



U.S. Department
of Transportation
**Federal Aviation
Administration**

Advisory Circular

Subject: TYPE CERTIFICATION--FIXED-
WING GLIDERS (SAILPLANES),
INCLUDING POWERED GLIDERS

Date: 2/10/93
Initiated by: ACE-100

AC No: 21.17-2A
Change:

1. PURPOSE. This advisory circular (AC) provides information and guidance concerning acceptable means, but not the only means, of showing compliance with § 21.17(b) of part 21 of the Federal Aviation Regulations (FAR) for type certification of gliders and powered gliders. Accordingly, this material is neither mandatory nor regulatory in nature and does not constitute a regulation. General guidance relative to glider type certification is also provided.

NOTE: The term glider is used interchangeably with the term sailplane throughout the AC. This includes both unpowered and powered gliders and sailplanes. Although JAR-22 uses the terms "sailplanes and powered sailplanes," the FAA will continue to use the terminology that was used in the previous AC and is currently used in other parts of Title 14 of the Code of Federal Regulations (CFR). The term "self-launching" has been left out of the title to avoid confusion between self-launching and self-sustaining, which are both considered powered gliders in this AC. (Self-sustaining gliders have low power engines that are not intended for self-launching operations.)

2. CANCELLATION. AC 21.17-2, "Type Certification--Fixed-Wing Gliders (Sailplanes), Including Self-Launching (powered) Gliders," dated July 13, 1989, is cancelled.

3. RELATED FEDERAL AVIATION REGULATIONS.

- a. Section 21.5--Airplane or Rotorcraft Flight Manual.
 - b. Section 21.17--Designation of applicable regulation.
 - c. Section 21.21--Issue of type certificate; normal, utility, acrobatic, commuter, and transport category aircraft; manned free balloons, special classes of aircraft; aircraft engines; propellers.
 - d. Section 21.29--Issue of type certificate; import products.
 - e. Part 23--Airworthiness Standards: Normal, Utility, Acrobatic, and Commuter Category Airplanes.
 - f. Part 33--Airworthiness Standards: Aircraft Engines.
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- g. Part 35--Airworthiness Standards: Propellers.
- h. Part 45, Subpart C--Nationality and Registration Marks.
- i. Section 91.9--Civil aircraft flight manual, marking, and placard requirements.
- j. Section 91.205--Powered civil aircraft with standard category U.S. airworthiness certificates: Instrument and equipment requirements.

4. OTHER RELATED DOCUMENTS.

a. SN 050-011-00004-6--"FAA Basic Glider Criteria Handbook," may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

b. JAR-22--"Joint Airworthiness Requirements Sailplanes and Powered Sailplanes," may be purchased from the Civil Aviation Authority, Printing and Publication Services, Greville House, 37 Gratton Road, Cheltenham Glos. GL 50 2BN, England.

c. AC 21.17-2A, "Type Certification--Fixed-Wing Gliders (Sailplanes), Including Powered Gliders," may be obtained from the U.S. Department of Transportation, Utilization and Storage Section, M-443.2, Washington, DC 20590.

5. BACKGROUND. On April 13, 1987, part 21 of the FAR was amended to provide procedures for the type certification and airworthiness certification of special classes of aircraft. Special classes of aircraft include gliders and powered gliders, airships, and other kinds of aircraft, which would be eligible for a standard airworthiness certificate, but for which no airworthiness standards have as yet been established as a separate part of chapter I, subchapter C, Title 14 of the CFR. Airworthiness standards for these special classes of aircraft are designated in § 21.17(b).

6. DISCUSSION. This AC contains a list of design criteria found acceptable to the Administrator for the type certification of gliders and powered gliders. The following is a discussion of some of the acceptable means of showing compliance with § 21.17(b).

a. JAR-22. Joint Airworthiness Requirements (JAR) for Sailplanes and Powered Sailplanes.

(1) Origin. On April 1, 1980, certain European Civil Aviation Authorities agreed to Joint Airworthiness Requirements for Sailplanes and Powered Sailplanes (JAR-22). JAR-22 is based on the Federal Republic of Germany national airworthiness code (Lufttaechtigkeitsforderungen fuer Segelflugzeuge and Motorsegler (LFSM) published by the Luftfahrt-Bundesamt), and was developed through joint participation of the Civil Aviation Authorities of Belgium, the Federal Republic of Germany, France, Italy, the

Netherlands, Sweden, and the United Kingdom. After the original issuance, JAR-22 was amended to add new subparts H and J which set forth criteria for the type certification of sailplane engines and propellers, respectively.

