

operation after the failure of one engine in multiengine rotorcraft, limited to three periods of use no longer than 30 seconds each in any one flight, and followed by mandatory inspection and prescribed maintenance action.

*Rated 2-minute OEI power*, with respect to rotorcraft turbine engines, means the approved brake horsepower developed under static conditions at specified altitudes and temperatures within the operating limitations established for the engine under part 33 of this chapter, for continued one-flight operation after the failure of one engine in multiengine rotorcraft, limited to three periods of use no longer than 2 minutes each in any one flight, and followed by mandatory inspection and prescribed maintenance action.

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### PART 33—AIRWORTHINESS STANDARDS: AIRCRAFT ENGINES

3. The authority citation for Part 33 continues to read as follows:

**Authority:** 49 U.S.C. 1344, 1354(a), 1355, 1421, 1423, 1424, 1425; 49 U.S.C. 106(g).

4. Section 33.7 is amended by redesignating paragraph (c)(1)(viii) as paragraph (c)(1)(x); and by adding new paragraphs (c)(1)(viii) and (c)(1)(ix) to read as follows:

#### § 33.7 Engine ratings and operating limitations.

\* \* \* \* \*

(c) \* \* \*

(1) \* \* \*

(viii) Rated 2-minute OEI power;

(ix) Rated 30-second OEI power; and

\* \* \* \* \*

5. Section 33.27 is amended by revising the introductory text of paragraph (c) and paragraph (c)(1), and by designating the undesignated paragraph following paragraph (c)(2)(vi) as paragraph (d) and revising it to read as follows:

#### § 33.27 Turbine, compressor, fan, and turbosupercharger rotors.

\* \* \* \* \*

(c) The most critically stressed rotor component (except blades) of each turbine, compressor, and fan, including integral drum rotors and centrifugal compressors in an engine or turbosupercharge, as determined by analysis or other acceptable means, must be tested:

(1) For a period of 5 minutes at the maximum rating's steady-state operating temperature limit, excluding the maximum operating temperature limits of the 30-second OEI and 2-minute OEI ratings, except as provided in paragraph (c)(2)(iv) of this section; for engines with

30-second OEI and 2-minute OEI ratings, using a separate test vehicle if desired, for a period of 2-1/2 minutes at the maximum operating temperature limit of the 30-second OEI rating, except as provided in paragraph (c)(2)(iv) of this section; and

\* \* \* \* \*

(d) Following the test, each rotor must be within approved dimensional limits for an overspeed condition and may not be cracked, except that following the test based on the maximum operating temperature limit of the 30-second OEI rating, growth and distress beyond the limits for an overspeed condition will be permitted, provided the engine is shown by analysis or test, as found necessary by the Administrator, to maintain the structural integrity of each rotor.

6. Section 33.29 is amended by adding a new paragraph (c) to read as follows:

#### § 33.29 Instrument connection.

\* \* \* \* \*

(c) Each rotorcraft turbine engine having a 30-second OEI and a 2-minute OEI power rating must have a provision for a means to:

(1) Alert the pilot when the engine is at the 30-second OEI and the 2-minute OEI power levels;

(2) Determine, in a positive manner, that the engine has been operated at each rating; and

(3) Determine the elapsed time of operation at each rating.

7. Section 33.67 is amended by adding a new paragraph (d) to read as follows:

#### § 33.67 Fuel system.

\* \* \* \* \*

(d) Engines having a 30-second OEI rating must incorporate means for automatic availability and automatic control of 30-second OEI power.

8. Section 33.85 is amended by adding new paragraphs (c) and (d) to read as follows:

#### § 33.85 Calibration tests.

(c) In showing compliance with this section, each condition must stabilize before measurements are taken, except as permitted by paragraph (d) of this section.

(d) In the case of engines having 30-second, OEI, 2-minute OEI, or 2 1/2-minute OEI ratings, measurements taken during the applicable endurance test prescribed in § 33.87 (f)(1) through (8) may be used in showing compliance with the requirements of this section for these OEI ratings.

9. Section 33.87 is amended by revising the introductory text of

paragraph (a) and paragraph (a)(8); by redesignating paragraph (f) as paragraph (g); by revising the reference “(e)(2) (ii) through (iv)” to read “(g)(2) (ii) through (iv)” in newly designated paragraph (g)(2)(i); by revising the reference “(e)(2)(i)” to read “(g)(2)(i)” in newly designated paragraph (g)(2)(ii); by revising the reference “(e)(2)(i)” to read “(g)(2)(i)” in newly designated paragraph (g)(2)(iii); by revising the reference “(e)(2) (i) and (ii)” to read “(g)(2)(i) and (ii)” in newly designated paragraph (g)(2)(iv); and by adding a new paragraph (f) to read as follows:

#### § 33.87 Endurance test.

(a) *General.* Each engine must be subjected to an endurance test that includes a total of at least 150 hours of operation and, depending upon the type and contemplated use of the engine, consists of one of the series of runs specified in paragraphs (b) through (g) of this section, as applicable. For engines tested under paragraphs (b), (c), (d), or (e) of this section, the prescribed 6-hour test sequence must be conducted 25 times to complete the required 150 hours of operation. Engines for which the 30-second OEI and 2-minute OEI ratings are desired must be further tested under paragraph (f) of this section. The following test requirements apply:

\* \* \* \* \*

(8) If the number of occurrences of either transient rotor shaft overspeed or transient gas overtemperature is limited, that number of accelerations required by paragraphs (b) through (g) of this section must be made at the limiting overspeed or overtemperature. If the number of occurrences is not limited, half the required accelerations must be made at the limiting overspeed or overtemperature.

\* \* \* \* \*

(f) *Rotorcraft engines for which 30-second OEI and 2-minute OEI ratings are desired.* For each rotorcraft engine for which 30-second OEI and 2-minute OEI power ratings are desired, and following completion of the tests under paragraphs (b), (c), (d), or (e) of this section, the applicant may disassemble the tested engine, to the extent necessary to show compliance with the requirements of § 33.93(a). The tested engine must then be reassembled using the same parts used during the test runs of paragraphs (b), (c), (d), or (e) of this section, except those parts described as consumables in the Instructions for Continued Airworthiness. The applicant must then conduct the following test sequence four times, for a total time of not less than 120 minutes: