accordance with the airworthiness regulations of the stated country and/or in the case of parts to be exported with the approved design data and with the notified special requirements of the importing country.

15. Used Parts:
Certificates that the work specified above except as otherwise specified in block 13 was carried out in accordance with the airworthiness regulations of the stated country and the notified special requirements of the importing country and in respect to that work, the part(s) is (are) in condition for safe operation and considered ready for release to service. (over)

16. Signature

17. Name (typed or printed)

18. Date

FAA Form 8130-3 (5-91)

* Cross-check eligibility for more details with parts catalog
B.2.2.1.4.3 Test Report

If the results of the test show the prototype to be in compliance, a test report identifying the part and presenting the data must be prepared. If the test plan is completed in accordance with B.2.2.1.4.2, the test plan may be modified to become a test report by completing the test data sections on the data sheets provided. The ACO will then approve the part (usually as part of a Type Certificate or an STC activity), or its DER designee will effect an FAA 8110-3 form, Statement of Compliance with the Federal Aviation Regulations (see figure B-1), which indicates approval that the design of the item satisfies the specific requirement(s) of the regulations that the test covered. The ACO itself does not issue a 8110-3 form; only DERs do that.

B.2.2.1.5 Technical Standard Orders

A TSO is a minimum performance standard for specified articles (i.e., materials, parts, processes, or appliances) used on civil aircraft. The performance standards stated in the TSO reflect some (but not necessarily all) of the requirements for that article stated in the Airworthiness Standards.

A TSO authorization is an FAA acknowledgment that the design of the article meets the specified minimum performance standard in the TSO, and that the TSO holder may produce and mark the authorized article with the TSO designation.

It is important to recognize, however, that since amendments to Airworthiness Standards and to TSOs are made independently by the FAA, there may be situations when TSO requirements and Airworthiness Standards are not the same. In such a case, approval of the article may involve requirements beyond those of the TSO itself.

TSOs involving flammability include the following:

- TSO C10a  Life Rafts (nonreversible)
- TSO C13a  Life Preservers
- TSO C13d  Life Preservers
- TSO C17a  Fire-Resistant Aircraft Sheet and Structural Material
- TSO C20  Combustion Heaters
- TSO C22f  Safety Belts
- TSO C25a  Aircraft Seats and Berths
- TSO C30b  Aircraft Position Lights
- TSO C31d  High-Frequency (HF) Radio Communications Transmitting Equipment
- TSO C32d  High-Frequency (HF) Radio Communications Transmitting Equipment
- TSO C34c  ILS Glide Slope Receiving Equipment
- TSO C36e  ILS Localizer Receiving Equipment
- TSO C37c  VHF Radio Communications Transmitting Equipment
- TSO C38c  VHF Radio Communications Receiving Equipment
- TSO C39b  Aircraft Seats and Berths
- TSO C40c  VOR Radio Receiving Equipment
- TSO C42  Propeller Feathering Hose Assemblies
- TSO C51a  Aircraft Flight Recorder
- TSO C53a  Fuel and Engine Oil System Hose Assemblies
- TSO C57a  Aircraft Headsets and Speakers
- TSO C58a  Aircraft Microphones
- TSO C60b  Airborne LORAN-A and LORAN-C Receiving Equipment
- TSO C63c  Airborne Weather and Ground Mapping Pulsed Radars
- TSO C65a  Airborne Doppler Radar Ground Speed and/or Drift Angle Measuring Equipment
- TSO C66b  Distance Measuring Equipment (DME)
- TSO C68a  Airborne Automatic Dead Reckoning Computer Equipment
- TSO C69b  Emergency Evacuation Slides, Ramps, and Slide/Raft Combinations
- TSO C70a  Liferafts (Reversible and Nonreversible)
- TSO C72c  Individual Flotation Devices
B.2.2.1.6 Parts Manufacturer Approval (PMA)

A PMA covers FAA approval for the production of certain materials, parts, processes, and appliances. A PMA application requires that the applicant submit for FAA approval the identity of the aircraft on which the part is to be installed, sufficient information defining the design of the part, and FAA approved test data showing that the design of the part complies with all Airworthiness Standards and special conditions applicable to the aircraft on which the part is to be installed.

B.2.2.2 Certification of Production Quality Control

FAA approval of production requires essentially the approval of the manufacturer’s production quality control system. The mechanisms of approval vary depending on whether or not the manufacturer holds a Production Certificate, TSO authorization, or PMA. The details are not important for the purposes of this Handbook.