(2) Acceptability of JAR-22. After reviewing JAR-22 as amended, the FAA has determined that the criteria of JAR-22 provides an acceptable level of safety and is appropriate for the type certification of gliders and powered gliders.

b. Other Airworthiness Criteria. Section 21.17(b) provides authority for the development and application of airworthiness standards and criteria for special classes of aircraft, which include gliders and powered gliders. The applicable requirements for gliders and powered gliders may be based on the appropriate portions of those airworthiness standards published in chapter I, subchapter C, Title 14 of the CFR, which include parts 1 thru 49, or such other airworthiness criteria as the Administrator may find to provide an equivalent level of safety to those standards.

c. Operational Provisions of Part 91. In addition to the type certification requirements of part 21 of the FAR, gliders must also comply with certain operational provisions of part 91 of the FAR. Applicants for type certification of gliders, particularly powered gliders, should ensure that these requirements are considered in their designs.

7. ACCEPTABLE CRITERIA.

a. Criteria for Gliders. Applicants may utilize one or both of the following means of showing compliance for type certification of gliders and powered gliders.

(1) JAR-22 as amended and accepted by the FAA at the date of application for type certification. However, in the event that the Administrator finds the compliance with airworthiness criteria prescribed in JAR-22 is inadequate as a certification basis of a glider or powered glider due to its unique design or design features, the Administrator may require an applicant to comply with additional conditions.

(2) Other Airworthiness Criteria.

(i) In the event that the airworthiness criteria prescribed in (1) are inadequate or otherwise inappropriate as a certification basis of a glider due to its unique design or design features, other criteria may be developed. Such criteria may utilize the appropriate airworthiness criteria contained in parts 23, 33, 35 of the FAR and in JAR 22, as well as any additional conditions that may be prescribed by the Administrator. Guidance for preparation and approval of these criteria are outlined below:

(A) These criteria must provide for a level of safety equivalent to that prescribed in § 21.17(b). Any proposed airworthiness criteria submitted to the FAA should be comparable to part 23 of the FAR. It is envisaged by the FAA that, to achieve a feasible set of airworthiness criteria, an engineering staff experienced in glider design, in conducting certification programs, and with the development of procedures and standards will be necessary. If the Administrator finds that there is a need, the FAA may participate in the development of such criteria depending on the feasibility of completing the project and the availability of personnel.

(B) The applicant should submit their airworthiness criteria for approval to the Aircraft Certification Office (ACO) having jurisdiction, who will submit them, with recommendations, to the Small Airplane Directorate, Aircraft Certification Service, ACE-100. Upon receipt, ACE-100 will review the airworthiness criteria for applicability to the type design and for completeness. After the criteria are determined by ACE-100 to be acceptable, they will be announced in the Federal Register for public comment as a proposed revision to this AC. The disposition of public comments will be kept on file. Once approved, these criteria may be used as the certification basis for other gliders. The approved set of criteria will be listed in the Federal Register, as an amendment to this AC, along with information on where they may be obtained. ACE-100 will maintain a file of these criteria.

(ii) The approval procedures for significant changes or additions to any previously approved airworthiness criteria proposed for a new project will follow the procedures outlined in (B) above established for a complete set of airworthiness criteria.

(iii) Previously approved airworthiness criteria, when proposed for a new project, should be evaluated against current glider design, service experience, and amendments to appropriate regulations such as part 23 of the FAR.

(iv) An applicant may make a case for exemption from § 21.17(b) and the approved airworthiness criteria, which is incorporated by reference. The preferred procedure, however, is for the applicant to approach the FAA during the process of establishing the certification basis to make its case for not imposing a particular rule or criterion. If the airworthiness criteria has already been approved, the applicant may apply for an amendment to these criteria.

(v) The procedures for equivalent safety findings provided in § 21.21(b)(1) may be used for glider airworthiness criteria. The reference to equivalent safety findings for glider criteria must be done through § 21.17(b) and the glider airworthiness criteria incorporated by reference. In such cases, a showing of equivalent safety findings should be required of the

applicant and approved by ACE-100. Such equivalent safety findings should be part of the type certification basis and noted on the type certificate data sheet.

(vi) These criteria shall also provide for instructions for continued airworthiness to show compliance with § 21.50.

b. Additional Criteria for Powered Gliders.

