

**[4910-13]**

**DEPARTMENT OF TRANSPORTATION**

**Federal Aviation Administration**

**14 CFR Part 33**

**[Docket No. NE133; Special Condition No. 33-010-SC]**

**Special Conditions: Pratt and Whitney Canada Model PT6C-67E Turboshift Engine**

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Final special conditions.

**SUMMARY:** These special conditions are issued for Pratt and Whitney Canada (PWC) model PT6C-67E engines. The engine model will have a novel or unusual design feature which is a 30-Minute All Engines Operating (AEO) power rating. This rating is primarily intended for high power hovering operations during search and rescue missions. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for this design feature. These special conditions contain the added safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

**DATES:** The effective date of these special conditions is [insert date 30 days after publication in the Federal Register].

**FOR FURTHER INFORMATION CONTACT:** For technical questions concerning this rule, contact Marc Bouthillier, ANE-111, Engine and Propeller Directorate, Aircraft Certification Service, 12 New England Executive Park, Burlington, Massachusetts 01803-5299; telephone (781) 238-7120; facsimile (781) 238-7199; email marc.bouthillier@faa.gov. For legal questions concerning this rule, contact Vincent Bennett, ANE-7 Engine and Propeller Directorate, Aircraft

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## **SUPPLEMENTARY INFORMATION:**

### **Background**

On July 10, 2008, PWC applied for type certification for the model PT6C-67E turboshaft engine. The PT6C-67E engine is a derivative of the PT6C-67C engine which has been type certificated by the FAA. This engine incorporates a four-stage axial compressor and a centrifugal compressor driven by a single stage high pressure turbine (HPT) and a two-stage power turbine (PT) driving a helicopter rotor system via a direct drive to the engine output shaft. The control system includes a dual channel full authority digital electronic control.

The engine will incorporate a novel or unusual design feature which is a 30-minute AEO power rating. This rating was requested by the applicant to support rotorcraft search and rescue missions that require extensive hover operations at high power. The use of 30-minute AEO power is limited to a cumulative total of 50 minutes for any given flight. However, the number of times the rating can be accessed on any given flight is not limited, as long as 50 minutes total time per flight is not exceeded.

The applicable airworthiness standards do not contain adequate or appropriate airworthiness standards to address this design feature. Therefore a special condition is necessary to apply additional requirements for rating definition, instructions for continued airworthiness (ICA), and endurance testing. The ICA requirement is intended to address the unknown nature of actual rating usage and associated engine deterioration. The applicant is expected to make an

assessment of the expected usage and publish ICA's and Airworthiness Limitations section limits in accordance with those assumptions, such that engine deterioration is not excessive.

The endurance test requirement of 25 hours operation at 30 minutes AEO is similar to several special conditions issued over the past 20 years. Because the PT6C-67E model has a Continuous One-Engine-Inoperative (OEI) rating and limits equal or higher than the 30-minute AEO rating, the test time performed at the Continuous OEI rating may be credited toward the 25-hour requirement. However, test time spent at other rating elements of the test, such as takeoff or other OEI ratings (that may be equal to or higher values), may not be counted toward the 25 hours of required running.

These special conditions contain the additional airworthiness standards necessary to establish a level of safety equivalent to the level that would result from compliance with the applicable standards of airworthiness in effect on the date of application.

### **Type Certification Basis**

Under the provisions of 14 CFR §§ 21.17 and 21.101(a), PWC must show that the model PT6C-67E turboshaft engine meets the provisions of the applicable regulations in effect on the date of application, unless otherwise specified by the FAA. The current certification basis for this model series is 14 CFR part 33 Amendment 20, however PWC proposes to demonstrate compliance to later amendments of part 33 for this model. In accordance with 14 CFR § 21.101(b), the FAA concurs with the PWC proposal. Therefore, the certification basis for the PT6C-67E model turboshaft engine will be part 33, effective February 1, 1965, as amended by Amendments 33-1 through 33-30.

If the Administrator finds that the applicable airworthiness regulations in part 33, as amended, do not contain adequate or appropriate safety standards for the PWC model PT6C-67E turboshaft engine, because of a novel or unusual design feature, special conditions are prescribed under the provisions of § 21.16.

The FAA issues special conditions, as defined by 14 CFR 11.19, in accordance with 14 CFR 11.38, which become part of the type certification basis in accordance with § 21.17(b)(2).

