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PART 3—AIRPLANE AIRWORTHINESS; NORMAL, UTILITY, AND ACROBATIC CATEGORIES

Miscellaneous Amendments Resulting From First Airworthiness Review

As a result of the First Federal Aviation Agency Airworthiness Review, the Agency published a notice of proposed rule making affecting several parts of the Civil Air Regulations. This notice was published in the FEDERAL REGISTER (26 F.R. 5130) and circulated as Civil Air Regulations Draft Release No. 61-12 dated June 8, 1961. There are contained herein amendments to Part 3 of the Civil Air Regulations which stem from this First FAA Airworthiness Review.

Interested persons have been afforded an opportunity to express their comments in regard to the proposal and, in some cases, the proposal has been modified in accordance with such comments. The more significant amendments being adopted by the Agency are discussed herein.

Section 3.82 provides for the flight test determination of the stalling speeds, V_{s_0} and V_{s_1}, except that when V_{s_1} is not obtainable it may be calculated. Since the purpose of this section is to determine the stall speeds by flight tests, it is being amended to require that V_{s_1} be determined in the same manner as V_{s_0}; i.e., as a stall or as a minimum steady flight speed.

Part 3 does not now provide engine inoperative en route climb performance for multiengine airplanes of 6,000 pounds or less. This information is necessary for the commercial operation of these airplanes and is useful to general operations. Therefore, § 3.85 is being amended to require that this information be obtained during type certification of the airplane.

Part 3 requires that spin tests be conducted on airplanes of 4,000 pounds or less, including multiengine airplanes. On the basis that spin prevention will contribute more toward reducing stall-spin accidents than spin recovery, the engine-inoperative stall requirements of § 3.123 are revised to preclude unintentional spins, and normal category multiengine spin tests are being deleted. While the proposed rule required that tests be conducted with the landing gear retracted and extended, the rule adopted herein provides that all tests shall be conducted with the landing gear extended. In § 3.123(b), the phrase "the turn shall be steadily tightened" has been changed to the more appropriate phrase "the angle of attack shall be steadily increased". Furthermore, the current 4,000-pound limit of § 3.124(a) is deleted. As a result, one-turn spin tests will be required on all normal category single-engine airplanes. These tests are considered to be an investigation of the airplane's characteristics in a delayed stall rather than true spin tests and as such should be applicable to all single-engine airplanes. Section 3.124(c) does not clearly state the spin capability required of acrobatic category airplanes. Therefore, § 3.124(c) is amended to expressly provide that acrobatic airplanes must be capable of six-turn spins and to incorporate the current policy material of §§ 3.124-1 and 3.124-2 concerning flap retraction during spin tests.

A clarifying change has been made to § 3.184 to indicate that the design speeds are stated in terms of equivalent airspeed, EAS which is already defined in § 3.1(d), and in miles per hour.

The amendments to §§ 3.183, 3.184, 3.186, 3.187, 3.188, 3.190, 3.195, 3.197, 3.198, 3.199, 3.217, 3.217-1, 3.220, and 3.270, which were proposed to make the strength requirements appropriate to the speed, altitude, and maneuverability characteristics of small turbine-powered airplanes, have been deferred for further study.

The present requirements on factors of safety and inspections for structural castings specify a special factor of 2.0 for visual inspection only, and a factor of 1.25 when radiographic inspection and strength tests of 3 sample castings are employed. Section 3.304 as adopted herein provides for a series of casting factors, and corresponding test and inspection requirements, which reflect current methods and practices. A minor revision in the format of the regulation as proposed has also been made and a new paragraph (d) has been added for purposes of clarification. In addition, the amendment now provides for alternative methods of compliance with the requirements therein. Section 3.304-1 has been deleted since its provisions have been incorporated into § 3.304.

Section 3.357 currently requires an auxiliary means of extending the landing gear be provided if other than manual power is used. This provision is unnecessary in the case of amphibian airplanes, since service experience has shown that such airplanes can be landed safely, on land or water, with the landing gear retracted. Therefore, this section is amended to exclude amphibian airplanes.

Section 3.359 currently provides that the aural warning device function continuously after the throttle is closed until the landing gear is down and locked. To remove the ambiguity which arises in the case of multiengine airplanes, this section is amended to specify that the warning occur and continue when one or more throttles are closed. In this connection, §§ 3.359-1, 3.359-2, and 3.359-3 are being deleted and the acceptable means of compliance set forth therein are being incorporated in a note.

