



Federal Aviation Administration

Memorandum

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To: SEE DISTRIBUTION

From: Manager, Engine and Propeller Directorate, Aircraft Certification Service

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Subject: **ACTION**: PMA or STC Approval of Reciprocating Engine External Accessory Replacement Parts, Part 33 [ANE-2006-33.19-2]

1. Purpose.

This policy provides guidance to determine the appropriate certification procedure for externally-mounted reciprocating engine accessory replacement parts. This policy describes how to determine compliance with either the Parts Manufacturer Approval (PMA) procedures or Supplemental Type Certificate (STC) procedures.

2. Related Documents.

FAA Order 8110.4C, Change 2, Type Certification, dated August 14, 2008
FAA Order 8110.42C, Parts Manufacturer Approval, dated June 23, 2008

3. Background.

a. Externally-mounted reciprocating engine accessory parts may be certified as part of the engine type design under 14 CFR part 33. When part of the type design, even though often still referred to as accessories, these engine type design parts have the following characteristics:

- Externally mounted on the engine accessory case, reduction gear case, or crankcase;
- Perform an independent function that contributes to the operation or control of the engine, but not directly involved in the engine internal drive train or combustion process; and
- Can be removed from the engine without disassembling the engine case or external structure.

Examples of these parts include, but are not limited to, starters, fuel pumps, starter drive adapters, external engine oil pumps, and magnetos.

b. Certification projects for externally-mounted reciprocating engine accessory changes require an STC or PMA approval, depending upon whether or not the proposed change is a major change to type design. Major changes approved under the STC process also require a FAA Form 337, “Record of Major Repair and Alteration” at the time of installation. However, installation of a PMA externally-mounted reciprocating engine accessory part, does not usually require additional FAA approval. Consequently, the type of design approval of the replacement accessory part can significantly impact the level of FAA and industry resources required to complete the installation of that part.

c. The regulations require that an STC be issued when the proposed product, or its installation, is considered a major design change. Our review of recent FAA STC and PMA projects involving externally-mounted reciprocating engine accessory parts revealed the appropriate certification procedures were not consistently being used. We found, for example, that some certification project installations that should have been classified and documented as a Major Change were not, but had been certified as PMA and therefore, as minor design changes. This resulted in installations without Form 337 documentation.

d. Policy for externally-mounted reciprocating engine accessory parts is, therefore, necessary to standardize how to select the appropriate design approval certification procedure. This will ensure that major design changes are properly classified and appropriately documented.

e. This policy will also aid Applicants wanting to export parts, as they should also consider their destination market State, and its import requirements. Foreign authorities may not accept PMA parts without a corresponding STC approval and validation.

4. Policy.

a. This policy is applicable to externally-mounted reciprocating engine accessory replacement parts, such as starters, fuel pumps, magnetos, or alternators that are included in the engine’s type design (in accordance with § 21.31). This policy is not applicable to accessories that are included in the powerplant installation type design, nor applicable to internal replacement parts used in the repair or overhaul of externally-mounted reciprocating engine accessories.

b. A certification project for an externally-mounted reciprocating engine accessory part should be conducted in accordance with either the procedures in part 21, subpart K for PMA parts, or those in subpart E for STCs. If the part is offered for certification based on identity, then the procedures in subpart K apply. If offered based on test and computation, the procedures in subpart K apply only if incorporation of the replacement part has no impact or results in only a minor change in engine type design.

(1) If incorporation of the replacement part results in a major design change to the engine type design, then the project should be accomplished using the STC procedures of part 21,

subpart E. This approach is consistent with FAA Order 8110.42C, paragraph 1-5a, which states the STC approval method should be used if incorporation of the replacement part results in a major design change to the product.

c. The applicant should submit data prior to the start of the certification compliance program to justify which of the above conditions (paragraphs b, or b(1)) is applicable. The following paragraphs of this policy provide additional guidance regarding the above conditions.

(1) PMA by Identity. FAA Order 8110.42C, Chapter 2, paragraphs 3(a) and (b) provide guidance for determining identity.

(2) PMA by Test and Computations. The incorporation of a replacement of an externally-mounted reciprocating engine accessory part in the engine type design should be evaluated in accordance with the criteria of § 21.93(a) to determine if it results in a major or minor design change to the engine. The design should be evaluated to determine if it results in an appreciable change in any of the following criteria:

(a) Weight. The applicant should provide data to show the installation of the replacement part does not increase the certificated maximum weight of the engine and does not change the certificated center of gravity range limits.

(b) Balance. This is not applicable to engines if the weight criteria above are followed.

(c) Structural Strength. The replacement of an externally-mounted reciprocating engine accessory part should not exceed the overhang moments specified in the Type Certificate Data Sheet (TCDS), or any other installation limitation established by the type certificate holder.

(d) Reliability. The applicant should verify the design of the replacement part has no detrimental effect on reliability by a combination of tests and/or analyses of the replacement part. This can be supported by analysis of the in-service reliability of the original equipment externally-mounted reciprocating engine accessory part. Acceptable tests and analyses include, but are not limited to, the following:

- 150 hour endurance test of § 33.49;
- Component testing in accordance with § 33.53;
- Similarity analyses that consider, for example, materials, subcomponents, method of construction, sealing; and
- Reliability analyses.

(e) Operating Characteristics. The applicant should verify the replacement of an externally-mounted reciprocating engine accessory part does not have any effect on the operating characteristics of the engines. This includes, but is not limited to, engine ratings, acceleration, deceleration, starting, performance, or operating limitations.

(f) Other Characteristics Affecting Airworthiness. The applicant should address the following:

- The durability of the replacement part, relative to the Time Between Overhaul (TBO), or other applicable maintenance intervals should be evaluated by test and/or analysis; and
- If the incorporation of the replacement part results in a change to the engine Instructions for Installation (required by § 33.5), then these changes should be evaluated to determine the potential affect on the aircraft the engine is installed on. The impact of these changes on aircraft systems, such as cooling air baffles, fluid-carrying lines and fittings, and electrical harnesses routing should be evaluated.

d. If the applicant provides data that shows the design results in an appreciable change in any of the criteria listed in c (2), then the certification project is a major design change and it should be conducted in accordance with the STC procedures of part 21, subpart E.

5. Conclusion.

Aircraft Certification Offices (ACO) should communicate the intent of this policy to manufacturers of externally-mounted reciprocating engine accessory parts. The applicant's design should be reviewed by the ACO in accordance with this policy.



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