



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

Advisory Circular

Subject: Propeller Instructions for Continued
Airworthiness

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AC No: 35.4-1

Initiated By: ANE-110

Change:

1. **PURPOSE.** This advisory circular (AC) provides guidance and acceptable methods, but not the only methods, for demonstrating compliance with 14 CFR §35.4, Instructions for Continued Airworthiness. This AC addresses preparing the instructions for continued airworthiness (ICA) for propellers.

2. **APPLICABILITY.**

a. The guidance provided in this document is directed to propeller manufacturers, modifiers, foreign regulatory authorities, and Federal Aviation Administration (FAA) propeller type certification engineers and their designees.

b. This material is neither mandatory nor regulatory in nature and does not constitute a regulation. It describes acceptable means, but not the only means, for demonstrating compliance with the applicable regulations. The FAA will consider other methods of demonstrating compliance that an applicant may elect to present. Terms such as “should,” “shall,” “may,” and “must” are used only in the sense of ensuring applicability of this particular method of compliance when the acceptable method of compliance in this document is used. While these guidelines are not mandatory, they are derived from extensive FAA and industry experience in determining compliance with the relevant regulations. On the other hand, if the FAA becomes aware of circumstances that convince us that following this AC would not result in compliance with the applicable regulations, we will not be bound by the terms of this AC, and we may require additional substantiation as the basis for finding compliance.

c. This material does not change, create any additional, authorize changes in, or permit deviations from existing regulatory requirements.

3. RELATED REGULATIONS, ORDERS, AND ADVISORY MATERIAL.

a. Related Regulations.

- (1) Part 21 – Certification Procedures for Products and Parts.
- (2) Part 35 – Airworthiness Standards: Propellers.
- (3) Part 43 – Maintenance, Preventive Maintenance, Rebuilding, and Alteration.
- (4) Part 91 – General Operating and Flight Rules.
- (5) Part 119 – Certification: Air Carriers and Commercial Operators.
- (6) Part 121, Subpart L – Maintenance, Preventive Maintenance, and Alterations.
- (7) Part 125, Subpart G – Maintenance.
- (8) Part 135, Subpart J – Maintenance, Preventive Maintenance, and Alterations.

b. Related Orders. FAA Order 8110.4B, Type Certification Process, dated 4/24/00.

c. Related Advisory Material.

- (1) AC 20-114, Manufacturers' Service Documents, dated 10/22/81.
- (2) AC 120-78, Acceptance and Use of Electronic Signature, Electronic Recordkeeping Systems, and Electronic Manuals, dated 10/29/02.

4. DISCUSSION. The propeller type certification process requires the applicant to prepare ICA. The ICA provide information for proper maintenance that ensures that propellers of that type design are airworthy. For the purposes of this AC, a propeller is considered airworthy when it meets the following two conditions:

a. The propeller conforms to its type certificate (TC). A propeller conforms to its TC when the propeller configuration is consistent with the type design and other data that is part of the TC, as well as other approved data such as that related to repairs, modifications, or alterations.

b. The propeller is in a condition for safe operation. A propeller is in a condition for safe operation when factors such as wear, damage, and deterioration do not prevent the propeller from demonstrating compliance with those requirements of part 35 that relate to the safe operation of the propeller and do not result in an unsafe condition to the aircraft. This means, for example, that a propeller in a condition for safe operation should still comply with the centrifugal load requirements of §35.35.

5. MANUAL CONSIDERATIONS.

a. General. The ICA should be in manual form. The manual should be organized to provide separate sections for maintenance functions and overhaul functions. Approved manuals may be distributed in paper or in an electronic format as described in AC 120-78.

b. Use of Aircraft Maintenance Manuals. Typically, the propeller manufacturer prepares and maintains propeller maintenance manuals, which are provided to the aircraft manufacturer. However, the propeller manufacturer may provide the aircraft manufacturer instructions that deal with maintenance of the propeller instead of preparing and maintaining a propeller maintenance manual. The propeller TC holder remains responsible for controlling the content and distribution of the propeller section of the aircraft ICA. The propeller TC holder should establish a program, approved by the FAA, to control and distribute those sections of the aircraft ICA that are used to show compliance with the propeller TC requirements, including any component manuals. In this context, it should be clear that the aircraft manufacturer should adopt the propeller TC holder's maintenance instructions without alteration. However, the aircraft manufacturer may supplement the propeller manufacturer's ICA with any aircraft installation-specific ICA as long as the aircraft manufacturer's ICA does not conflict with the propeller manufacturer's ICA. Only the propeller TC holder may make changes to the propeller maintenance portion of the aircraft ICA, and the aircraft manufacturer should accurately incorporate those changes. If the propeller TC holder does not or cannot provide a program to control the content and distribution of the propeller maintenance section of the aircraft ICA, then the propeller TC holder should produce and distribute its own propeller maintenance ICA. In either case, the propeller TC holder should always provide a separate propeller overhaul manual to address the maintenance of uninstalled propellers.

c. Supplemental Type Certificates, Part Manufacturer Approvals, Repairs, and Alterations. The ICA should also be provided for supplemental type certificates (STCs), part manufacturer approvals (PMAs), design changes, and any repairs or alterations that introduce new features that the existing ICA does not adequately cover. In these cases, the STC or PMA holder, or the individual who receives the repair or alteration approval, is responsible for providing the ICA. The process for reviewing and accepting ICA for STCs, PMAs, design changes, and repairs or alterations is the same as that described in paragraph 6b of this AC. When the existing ICA is determined to be adequate for the continued airworthiness of the product, that determination should be noted in the design approval to ensure the continued airworthiness of the product (for example, in the limitations and conditions section of the STC).

6. GUIDANCE FOR §35.4, INSTRUCTIONS FOR CONTINUED AIRWORTHINESS.

a. For a certification program under part 35, the applicant should submit the ICA to the FAA for acceptance before the propeller TC is issued. Under §35.4, the ICA may be incomplete at the time of type certification if there is a program to ensure its completion before delivery of the first aircraft with the propeller installed, or upon issuance of a standard airworthiness certificate for the aircraft with the propeller installed, whichever occurs later. The program should be presented to and accepted by the FAA before the issuance of the propeller TC. The rule accommodates applicants who cannot complete the ICA until a specific aircraft application is identified. However, every effort should be made to complete the ICA at the time of propeller TC issuance. The FAA cannot issue the airworthiness certificate for an aircraft without complete ICA. However, the completion of the overhaul manual or the ICA section for overhaul or other forms of heavy maintenance may be delayed until after the propeller has entered service. In such cases, the applicant should provide a schedule to complete the overhaul manual or section that is acceptable to the FAA; normally the overhaul manual or section would be completed within six months of the propeller entering service. Until it is completed no person, including the propeller manufacturer, should be allowed to overhaul or perform any form of heavy maintenance on the propeller. The manual, when completed, becomes part of the ICA.

b. Applicants should submit ICA to the Aircraft Certification Office (ACO) responsible for overseeing that type certification project. That ACO is responsible for the approval of any airworthiness limitations and acceptance of the associated maintenance and overhaul procedures. The Aircraft Evaluation Group (AEG) will review the ICA and make recommendations on the maintenance and operational aspects. The ACO and AEG offices are jointly responsible for determining the acceptability of the ICA; however, the final acceptance of the completed ICA is the responsibility of the ACO. If the project is an STC project or PMA project, coordination between the Project Aircraft Certification Office (PACO) and the Certificate Management Aircraft Certification Office (CMACO) may be required.

c. The propeller ICA may require modification and FAA approval for each unique airplane and engine installation due to configuration differences that affect elements such as propeller loading, system rigging, propeller controls, and deicing systems. The submittal and approval process is the same as the process discussed in paragraph 6b of this AC, except that the applicant may submit the ICA to the PACO to be forwarded to the CMACO.

7. GUIDANCE FOR APPENDIX TO PART 35, A35.1 - GENERAL.

a. The ICA should include instructions for all propeller parts. These instructions should ensure the continued airworthiness of the entire propeller to the extent that the lack of specific instructions for any given part should not adversely affect an operator's ability to maintain the propeller in an airworthy condition.

b. Each part should be addressed either individually or as part of a group or system. The applicant should consider airworthiness limitations, safety assessments, classification of parts, and compliance requirements when determining the need for instructions for parts, sub-assemblies, assemblies, or modules.

c. The ICA should establish specific inspections with threshold or opportunity schedule requirements. Additionally, when the propeller is in the shop and the propeller parts and components are exposed, the parts and components should be subjected to appropriate inspections to determine their eligibility for reinstallation in a propeller for continued service. An adequate inspection program with threshold or opportunity inspections is essential for the continued airworthiness of the propeller.