Special conditions are initially applicable to the model for which they are issued. Should the type certificate for that model be amended later to include another related model that incorporates the same or similar novel or unusual design feature, or should any other model already included on the same type certificate be modified to incorporate the same or similar novel or unusual design feature, the special conditions would also apply to the other model.

### **Novel or Unusual Design Features**

The PWC model PT6C-67E turbo shaft engine will incorporate a novel or unusual design feature which is a 30-Minute All Engine Operating (AEO) power rating, for use up to 30 minutes at any time between take-off and landing. This design feature is considered to be novel and unusual relative to the part 33 airworthiness standards.

### **Discussion of Comments**

Notice of proposed special conditions, Notice 33-11-02-SC for the PT6C-67E engine model was published on July 7, 2011 (76 FR 39795). No comments were received.

We added a statement to paragraph 2(c)(1) of the special conditions that clarifies the elements of the referenced test that cannot be taken credit for. The text change is for clarification only and does not change the requirement as proposed.

Paragraph 2(c)(1) previously read:

(1) Each § 33.87(d) continuous OEI rating test period of 30 minutes or longer, run at power and limits equal to or higher than the 30 minute AEO rating, may be credited toward this requirement.

Paragraph 2(c)(1) now reads:

(1) Each § 33.87(d) continuous OEI rating test period of 30 minutes or longer, run at power and limits equal to or higher than the 30 minute AEO rating, may be credited toward this requirement. Note that the test time required for the takeoff or other OEI ratings may not be counted toward the 25 hours of operation required at the 30-minute AEO rating.

### **Applicability**

These special conditions are applicable to PWC model PT6C-67E turbo shaft engines. If Pratt and Whitney Canada applies later for a change to the type certificate to include another closely related model incorporating the same novel or unusual design feature, these special conditions would apply to that model as well, and would be made part of the certification basis for that model.

### **Conclusion**

We reviewed the available data and have determined that air safety and the public interest require adopting these special conditions as proposed. This action affects only certain novel or unusual design features on the Pratt and Whitney Canada Model PT6C-67E Turboshaft Engine. It is not a rule of general applicability, and it affects only the applicant who applied to the FAA for approval of this feature on the engine product.

### **List of Subjects in 14 CFR Part 33**

Air transportation, Aircraft, Aviation safety, Safety.

The authority citation for these special conditions continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701–44702, 44704.

### **The Special Conditions**

Accordingly, the FAA issues the following special conditions as part of the type certification basis for PWC model PT6C-67E turbo shaft engines.

#### **1. PART 1 DEFINITIONS.**

Unless otherwise approved by the Administrator and documented in the appropriate manuals and certification documents, the following definition applies to these special conditions: “Rated 30 Minute AEO Power,” means the approved shaft horsepower developed under static conditions at the specified altitude and temperature, and within the operating limitations established under part 33, and limited in use to periods not exceeding 30 minutes, and limited to a cumulative total of 50 minutes use for any given flight.

#### **2. PART 33 REQUIREMENTS.**

(a) Sections 33.1 Applicability and 33.3 General: As applicable, all documentation, testing and analysis required to comply with the part 33 certification basis must account for the 30 minute AEO rating, limits and usage.

(b) Section 33.4, Instructions for Continued Airworthiness (ICA). In addition to the requirements of § 33.4, the ICA must:

(1) Include instructions to ensure that in-service engine deterioration due to rated 30 minute AEO power usage will not be excessive, meaning that all other approved ratings, including One Engine Inoperative (OEI), are available (within associated limits and assumed usage) for each

flight; and that deterioration will not exceed that assumed for declaring a Time Between Overhaul period.

(i) The applicant must validate the adequacy of the maintenance actions required under paragraph (b)(1) above.

(2) Include in the Airworthiness Limitations section, any mandatory inspections and serviceability limits related to the use of the 30-minute AEO rating.

(c) Section 33.87, Endurance Test. In addition to the requirements of §§ 33.87(a) and 33.87(d), the overall test run must include a minimum of 25 hours of operation at 30 minute AEO power and limits, divided into periods of 30 minutes AEO power with alternate periods at maximum continuous power or less.

(1) Each § 33.87(d) continuous OEI rating test period of 30 minutes or longer, run at power and limits equal to or higher than the 30 minute AEO rating, may be credited toward this requirement. Note that the test time required for the takeoff or other OEI ratings may not be counted toward the 25 hours of operation required at the 30-minute AEO rating.

Issued in Burlington, Massachusetts on August 31, 2011.

//signed by Peter A. White//  
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