



U.S. Department
of Transportation

**Federal Aviation
Administration**

Advisory Circular

**Subject: ISSUANCE OF TYPE
CERTIFICATE: RESTRICTED
CATEGORY AGRICULTURAL AIRPLANES**

**Date: 12/1/97
Initiated By: ACE-100**

**AC No: 21.25-1
Change:**

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1. **PURPOSE**. This advisory circular (AC) provides information and guidance for obtaining a type certificate in the restricted category under Title 14 of the Code of Federal Regulations (14 CFR) Part 21, § 21.25, for small single-engine piston and turbo-propeller driven airplanes, which will be used for agricultural special purpose operations. This AC provides an acceptable means, but not the only means, of meeting the requirements of 14 CFR Part 21 for the issuance of a type certificate in the restricted category. This procedure incorporates the appropriate normal category airworthiness standards of 14 CFR Part 23, Airworthiness Standards: Normal, Utility, Acrobatic, and Commuter Category Airplanes. This material is neither mandatory nor regulatory in nature and does not constitute a regulation.
 2. **RELATED REGULATIONS**. 14 CFR Part 21, § 21.25, Issue of type certificate: Restricted category aircraft, and 14 CFR Part 23.
 3. **BACKGROUND**. The current philosophy concerning type certification of restricted category agricultural airplanes is historically based on Part 8 of the Civil Air Regulations (CAR). Under this Part, the applicant for a new aircraft was required to show compliance with all of the airworthiness requirements of any other aircraft category prescribed by the CAR, except those requirements which the Administrator found inappropriate for the special purpose for which the aircraft was to be used. In addition, the applicant was required to show that the aircraft had no unsafe features or characteristics that would render the aircraft unsafe when operated under its prescribed limits. This Part also established new standards for the issuance of type certificates, alterations to type certificates, and type certification procedures. The preamble for Part 8 stated that for such restricted operations where public safety is not endangered it appears unreasonable to require the same level of safety as that required for passenger carrying aircraft. The intent of Part 8 was to place the minimum possible burden consistent with public safety on the applicant for a type certificate in the restricted category. Since the inception of Part 8 of the CAR and following recodification of the CAR into the Federal Aviation Regulations, the Federal Aviation Administration (FAA) has continued using the basic concepts of that Part. On February 8, 1965, the FAA issued AC 20-33. This AC notified the public that policy information contained in Civil Aeronautics Manuals (CAM) 1, 3, 4a, 4b, 5, 6, 7, 8, 9, 10, 13, and 14 could be used in conjunction with specific sections of the CFR, which corresponds with the sections of the CAR
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to which the policies were applicable. Approximately 10 years later, in March 1975, AC 20-33A temporarily deleted the reference to CAM 8 in AC 20-33 from being applied to any sections of the Federal Aviation Regulations. However, in 2 months time, AC 20-33B reinstated CAM 8 for use with Part 21, § 21.25, for small restricted category agricultural airplanes. This policy continued until July 1981 when FAA Order 8130.2, Airworthiness Certification of Aircraft and Related Approvals, eliminated CAM 8 from being used for certificating new restricted category agricultural airplanes.

In October of 1992, two manufacturers of small restricted category agricultural airplanes petitioned the FAA to develop a new set of certification requirements strictly for agricultural airplanes. In February of 1993, representatives from the FAA's Small Airplane Directorate met with a representative for the Agricultural Airplane Manufacturers who had petitioned the FAA to discuss the certification problems that had developed between the Agricultural Airplane Manufacturers and the FAA. At this meeting a draft AC that had been developed by the Small Airplane Directorate to solve the certification problem was presented to the Agricultural Airplane Manufacturer's representative. It was mutually agreed upon between the two parties that the development of an AC that addressed the certification of new restricted category agricultural airplanes would be the quickest way of resolving the issues that had developed between the FAA and the Agricultural Airplane Manufacturers. After several months of discussion between both parties, it was agreed that the most efficient way for the FAA to revise the draft AC was to form a team of engineers and pilots. This team would then visit agricultural operators and pilots out in the field and interview them to determine what their needs were for newly certificated agricultural airplanes. The Agricultural Airplane Certification Team that was formed visited many agricultural operators and pilots across the south from Georgia to Texas. The team finished performing these interviews in the summer of 1994 and met in the fall of 1994 to review their experiences and revise the existing draft AC. In January of 1995, the team met with representatives of the Agricultural Airplane Manufacturers, at the Small Airplane Directorate's Office, to discuss the revised AC and portions of its policy. The AC that has been developed is a product of the combined efforts of the FAA's Agricultural Airplane Certification Team and representatives of the Agricultural Airplane Manufacturers.

