



[4910-13]

**DEPARTMENT OF TRANSPORTATION**

**Federal Aviation Administration**

**14 CFR Part 33**

[Docket No.FAA-2015-1771; Special Conditions No. 33-016-SC]

**Special Conditions: Pratt and Whitney Canada, PW210A; Flat 30-Second and 2-Minute One Engine Inoperative Rating**

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

**ACTION:** Final special conditions.

**SUMMARY:** These special conditions are issued for the Pratt and Whitney Canada PW210A engine model. This engine will have a novel or unusual design feature – an additional one engine inoperative (OEI) rating that combines the 30-second and 2-minute OEI ratings into a single rating. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for this design feature. These special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

**DATES:** Effective [Insert date 30 days after date of publication in the Federal Register].

**FOR FURTHER INFORMATION CONTACT:** For technical questions concerning these special conditions, contact Tara Fitzgerald, ANE-111, Engine and Propeller Directorate, Aircraft Certification Service, 12 New England Executive Park, Burlington, Massachusetts, 01803-5213; telephone (781) 238-7130; facsimile (781) 238-7199; e-mail [tara.fitzgerald@faa.gov](mailto:tara.fitzgerald@faa.gov). For legal

questions concerning these special conditions, contact Vincent Bennett, ANE-7, Engine and Propeller Directorate, Aircraft Certification Service, 12 New England Executive Park, Burlington, Massachusetts, 01803-5299; telephone (781) 238-7044; facsimile (781) 238-7055; e-mail vincent.bennett@faa.gov.

## **SUPPLEMENTARY INFORMATION:**

### **Background**

On February 14, 2013, Pratt and Whitney Canada applied for an amendment to Type Certificate No. E00083EN-E to include the new PW210A engine model. The PW210A, which is a derivative of the PW210S currently approved under E00083EN-E, is intended for rotorcraft use. For their PW210A engine model, Pratt and Whitney Canada requests an additional OEI rating that combines the 30-second and 2-minute OEI rating into a single rating to satisfy the rotorcraft requirements for increased power in OEI scenarios. This additional OEI rating is named "Flat 30-second and 2-minute OEI."

These special conditions are necessary because the applicable airworthiness regulations do not contain adequate or appropriate safety standards for combining the requirements of the flat 30-second and 2-minute OEI rating.

### **Type Certification Basis**

Under the provisions of § 21.101, Pratt and Whitney Canada must show that the PW210A meets the applicable provisions of 14 CFR part 33, as amended by Amendments 33-1 through 33-30. These regulations will be incorporated into Type Certificate No. E00083EN after type certification approval of the PW210A. The regulations incorporated by reference in the type certificate are commonly referred to as the "original type certification basis." The regulations incorporated by reference in Type Certificate No. E00083NE are as follows:

Title 14 of the Code of Federal Regulations (14 CFR Part 33), effective February 1, 1965, Amendments 33-1 through 33-24 and two special conditions:

33-008-SC: for on ground engine operation in auxiliary power unit (APU) mode, and

33-009-SC: for 30-minutes all engines operating (AEO) hovering power engine rating

For the PW210A the certification basis is:

1. Airworthiness Standards: 14 CFR part 33, effective February 1, 1965, Amendments 33-1 through 33-30, inclusive.
2. Environmental Standards: 14 CFR part 34, effective September 10, 1990, as amended by 34-1 through 34-4 and 40 CFR part 87, effective (ICAO Annex 16, Volume II – Aircraft Engine Emissions, as amended up to and including Amendment 6).

In addition, the certification basis includes other regulations, special conditions and exemptions that are not relevant to these special conditions. Type Certificate No. E00083EN will be updated to include a complete description of the certification basis for this model engine.

If the Administrator finds that the applicable airworthiness regulations (i.e., 14 CFR part 33) do not contain adequate or appropriate safety standards for the PW210A because of a novel or unusual design feature, special conditions are prescribed under the provisions of § 21.16.

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 any other 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 under § 21.101.

Accordingly, should type certificate E00083EN be amended to include another model that incorporates the “Flat 30-second and 2-minute OEI,” the special conditions as defined would apply to models whose certification basis is amendment 33-25 or later.

The FAA issues special conditions, as defined in 14 CFR 11.19, in accordance with § 11.38, and they become part of the type-certification basis under § 21.17(a)(2).

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

The PW210A will incorporate the following novel or unusual design features:

The design feature is a “Flat 30-second and 2-minute” one engine inoperative (OEI) rating. The Flat 30-second and 2-minute OEI rating represents a case where the power levels and associated operating limitations for the 30-second OEI and 2-minute OEI ratings (defined in Part 33) are the same.

### **Discussion**

These special conditions are necessary because current part 33 regulations do not contain airworthiness standards for extending the 2-minute OEI rating for 30-seconds. These special conditions extend the time dependent requirements applicable to the 30-second OEI or 2-minute OEI to the 2.5 minutes time duration of the “Flat 30-second and 2-minute OEI” Power.

The 2.5 minutes time duration for the rating may affect the engine’s structural and operational characteristics that are time dependent, such as the values for transients, time duration for stabilization to steady state, and part growth due to deformation. To address these aspects, we propose special conditions based on revised requirements of §§ 33.27, 33.87(a)(7), and 33.88(b).

