

**DEPARTMENT OF TRANSPORTATION
Federal Aviation Administration**

14 CFR Parts 1 and 33

[Docket No. 26019; Notice No. 89-27A]

RIN 2120-AD21

**Airworthiness Standards: Aircraft
Engines; New One-Engine-Inoperative
Ratings, Definitions, and Type
Certification Standards**

AGENCY: Federal Aviation
Administration, DOT.

ACTION: Supplemental notice of
proposed rulemaking.

SUMMARY: This document modifies Notice of Proposed Rulemaking (NPRM) No. 89-27, published in the **Federal Register** on September 22, 1989 (54 FR 39080). In that document, the FAA proposed adoption of new definitions and airworthiness standards of new one-engine-inoperative (OEI) ratings for type certification of rotorcraft engines. The maximum engine power level available for a certificated rotorcraft engine under current part 33 rules is the 2½-minute OEI rating. The proposed rule would establish type certification standards for 30-second OEI and 2-minute OEI ratings at higher power levels than the current OEI rating.

Four commenters provided the FAA with comments to the NPRM, addressing numerous issues. The FAA has determined that the comments and recommended changes merit consideration. Substantive changes have been made to the proposed rule based upon the relevant comments received. Accordingly, the FAA is issuing this Supplemental Notice of Proposed Rulemaking (SNPRM) to give all interested parties an opportunity to comment on the modified proposed rule.

DATES: Comments must be received on or before March 24, 1995.

ADDRESSES: Comments on this notice should be mailed in triplicate to: Federal Aviation Administration, Office of the Chief Counsel, Attn: Rules Docket (AGC-200), Docket No. 26019, 800 Independence Avenue SW., Washington, DC 20591. Comments delivered must be marked Docket No. 26019. Comments may be examined in Room 915G weekdays between 9:00 a.m. and 5:00 p.m., except Federal holidays.

FOR FURTHER INFORMATION CONTACT: Chung C. Hsieh, Aerospace Engineer, Engine and Propeller Standards Staff, ANE-110, Engine and Propeller Directorate, Aircraft Certification Service, FAA, 12 New England Executive Park, Burlington,

Massachusetts 01803-5299; telephone (617) 238-7116; fax (617) 238-7199.

SUPPLEMENTARY INFORMATION:

Comments Invited

This supplemental notice modifies Notice No. 89-27. Comments on the effect of this change to the proposed rule are invited. Comments should be limited to the changes proposed in this document. This notice does not serve to reopen the comment period on the remainder of the original proposal. Interested persons are invited to comment on this supplemental notice by submitting written data, views, or arguments as they may desire. Comments relating to the environmental, energy, or economic impact that might result from adopting the proposals, as modified in this document, are also invited. Communications should identify the regulatory docket number and be submitted in triplicate to the address specified above. All communications received on or before the closing date for comments will be considered by the Administrator before taking further rulemaking action. Commenters wishing the FAA to acknowledge receipt of their comments submitted in response to this proposed rule must submit with those comments a self-addressed stamped postcard on which the following statement is made: "Comments to Docket No. 26019." The postcard will be date stamped and mailed to the commenter.

Availability of SNPRM

Any person may obtain a copy of this notice by submitting a request to the Federal Aviation Administration Office of Public Affairs, Attn: Public Inquiry Center, (APA-200), 800 Independence Avenue, SW., Washington, DC 20591, or by calling (202) 267-3484.

Communications must identify the notice number of this SNPRM.

Persons interested in being placed on the mailing list for future NPRM's should request, from the above office, a copy of Advisory Circular No. 11-2A, Notice of Proposed Rulemaking Distribution System, which describes the application procedure.

Background

On September 14, 1989, the FAA issued two NPRM's, Notice Nos. 89-27 (54 FR 39080 and 54 FR 39085). The Notice associated with this SNPRM is No. 89-27, which proposed to define and establish type certification standards for new OEI ratings for rotorcraft engines. The companion NPRM, No. 89-26, addressed the usage of the 30-second OEI and 2-minute OEI

ratings by rotorcraft. A final rule based on Notice No. 89-26 was published in the **Federal Register** on September 16, 1994 (59 FR 47764).

