DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Parts 27 and 29

[Docket No. 28008; Amendment No. 27–33, 29–39]

RIN 2120–AF65

Rotorcraft Regulatory Changes Based on European Joint Aviation Requirements

AGENCY: Federal Aviation Administration, DOT.

ACTION: Final rule.

SUMMARY: The Federal Aviation Administration (FAA) is amending the airworthiness standards for normal and transport category rotorcraft. The changes revise airworthiness standards for performance, systems, propulsion, and airframes. The changes increase the regulatory safety level, clarify existing regulations, and standardize terminology. The changes are based on standards incorporated by the European Joint Aviation Authorities (JAA) for Joint Aviation Requirements (JAR) 27 and 29. These changes are intended to harmonize the U.S. rotorcraft airworthiness standards with the European JAR.

EFFECTIVE DATE: August 8, 1996.

FOR FURTHER INFORMATION CONTACT: Carroll Wright, Regulations Group Rotorcraft Directorate, Aircraft Certification Service, Federal Aviation Administration, Fort Worth, Texas 76193–0111, telephone (817) 222–5120.

SUPPLEMENTARY INFORMATION:

Background

These amendments are based on Notice of Proposed Rulemaking (NPRM) No. 94–36 published in the Federal Register on December 28, 1994 (59 FR 67068). That notice proposed to amend the airworthiness standards for both normal and transport category rotorcraft based on recommendations from the Aviation Rulemaking Advisory Committee (ARAC). By announcement in the Federal Register (57 FR 58846, December 11, 1992), the ''JAR/FAR 27 and 29 Harmonization Working Group'' was chartered by the ARAC. The working group included representatives from four major rotorcraft manufacturers (normal and transport) and representatives from Aerospace Industries Association of America, Inc. (AIA), Association Europeene des Constructeurs de Material Aerospatial (AECMA), Helicopter Association International (HAI), JAA, and the FAA Rotorcraft Directorate. This broad participation is consistent with FAA policy to involve all known interested parties as early as practicable in the rulemaking process.

The Harmonization Working Group was tasked with making recommendations to the ARAC regarding JAA Notices of Proposed Amendment (NPA's). The ARAC subsequently recommended that the FAA revise the airworthiness standards for normal and transport category rotorcraft to those currently in the JAR 27 and 29.

The FAA evaluated the ARAC recommendations and proposed changes to the rotorcraft airworthiness standards in 14 CFR parts 27 and 29 (parts 27 and 29). These proposed changes evolved from the FAA, JAA, and industry meetings of 1990–1992 and the ARAC recommendations of 1993. The changes proposed to (1) incorporate current design and testing practices into the rules by requiring additional performance data, (2) incorporate additional powerplant and rotor brake controls requirements, (3) incorporate bird-strike protection requirements, and (4) harmonize the certification requirements between parts 27 and 29 and the JAR. The proposals for part 27 included JAA's harmonized NPA's 27-Basic and 27–1, and the proposals for part 29 included NPA's 29-Basic and 29–1 through 29–5. This rule contains the harmonized rule language of those sections of the NPA's except for § 27.602 of NPA 27-Basic and § 29.602 of NPA 29–4.

In proposed rule, NPRM 94–36, there were several instances in which a few descriptive words were proposed to either be removed from or added to regulatory text. These word changes were adequately described in the amendatory language to NPRM 94–36 when that proposal was published in the Federal Register. However, at least one commenter misunderstood the amendatory language. Therefore, to avoid possible misunderstanding about the final rule language, the paragraphs with the minor rule language changes are reproduced in their entirety in this final rule. Also, the numbering of other regulations referenced in §§ 29.1587(a)(4) and (a)(5) has been changed, and a new § 29.1587(a)(6) has been added. The current § 29.1587(a)(6), which is being redesignated in this rule as § 29.1587(a)(7), was added by the Transport Category Rotorcraft Performance Rule published elsewhere in this issue of the Federal Register.