(1) Powered fixed-wing gliders may be type certificated under Section 21.17(b) if:

(i) The number of occupants does not exceed two;

(ii) Maximum weight does not exceed 850 kg (1874 pounds); and

(iii) The maximum weight to wing span squared (w/b^2) does not exceed 3.0 kg/m^2 (0.62 lb./ft.^2).

NOTE: These criteria originated from JAR-22.

(2) Engines and propellers intended for use on powered gliders may be type certificated in accordance with parts 33 and 35 of the FAR, respectively; under § 21.29 for import products; or may be approved as an integral part of the glider using such other airworthiness criteria approved by the FAA.

Engines and/or propellers that are approved as an integral part of the glider will be certificated as a part of the glider and will be limited to installation on that specific type glider. Separate type certificates will not be issued for these engines and propellers. Type certification of an engine and/or propeller installed in one JAR-22 design does not in and of itself constitute type certification of the same engine and/or propeller in another JAR-22 type design. Maximum credit will, however, be given for the use of FAA approved data developed in an earlier certification project as well as engines and propellers certificated by other agencies to JAR-22, subparts H and J. If either the engine or the propeller is certificated as an integral part of the glider, the applicant has two ways in which to obtain approval:

(i) For Engines: JAR-22, subpart H - Engines, or other requirements that may be based on part 33 of the FAR.

(ii) For Propellers: JAR-22, subpart J - Propellers, or other requirements that may be based on part 35 of the FAR.

(3) Part 36 of the FAR does not contain noise requirements for gliders and powered gliders. A finding under the Noise Control Act of 1972 is to be made by the FAA for all aircraft before a new type certificate can be issued. The finding may consist of the

rationale as to why it would be impractical to decrease the aircraft's noise level. Amended type certificates do not require determinations.

c. JAR-22. If JAR-22 is selected by the applicant--

(1) The national variants identified by individual countries need not be applied.

(2) The "ACJ" (interpretative material) is considered acceptable to the FAA.

d. JAR Section 22.1581. The flight manual requirements of § 22.1581 apply to all gliders. In addition, compliance with § 21.29(a)(3) of the FAR is required. Manuals, placards, listings, and instrument markings are to be presented in the English language.

e. Section 21.17(c) of the FAR. An application for type certification is effective for three years, as specified by § 21.17(c), unless an applicant shows at the time of application that his product requires a longer period of time for design, development, and testing, and the Administrator approves a longer period.

f. Section 21.21(b)(2) of the FAR. Gliders may be designed for quick removal and installation of the wing and tail surfaces by the pilot in accordance with JAR 22.611, 22.612, and 22.685.

g. Part 45, Subpart C of the FAR. Registration marking requirements for U.S. registered gliders are provided in part 45 of the FAR, subpart C.

h. Section 91.205 of the FAR. Powered gliders are considered to be powered aircraft for the purpose of complying with § 91.205.

8. OTHER INFORMATION.

a. Compliance with JAR-22. United States designers and manufacturers of gliders and powered gliders should be advised that strict compliance with JAR-22, including adherence to the national variants, will probably be required by participating countries of the JAA group for import airworthiness acceptance. Accordingly, the FAA will consider strict compliance with JAR-22 required for issuance of a U.S. Class I Export Certificate of Airworthiness for export to a JAR participating country, unless specifically notified to the contrary by the authority of the importing country on an individual case basis.

b. Certification Basis. An FAA letter may be used by the certificating ACO to inform the applicant of the airworthiness criteria, selected in accordance with paragraph 6, that were found to be acceptable to the Administrator for showing compliance with § 21.17(b) of the FAR. These airworthiness criteria should be identified by title, number, revision, and date of FAA approval.

c. Type Certificate Data Sheet (TCDS). Section 21.17(b) of the FAR will be cited as the certification basis for gliders and powered gliders. The TCDS will list, as the certification basis, § 21.17(b), the airworthiness criteria established in paragraph 7b above, and any other additional conditions proposed by the Administrator. These criteria need to be identified by title, number, revision, and date of approval.

d. Basic Glider Criteria Handbook. Originally designed for individual glider designers, the glider industry, and glider operating organizations in 1962, the Basic Glider Handbook is no longer an acceptable means of compliance for type certification of gliders and powered gliders. This handbook does, however, provide useful information on design practices and design criteria.



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