The increasing use of tinted windshields to reduce sun glare has raised questions as to the possible adverse effects on pilot vision during operations under poor lighting conditions. On the basis of automotive experience, § 3.383 is being amended to require that windshields and windows forward of the pilot's back have a luminous transmittance value of not less than 70 percent. This value of transmittance will permit consideration of thick material in the windshield if it should be needed for structural reasons or if bird-proof windshields are used.

Sections 3.390(d) and 3.715 presently require an additional factor of safety of 1.33 on the loads for seat and safety belt attachments, and § 3.306 requires a factor of 1.15 for structural fittings (attachments). Sections 3.390(d) and 3.715 are being clarified by inserting a statement that the 1.33 factor may be applied in lieu of the 1.15 factor, not added to it. This is consistent with the general principle that only the highest factor intended for a similar purpose need be applied. However, if castings are used, the casting factor specified in § 3.304

would still apply, since this factor is intended for another purpose.

Section 3.432 restricts the routing of pressure crossfeed fuel lines unless means are provided to permit flight personnel to shut off the supply of fuel to these lines, or unless any joints, fittings, or other possible sources of leakage installed in such lines are enclosed in a fuel- and fume-proof enclosure ventilated and drained to the exterior of the airplane. Experience has shown that pressure crossfeed lines do not require provisions different from other pressure fuel lines. Accordingly, this section is being deleted.

Section 3.581 requires that powerplant cooling provisions be capable of maintaining component and fluid temperatures at or below the maximum established limits under critical conditions of ground and flight operation. Since modern airplanes have minimum as well as maximum limits, § 3.581 is being amended to require that cooling provisions be capable of maintaining temperatures within limits. For the same reason, the word "maximum" is being deleted from § 3.582. Sections 3.586 and 3.587 establish cooling test procedures for single-engine and multiengine airplanes. Section 3.587 provides that the airplane be in the configuration specified in § 3.85, which covers climb performance, while § 3.586 is silent in this respect. Section 3.85, however, provides that the cowl flap setting, which is part of the airplane configuration, be that employed in the cooling test. To avoid ambiguity it is being specified that the applicant select the cowl flap setting to be used in establishing cooling system capability.

Several amendments to §§ 3.681 through 3.693, concerning electrical systems and equipment are being made. In particular, § 3.682 now deals with electric power sources, and revisions are being made to §§ 3.688, 3.690, 3.691, and 3.693 which cover master switch arrangement, protective devices, and electric cables, respectively. In conjunction with these changes, §§ 3.681(b), 3.681–1, 3.681–2, 3.682–1, 3.688–1, 3.688–2, 3.690–1, 3.690–2, and 3.693–1 are being deleted because the material contained in these sections is being included, or already is included, in other sections.

Two changes are being made to the lighting requirements. Figure 3–16 now specifies that position light intensity for angles 40° to 90° above or below the horizontal be at least 2 candles. Because this results in an irrational discontinuity when related to the other data in Figure 3–16, Figure 3–16 is being amended to require an intensity of 0.05 *I* for these angles.

The current anticollision light requirements in § 3.705 permit 0.03 steradians blockage in the rearward direction. In view of recent qualitative studies it has been determined that such a limitation might be unduly restrictive. Therefore, § 3.705 is being amended to permit 0.5 steradians of obstruction without limitation as to direction.

Although Part 3 requires satisfactory airplane ground handling characteristics in crosswind velocities up to 0.2 V_{S_0}, there are no provisions to inform the pilot of this capability. Since the safe operation of an airplane requires knowledge of the airplane's capabilities, § 3.771 is being amended to require that the demonstrated crosswind velocity be included on the airspeed placards specified for all airplanes.

The airspeed placards now required by Part 3 do not include certain operational speed information considered essential for airplanes weighing more than 6,000 pounds. These speeds include the recommended climb speed, best angle of climb speed, engine-inoperative climb speeds, and approach speeds. In addition, supplementary information regarding the airplane configuration, power, etc., is necessary to describe the conditions for which these speeds can be used. It is not considered practical to include all of this information on a cockpit placard. The detailed supplementary information should be included in a separate source which is readily available to the pilot. The Airplane Flight Manual procedures section is considered satisfactory for this purpose. Therefore, § 3.771 is being amended to require the climb and approach speeds placard for airplanes weighing more than 6,000 pounds, and § 3.779 is being amended to require the necessary supplementary data. Consistent with this amendment a minor clarifying amendment to § 3.755(a) is necessary. Section 3.750 requires the establishment of operation limitations related to installed equipment but there are no provisions to inform the pilot of these limitations. Therefore, new §§ 3.772 and 3.778(h) are being adopted to provide that the airplane crew be informed of the operation limitations established for the airplane; e.g., VFR day, IFR night, operation in icing conditions, etc.