In this final rule, under the heading ''Appendix C to Part 27—Criteria for Category A,'' the NPRM 94–36 cites to Advisory Circular (AC) material have been removed since AC material is advisory only. A note has been added that informs the reader that there is appropriate guidance material available. Further, the requirement to meet § 29.571 standards for certification as a part 27 Category A rotorcraft has been removed from the Appendix C listing. The FAA has determined that the current § 27.571 contains sufficient certification standards to maintain an adequate level of safety for part 27 Category A rotorcraft, and an additional requirement of testing to § 29.571 standards is unnecessary.

Discussion of Comments

Interested persons have been afforded an opportunity to participate in the making of these amendments. Due consideration has been given to the comments received. Comments were received from the JAA, HAI, Transport Canada, and the United Kingdom Civil Aviation Authority (UKCAA).

The JAA agrees with the proposed rule and the effort to harmonize certification regulations of the U.S. and the European communities. To fulfill harmonization objectives, the JAA prepared an NPA identical to the NPRM and will publish the JAR final rule at the same time as this time as this final rule for parts 27 and 29.

HAI comments that the proposals faithfully reflect the recommendation made to the FAA by the ARAC on rotorcraft regulatory changes. HAI further comments that the NPRM reflects prudent rulemaking to increase safety, economic viability, and harmonization within realistic requirements and urges the adoption of the proposal.

Transport Canada comments that the NPRM was not the same as the ARAC recommendations in that there were changes in the nonregulatory sections (preamble) and in the proposed text of the rule. The commenter states that these changes cause concern because the discrepancies may lead to different interpretations. The commenter notes that the meaning of § 29.547 was changed because the word ''main'' had been removed in the ARAC recommendations but was not removed in the NPRM. This commenter also states that the requirements of §§ 29.547 and 29.917 are redundant because § 29.571 also requires the identification of the principal structural elements (PSE) that includes rotors and rotor drive systems with the establishment of the inspections and replacement times for those PSE's. Additionally, the commenter says that § 29.610 should state that it addresses only ''direct effects'' of lightning and electricity and

that indirect effects are covered elsewhere in §§ 29.954, 29.863, 29.1309, etc. This commenter also states that § 29.1309 should retain the reference to § 29.610. This commenter also suggests adding a new requirement and paragraph to Appendix B to part 29 that would require an additional, self-powered third attitude indicator.

The FAA agrees with Transport Canada that editorial changes between the ARAC recommendations and the NPRM are a concern because the differences may lead to different interpretations. To obviate this concern, editorial changes have been made in the final rule language to make it consistent with the ARAC recommended language. Also, the FAA agrees with Transport Canada that the word ''main'' had been removed from the introductory paragraph of § 29.547(c), (d), and (e) in the ARAC recommended language but, as previously discussed, had not been shown as removed in the NPRM rule language. However, the word ''main'' is being removed from this final rule.

The FAA does not agree with this commenter that §§ 29.547, 29.571, and 29.917 are redundant in requiring identification of principal structural elements (PSE's), which include rotors and rotor drive systems, and the establishment of the inspections, replacement times of those PSE's. Section 29.547(b) requires a design assessment for main and tail rotor structure components (rotor hub, blades, pitch control mechanisms, etc); § 29.571 requires fatigue evaluation of structural components; and § 29.917 requires a design assessment of the rotor drive system (drive shafts, transmission, gearboxes, etc). Therefore, these are non redundant requirements. The language is adopted as proposed.

The FAA agrees with the intent of this commenter's suggestion that § 29.610 should clearly indicate that it addresses only ''direct effects'' of lightning and electricity. However, this was achieved in the NPRM by adding the word ''structure'' between the words ''rotorcraft'' and ''must'' in § 29.610(a) to clarify that this paragraph applied to rotorcraft structure and not to systems and equipment. Accordingly, the language is adopted as proposed.

The FAA does not agree with this commenter that § 29.1309 should retain the reference to § 29.610. The NPRM added the word ''structure'' to § 29.610 to clarify that the paragraph applied to rotorcraft structure and not to systems and equipment. Since § 29.1309(h) applies to lightning protection of systems and equipment, it is inappropriate to reference § 29.610, which applies to lightning protection of structures. The commenter's proposal to retain the reference to § 29.610 is not adopted.

The FAA disagrees with this commenter's suggestion that a new requirement and paragraph be added to part 29, Appendix B, to require an additional, self-powered third attitude indicator. Part 29, Appendix B, paragraph VIII(a)(2) currently requires a standby attitude indicator that is independent of the aircraft electrical generating system. Additionally, part 29, Appendix B, paragraph VIII(b)(5)(iii) states, ''The equipment, systems, and installations must be designed so that one display of the information essential to the safety of flight that is provided by the instruments will remain available to a pilot, without additional crew-member action, after any single failure or combination of failures that is not shown to be extremely improbable * * *.'' Currently, the only practical design to meet the extremely improbable (10^{-9}) requirement of part 29, Appendix B, for the display of information essential to flight safety after a single failure or combination of failures is the design that uses a third attitude indicator powered by a source other than the aircraft electrical generating system. However, the FAA does not wish to limit future alternative designs that may meet the extremely improbable standard without a third attitude indicator. The suggestion of the commenter to add a requirement for a self-powered third attitude indicator is not adopted.

The UKCAA comments that Proposal No. 13 in NPRM 94–36 proposed to amend § 29.923(b)(3)(i), to require two applications of 2-minute power following each application of 30-second power, instead of the one application of 2-minute power previously proposed. The UKCAA fully supports the proposed changes in NPRM 94–36. However, the UKCAA further comments that since publication of NPRM 94–36, the FAA published Amendment 29–34 (59 FR 47764, September 16, 1994) that states in part, ''When conducted on a bench test, the test sequence must be conducted following stabilization at take-off power.'' The commenter states that the reason for adding this sentence, as stated in the preamble to Amendment 29–34, remains valid, and this sentence should therefore be included in the final rule developed from NPRM 94–36.

The FAA concurs with the UKCAA that the reason for adding the sentence, ''When conducted on a bench test, the test sequence must be conducted following stabilization at take-off power'' remains valid and the sentence should be retained in § 29.923(b)(3)(i). The sentence was adopted in Amendment 29–34 due to a commenter's statement that if the 5-minute takeoff power run to qualify the drive system is conducted as part of the endurance run, and the 30-second/2-minute OEI requirements are conducted on a bench test, then the takeoff power 5-minute run will be conducted twice on the same set of gears. The FAA did not intend to duplicate the takeoff power 5-minute run if the OEI requirements are conducted on a bench test, and the sentence was adopted for clarification. Since the omission of the sentence in NPRM 94–36 was inadvertent, since the reasons for including the sentence remain valid, and since the sentence is relieving in nature and does not place any additional burden on manufacturers, it is unnecessary to solicit prior public comment. Therefore, the sentence is restored as requested by the commenter.

After considering all of the comments, the FAA has determined that air safety and the pubic interest support adoption of the amendments with the changes noted.

Regulatory Evaluation Summary

Proposed changes to federal regulations must undergo several economic analyses. First, Executive Order 12866 directs that each Federal agency shall propose or adopt a regulation only upon a reasoned determination that the benefits of the intended regulation justify its costs. Second, the Regulatory Flexibility Act of 1980 requires agencies to analyze the economic effect of regulatory changes on small entities. Third, the Office of Management and Budget directs agencies to assess the effect of regulatory changes on international trade. In conducting these analyses, the FAA has determined that this rule: (1) would generate benefits that justify its costs and is not ''a significant regulatory action'' as defined in the Executive Order; (2) is nonsignificant as defined in DOT's Regulatory Policies and Procedures; (3) would not have a significant impact on substantial number of small entities; and (4) will lessen restraints on international trade. These analyses, available in the docket, are summarized below.

Cost-Benefit Analysis

All of the changes to part 27 and all but four of the changes to part 29 will impose no or insignificant costs on rotorcraft manufacturers since they largely reflect current design practices. In recent years, manufacturers have incorporated engineering and structural improvements into rotorcraft designs

that exceed minimum regulatory requirements with the aim of increasing operating efficiencies, payload capabilities, and marketability in world markets. Many of these improvements have also inherently improved safety codification of these improvement and other changes will ensure continuation of enhanced safety levels in future rotorcraft designs.