These new OEI ratings are applicable to turbine engines installed on multiengine powered rotorcraft. In a Category A operation, a multiengine turbine-powered rotorcraft must have the ability to either continue flight or land within a demonstrated field size in the event of failure of an engine. In a Category B operation, the rotorcraft would not have sufficient residual power if one engine failed to continue its flight and would, therefore, need safe landing areas throughout its flight path. Category A rotorcraft mission payloads are limited by the power available from the remaining operating engine(s) in the event one engine fails during takeoff or landing. The maximum engine power level available under current part 33 rules is the 2½-minute OEI rating.

This proposal would establish 30-second OEI and 2-minute OEI ratings at higher power levels than the current 2½-minute OEI rating. Engine type certification to these ratings, as with other OEI ratings, would be optional.

The comment period for Notice 89-27 closed on March 27, 1990. On November 16, 1989, a public meeting to hear comments on the proposals was convened in Fort Worth, Texas. In addition, the minutes of a meeting between the FAA and the Aerospace Industries Association of America, Inc., inspected, in the Rules Docket No. 26019. The FAA has determined that the comments and recommended changes merit consideration. Substantive changes have been made to the proposed rule based upon the relevant comments received. Accordingly, the FAA is issuing this SNPRM to give all interested parties an opportunity to comment on the modified proposed rule.

Discussion

Four commenters provided the FAA with comments to the NPRM, addressing numerous issues. This discussion describes only those changes made to the proposal of Notice 89-27 and the comments associated with those changes. However, for the convenience of the public, the proposed rule is being reprinted in its entirety.

Section 1.1 Definitions and Abbreviations

One commenter states that the definitions of 30-second OEI and 2-minute OEI ratings should contain a specific limit as to the number of items these power levels could be used during

any one flight. The commenter noted that the lack of a specific limit in the proposed definitions leaves the issue ambiguous. The commenter also noted that a number of a specific limit in the proposed definitions leaves the issue ambiguous. The commenter also noted that a number of people at the public meeting expressed differing views on the intended maximum number of allowable applications of 30-second OEI or 2-minute OEI power on a single flight.

The FAA agrees. The rated 30-second OEI power and rated 2-minute OEI power for section 1.1 are therefore revised to limit the use of these new power levels to a maximum of three periods. The definitions retain requirements of mandatory inspection and prescribed maintenance following any use of 30-second OEI or 2-minute OEI power, and the limit of use of these new power levels to continue operation, in order to complete the flight during which engine failure occurred.

Section 33.27 Turbine, Compressor, Fan, and Turbosupercharger Rotors

One commenter states that post-test acceptance criteria after the overspeed test for the 30-second OEI rating should be less severe since a mandatory inspection of the engine will be required after the engine is used at the 30-second OEI rating. The commenter suggests that since the inspection would result in replacement of parts unsuitable for continuous use, more specific acceptable criteria are not considered practical in view of the wide variety of designs in use and yet to come. The commenter also suggests that the last paragraph of § 33.27(c) be changed as follows:

Following the testing, 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 30-second OEI rating condition, growth and distress beyond the dimensional limits for an overspeed condition and cracks will be permitted, provided there is no evidence of imminent failure. The applicant may show by analysis or test, as found necessary by the Administrator, that there is no evidence of imminent failure.

Another commenter suggests that the severity of the rotor test requirement needs to be clearly specified, consistent with the worst case rationale identified in the NPRM. The commenter suggests that the second paragraph of § 33.27(c) should be extended by the addition of the following: “* * * including two subsequent uses of both 30-second OEI and 2-minute OEI conditions.”

The FAA does not agree that section 33.27 should be revised as the

commenters suggested. The FAA would require that, based on the condition of the rotor following the test, the engine would have sufficient safety margin for continued operation and the capability of completing up to three uses of both 30-second OEI power and 2-minute OEI power. It is inappropriate to specify in the rule that all cracks would be acceptable, since a rotor with cracks may not be in airworthy condition in all engines affected by the rule. The same argument applies concerning the “dimensional” and “imminent failure” statements. The standard that 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, that the structural integrity of each rotor is maintained will permit the FAA to apply the best engineering judgment for each specific engine type design tested. Therefore, the FAA proposes to revise the paragraph at the end of section 33.27(c) by incorporating that standard; the revised paragraph is proposed as a new paragraph (d) to section 33.27. In addition to these revisions other editorial changes have been made in the proposed § 33.27.