Miscellaneous changes of an editorial or clarifying nature are being made to §§ 3.1, 3.11(b), 3.82, 3.86, 3.174–1, 3.174–3, 3.174–7, 3.216–5, 3.216–6, 3.301, 3.301–1, 3.301–2, 3.304–1, 3.345–3, 3.573, 3.582, 3.714, 3.744, 3.745, 3.746, 3.747, 3.767, 3.779, 3.780, 3.780–1, Figure 3–12(b), and the heading of subpart E. The miscellaneous amendments contain an amendment to § 3.11(b) which excludes from the provisions of that section consideration of provisional type certificates. It was proposed that this be accomplished by a note. However, it now appears to be more appropriate to include such a provision within § 3.11(b) rather than as a note thereto. Although not contained in the proposal, the heading of subpart E is being corrected to read "Subpart E—Powerplant".

Interested persons have been afforded an opportunity to participate in the making of this amendment, and due consideration has been given to all relevant matter presented.

In consideration of the foregoing, Part 3 of the Civil Air Regulations (14 CFR Part 3, as amended) is hereby amended as follows, effective May 3, *1962:*

1. By amending the title of § 3.1(f) and by adding a new subparagraph (9) to read as follows:

§ 3.1 Definitions.

* * * * *

(f) *Powerplant installation.* * * *

(9) *Gas temperature.* Gas temperature for turbine engines is the temperature of the gas stream obtained as indicated in the approved engine specification.

§ 3.11 [Amendment]

2. By amending § 3.11(b) by inserting in the first sentence between the words "required" and "except" the phrase "notwithstanding the fact that the applicant may have been issued a provisional type certificate".

§ 3.82 [Amendment]

3. By amending § 3.82 by deleting from paragraph (a) the words "true indicated"; by deleting from paragraph (a) the words "in miles per hour" and inserting in lieu thereof "expressed in miles per hour, calibrated airspeed,"; by deleting from paragraph (b) the words "true indicated"; by deleting from paragraph (b) the words "otherwise the calculated value in miles per hour," and inserting in lieu thereof "or the minimum steady flight speed at which the airplane is controllable, expressed in miles per hour, calibrated airspeed,".

4. By amending § 3.85a(b) by redesignating the present text of the section following the title as subparagraph (1); by redesignating the present subparagraphs (1), (2), (3), (4), and (5) as subdivisions (i), (ii), (iii), (iv), and (v), respectively, and by adding a new subparagraph (2) to read as follows:

§ 3.85a Climb requirements; airplanes of 6,000 pounds or less.

* * * * *

(b) *Climb with inoperative engine.* * * *

(2) For all multiengine airplanes having a stalling speed equal to or less than 70 miles per hour, the steady rate of climb at 5,000 feet shall be determined with the critical engine inoperative and the following:

(i) Remaining engines operating at not more than maximum continuous power,

(ii) Inoperative propeller in the minimum drag position,

(iii) Landing gear retracted,

(iv) Wing flaps in the most favorable position, and

(v) Cowl flaps in the position used in cooling tests specified in §§ 3.581 through 3.596.

§ 3.86 [Amendment]

5. By amending § 3.86(a)(1) by deleting the words "true indicated" and inserting in lieu thereof "calibrated".

6. By amending § 3.123 to read as follows:

§ 3.123 One-engine-inoperative stalls.

(a) Multiengine airplanes shall have stall characteristics which preclude unintentional spin entry. These characteristics shall be demonstrated by performing the maneuvers prescribed in paragraph (b) of this section at the lowest practical altitude with:

(1) The critical engine inoperative and its propeller in the normal inoperative position;

(2) Flaps and landing gear extended, and with flaps retracted and landing gear extended; and

(3) The remaining engines operating at full throttle, except that the power need not be greater than maximum continuous power.

(b) After a steady curvilinear flight condition has been established, and while maintaining a 15-degree bank towards in one case, and away in the other case, from the inoperative engine, the angle of attack shall be steadily increased with the elevator control until an uncontrollable downward pitching motion of the airplane indicates the stall. In performing these maneuvers, the following shall apply:

(1) It shall be possible to produce and correct roll by unreversed use of the lateral control until the airplane stalls;

(2) It shall be possible to effect immediate recovery to full flight control with wings level from the stalled condition by normal use of the controls, reducing power on the operating engines if desired without the airplane exceeding a 60-degree bank angle; and

(3) The loss of altitude, as measured from the altitude at which the airplane starts to pitch uncontrollably to the altitude at which level flight is regained, and the pitch angle shall be entered in the performance section of the Airplane Flight Manual for airplanes having a maximum certificated weight of more than 6,000 pounds, or shall be shown on a cockpit placard for airplanes having a maximum certificated weight of 6,000 pounds or less.