The changes will also increase harmonization and commonality between U.S. and European airworthiness standards. Harmonization will eliminate the need to comply with different FAA and JAA airworthiness requirements, thus reducing manufacturers' certification costs. Based on experience in a recent certification, one rotorcraft manufacturer indicated that complying with different FAA and JAA requirements resulted in several hundred thousand dollars of excessive certification costs (as related to all part 27 and 29 requirements). The duplicate certification costs avoided by the harmonized rule alone could outweigh the relatively modest increase in certification costs imposed by the few new requirements. Following is a summary of the four changes to part 29 that will impose additional costs totaling approximately $160,000 per type certification. The safety benefits of these changes are expected to easily exceed the incremental costs.

Section 29.547—Main and tail rotor structure. While manufacturers currently perform the design assessment as an integral part of the design requirements of § 29.917, there will be some incremental costs to formalize the existing information. These costs are included in the cost estimates of § 29.917 summarized below. Formal identification and assessment of critical component failures will increase safety by providing more comprehensive maintenance information to operators. The benefits of averting a single accident will exceed the relatively low incremental costs of compliance.

Section 29.631—Bird strike. Manufacturers indicate that present rotorcraft structures can withstand impacts with 2.2 pound birds; therefore, no incremental manufacturing costs are anticipated. Nonrecurring testing and analysis costs of the requirement are estimated to be $107,000 per type certification. A review of National Transportation Safety Board (NTSB) data for the period 1983–1991 reveals two rotorcraft accidents caused by bird strikes. One accident resulted in one serious injury, one minor injury, and substantial damage to the rotorcraft (tail rotor separation); in the other accident, the rotorcraft was destroyed but there were no injuries. There is at least an equal probability of such accidents in the future, given the tendencies toward higher operating speeds. The benefits of averting a single accident will exceed the incremental costs of the amendment.

Section 29.917—Design. The incremental costs to formalize existing design information for the rotor structure (§ 29.547 above) and drive system are estimated to total $47,000 per type certification. Formal identification and assessment of critical component failures of the rotor drive system will increase safety by providing more comprehensive maintenance information to operators. The benefits of averting a single accident caused directly or indirectly by a lack of relevant data would easily exceed the incremental costs.

Section 29.1587—Performance information. Since the required climb gradient data are already available from the results of flight tests required to obtain performance information, the only additional costs will be those associated with incorporating the data into the Flight Manual, estimated to total $6,000 per type certification. The availability and accuracy of performance data are paramount to operational safety. The benefits of averting a single accident caused directly or indirectly by a lack of relevant performance information will easily exceed the incremental costs.

Regulatory Flexibility determination

The Regulatory Flexibility Act of 1980 (RFA) was enacted by Congress to ensure that small entities are not unnecessarily and disproportionately burdened by Federal 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.'' Based on the criteria of FAA Order 2100.14A, the FAA has determined that the rule will not have a significant impact on a substantial number of small entities.

The rule will affect manufacturers of future type-certificated normal (part 27) and transport category (part 29) rotorcraft. For manufacturers, Order 2100.14A defines a small entity as one with 75 or fewer employees and a significant economic impact as annualized costs of $19,000 or more. The FAA has determined that the rule will not have a significant economic impact on a substantial number of small manufacturers since (1) no part 29 and only two part 27 rotorcraft manufacturers have 75 or fewer employees, and (2) the annualized certification costs of the rule are less than $19,000.

International Trade Impact Assessment

The rule will not constitute a barrier to international trade, including the export of American rotorcraft to other countries and the import of rotorcraft into the United States. Instead, the changes will harmonize with certification procedures of the JAA and thereby enhance free trade.

Conclusion

For the reasons discussed above, including the findings in the Regulatory Flexibility Determination and the International Trade Impact Analysis, the FAA has determined that this regulation is not a significant regulatory action under Executive Order 12866. In addition, the FAA certifies that this regulation 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 regulation is considered nonsignificant under DOT Order 2100.5. A final regulatory evaluation of the regulation, including a final Regulatory Flexibility Determination and International Trade Impact Analysis, has been placed in the docket. A copy may be obtained by contacting the person identified under **FOR FURTHER INFORMATION CONTACT.**

List of Subjects in 14 CFR Parts 27 and 29

Air transportation, Aircraft, Aviation safety, Rotorcraft, Safety.