4. **EXPLANATION.**

a. This AC contains guidance for the type certification of small restricted category agricultural airplanes meeting the requirements of Part 21, § 21.25(a)(1). Overall restricted category regulations and policy under Part 21 is the responsibility of the Aircraft Engineering Division (AIR-100), in Washington, D.C. For small airplanes, the Small Airplane Directorate is responsible for determining the certification standards that apply, and those that are inappropriate for the special purpose for which the airplane is to be used.

b. Part 21, §§ 21.25(a)(1) and 21.185, contains the requirements for the issuance of type and airworthiness certificates in the restricted category. Civil airplanes affected by these requirements fall into the following three basic groups:

(1) New airplanes produced in the United States for special purpose operations;

(2) Airplanes produced outside of the United States that have been type certificated in accordance with Part 21, § 21.29 (import aircraft); and

(3) Older airplane models certificated in another category, which have been altered for a special purpose.

c. Part 21, § 21.25(a), addresses three certification areas for the issuance of a type certificate in the restricted category. These are noise measurements, unsafe features, and the airworthiness standards. The noise requirements are addressed in 14 CFR Part 36. However, § 36.1(a)(2) exempts small propeller driven airplanes that are designed for agricultural aircraft operations. The applicant should also show that no feature or characteristic of the airplane makes it unsafe when it is operated under the limitations prescribed for its intended use. This requirement reflects the same requirement provided in Part 21, § 21.21. In addition, the airplane should meet the airworthiness requirements of Part 23 except those requirements that the Administrator finds inappropriate for the special purpose for which the airplane is to be used.

5. **PROCEDURE.**

a. The procedures by which compliance is shown for the restricted category is essentially the same as that required for certification in any other airworthiness category except as specified in the regulations.

b. Application for a type certificate in the restricted category under Part 21, § 21.25(a)(1), using the airworthiness standards from Part 23, may be submitted to the responsible FAA Aircraft Certification Office (ACO) in accordance with Part 21, § 21.15.

c. As soon as practicable after the application has been received and acknowledged by the FAA, the ACO will notify the Small Airplane Directorate who will then advise the ACO of the Directorate's degree of involvement.

d. The ACO project manager and the Small Airplane Directorate project officer will, as appropriate, develop a certification program plan which will identify the number and type of meetings necessary to complete the certification. A familiarization and a preliminary type certification board meeting will be held as soon as possible. The type certification basis is established during the initial meeting, which is basically an administrative type meeting. Subsequent meetings are usually technical in nature and are primarily concerned with the airplane type design. The familiarization and technical meetings will:

(1) Familiarize FAA personnel with the project and the airplane type design as defined in Part 21, § 21.31.

(2) Establish the basis for type certification and an overall schedule for accomplishing the program.

(3) Begin the type certification evaluation process.

(4) Provide an opportunity to discuss the conformity and airworthiness of each individual airplane to the approved type design.

(5) Permit discussions of design details between the applicant and airworthiness authority specialists to identify possible areas where the design does not comply with the type certification basis.

(6) Determine the certification basis of the special purpose agricultural airplane using Part 23 normal category airworthiness standards as a basis. Normal category regulations that are typically found to be inappropriate for the special purpose agricultural airplane are listed in Appendix 1 of this AC. It should be noted that some of the regulations found in the list do not normally present certification problems, i.e., turbojet/turbofan regulations or pressurized cabin regulations are normally found to be inappropriate. However, should an airplane like this ever be designed for special purpose agricultural operation, then these regulations would be appropriate. If the regulations of Part 23 (established as the certification basis for the airplane) do not contain adequate safety standards for the airplane because of a novel or unusual design feature, special conditions may be prescribed. The procedures governing the use of exemptions and equivalent levels of safety would be identical to that for standard category airplanes, and should provide levels of safety consistent with the special purpose operations.

(7) Identify all manuals, placards, limitations, and instrument markings required by the type certification basis. For imported airplanes, these are to be identified and presented by the applicant in the English language, and in consistent units in accordance with the working agreements document.

e. Restricted category airplanes that are to be imported into the United States, which were manufactured in a foreign country with which the United States has a Bilateral Airworthiness Agreement (BAA) or a Bilateral Aviation Safety Agreement (BASA), will be considered on a case-by-case basis. These airplanes are nonstandard, requiring special consideration. The certification basis and the special purpose operations are unique and should be developed by the FAA, the exporting airworthiness authority, and the applicant prior to initiation of the project. Because restricted category airplanes are not specifically covered under any bilateral agreements, special arrangements with the foreign airworthiness authority should be mutually agreed upon, by the two authorities, in a separate procedure.

f. The FAA will identify and resolve significant technical, regulatory, and administrative issues using formal issue papers.

g. Prior to the final certification meeting, the responsible ACO will determine whether the applicant has demonstrated compliance with the type certification basis.

h. In accordance with Part 21, § 21.33, the FAA will make any inspections and any flight and ground tests necessary to determine compliance with the Federal Aviation Regulations. Inspections and tests are conducted throughout the type certification program. There are two types of FAA inspections associated with type certification procedures: conformity and compliance inspections. These include progressive prototype inspections; verification of process specifications; component conformity, if applicable; and system ground tests.