d. In the ICA, the applicant should provide a means to ensure accurate configuration control that complies with the TC for all parts, components, and combinations of parts or components, and allows proper identification of the propeller configuration during assembly or replacement.

e. For highly complex propeller parts and components, the manufacturers of those parts may provide the ICA through the propeller TC holder. However, in this case, the propeller TC holder should cross-reference the part or component manufacturer's instructions in the ICA by revision level and date of publication, since those instructions become part of the complete ICA as required by §35.4.

f. The propeller TC holder should have a program for controlling the content and distribution of all propeller ICA, including part or component manuals or sections. The applicant should document the procedure for distributing the changes to the ICA in the internal procedures manual. The ICA distributed to owners and operators does not have to include the program for managing changes to the ICA, but should include the revision history records, including revision number or level, affected pages or sections, and dates. These revision history records are important in establishing the content of the current manual, which is used in accordance with part 43.

g. The TC holder should clearly define what level or amount of inspection and repair or replacement of parts constitutes an overhaul. This is needed for several reasons:

(1) Section 35.19 requires that a propeller be designed and constructed to minimize the development of an unsafe condition between overhaul periods; this includes components and accessories that are part of the TC.

(2) When issuing an export airworthiness approval on a newly overhauled product as defined under §21.321(b)(4), the definition of complete overhaul must be known in order to make an airworthiness determination for export.

8. GUIDANCE FOR APPENDIX A TO PART 35, A35.2 - FORMAT.

a. The ICA should be organized and cross-referenced in a clear, logical, and usable format. Service bulletins (SBs), as described in AC 20-114, form a different class of service document than those required for type certification; SBs are not an acceptable substitute for ICA. The SBs may be used as a vehicle for distributing information; however, temporary manual revisions are more appropriate for this purpose. Incorporating the appropriate information through temporary manual revisions is not considered an undue burden to the TC holder. However, if the TC holder decides to incorporate SBs by reference into the ICA, the TC holder should meet the following criteria:

(1) The ICA should reference the specific SB revision. The ICA should not simply specify “latest revision.”

(2) The technical content of the SB should be FAA-approved.

b. Appendix A35.4, Airworthiness Limitations Section, specifies that the ICA must contain a separate section titled “Airworthiness Limitations.”

c. The FAA has accepted a variety of formats, including the Air Transport Association (ATA) 100 Specification or ATA iSpec 2200. The documents that constitute the complete ICA should be identified as containing the ICA required under §35.4, regardless of the format.

9. GUIDANCE FOR APPENDIX A TO PART 35, A35.3 - CONTENT. The ICA is intended to be a complete document; therefore, it should be emphasized that the information should be contained in the manuals, not referenced in separate documents, such as service letters or SBs. The ICA must be written in English; however, metric system units may be used for the technical aspects of the product in the areas of design, production, operation, or maintenance. Appendix A35.3 also specifies that the applicant provide a minimum of two distinct groupings as part of the ICA manual. These two groupings are: Propeller Maintenance Section and Propeller Overhaul Section. When the overhaul manual is not titled “Propeller Overhaul Manual,” the following sentence or a similar sentence to define an overhaul should be added: «The contents of this manual serve to document all requirements in order to accomplish a complete propeller overhaul.».

a. Guidance for A35.3(a), Propeller Maintenance Section.

(1) Paragraphs A35.3(a)(1) and (a)(2). The description of the propeller features and data and its components, systems, and installations should contain enough detail to perform propeller maintenance and preventive maintenance. This may include any necessary warnings and guidance, such as applicable metric system or U.S. Standard System requirements. This description ensures compliance with the requirements for the observation and recording of the maintenance performed and the methods, techniques, and practices used.

(2) Paragraph A35.3(a)(3). The description of the control and operation of the propeller components and systems should also provide enough detail to perform the maintenance at the levels specified in the ICA.

(3) Paragraph A35.3(a)(4). The propeller maintenance section should also address all accessories, cover-plates, etc., that may be attached to, mounted on, or driven by the propeller, because their interfaces affect the propeller. The propeller maintenance section should have complete installation instructions for those parts and accessories that are part of the propeller type design. The instructions should include minimum interface instructions and any appropriate specifications, warnings, or cautions for those areas on which non-propeller TC accessories or parts could be installed on the propeller at a later date.