The Amendments

In consideration of the foregoing, the Federal Aviation Administration amends parts 27 and 29 of Title 14, Code of Federal Regulations (14 CFR parts 27 and 29) as follows:

PART 27—AIRWORTHINESS STANDARDS: NORMAL CATEGORY ROTORCRAFT

1. The authority citation for part 27 continues to read as follows:

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

2. Section 27.1 is amended by adding a new paragraph (c) to read as follows:

§ 27.1 Applicability.

* * * * *

(c) Multiengine rotorcraft may be type certificated as Category A provided the requirements referenced in appendix C of this part are met.

3. Section 27.65 is amended by revising paragraphs (b)(2) introductory text and (b)(2)(ii) to read as follows:

§ 27.65 Climb: all engines operating.

* * * * *

(b) * * *

(2) The steady rate of climb must be determined—

* * * * *

(ii) Within the range from sea level up to the maximum altitude for which certification is requested;

* * * * *

4. Section 27.1141 is amended by redesignating existing paragraphs (c) and (d) as paragraphs (d) and (e) and by adding a new paragraph (c) to read as follows:

§ 27.1141 Powerplant controls: general.

* * * * *

(c) Each control must be able to maintain any set position without—

(1) Constant attention; or

(2) Tendency to creep due to control loads or vibration.

* * * * *

5. New § 27.1151 is added to read as follows:

§ 27.1151 Rotor brake controls.

(a) It must be impossible to apply the rotor brake inadvertently in flight.

(b) There must be means to warn the crew if the rotor brake has not been completely released before takeoff.

6. Part 27 is amended by adding a new appendix C to read as follows:

Appendix C to Part 27—Criteria for Category A

C27.1 General.

A small multiengine rotorcraft may not be type certificated for Category A operation unless it meets the design installation and performance requirements contained in this appendix in addition to the requirements of this part.

C27.2 Applicable part 29 sections. The following sections of part 29 of this chapter must be met in addition to the requirements of this part:

29.45(a) and (b)(2)—General.
29.49(a)—Performance at minimum operating speed.
29.51—Takeoff data: General.
29.53—Takeoff: Category A.
29.55—Takeoff decision point: Category A.
29.59—Takeoff Path: Category A.
29.60—Elevated heliport takeoff path: Category A.
29.61—Takeoff distance: Category A.
29.62—Rejected takeoff: Category A.
29.64—Climb: General.
29.65(a)—Climb: AEO.
29.67(a)—Climb: OEI.
29.75—Landing: General.
29.77—Landing decision point: Category A.
29.79—Landing: Category A.
29.81—Landing distance (Ground level sites): Category A.
29.85—Balked landing: Category A.
29.87(a)—Height-velocity envelope.
29.547(a) and (b)—Main and tail rotor structure.
29.861(a)—Fire protection of structure, controls, and other parts.
29.901(c)—Powerplant: Installation.
29.903(b) (c) and (e)—Engines.
29.908(a)—Cooling fans.
29.917(b) and (c)(1)—Rotor drive system: Design.
29.927(c)(1)—Additional tests.
29.953(a)—Fuel system independence.
29.1027(a)—Transmission and gearboxes: General.
29.1045(a)(1), (b), (c), (d), and (f)—Climb cooling test procedures.
29.1047(a)—Takeoff cooling test procedures.
29.1181(a)—Designated fire zones: Regions included.
29.1187(e)—Drainage and ventilation of fire zones.
29.1189(c)—Shutoff means.
29.1191(a)(1)—Firewalls.
29.1193(e)—Cowling and engine compartment covering.
29.1195(a) and (d)—Fire extinguishing systems (one shot).
29.1197—Fire extinguishing agents.
29.1199—Extinguishing agent containers.
29.1201—Fire extinguishing system materials.
29.1305(a) (6) and (b)—Powerplant instruments.
29.1309(b)(2) (i) and (d)—Equipment, systems, and installations.
29.1323(c)(1)—Airspeed indicating system.
29.1331(b)—Instruments using a power supply.
29.1351(d)(2)—Electrical systems and equipment: General (operation without normal electrical power).
29.1587(a)—Performance information.