i. After all flight tests have been completed by the applicant and all technical data have been submitted to and approved by the responsible ACO, a Type Inspection Authorization (TIA) will be issued. FAA inspectors will ensure conformity to type design; and FAA test pilots and flight test

engineers will conduct flight tests in accordance with the TIA and provide results to the responsible ACO. FAA flight test personnel do not participate in or conduct hazardous flight tests until the applicant has successfully performed these tests and has submitted a report. Conversely, if the flight tests are not deemed hazardous, then FAA flight test pilots and flight test engineers are authorized to participate in flight tests with an applicant on the first flight that those tests are conducted. The determination of which tests are hazardous will be made by responsible personnel (Flight Test Manager/ACO Manager or higher). The FAA test pilot may be authorized to conduct progressive flight tests with the applicant if a TIA has been issued; the airplane, or components of the airplane to be tested, is determined by FAA inspectors to conform to type design; and the airplane is determined by FAA inspectors to be airworthy.

j. Part 21, § 21.35(f)(1), requires 300 hours of function and reliability operation and tests for aircraft incorporating type certificated turbine engines of a type not previously used in a type certificated aircraft. Part 21, § 21.35(f)(2), requires at least 150 hours of operation on all other aircraft. Accumulated test time in a conformed airplane is generally used toward meeting either the 300 or 150 hours of operation. Flight test time of a conformed airplane or components of an airplane may be used toward meeting this requirement, except for airplanes with a maximum certificated takeoff weight of less than 6,000 pounds.

k. The applicant should comply with the requirements of Part 21, § 21.50, by providing complete instructions for continued airworthiness as referenced in Part 23, § 23.1529. A system should be developed that will identify, trace, and maintain the hours on all life-limited components in the airplane. If such a system did not previously exist and the exact life of the component is not known, a life limit will be established based upon airplane records and historical data. The original airplane manufacturer will be significantly involved in establishing these life limits. In addition to these requirements, the reporting of failures, malfunctions, or defects should be accomplished in accordance with Part 21, § 21.3, to determine the necessity for corrective action.

l. After a restricted category type certificate has been issued, changes to that type certificate will be processed in accordance with Part 21, subpart D. All changes to the approved type design should be submitted by the applicant to the responsible ACO or other civil airworthiness authority for approval. The responsible ACO (or other civil airworthiness authority) will review all data, conduct tests and inspections, and, if appropriate, issue the approval.

m. A supplemental type certificate (STC) may be issued for a major change to an airplane with a United States type certificate in the restricted category. The applicant should show compliance with the requirements in Part 21, subpart E. The certificated special purpose operation

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of the airplane cannot be affected by any major change--a change of the special purpose operation is a major change in itself and requires FAA approval. Application for the STC should be made to the responsible ACO. The responsible ACO will review all data, conduct tests and inspections, and, if appropriate, issue the STC.

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**APPENDIX 1. TYPICAL NORMAL CATEGORY REQUIREMENTS
FOUND TO BE INAPPROPRIATE FOR SINGLE-ENGINE
AGRICULTURAL RESTRICTED CATEGORY AIRPLANES**

In developing the following list of regulations (through Amendment 23-52) that generally are not appropriate for restricted category single-engine small agricultural airplanes, consideration was given only to regulations that are applicable to Part 23 normal category airplanes. All other regulations applicable to utility, acrobatic, and commuter category airplanes would be inappropriate.

Subpart B - Flight

<u>Section</u>	<u>Subject</u>
23.45 (d)	Performance — General
23.75(a) and (g)	Landing distance
23.221	Spinning
23.253	High speed characteristics

Subpart C - Structure

23.365	Pressurized cabin loads
23.571	Metallic pressurized cabin structures
23.629(f)	Flutter
23.677(b)	Trim systems

Subpart D - Design and Construction

23.771(b)	Pilot compartment
23.775(b), (c), and (e)	Windshields and windows
23.781(b)	Cockpit control knob shape
23.785(m)	Seats, berths, litters, safety belts, and shoulder harnesses

Subpart D - Design and Construction (continued)

<u>Section</u>	<u>Subject</u>
23.807(a)(3)	Emergency exits
23.831(b)	Ventilation
23.841	Pressurized cabins
23.843	Pressurization tests
23.853(c)	Passenger and crew compartment interiors

Subpart F - Equipment

23.1303(e)	Flight and navigation instruments
23.1305(d)	Powerplant instruments
23.1321(d) and (e)	Arrangement and visibility
23.1325(b)(2)(ii)	Static pressure system
23.1325(b)(3)	Static pressure system
23.1415	Ditching equipment
23.1416	Pneumatic de-icer boot system
23.1419	Ice protection
23.1441	Oxygen equipment and supply
23.1443	Minimum mass flow of supplemental oxygen
23.1449	Means for determining use of oxygen
23.1450	Chemical oxygen generators
23.1453	Protection of oxygen equipment from rupture

Subpart F - Equipment (continued)

<u>Section</u>	<u>Subject</u>
23.1457	Cockpit voice recorders
23.1459	Flight recorders

Subpart G - Operating Limitations and Information

23.1505(c)	Airspeed limitations
23.1523(a)	Minimum flight crew
23.1524	Maximum passenger seating configuration
23.1545(d)	Airspeed indicator
23.1559(a)(2)	Operating limitations placard
23.1581(e)	Airplane Flight Manual and Approved Manual Material — General
23.1583(g), (h), (j), and (l)	Operating limitations