7. By amending § 3.124(a) by deleting the first sentence and inserting in lieu thereof "All single-engine airplanes shall recover from a one-turn spin in not more than one additional turn. The controls shall be applied in the manner normally used for recovery. For both the flaps retracted and flaps extended conditions, the applicable limiting airspeed and postive limit maneuvering load factor shall not be exceeded. For the flaps extended condition, it shall be acceptable to retract the flaps during recovery."

8. By amending § 3.124(c) by inserting in the introductory sentence between the words "spinning" and "and" the words "at least six turns"; by deleting from subparagraph (1) the clause "the airplane shall recover from a six-turn spin, or from any point in a six-turn spin," and inserting in lieu thereof "the airplane shall recover from any point in a spin not exceeding six turns with flaps retracted and one turn with flaps extended;" and by amending subparagraph (2) to read:

§ 3.124 Spinning.

* * * * *

(c) *Category A.* * * *

(2) For both the flaps retracted and flaps extended conditions, the applicable limiting airspeed and positive limit maneuvering load factor shall not be exceeded. For the flaps extended condition, it shall be acceptable to retract the flaps during recovery, provided a placard is installed prohibiting intentional spins with flaps extended.

§§ 3.124–1, 3.124–2 [Deletion]

9. By deleting §§ 3.124–1 and 3.124–2.

10. By amending § 3.174–1(a) by deleting from the parenthetical expression the words "Secs. 1.654 and 1.655 of ANC–5a 1949 edition [2]" and inserting in lieu thereof "Sections 1.6.5.4 and 1.6.5.5 of MIL–HDBK–5"; and by amending the related footnote to read as follows:

[2] MIL–HDBK–5, "Strength of Aircraft Elements" is published by the Department of Defense and the Federal Aviation Agency and may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D.C.

§ 3.174–3 [Amendment]

11. By amending § 3.174–3(a)(1) by deleting the expression "ANC–5" and inserting in lieu thereof "MIL–HDBK–5".

§ 3.174–7 [Amendment]

12. By amending § 3.174–7(c) by deleting the phrase "in ANC–5 and ANC–18" and inserting in lieu thereof "in MIL–HDBK–5, MIL–HDBK–17 Part I, ANC–17 Part II, ANC–18, MIL–HDBK–23 Part I, and ANC–23 Part II".

§ 3.184 [Amendment]

13. By amending § 3.184 by inserting in the first sentence between the words "speeds" and "shall" the words "shall be equivalent air speeds (EAS) and"; and by adding to each of the parenthetical expressions after the word "speed" the abbreviation ", m.p.h.".

§ 3.216–5 [Amendment]

14. By amending § 3.216–5 by deleting from paragraph (a) the phrase "in § 3.216 (a), (b), and (c)" and inserting in lieu thereof "in § 3.216(c)"; and by deleting from paragraph (b) the phrase "in § 3.216(c)" and inserting in lieu thereof "in § 3.216".

§ 3.216–6 [Amendment]

15. By amending § 3.216–6 by deleting the equation

$$q_p = \frac{n\,(W/S)}{C_{L_{max}}} = \frac{(W/S)}{1.5}$$

and inserting in lieu thereof

$$q_p = \frac{n\,(W/S)}{C_{L_{max}}} = \frac{n\,(W/S)}{1.5}.$$

§ 3.244 [Amendment]

16. By amending Figure 3–12(b) referred to in § 3.244 as follows:

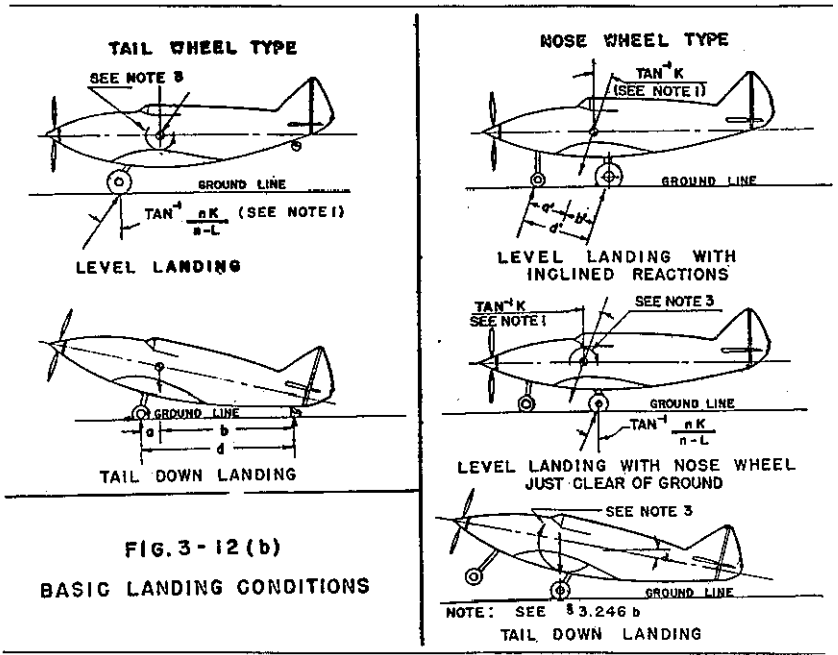

FIG. 3-12(b)

BASIC LANDING CONDITIONS

17. By amending § 3.301 by deleting the last sentence and inserting in lieu thereof "Values contained in MIL–HDBK–5, MIL–HDBK–17 Part I, ANC–17 Part II, ANC–18, MIL–HDBK–23 Part I, and ANC–23 Part II shall be used unless shown to be inapplicable in a particular case" and by amending the note to read as follows:

§ 3.301 Material strength properties and design values.

* * * * *

NOTE: MIL–HDBK–5, "Strength of Metal Aircraft Elements"; MIL–HDBK–17, "Plastics for Flight Vehicles, Part I—Reinforced Plastics"; ANC–17, "Plastics for Aircraft, Part II—Transparent Glazing Materials"; ANC–18, "Design of Wood Aircraft Structures"; MIL–HDBK–23, "Composite Construction for Flight Vehicles, Part I—Fabrication Inspection Durability and Repair"; and ANC–23, "Sandwich Construction for Aircraft, Part II—Material Properties and Design Criteria", are published by the Department of Defense and the Federal Aviation Agency and may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D.C.

18. By amending § 3.301–1(a) by deleting the first sentence and inserting in

lieu thereof "With reference to Chapter 3 of MIL-HDBK-5, the allowable design property columns headed "B" represent design properties which will be equalled or exceeded by the properties possessed by approximately 90 percent of the material", and by deleting from subparagraph (1) the phrase "in ANC-5" and inserting in lieu thereof "in MIL-HDBK-5".

19. By amending § 3.301-2 to read as follows:

§ 3.301-2 Substitution of seam-welded for seamless steel tubing (FAA policies which apply to § 3.301).

Seam-welded tubing may be substituted for seamless steel tubing as follows:

(a) SAE 4130 welded tubing as per Specification MIL-T-6731 may be substituted for SAE 4130 seamless tubing conforming to Specification MIL-T-6736, and vice versa.

(b) SAE 1025 welded tubing as per Specification MIL-T-5066 may be substituted for SAE 1025 seamless tubing conforming to Specification MIL-T-5066, and vice versa.

(c) SAE 8630 welded tubing conforming to Specification MIL-T-6734 may be substituted for SAE 8630 seamless tubing conforming to Specification MIL-T-6732, and vice versa.

20. By amending § 3.304 to read as follows:

§ 3.304 Casting factors.

For structural castings, the factor of safety prescribed in § 3.172 shall be multiplied by the casting factors specified in paragraphs (a) and (b) of this section. The prescribed tests and inspections shall be in addition to those necessary to establish foundry quality control. Castings shall be inspected in accordance with approved specifications.

(a) Each casting, the failure of which would preclude continued safe flight and landing of the airplane or which would result in serious injury to occupants, shall have a casting factor of at least 1.25 and shall receive 100-percent inspection by visual, radiographic, and magnetic particle or penetrant inspection methods or approved equivalent nondestructive inspection methods. Where such castings have a casting factor less than 1.50, three sample castings shall be static tested. The test castings shall comply with the strength requirements of § 3.173 at an ultimate load corresponding with a casting factor of 1.25 and shall comply with the deformation requirements at a load equal to 1.15 times limit load.

NOTE: Examples of castings to which this subparagraph applies are: structural attachment fittings; parts of flight control systems; control surface hinges and balance weight attachments; seat, berth, safety belt, and fuel and oil tank supports and attachments; cabin pressure valves.

(b) For structural castings other than those specified in paragraph (a) of this section, the casting factors and inspections shall be in accordance with the following table except that it shall be acceptable to reduce the percentage of castings inspected by nonvisual methods when an approved quality control procedure is established. For castings procured to a specification which guarantees the mechanical properties of the material in the castings and provides for demonstration of these properties by test of coupons cut from castings on a sampling basis, it shall be acceptable to use a casting factor of 1.0. The inspection requirements for such castings shall be in accordance with those specified in the following table for casting factors of 1.25 to 1.50, and the testing requirements shall be in accordance with paragraph (a) of this section.

Casting factor	Inspections
2.0 or greater	100 percent visual.
Less than 2.0 greater than 1.5.	100 percent visual, and magnetic particle or penetrant or equivalent nondestructive inspection methods.
1.25 to 1.50	100 percent visual, magnetic particle or penetrant, and radiographic, or approved equivalent nondestructive inspection methods.

(c) Castings which are pressure tested as parts of a hydraulic or other fluid system shall not be required to comply with the provisions of this section unless such castings support airplane structural loads.

(d) The casting factor need not exceed 1.25 with regard to bearing stresses regardless of the method of inspection employed. A casting factor need not be employed with respect to the bearing surface of a part if the bearing factor used (see § 3.305) is greater than the casting factor.

§ 3.304-1 [Deletion]

21. By deleting § 3.304-1.

§ 3.345-3 [Amendment]

22. By amending § 3.345-3 by inserting between the expressions "Army-Navy-Aeronautical Standards" and "National Aircraft Standards" the expression "Military Standards".

§ 3.357 [Amendment]

23. By amending § 3.357 by adding at the end thereof the phrase "on airplanes which are not amphibian".

24. By amending § 3.359 by deleting from the second sentence the phrase "after the throttle is closed" and inserting in lieu thereof "when one or more throttles are closed" and by adding a note to read as follows:

§ 3.359 Position indicator and warning device.

* * * * *

NOTE: An acceptable method for indicating to the pilot when the wheels are secured in the extreme positions is by means of lights; e.g., landplanes may display a green light when the wheels are down and locked, a red light to indicate an intermediate or unlocked wheel position, and "all lights out" when the wheels are up and locked. An acceptable method for sensing when the wheels are secured in the extreme positions is to locate the sensing devices so that they are operated by the landing gear locking latch. A throttle stop is not considered to be an acceptable alternative to an aural landing gear warning device.

§§ 3.359-1, 3.359-2, 3.359-3 [Deletion]

25. By deleting §§ 3.359-1, 3.359-2, and 3.359-3.

26. By amending § 3.383 by adding a new paragraph (d) to read as follows:

3.383 Windshields, windows, and canopies.

* * * * *

(d) The windshield and side windows forward of the pilot's back, when he is seated in normal flight position, shall have a luminous transmittance value of not less than 70 percent.

NOTE: Tinted windshields may adversely affect vision under certain flight conditions.

§ 3.390 [Amendment]

27. By amending § 3.390(d) by adding at the end thereof the words "in lieu of the fitting factor prescribed in § 3.366."

28. By amending the heading of Subpart E to read as follows: "Subpart E—Powerplant".

§ 3.432 [Deletion]

29. By deleting § 3.432.

30. By amending § 3.573 to read as follows:

§ 3.573 Oil filters.

If the powerplant installation incorporates an oil filter (strainer), the filter shall be constructed and installed so that oil will continue to flow at the normal rate through the remainder of the system when the flow of oil through the filter element is completely blocked.

31. By amending § 3.581 to read as follows:

§ 3.581 General.

The powerplant cooling provisions shall be capable of maintaining the temperatures of all powerplant components and fluid within the established limits during ground and flight operation.

§ 3.582 [Amendment]

32. By amending § 3.582 by deleting from the third sentence the word "maximum"; and by deleting from the fourth sentence the words "octane number" and inserting in lieu thereof "grade".

§ 3.586 [Amendment]

33. By amending § 3.586 by deleting the last sentence including paragraphs (a) and (b) and inserting in lieu thereof the following: "The climb shall not be conducted at a speed greater than the best rate-of-climb speed with maximum continuous power unless the slope of the flight path at the speed chosen for the cooling test is equal to or greater than the minimum required angle of climb (see § 3.85(a)) and a cylinder head temperature indicator is provided as specified in § 3.675. The stabilizing and climb portions of the test shall be conducted with cowl flap settings selected by the applicant (see §§ 3.85 and 3.85a)."

34. By amending § 3.587(a) to read as follows:

§ 3.587 Cooling test procedure for multi-engine airplanes.

(a) *Airplanes which meet the minimum one-engine-inoperative climb performance specified in § 3.85(b).* The engine cooling test for these airplanes shall be conducted with the airplane in the configuration specified in § 3.85(b), except that the operating engines shall

be operated at maximum continuous power or at full throttle when above the critical altitude. The stabilizing and climb portions of the test shall be conducted with cowl flap settings selected by the applicant (see § 3.85). Temperatures of the operating engines shall be stabilized in flight with the engines operating at not less than 75 percent of the maximum continuous power rating. After stabilizing temperatures in flight, the climb shall be started 1,000 feet below the engine critical altitude (if this is impracticable, then at the lowest practicable altitude which the terrain will permit) or 1,000 feet below the altitude at which the single-engine-inoperative rate of climb is 0.02 $V_{S_0}^2$, whichever is the lower altitude, and shall be continued until at least 5 minutes after the highest temperature has been recorded. The climb shall be conducted at a speed not greater than the highest speed at which compliance with the climb requirement of § 3.85(b) can be shown, except that, if the speed used exceeds the speed for best rate of climb with one engine inoperative, a cylinder head temperature indicator shall be provided as specified in § 3.675.

§ 3.681 [Deletion]

35. By deleting § 3.681(b).

§§ 3.681–1, 3.681–2 [Amendment]

36. By deleting §§ 3.681–1 and 3.681–2 and related footnotes.

37. By amending § 3.682 and the center heading preceding § 3.682 to read as follows:

ELECTRIC POWER SOURCES

§ 3.682 Electric power sources.

(a) Electric power sources, their transmission cables, and their associated control and protective devices, shall have sufficient capacity to furnish the required power at the proper voltage to all load circuits essential to the safe operation of the airplane.

(b) Compliance with paragraph (a) of this section shall be shown by means of an electrical load analysis, or by electrical measurements, which take into account all electrical loads applied to the electrical system, in probable combinations and for probable durations.

(c) At least one generator shall be installed if the electrical system supplies power to load circuits essential to the safe operation of the airplane.

(d) Electric power sources shall function properly when connected in combination or independently. The failure or malfunction of any electric power source shall not impair the ability of any remaining source to supply load circuits essential to the safe operation of the airplane.

(e) Electric power source controls shall be such as to permit independent operation of each source.

§ 3.682–1 [Deletion]

38. By deleting § 3.682–1.

39. By deleting the center heading "Generators" preceding § 3.685.

40. By amending § 3.688 to read as follows:

§ 3.688 Arrangement.

A master switch arrangement shall be provided to permit expeditious disconnection of all electric power sources from all load circuits. The point of disconnection shall be adjacent to the power sources.

§§ 3.688–1, 3.688–2 [Deletion]

41. By deleting §§ 3.688–1 and 3.688–2 and related footnotes.

§ 3.690 [Amendment]

42. By amending § 3.690 by adding at the end thereof two sentences and a note to read as follows: "Not more than one circuit, which is essential to safety in flight, shall be protected by a single protective device. All resettable type circuit protective devices shall be designed so that a manual operation is required to restore service after tripping and so that, when an overload or circuit fault exists, they will open the circuit irrespective of the position of the operating control.

NOTE: The aforementioned resettable type circuit protective devices are known commercially as "trip-free"; i.e., the tripping mechanism cannot be overridden by the operating control. Such circuit protective devices can be reset on an overload or circuit fault, but will trip subsequently in accordance with their current-time trip characteristic.

§§ 3.690–1, 3.690–2 [Deletion]

43. By deleting §§ 3.690–1 and 3.690–2 and related footnotes.

44. By amending § 3.691 to read as follows:

§ 3.691 Protective devices installation.

If the ability to reset a circuit breaker or to replace a fuse is essential to safety in flight, such circuit breaker or fuse shall be so located and identified that it can be readily reset or replaced in flight.

45. By amending § 3.693 to read as follows:

§ 3.693 Electric cables.

Electric connecting cables shall be of adequate capacity. Cables which would overheat in the event of circuit overload or fault shall be flame-resistant and shall not emit dangerous quantities of toxic fumes.

§ 3.693–1 [Deletion]

46. By deleting § 3.693–1 and related footnote.

§ 3.702 [Amendment]

47. By amending Figure 3–16 referred to in § 3.702 by deleting the phrase "At least 2 candles" in the intensity column and inserting in lieu thereof "0.05 *I*."