Section 33.29 Instrument Connection

One commenter states that Proposal No. 6 of the NPRM corresponds to only one of the two aspects covered by Proposal No. 11 for § 29.1305 in Notice No. 89–26. The commenter states that it corresponds only with § 29.1305(a)(25), whereas, it should also be concerned with § 29.1305(a)(24) because the engine manufacturer will need to provide some means, incorporated in the engine, in order to enable the complete helicopter to comply with both of these two part 29 sections. Therefore, the engine certification standards must address all issues that could be considered as engine requirements.

The FAA agrees. The proposed section 33.29 is changed to require a provision for a means to alert the pilot when the engine is at the 30-second OEI and 2-minute OEI levels; and is reorganized. The proposed section 33.29(c)(1) corresponds to section 29.1305(a)(24); the proposed sections 33.29(c)(2) and (c)(3) correspond to section 29.1305(a)(25).

Section 33.67 Fuel System

One commenter states that the FAA proposal is somewhat meager when compared with existing requirements in Joint Airworthiness Requirement Engines (JAR–E) for engines in which power output and associated conditions are controlled by automatic devices. The

commenter, therefore, suggests changing the wording from “* * * means for automatic control of 30-second power” to “* * * means for automatic availability and automatic control of 30-second OEI power.”

The FAA concurs with the suggested wording and the proposed § 33.67 is changed accordingly.

Section 33.85 Calibration Tests

One commenter states that Proposal No. 8 of the NPRM contains cross-referencing errors in the first sentence of the proposed § 33.85(c). It should state that “* * * measurements taken during the endurance test described in § 33.87(f)(1) through (8) may be used * * *”

The FAA agrees, and the changes have been made to the proposal.

One commenter states that, in the absence of any provision in the existing § 33.85 concerning the minimum period of stabilized conditions before taking measurements, it is not clear why the proposed § 33.85(c) is required. Alternatively, if this aspect needs to be included under § 33.85, it should address all engines, regardless of their power ratings.

The commenter further suggests that the following language would be more appropriate for § 33.85 (c) and (d):

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

(d) In the case of engines having 30-second, 2-minute, or 2½-minute OEI ratings, measurements taken during the applicable endurance test prescribed in § 33.87 may be used in showing compliance with the requirements of this section for these OEI ratings.

The FAA agrees, and has made the suggested changes to proposed § 33.85 (c) and (d). This proposal is required to provide an acceptable and viable approach for obtaining meaningful calibration data in the briefest time possible, consistent with the practical limits of the 30-second OEI and 2-minute OEI power ratings. The proposed § 33.85(c), which requires engine parameters to stabilize before recording measurements, is consistent with current § 33.85(a) requirements.

Section 33.87 Endurance Test

One commenter suggests that § 33.87(f)(5) be changed to read as follows: “50 percent takeoff power. One minute at 50 percent takeoff power.” The commenter reasons that the power level for a one-minute run at 50 percent takeoff power realistically represents the minimum OEI flight power and engine

thermal condition preceding reapplication of 30-second OEI power.

The FAA agrees. The proposed wording for § 33.87(f)(5) is modified accordingly. Actual operations could realistically be expected to have a power setting of 50 to 60 percent takeoff power in an approach descent from a continuous OEI power setting toward a landing spot. The flight scenario would likely include and follow one use of takeoff power to the takeoff path's critical decision point (CDP), then from one to three applications of 30-second OEI power, and one or two applications of 2-minute OEI power.

One commenter states that Proposal 9 of the NPRM is inaccurate in stating that existing § 33.87(f) will be redesignated as paragraph (g) without text change. The commenter claims that a number of cross-references in the existing subparagraphs of the newly redesignated § 33.87(g) are incorrectly designated as (e) instead of (f). The commenter suggests changing those cross-references from (e) to (g) if § 33.87(f) is redesignated as § 33.87(g).

The FAA agrees. Editorial changes have been made in the proposed § 33.87.

Section 33.88 Engine Overtemperature Test

One commenter suggests that the wording "or equivalent device" be inserted after "temperature limiter" in § 33.88(c) and that language allowing "equivalent limiting device" be added as an alternative to the direct temperature limiting control system.

The FAA agrees. The proposed wording is changed from "a temperature limiter" to "a means to limit temperature." The means to limit the temperature is intended for limiting the maximum engine gas temperature.

Section 33.93 Teardown Inspection

One commenter states that in § 33.93, an "and" in the first sentence of § 33.93(c) should read "or", making the fifth and sixth lines read as follows: "* * * the endurance testing of § 33.87 (b), or (c), or (d), or (e) of this part and followed * * *." The commenter states this change is needed because in Proposal No. 9, revised § 33.87(a) states: "* * * for engines tested under paragraphs (b), (c), (d), or (e) of this section * * *," and the new § 33.87(f) reads: "* * * and following completion of the tests under paragraphs (b), (c), (d), or (e) of this section * * *."

The FAA agrees, and editorial changes in proposed § 33.93 are made.

Supplemental Regulatory Evaluation Summary

The FAA has determined that the changes made to the NPRM do not increase the scope of the proposed rule or the original economic analysis. Therefore, the FAA has determined that this is not a significant rulemaking as defined in Executive Order 12866.

Regulatory Flexibility Determination

The Regulatory Flexibility Act of 1980 (RFA) was enacted to ensure that small entities are not unnecessarily or disproportionately burdened by Government regulations. The RFA requires a Regulatory Flexibility Analysis if a proposed rule would have "a significant economic impact, on a substantial number of small entities." FAA Order 2100.14A outlines FAA's procedures and criteria for implementing the RFA.

The proposed modification of Notice No. 89-27 will neither eliminate any present regulations, nor impose any new regulations and, thus, will not have a significant economic impact on a substantial number of small entities. Consequently, the FAA has determined that, under the criteria of the Regulatory Flexibility Act of 1980, a regulatory flexibility analysis of this supplemental notice of proposed rulemaking is not required.

International Trade Impact Assessment

The proposed modification of Notice No. 89-27 will neither eliminate any present regulations, nor impose any new ones. As a result, affected manufacturers and operators will not incur additional costs, or realize significant savings. Thus, the proposed modification of Notice No. 89-27 will not have any impact on trade opportunities for either U.S. firms doing business overseas, or foreign firms doing business in the United States.

Federalism Implications

The revised regulations proposed herein would not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government. Therefore, in accordance with Executive Order 12612, it is determined that this proposal would not have sufficient federalism implications to warrant the preparation of a Federalism Assessment.

Conclusion

This SNPRM changes certain sections of the proposed rule based on comments received. For the reasons discussed in the Notice No. 89-27 and this

supplemental notice, and based on the findings in the Regulatory Flexibility Determination and the International Trade Impact Analysis, the FAA has determined that this proposed regulation is not a significant regulation as defined in Executive Order 12866. In addition, it is certified this SNPRM will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act. This proposal, including this supplemental notice, is not considered significant under DOT Regulatory Policies and Procedures (44 FR 11034, February 26, 1979). A draft regulatory evaluation of the proposal, including a supplement relating to the modifications in this notice, has been placed in the regulatory docket. A copy may be obtained by contacting the person identified under the caption **FOR FURTHER INFORMATION CONTACT**.

List of Subjects

14 CFR Part 1

Airmen, Flights, Balloons, Parachutes, Aircraft pilots, Pilots, Transportation, Agreements, Kites, Air safety, Safety, Aviation safety, Air transportation, Air carriers, Aircraft, Airports, Airplanes, Helicopters, Rotorcraft, Heliports, Engines, and Ratings.

14 CFR Part 33

Air transportation, Aircraft, Aviation safety, Safety.

The Proposed Amendment

Accordingly, the Federal Aviation Administration proposes to amend 14 CFR part 1 and part 33 as follows:

PART 1—DEFINITIONS AND ABBREVIATIONS

1. The authority citation for Part 1 continues to read as follows:

Authority: 49 U.S.C. app. 1347, 1348, 1354(a), 1357(d)(2), 1372, 1421 through 1430, 1432, 1442, 1443, 1472, 1510, 1522, 1652(e), 1655(c), 1567(f); 49 U.S.C. 106(g).