The purpose of the quality control system is to ensure consistent satisfactory production of all items involving FAA-approved designs.

In a quality control system, the manufacturer must provide for systematic monitoring of materials and processing to ensure that production goods meet their individual design requirements. The procedures used, including the frequency of inspections, must be documented and presented to the FAA for approval. Any changes in the quality control system must also be submitted to the FAA for approval.

FAA approval of a manufacturer’s production quality control system is the responsibility of the Manufacturing Inspection Offices of the Manufacturing Inspection Branch. No other section of the FAA, including the Aircraft Certification Division, has the authority to approve a production quality control system.

The Manufacturing Inspection Offices, like the ACOs, do not have adequate manpower to carry out all the reviews and inspections necessary for approval and monitoring of production quality control systems. The Manufacturing Inspection Offices have been authorized by statute to delegate certain inspection and monitoring responsibilities to Designated Manufacturing Inspection Representatives (DMIRs) who are properly qualified private persons. DMIRs may be employees of manufacturers involved with aircraft (material suppliers, holders of Production Certificates, TSO authorizations, PMAs, etc.). In determining whether or not an aircraft or aircraft part complies with FAA regulations, DMIRs are guided by the same requirements, instructions, and procedures as Manufacturing Inspection Office personnel.

B.2.2.3 Certification of Individual Aircraft

Each individual aircraft must receive FAA approval before it can be placed into any service. If there are minor design differences between the actual produced aircraft and the Type Design used for the aircraft’s Type Certificate, the ACO or its designee(s) must approve the design modifications.

The approval of the aircraft itself takes the form of an Airworthiness Certificate (FAA 8100-2 form), as shown in figure B-5, which signifies that the aircraft was manufactured according to the engineering drawings defining it and, therefore, complies with the applicable Airworthiness Standards and all special conditions that may apply to that aircraft.
FAA approval of an aircraft (i.e., the issuance of an Airworthiness Certificate to that aircraft) is the responsibility of the Manufacturing Inspection Offices of the Manufacturing Inspection Division. The approval may be delegated to a specific DMIR.

It is important to recognize that the production of each item used on an aircraft must generally be carried out within an FAA-approved quality control system; otherwise, an Airworthiness Certificate cannot be issued for that aircraft. For example, a transport category (FAR 25) airframe manufacturer who holds a Production Certificate may subcontract the fabrication of a part or purchase a part at the request of a customer for installation on that customer’s airplane or install a part supplied by a customer on that customer’s airplane. In such cases, the holder of the Production Certificate is responsible to the FAA for the conformity of the manufactured end item (i.e., for the quality control system used by whoever actually produces the item) unless the actual manufacturer of the item is otherwise covered by some FAA approval of production of that end item, such as a TSO or a PMA.

B.3 Approval Steps—Operators

Operators are responsible for carrying out and receiving FAA approval of the several steps involved with the maintenance and operation of the aircraft. These steps begin after the operator receives an aircraft from a manufacturer that has an Airworthiness Certificate.

The operators must obtain approvals under FARs covering Certification and Operations, viz.,

FAR Part 91 General Operating and Flight Rules

FAR Part 121 Certification and Operations: Domestic, Flag, and Supplemental Air Carriers, and Commercial Operators of Large Aircraft

FAR Part 125 Certification and Operations: Airplanes Having a Seating Capacity of 20 or More Passengers or a Maximum Payload Capacity of 6,000 Pounds or More
The operation of airlines is covered in FAR Part 121 Certification and Operations: Domestic, Flag, and Supplemental Air Carriers, and Commercial Operators of Large Aircraft. The FAA sometimes amends FAR 121 to add requirements to airplanes operated by the airlines that are in addition to the Part 25 Airworthiness Standards that are applicable to those airplanes. The additional requirements sometimes force airlines to retrofit airplanes and/or to request from airplane manufacturers that newly manufactured airplanes meet the upgraded standards.

The Flight Standards Branch of the FAA is responsible for overseeing and approving the activities of aircraft operators. The activities are divided between those dealing with aircraft maintenance and those dealing with aircraft operations. For the purposes of this Handbook, only aircraft maintenance activities are relevant. The approval procedures essentially duplicate those in the Airworthiness Standards.