Note: In complying with the paragraphs listed in paragraph C27.2 above, relevant material in the AC ''Certification of Transport Category Rotorcraft'' should be used.

PART 29—AIRWORTHINESS STANDARDS: TRANSPORT CATEGORY ROTORCRAFT

7. The authority citation for part 29 continues to read as follows:

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

8. Section 29.547 is amended by revising the heading; by revising paragraph (a); by revising the introductory text in paragraphs (c), (d), and (e); by revising paragraph (e)(1)(ii); and by adding paragraph (b) to read as follows:

§ 29.547 Main and tail rotor structure.

(a) A rotor is an assembly of rotating components, which includes the rotor hub, blades, blade dampers, the pitch control mechanisms, and all other parts that rotate with the assembly.

(b) Each rotor assembly must be designed as prescribed in this section and must function safely for the critical flight load and operating conditions. A design assessment must be performed, including a detailed failure analysis to identify all failures that will prevent continued safe flight or safe landing, and must identify the means to minimize the likelihood of their occurrence.

(c) The rotor structure must be designed to withstand the following loads prescribed in §§ 29.337 through 29.341 and 29.351:

* * * * *

(d) The rotor structure must be designed to withstand loads simulating—

* * * * *

(e) The rotor structure must be designed to withstand the limit torque at any rotational speed, including zero.

In addition:

(1) * * *

* * * * *

(ii) For the main rotor, the limit engine torque specified in § 29.361.

* * * * *

9. Section 29.610 is amended by revising the heading; by revising paragraph (a); and by adding a new paragraph (d) to read as follows:

§ 29.610 Lightning and static electricity protection.

(a) The rotorcraft structure must be protected against catastrophic effects from lightning.

* * * * *

(d) The electric bonding and protection against lightning and static electricity must—

(1) Minimize the accumulation of electrostatic charge;

(2) Minimize the risk of electric shock to crew, passengers, and service and maintenance personnel using normal precautions;

(3) Provide an electrical return path, under both normal and static electricity on the functioning of essential electrical and electronic equipment.

(4) Reduce to an acceptable level the effects of lightning and static electricity on the functioning of essential electronic equipment.

10. Section 29.629 is revised to read as follows:

§ 29.629 Flutter and divergence.

Each aerodynamic surface of the rotorcraft must be free from flutter and divergence under each appropriate speed and power condition.

11. Section 29.631 is added before the undesignated center heading, ''Rotors'' to read as follows:

§ 29.631 Bird strike.

The rotorcraft must be designated to ensure capability of continued safe flight and landing (for Category A) or safe landing (for Category B) after impact with a 2.2-lb (1.0 kg) bird when

the velocity of the rotorcraft (relative to the bird along the flight path of the rotorcraft) is equal to V_{NE} or V_H (whichever is the lesser) at altitudes up to 8,000 feet. Compliance must be shown by tests or by analysis based on tests carried out on sufficiently representative structures of similar design.

12. Section 29.917 is amended by redesignating existing paragraph (b) as (c) and by adding a new paragraph (b) to read as follows:

§ 29.917 Design.

* * * * *

(b) Design assessment. A design assessment must be performed to ensure that the rotor drive system functions safely over the full range of conditions for which certification is sought. The design assessment must include a detailed failure analysis to identify all failures that will prevent continued safe flight or safe landing and must identify the means to minimize the likelihood of their occurrence.

* * * * *

13. Section 29.923 is amended by revising paragraph (b)(3)(i) to read as follows:

§ 29.923 Rotor drive system and control mechanism tests.

