

UNITED STATES OF AMERICA  
FEDERAL AVIATION AGENCY  
WASHINGTON, D. C.

Civil Air Regulations Amendment 3-5

Effective: October 1, 1959

Issued: August 24, 1959

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

**Miscellaneous Amendments Resulting  
From the 1958 Annual Airworthiness Review**

There are contained herein amendments as a result of the 1958 Annual Airworthiness Review.

Substantive changes have been made to the flight characteristics requirements applicable to the approach and landing phases of flight as well as to the stability requirements. Since, in the normal operation of airplanes, power is used during the approach phase, § 3.112 is being revised to require that trim be maintained at a speed of  $1.5V_s$ , with sufficient power to achieve a descent angle of 3 degrees. To insure that a satisfactory level of longitudinal controllability is maintained for single-engine airplanes, § 3.109 is being changed to limit to 10 pounds the maximum permissible control force necessary to hold a glide speed of  $1.5V_s$ . In recognition of the higher approach speeds permitted, a revision to § 3.86 requires that a speed of not less than  $1.5V_s$  be used to determine the landing distance. Inasmuch as wing flaps have reduced the use of severe sideslips and improved ailerons have almost eliminated adverse yaw characteristics, amendments

are being made to the directional and lateral stability requirements of § 3.118 to provide more realistic requirements for modern airplanes.

Accident records have shown that approximately one-sixth of all accidents with airplanes certificated under Part 3 have involved the misuse of the landing gear control. Incorrect operation of this control has been attributed to its proximity and similarity to the wing flap control. Therefore, § 3.384 is being amended to specify the location and shape of the landing gear and wing flap controls to reduce the possibility of confusion.

Since a number of accidents have occurred to airplanes equipped with feathering propellers because there was no means of unfeathering, § 3.416 is being amended to require such a means. Another revision concerns the fuel system arrangement on multiengine airplanes. The objective of this amendment to § 3.431 is to provide substantially the same level of safety in multiengine airplanes using a single fuel tank as when separate tanks are used for each engine. Another related change has been made to § 3.551 to require that fuel shutoff valves be provided with means to guard against inadvertent operation.

Section 3.606 is being amended to require a carburetor air preheater on multiengine airplanes having sea level en-

gines with carburetors which embody features tending to reduce the possibility of ice formation. This amendment was proposed as a result of incidents involving multiengine airplanes operating in severe weather conditions. The application of this requirement to single-engine airplanes has been deferred pending further study of the operating record.

Section 3.683 is being amended to cover new types of storage batteries as well as the conventional lead-acid type. By an amendment to § 3.638, the use of rigid fuel lines is permitted regardless of whether or not the line is under pressure, except where other provisions require flexibility.

An addition to the provisions of § 3.780 requires that the correct engine-out best climb or minimum descent speed be included in the Airplane Flight Manual.

In addition, there are included other changes which are of a clarifying or editorial nature.

Interested persons have been afforded an opportunity to participate in the making of this amendment (24 F.R. 128), 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 October 1, 1959:

**§ 3.1 [Amendment]**

1. By amending § 3.1(b) (4) by deleting the phrase "by the U.S. National Advisory Committee for Aeronautics" and inserting in lieu thereof "by the National Aeronautics and Space Administration (formerly the National Advisory Committee for Aeronautics)".

**§ 3.36 [Amendment]**

2. By amending § 3.86(a) (1) by deleting "1.3V<sub>s0</sub>" and inserting in lieu thereof "1.5V<sub>s1</sub>".

3. By amending § 3.109 by amending paragraph (a) (2) and adding new paragraphs (d) and (e) to read as follows:

**§ 3.109 Longitudinal control.**

(a) \* \* \*

(2) Power-off and the airplane trimmed at 1.5V<sub>s1</sub> or at the minimum trim speed, whichever is higher.

(d) It shall be possible to maintain a speed of not more than 1.5V<sub>s1</sub> with a pilot control force of not more than 10 pounds during a power-off glide with landing gear and wing flaps extended, with the most forward center of gravity position approved at the maximum weight, and regardless of weight.

(e) It shall be possible, without the use of the primary means of longitudinal control, to control the descent of the airplane with the use of all other normal flight and power controls to a zero rate of descent and to an attitude suitable for a controlled landing without requiring exceptional strength, skill, or alertness on the part of the pilot, or without exceeding the operational and the structural limitations of the airplane.

4. By amending § 3.112 by deleting paragraph (c) and by amending paragraph (a) (2) (ii) to read as follows:

**§ 3.112 Requirements.**

(a) \* \* \*

(2) \* \* \*

(ii) During a power approach at 1.5V<sub>s1</sub> and while maintaining a 3 degree angle of descent,

(a) With landing gear extended and wing flaps retracted,

(b) With landing gear extended and wing flaps extended under the forward center of gravity position approved with the maximum weight,

(c) With landing gear extended and wing flaps extended under the most forward center of gravity position approved, regardless of weight.

5. By amending § 3.115 by deleting the heading of paragraph (a) and inserting in lieu thereof "Approach" and by deleting paragraphs (a) (4) and (a) (5) and inserting a new paragraph (a) to read as follows:

**§ 3.115 Specific conditions.**

(a) Approach. \* \* \*

(4) Airplane trimmed at 1.5V<sub>s1</sub> and power on as required to maintain a 3 degree angle of descent.