2. Section 1.1 is amended by adding the definitions in alphabetical order of "Rated 30-second OEI power" and "Rated 2-minute OEI power" to read as follows:

§ 1.1 General definitions.

* * * * *

Rated 30-second 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 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.

* * * * *

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:

(1) *Takeoff power.* Three minutes at rated takeoff power.

(2) *30-second OEI power.* Thirty seconds at rated 30-second OEI power.

(3) *2-minute OEI power.* Two minutes at rated 2-minute OEI power.

(4) *30-minute OEI power, continuous OEI power, or maximum continuous power.* Five minutes at rated 30-minute OEI power, rated continuous OEI power, or rated maximum continuous power, whichever is greatest, except that, during the first test sequence, this period shall be sixty-five minutes.

(5) *50 percent takeoff power.* One minute at 50 percent takeoff power.

(6) *30-second OEI power.* Thirty seconds at rated 30-second OEI power.

(7) *2-minute OEI power.* Two minutes at rated 2-minute OEI power.

(8) *Idle.* One minute at idle.

* * * * *

10. Section 33.88 is revised to read as follows:

§ 33.88 Engine overtemperature test.

(a) Each engine must run for 5 minutes at maximum permissible rpm with the gas temperature at least 75 °F (42 °C) higher than the maximum rating's steady-state operating limit, excluding maximum values of rpm and gas temperature associated with the 30-second OEI and 2-minute OEI ratings. Following this run, the turbine assembly must be within serviceable limits.

(b) Each engine for which 30-second OEI and 2-minute OEI ratings are desired, that does not incorporate a means to limit temperature, must be run for a period of 5 minutes at the maximum power-on rpm with the gas temperature at least 75 °F (42 °C) higher than the 30-second OEI ratings operating limit. Following this run, the

turbine assembly may exhibit distress beyond the limits for an overtemperature condition provided the engine is shown by analysis or test, as found necessary by the Administrator, to maintain the integrity of the turbine assembly.

(c) Each engine for which 30-second OEI and 2-minute OEI ratings are desired, that incorporates a means to limit temperature, must be run for a period of 4 minutes at the maximum power-on rpm with the gas temperature at least 35 °F (20 °C) higher than the maximum operating limit. Following this run, the turbine assembly may exhibit distress beyond the limits for an overtemperature condition provided the engine is shown by analysis or test, as found necessary by the Administrator, to maintain the integrity of the turbine assembly.

(d) A separate test vehicle may be used for each test condition.

11. Section 33.93 is revised to read as follows:

§ 33.93 Teardown inspection.

(a) After completing the endurance testing of § 33.87 (b), (c), (d), (e), or (g), each engine must be completely disassembled; and—

(1) Each component having an adjustment setting and a functioning characteristic that can be established independent of installation on the engine must retain each setting and functioning characteristic within the limits that were established and recorded at the beginning of the test; and

(2) Each engine part must conform to the type design and be eligible for incorporation into an engine for continued operation, in accordance with

information submitted in compliance with § 33.4.

(b) After completing the endurance testing of § 33.87(f), each engine must be completely disassembled; and

(1) Each component having an adjustment setting and a functioning characteristic that can be established independent of installation on the engine must retain each setting and functioning characteristic within the limits that were established and recorded at the beginning of the test; and

(2) Each engine may exhibit deterioration in excess of that permitted in paragraph (a)(2) of this section, including some engine parts or components that may be unsuitable for further use. The applicant must show by analysis and/or test, as found necessary by the Administrator, that structural integrity of the engine including mounts, cases, bearing supports, shafts, and rotors, is maintained; or

(c) In lieu of compliance with paragraph (b) of this section, each engine for which the 30-second OEI and 2-minute OEI ratings are desired, may be subjected to the endurance testing of § 33.87 (b), (c), (d), or (e) of this part, and followed by the testing of § 33.87(f), without intervening disassembly and inspection. However, the engine must comply with paragraph (a) of this section after completing the endurance testing of § 33.87(f). Issued in Washington, DC, on January 24, 1995.

Elizabeth Yoest,

Acting Director, Aircraft Certification Service.
[FR Doc. 95-2730 Filed 2-6-95; 8:45 am]

BILLING CODE 4910-13-M