* * * * *

(b) * * *

(3) * * *

(i) Immediately following any one 5-minute power-on run required by paragraph (b)(1) of this section, simulate a failure for each power source in turn, and apply the maximum torque and the maximum speed for use with 30-second OEI power to the remaining affected drive system power inputs for not less than 30 seconds. Each application of 30-second OEI power must be followed by two applications of the maximum torque and the maximum speed for use with the 2 minute OEI power for not less than 2 minutes each; the second application must follow a period at stabilized continuous or 30 minute OEI power (whichever is requested by the applicant). At least one run sequence must be conducted from a simulated ''flight idle'' condition. When conducted on a bench test, the test sequence must be conducted following stabilization at take-off power.

* * * * *

14. Section 29.1305 is amended by redesignating existing paragraphs (a)(6) through (a)(25) as paragraphs (a)(7) through (a)(26) and by adding a new paragraph (a)(6) to read as follows:

§ 29.1305 Powerplant instruments

* * * * *

(a) * * *

(6) An oil pressure indicator for each pressure-lubricated gearbox.

* * * * *

15. Section 29.1309 is amended by revising paragraph (h) to read as follows:

§ 29.1309 Equipment, systems, and installations

* * * * *

(h) In showing compliance with paragraphs (a) and (b) of this section, the effects of lightning strikes on the rotorcraft must be considered.

16. Section 29.1351(d) is revised to read as follows:

§ 29.1351 General

* * * * *

(d) Operation with the normal electrical power generating system inoperative.

(1) It must be shown by analysis, tests, or both, that the rotorcraft can be operated safely in VFR conditions for a period of not less than 5 minutes, with the normal electrical power generating system (electrical power sources excluding the battery) inoperative, with critical type fuel (from the standpoint of flameout and restart capability), and with the rotorcraft initially at the maximum certificated altitude. Parts of the electrical system may remain on if—

(i) A single malfunction, including a wire bundle or junction box fire, cannot result in loss of the part turned off and the part turned on;

(ii) The parts turned on are electrically and mechanically isolated from the parts turned off; and

(iii) The electrical wire and cable insulation, and other materials, of the parts turned on are self-extinguishing when tested in accordance with § 25.1359(d) in effect on September 1, 1977.

(2) Additional requirements for Category A Rotorcraft.

(i) Unless it can be shown that the loss of the normal electrical power generating system is extremely improbable, an emergency electrical power system, independent of the normal electrical power generating system, must be provided, with sufficient capacity to power all systems necessary for continued safe flight and landing.

(ii) Failures, including junction box, control panel, or wire bundle fires, which would result in the loss of the normal and emergency systems, must be shown to be extremely improbable.

(iii) Systems necessary for immediate safety must continue to operate following the loss of the normal electrical power generating system, without the need for flight crew action.

17. Section 29.1587 is amended by redesignating (a)(6) as (a)(7), by removing ''and'' from the end of paragraph (a)(5), and by adding a new paragraph (a)(6) to read as follows:

§ 29.1587 Performance Information.

* * * * *

(a) * * *

(6) The steady gradient of climb for each weight, altitude, and temperature for which takeoff data are to be scheduled, along the takeoff path determined in the flight conditions required in § 29.67(a)(1) and (a)(2):

(i) In the flight conditions required in § 29.67(a)(1) between the end of the takeoff distance and the point at which the rotorcraft is 200 feet above the takeoff surface (or 200 feet above the lowest point of the takeoff profile for elevated heliports);

(ii) In the flight conditions required in § 29.67(a)(2) between the points at which the rotorcraft is 200 and 1000 feet above the takeoff surface (or 200 and 1000 feet above the lowest point of the takeoff profile for elevated heliports); and

* * * * *

18. Part 29 Appendix B is amended by adding a new paragraph VIII(b)(6) to read as follows:

Appendix B to Part 29—Airworthiness Criteria for Helicopter Instrument Flight

* * * * *

VIII * * *

(b) * * *

(6) In determining compliance with the requirements of § 29.1351(d)(2), the supply of electrical power to all systems necessary for flight under IFR must be included in the evaluation.

Issued in Washington, DC, on May 2, 1996.

David R. Hinson,

Administrator.

[FR Doc. 96–11493 Filed 5–9–96; 8:45 am]

BILLING CODE 4910–13–M