§ 3.705 [Amendment]

48. By amending § 3.705(a) by deleting the number ".03" and inserting in lieu thereof "0.5", and by deleting the phrase "within a solid angle equal to 0.15 steradians centered about the longitudinal axis in the rearward direction."

§ 3.714 [Amendment]

49. By amending § 3.714 by deleting from the first sentence the word "danger" and inserting in lieu thereof "the probability".

§ 3.715 [Amendment]

50. By amending § 3.715 by adding at the end of the third sentence the words "in lieu of the fitting factor prescribed in § 3.306."

51. By amending § 3.744 to read as follows:

§ 3.744 Powerplant limitations.

The powerplant limitations set forth in this section shall be established for the airplane. The limitations shall not exceed the corresponding limits established as part of the type certification of the engine and propeller installed in the airplane.

(a) *Takeoff operation.* (1) Maximum rotational speed (r.p.m.);

(2) Maximum permissible manifold pressure;

(3) Maximum permissible gas temperature;

(4) The time limit for use of the power or thrust which corresponds with the values established in subparagraphs (1) through (3) of this paragraph; and

(5) When the time limit established in subparagraph (4) of this paragraph exceeds 2 minutes, the maximum permissible cylinder head, oil, and liquid coolant temperatures.

(b) *Maximum continuous operation.* (1) Maximum rotational speed (r.p.m.);

(2) Maximum permissible manifold pressure;

(3) Maximum permissible gas temperature; and

(4) Maximum permissible cylinder head, oil, and liquid coolant temperatures.

(c) *Fuel grade or specification designation.* The minimum fuel grade required for reciprocating engines or the fuel designation for turbine engines, required for the operation of the engine within the limitations prescribed in paragraphs (a) and (b) of this section.

§§ 3.745, 3.746, 3.747 [Deletion]

52. By deleting §§ 3.745, 3.746, and 3.747.

§ 3.755 [Amendment]

53. By amending § 3.755(a) by adding at the end of the first sentence thereof the phrase "except as provided in § 3.771(b)".

§ 3.767 [Amendment]

54. By amending § 3.767(a) by deleting the words "octane number" and inserting in lieu thereof "grade or designation".

55. By amending § 3.771 to read as follows:

§ 3.771 Airspeed placards.

(a) *All airplanes.* An airspeed placard shall be provided, in clear view of the pilot and as close as practicable to the airspeed indicator. The placard shall list the following:

(1) Maximum speed for landing gear operation; and maximum speed with landing gear extended, if the airplane is equipped with retractable landing gear;
(2) Design maneuvering speed (V_D) (see § 3.184);
(3) Minimum control speed (V_{mc}) (see § 3.111); and
(4) The demonstrated crosswind velocity (see § 3.145).
(b) *Airplanes weighing more than 6,000 pounds.* The placard prescribed in paragraph (a) of this section shall also include:
(1) Recommended climb speed;
(2) Best angle-of-climb speed;
(3) Engine-inoperative-climb speed; and
(4) Approach speeds.

56. By adding a new § 3.772 to read as follows:

§ 3.772 Types of operation placard.

A placard shall be provided in clear view of the pilot which specifies the type of operations (e.g., VFR, IFR, day or night) and the meteorological conditions (e.g., icing conditions) to which the operation of the airplane is limited by the equipment installed. (See §§ 3.750 and 3.778(h).)

57. By amending § 3.778 by adding a new paragraph (h) to read as follows:

§ 3.778 Operating limitations.

* * * * *

(h) *Types of operation.* The type of operations (e.g., VFR, IFR, day or night) and the meteorological conditions (e.g., icing conditions) to which the operation of the airplane is limited shall be stated. (See §§ 3.750 and 3.772.) All installed equipment affecting the operations limitations of the airplane shall be listed and identified as to operational function.

§ 3.779 [Amendment]

58. By amending § 3.779 by adding at the end thereof a new sentence to read as follows: "In particular, procedures and pertinent information relating to the use of the airspeeds prescribed in § 3.771(b) for airplanes weighing more than 6,000 pounds shall be included".

59. By amending § 3.780(c) to read as follows:

§ 3.780 Performance information.

* * * * *

(c) The calculated approximate effect of variations in paragraph (a) (3), (4), and (5) of this section with altitudes from sea level to 8,000 feet and with temperatures at these altitudes from minus 60° F. below standard to plus 40° F. above standard shall be included.

§ 3.780–1 [Deletion]

60. By deleting § 3.780–1.

(Secs. 313(a), 601, 603; 72 Stat. 752, 775, 776; 49 U.S.C. 1354(a), 1421, 1423)

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N. E. HALABY,
Administrator.

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