CIVIL AVIATION SAFETY AUTHORITY AUSTRALIA

Advisory Circular

AC 21.20(0) SEPTEMBER 1999

PRODUCTION UNDER TYPE CERTIFICATE ONLY

CONTENTS

1. REFERENCES

- Civil Aviation Safety Regulations (CASRs) Part 21- Certification Procedures for Products and Parts, Subpart F.
- Advisory Circular AC 21.27 "Manufacturing Approval – Overview"

Note: CASRs referred to above are currently enacted as CAR 1998

2. PURPOSE

This Advisory Circular (AC) provides information and guidance concerning the approval to manufacture of aircraft, aircraft engines, and propellers under a Type Certificate (TC) only.

3. STATUS OF THIS AC

This is the first AC to be written on this subject.

Advisory Circulars (ACs) are advisory only. ACs provide recommendations and guidance to illustrate a method, or several methods, not necessarily being the only method by which legislative requirements may be met. They also provide a means of illustrating the meaning of certain requirements by offering interpretive and explanatory guidance. ACs should always be read in conjunction with the referenced regulations.

4. DEFINITIONS

For the purpose of this AC, the following definitions apply:

manufacturer*:* the holder or licensee of a TC, producing duplicate products in accordance with CASR Part 21 Subpart F.

supplier*:* any person who furnishes articles or services related to the manufacture of type certificated products.

product: the aircraft, engine or propeller for which the TC is issued.

article*:* a material, part, component, assembly, or appliance which is used in the type certificated product, as specified in the Type Design data.

5. BACKGROUND

5.1 This AC is one of several that provide assistance and advice concerning manufacturing approval of aircraft and related parts following the introduction of CASR Part 21 and in respect of manufacturing, supersedes those arrangements previously in place under regulation 30 of CAR 1988 and those further described in CAAP 30-1 (1). Other related ACs include:

AC 21.14	Production Certificates
AC 21.16	Approval of Materials, Parts, Processes and Appliances
AC 21.27	Manufacturing Approval - Overview

5.2 Regulation 318 of CAR 1988 provides transitional arrangements for approvals to manufacture issued under regulation 30 of CAR 1988 to continue until 30 September 2003.

6. APPLICABILITY

The holder or licensee of a TC may apply for manufacturing approval to manufacture the product that is the subject of the TC under the provisions of CASR Part 21 Subpart F.

7. PRODUCTION UNDER TYPE CERTIFICATE

7.1 Any applicant seeking to manufacture under a TC will have only 6 months from the date of issue of the TC to establish and implement an Approved Production Inspection System (APIS) in accordance with CASR 21.123. During this 6 months period the Authority has full responsibility for determining whether the product and parts thereof conform to the Type Design and are in a condition for safe operation. An applicant will need to have established a reasonable capability to comply with the regulatory requirements and have accepted the Authority's estimate of costs before the Authority will conduct a preliminary assessment of the application.

7.2 The required inspections for each aircraft produced prior to the issue of an APIS may be very time consuming and, depending upon the Authority's available resources, may be delayed, and would normally only cater for a very low rate of production by the manufacturer. The Authority would also invoke standard fees for the service at the manhour rate current at the time. It is therefore to the manufacturer's advantage to develop and implement an APIS as quickly as possible.

7.3 Applicants should be aware that the Authority considers an APIS to be an interim production stage. The Authority would encourage manufacturers to achieve a Production Certificate for their manufacturing activities as soon as they are in a position to do so (AC21.14 "Production Certificates" refers).

7.4 The Authority will evaluate the adequacy of the applicant's quality system by directly observing control of each stage of production and all supplementary functions associated with the production process including document control. As the manufacturer's individual fabrication, assembly and inspection operations are found to comply with the CASRs, they may be approved by the Authority on a progressive basis. When areas are found to be in compliance, the Authority may reduce its inspection and increase its reliance upon the manufacturer's Production Inspection System (PIS).

7.5 When the PIS has been found to be in compliance with CASR 21.123, the Authority will issue the letter of approval of the APIS. An APIS does not absolve the Authority from the responsibility of carrying out inspections and being satisfied before issuing airworthiness approvals for the product, but it would be expected that with the issue by the manufacturer of the Statement of Conformity (CASR 21.130), the depth and intensity of such inspections would be reduced except where the inspection was associated with the actual surveillance of the APIS.