The 2.5 minutes time duration for the rating affects the test conducted for the endurance test. For the 30-second OEI and 2-minute OEI the test schedule of § 33.87(f) is divided among

the two ratings. We propose special conditions based on revised requirements of § 33.87(f) to ensure the test will be run for 2.5 minutes duration with no interruption.

The 2.5 minutes time duration for the rating necessitates extending the time duration requirement of § 33.28(k) applicable to the 30-second OEI rating from 30 seconds to 2.5 minutes. This requirement is for automatic availability and control of the engine for the entire duration of the rating's usage.

The 2.5 minutes time duration for the rating necessitates extending the requirements of § 33.29(c) that are applicable to 30-second OEI and 2-minute OEI ratings to the single Flat 30-second and 2-minute OEI Power rating. We propose special conditions to ensure that the instrumentation requirements normally reserved for 30-second OEI and 2-minute OEI ratings are applied to the Flat 30-second and 2-minute OEI Power rating over its whole duration. The pilot does not have to be alerted at the end of 30 seconds use of the Flat 30-second and 2-minute OEI Power rating, only after the entire 2 minutes 30 seconds has expired.

Paragraph 2.(e)(3) of these special conditions states that the engine must provide means or provision of means to alert maintenance of use of the Flat 30-second and 2-minute OEI Power rating, 'alert' means after the aircraft lands, so any required maintenance actions can be completed before next flight.

### **Applicability**

As discussed above, these special conditions are applicable to the PW210A. Should Pratt and Whitney Canada apply at a later date for a change to the type certificate to include another model incorporating the same novel or unusual design feature, the special conditions would apply to that model as well.

## **Conclusion**

This action affects only the Flat 30-second and 2-minute OEI design features on the PW210A engine model. It is not a rule of general applicability and applies only to Pratt and Whitney Canada, who requested FAA approval of this engine feature.

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

Aircraft, Engines, Aviation Safety, Reporting and Recordkeeping requirements.

The authority citation for these special conditions is as follows:

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

### **The Special Conditions**

Accordingly, pursuant to the authority delegated to me by the Administrator, the following special conditions are issued as part of the type certification basis for Pratt and Whitney Canada PW210A engine model.

#### **Flat 30-second and 2-minute OEI**

##### **1. Part 1.1 Definitions**

“Rated Flat 30-second and 2-minute One Engine Inoperative (OEI) Power,” with respect to rotorcraft turbine engines, means (1) a single rating for which the shaft horsepower and associated operating limitations of the 30-second OEI and 2-minute OEI ratings are equal, and (2) the shaft horsepower is that developed under static conditions at the altitude and temperature for the hot day, and within the operating limitations established under Part 33. The rating is for continuation of flight operation after the failure or shutdown of one engine in multiengine rotorcraft, for up to three periods of use no longer than 2.5 minutes each in any one flight, and followed by mandatory inspection and prescribed maintenance action.

2. Part 33 requirements

(a) The airworthiness standards in Part 33 Amendment 30 for the 30-second OEI and 2-minute OEI ratings are applicable to the Flat 30-second and 2-minute OEI Power rating. In addition the following special conditions apply;

(b) Section 33.7 Engine ratings and operating limitations. Flat 30-second and 2-minute OEI Power rating and operating limitations are established for power, torque, rotational speed, gas temperature, and time duration.

(c) Section 33.27 Turbine, compressor, fan, and turbosupercharger rotor overspeed. The requirements of § 33.27, except that following the test, the rotor may not exhibit conditions such as cracking or distortion which preclude continued safe operation.

(d) Section 33.28 Engine controls systems. Must incorporate a means, or a provision for a means, for automatic availability and automatic control of the Flat 30-second and 2-minute OEI Power within the declared operating limitations.

(e) Section 33.29 Instrument Connection. In lieu of the requirements of 33.29(c) the PW210A must incorporate a means or a provision for a means to:

(1) Alert the pilot when the engine is at the Flat 30-second and 2-minute OEI Power level, when the event begins, and when the time interval expires;

(2) Automatically record each usage and duration of power at the Flat 30-second and 2-minute OEI Power rating;

(3) Following each flight when the Flat 30-second and 2-minute OEI Power rating is used, alert maintenance personnel in a positive manner that the engine has been operated at the Flat 30-second and 2-minute OEI Power level, and permit retrieval of the recorded data; and

(4) Enable routine verification of the proper operation of the above means.

(f) Section 33.87 Endurance test. The requirements applicable to 30-second and 2-minute OEI ratings, except for:

(1) The test of § 33.87(a)(7) for the purposes of temperature stabilization, must be run with a test period time of 2.5 minutes.

(2) The tests in § 33.87(f)(2) and (3) must be run continuously for the duration of 2.5 minutes, and

(3) The tests in § 33.87(f)(6) and (7) must be run continuously for the duration of 2.5 minutes.

(g) Section 33.88 Engine overtemperature test. The requirements of § 33.88(b) except that the test time is 5 minutes instead of 4 minutes.

Issued in Burlington, Massachusetts, on June 26, 2015.

Ann C. Mollica

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