(4) Paragraph A35.3(a)(5). The instructions should include appropriate warnings to head the aircraft into the wind during the performance of rotating ground system checks such as overspeed governor checks. The manual should include any additional checks specific for the propeller.

(5) Paragraph A35.3(a)(6).

(a) The applicant does not have to provide specific scheduling information for each part, but the scheduling information provided should ensure the continued airworthiness of the entire propeller to the extent that the lack of specific scheduling information on any part would not adversely affect the continued airworthiness of the propeller. The substantiation for scheduling information should be derived from propeller certification testing, development testing, service experience of the same or similar type design propeller, or a combination of these. A general note should be added to the ICA that states that it is good maintenance practice to perform inspections on an opportunity basis whenever any component is exposed, regardless of if the component is scheduled to be serviced at that time.

(b) A single, top-level overhaul period for the propeller should be adequate when the overhaul period provides an appropriate interval to ensure the continued airworthiness of the entire propeller.

(c) An applicant should provide at least one scheduling option for the ICA. The propeller parts, components, and accessories should be monitored and serviced while installed; if not, the products should be scheduled for appropriate maintenance or overhaul to ensure their continued airworthiness. For example, this could mean soft times for each module, assembly, sub-assembly, accessory, or part of the propeller. If the propeller is taken off the aircraft, the ICA should provide maintenance or overhaul instructions to determine the propeller's eligibility for reinstallation on an aircraft and continued service use. The disassembly of the propeller, module, or component assembly to the piece-part level may be required before returning the propeller to service if the exposure occurs after a considerable number of hours in service.

(d) The applicant may refer to a component manufacturer as the source for the scheduling information. In that case, the manufacturer's component manual becomes part of the ICA, and the TC holder remains responsible for the information, even though the component manufacturer provides the information in the component manual. The TC holder is responsible for providing the scheduling information in the principal ICA (for example, the propeller maintenance section) and defining when the maintenance referenced in the component manual should be performed. There may be cases in which, due to the complexity of the maintenance task, only the original equipment manufacturer (OEM) is approved to work on a part or component. In such cases, when accepted by the CMACO, the ICA should only reference the recommended scheduling periods, the manufacturer's documents, and the manufacturer's name and address.

(e) The ICA should identify and reference any component manuals that are part of the ICA. In such cases, the TC holder is responsible for controlling the content and changes in component manuals in accordance with the program provided to the FAA under paragraph A35.1(c). The TC holder may work with the component manufacturer to distribute changes to component manuals.

(f) The ICA should include the recommended overhaul periods.

(g) The applicant must include an inspection program in the ICA to ensure the continued airworthiness of the propeller. Certification tests, analyses, and service experience, if available, should be used to develop the inspection program for parts, assemblies, sub-assemblies, or modules. The Airworthiness Limitations section does not have to define the inspection program. However, the inspection program should cross-reference any airworthiness limitations that are required with the inspection program. An adequate inspection program should also include subsequent inspections (periods, frequency, and parts involved).

(6) Paragraph A35.3(a)(7). The troubleshooting information should ensure that the propeller and its modules, assemblies, sub-assemblies, and parts are able to perform their intended functions within the approved flight envelope and prevent propeller malfunctions. The troubleshooting information should address potential malfunctions and provide either procedures to rectify them or to replace the affected part or component before continued operation.

(7) Paragraph A35.3(a)(8). The applicant should provide a means to ensure configuration control during maintenance in the ICA. This configuration control should ensure that the proper parts, components, and combinations of parts and components are identified and comply with the TC.

(8) Paragraph A35.3(a)(9). The list of tools for maintenance should be adequate for completing the work. The list may include lists located in the sections of the ICA in which the work is described. However, the list of tools and equipment should be located in a manner that facilitates locating and ordering the tools and equipment. Also, the list should include a cross-reference to the section in which the method of using each tool is described. Special tools should be noted, as there is a specific regulatory requirement for the use of a special tool when performing maintenance.

b. Guidance for A35.3(b), Propeller Overhaul Section. It is not necessary to define a single overhaul period for the entire propeller, modules, or assemblies. However, experience has shown that every part of the propeller is exposed for inspection at some point during the life of the propeller. The TC holder should clearly define what level or amount of inspection and repair or replacement of parts constitutes an overhaul. The modular maintenance concept is an efficient overhaul method, even though each part may effectively be overhauled at different times.