7.6 As part of the establishment of the PIS, the manufacturer is required to submit a manual that describes the system and the means of making the determinations in accordance with CASR 21.125(2). The Authority will evaluate the manual to determine whether the contents are adequate to show compliance with CASR 21.125 through 21.130, as applicable, and that it provides a clear and complete description of the tests, procedures, records and forms necessary to maintain the quality system. A physical inspection will be conducted by CASA Airworthiness Inspectors of the various areas of the PIS.

7.7 In the event that a manufacturer does not establish and implement an APIS within the required period, the Authority will discontinue its inspections and production must cease (unless specifically authorised by the Authority). Any product manufactured contrary to authorisation will not be eligible for an airworthiness approval and will be subject to enforcement action. A manufacturer may, however, apply for an extension of time to complete, have approved and implement an APIS when there are unusual or extenuating circumstances that precluded or would preclude the establishment of such a system within the allowed timeframe. Such a request should include information, views and arguments to substantiate that the reason for the extension was unavoidable.

8. APPROVED PRODUCTION INSPECTION SYSTEM

Approval of an APIS is based on compliance with all the areas specified in CASR 21.125(2). AC 21.27 "Manufacturing Approval — Overview" Appendix 1 provides advice on establishing an acceptable APIS.

9. TESTS: AIRCRAFT

9.1 The production flight test schedule, procedure and checklist form must be approved under CASR 21.127 and, subsequent to acceptance by the appropriate flight test and engineering specialists, may be included in the manual required under CASR 21.123(1)(d).

9.2 Prior to the production testing of an aircraft, any items peculiar to the aircraft being tested, as indicated in CASR 21.127(2)(e), should be checked. For example it is important that:

(a) the means provided to level the aircraft are accurate and conform with the Type Design data;

(b) each aircraft is weighed to determine that the empty weight and centre of gravity conform with the Type Design data. (CAO 100.7 refers); and

(c) each aircraft produced, both prior to and subsequent to the issue of an APIS, must be flight tested by a CASA approved pilot.

10. TESTS: AIRCRAFT ENGINES

10.1 The test equipment used for the test runs should have sufficient capability and be sufficiently accurate to ensure that the engine output delivered complies with the official ratings as specified in the type data.

10.2 Following the tests prescribed by CASR 21.128, each engine will be subject to inspection by the Authority to determine that the engine is in a condition for safe operation. Such inspection may include internal inspection and examination to ensure that no unsafe condition exists. The degree of internal inspections will be at the discretion of the CASA Airworthiness Inspector, but would normally be determined by the cumulative results of such inspections conducted on the first production engines and service experience. The Authority may consider a statistical plan for internal engine inspections if the manufacturer submits a proposal based on product uniformity, satisfactory history of previous internal inspections and service experience.

11. TESTS: PROPELLERS

11.1 An acceptable functional test for variable pitch propellers would include 25 complete cycles of the control throughout the propeller pitch and rotational speed ranges. In addition, for feathering and/or reversing propellers, 5 cycles of feathering operation and 5 cycles of reverse operation from the lowest normal pitch to maximum reverse, should be accomplished.

11.2 Following the functional test, each propeller is subject to inspection by the Authority to determine that the propeller is in a condition for safe operation in a similar manner to that described above for engines.

12. STATEMENT OF CONFORMITY

12.1 Upon receipt of the Statement of Conformity for each aircraft, aircraft engine or propeller manufactured under the TC, the Authority will inspect the completed product to determine that it conforms to the Type Design and is in a condition for safe operation as per CASR 21.130. If so, the appropriate airworthiness certification will be issued.

12.2 When it has been determined and documented that the manufacturer's PIS complies with CASR Part 21 requirements, an approval letter will be forwarded to the applicant. If, subsequent to the issue of the original letter, the manufacturer desires to add another type certificated product or a new model to the manufacturer's APIS, a superseding approval letter will be issued containing the new product(s) and/or model(s) if they also are found to comply with the Authority's requirements.

12.3 An APIS holder's manufacturing complex would normally consist of a principal facility and all associated facilities using the same quality system as approved by the Authority for the particular type-certificated product(s). When an APIS holder moves the principal manufacturing facility to a new location, the APIS will cease to be effective until such time as a CASA audit has been carried out and the new facility/location found to be satisfactory.

13. GENERAL

13.1 Approved replacement parts may be identified with an Authorised Release Certificate Tag DA 1 (Form One). Parts which are not accompanied by a DA 1 (Form One) are not considered to be CASA approved parts.

13.2 Following approval of the APIS, the manufacturer may obtain the appointment of employees as authorised persons for the purpose of issuing Certificates of Airworthiness and product DA 1 (Form One) forms.

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