(1) Paragraph A33.3(b)(1). The propeller overhaul manual or section should contain enough details for the disassembly, overhaul, and re-assembly of the propeller. This manual or section should also include necessary warnings and guidance.

(2) Paragraph A35.3(b)(2).

(a) Adequate inspection criteria should enable the appropriate inspection of each part of the propeller, sub-assembly, assembly, and module, as well as systems and components. Inspections should identify the required action at each level, such as part replacement, repair, or further detailed inspection.

(b) The accuracy and reliability of inspection techniques should be consistent with the criticality of the parts being inspected and the types of defects for which the part is being inspected. The ICA should identify parts and key features or areas for which special emphasis or a higher awareness is needed to assure continued airworthiness. Cleaning could have a significant effect on the inspection, as improper cleaning could result in missing potentially hazardous defects. Therefore, the ICA should emphasize the proper cleaning methods, with the appropriate cautions when improper cleaning could impede inspection.

(3) Paragraph A35.3(b)(3). The overhaul manual should contain details for all fits and clearances for the propeller and components, structural integrity, and functionality of new and worn parts. While these fits and clearances may be identified in the manual as limits, they are not considered airworthiness limitations. However, if these limits are exceeded, the component or part may not be airworthy.

(4) Paragraph A35.3(b)(4).

(a) This requirement ensures that worn or substandard parts that do not meet the ICA inspection limits cannot be returned to service. To make the propeller airworthy, such parts should be either replaced or repaired. While the ICA does not have to include repairs for all propeller parts, it should identify when or under what conditions parts must be replaced or repaired. If a part or component fails to meet the inspection requirements of the ICA, replacement is an acceptable alternative to repair.

(b) Repairs specified in the ICA should be complete and may include personnel training requirements. When the repair is accomplished in accordance with the ICA, the part should conform to its approved type certificate and, if safe for operation, should constitute an airworthy part.

(c) The FAA may allow and approve other repair data that is not part of the TC and is not reflected in the ICA. However, when design change data for repair or alteration constitutes a major change to the type design, the need for such repair or alteration information in the ICA should be evaluated, because the repair or alteration could introduce a new feature that does not exist in the original type design. This is particularly true for an STC. Any major change in type design, whether in support of a repair or an alteration, that is substantive enough to require significant additions to the ICA should be approved as an STC or amended TC.

(5) Paragraph A35.3(b)(5). The ICA should also contain a means to ensure configuration control during overhaul such that the proper parts, components, and any combinations that comply with the type design are identified during assembly or replacement.

(6) Paragraph A35.3(b)(6).

(a) The ICA should provide test acceptance criteria identified as limits, although not identified as airworthiness limitations. Changes to such propeller test acceptance criteria that are safety related should be considered major design changes and may be changed with appropriate FAA-approved data to substantiate the change. The ICA should provide calibration requirements (frequency, accuracy, and protocol to be used) for all testing and measurement equipment used to return the propeller and its component parts to service.

(b) The manual or section should include instructions for testing a propeller after overhaul. When applicable, this should also include any minimum testing requirements for a single overhauled component or model.

(7) Paragraph A35.3(b)(7). The manual or section should identify special containers, equipment, and tools that may be necessary to comply with the instructions for storage. The storage limits should also include any environmental restrictions, such as limits for temperature or humidity.

(8) Paragraph A35.3(b)(8). The list of tools for overhaul should be adequate for completing the work. The list may include lists located in the sections of the ICA in which the work is described. Also, the list should include a cross-reference to the section in which the method of using each tool is described or the tools are used. Any special tools should be highlighted, because §43.13 requires the use of special tools when performing maintenance.

10. GUIDANCE FOR APPENDIX A TO PART 35, A35.4 -- AIRWORTHINESS LIMITATIONS SECTION.

a. The ICA must include an Airworthiness Limitations section. The Airworthiness Limitations section may appear in both the maintenance and overhaul sections; this is acceptable as long as both sections remain identical. The Airworthiness Limitations section should be prominently located, entitled "Airworthiness Limitations," and identified at the beginning of the section as having been approved by the FAA.

b. The CMACO approves the Airworthiness Limitations section. Changes to mandatory inspection intervals, as well as life limits and replacement times, require CMACO approval. The addition of restrictions to an existing Airworthiness Limitations section should be accompanied by an airworthiness directive (AD).

[Original signed 11/3/03 by P.A.W.]

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