6. By amending § 3.118(a) (1), (a) (2), (a) (3) to read as follows:

**§ 3.118 Directional and lateral stability.**

(a) *Three-control airplanes.* (1) The static directional stability, as shown by the tendency to recover from a skid with rudder free, shall be positive for all landing gear and flap positions appropriate to the takeoff, climb, cruise, and approach configurations, with symmetrical power up to maximum continuous power, and at all speeds from 1.2V<sub>s1</sub> up to the maximum permissible speed for the configuration being investigated. The angle of skid for these tests shall be appropriate to the type of airplane. At greater angles of skid up to that at which full rudder is employed or a control force limit specified in § 3.106 is obtained, whichever occurs first, and at speeds from 1.2V<sub>s1</sub> to V<sub>p</sub>, the rudder pedal force shall not reverse.

(2) The static lateral stability, as shown by the tendency to raise the low wing in a sideslip, shall be positive for all landing gear and flap positions with symmetrical power up to 75 percent maximum continuous power at all speeds above 1.2V<sub>s1</sub> up to the maximum permissible speed for the configuration investigated but shall not be negative at a speed of 1.2V<sub>s1</sub>. The angle of sideslip for these tests shall be appropriate to the type of airplane but in no case shall the sideslip be less than that obtained with 10 degrees of bank.

(3) In straight steady sideslips at a speed of 1.2V<sub>s1</sub> for all gear and flap positions and for all symmetrical power conditions up to 50 percent maximum continuous power, the aileron and rudder control movements and forces shall increase steadily, but not necessarily in constant proportion, as the angle of sideslip is increased up to the maximum appropriate to the type of airplane. At greater angles up to that at which the full rudder or aileron control is employed or a control force limit specified by § 3.106 is obtained, the rudder pedal force shall not reverse. Sufficient bank shall accompany sideslipping to prevent departure from a constant heading. Rapid entry into or recovery from a maximum sideslip shall not result in uncontrollable flight characteristics.

7. By amending § 3.120(g) (1) to read as follows:

**§ 3.120 Stalling demonstration.**

(g) \* \* \*

(1) With trim controls adjusted for straight flight at 1.5V<sub>s1</sub> or at the minimum trim speed, whichever is higher, the speed shall be reduced by means of the elevator control until the speed is slightly above the stalling speed; then

8. By amending § 3.384 by adding a new paragraph (c) to read as follows:

**§ 3.384 Cockpit controls.**

(c) The wing flap and landing gear controls shall comply with the following:

(1) The wing flap or auxiliary lift device control shall be located centrally or to the right of the pedestal centerline or of the powerplant throttle control centerline and shall be sufficiently displaced

from the landing gear control to avoid confusion.

(2) The landing gear control shall be located to the left of the throttle centerline or of the pedestal centerline.

(3) The control knobs shall be shaped in accordance with figure 3-13.

NOTE: Figure 3-13 is not intended to indicate the exact size or proportion of the control knobs.

9. By adding a new figure 3-13 as follows:

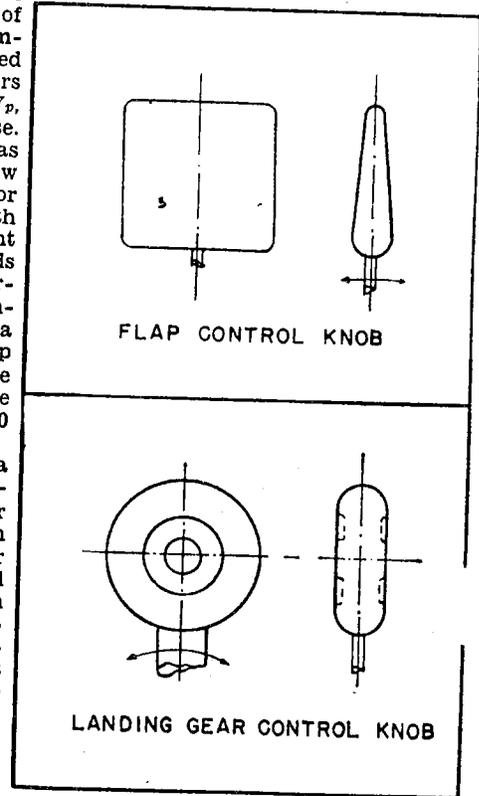


FIGURE 3-13.—CONTROL KNOB SHAPES.

10. By amending § 3.416 by adding a new paragraph (c) to read as follows:

**§ 3.416 Propellers.**

(c) When propeller control design permits stopping of crankshaft rotation of any engine in flight by feathering the propeller, means shall be provided for unfeathering each propeller individually in flight.

11. By amending § 3.431 by redesignating the present section as paragraph (a), by inserting the words, "except the fuel tanks" between the words "component" and "will", by deleting the note under § 3.431, and by adding a new paragraph (b) to read as follows:

**§ 3.431 Multiengine fuel system arrangement.**

(b) If multiengine aircraft employ a single fuel tank or series of fuel tanks interconnected to function as a single fuel tank, the following provisions shall apply:

(1) Independent tank outlets to each engine. Each outlet shall incorporate a shutoff valve at the tank. This valve may also serve as the fire wall shutoff valve required by § 3.551 provided the line between the valve and the engine compartment does not contain a hazardous amount of fuel which can drain into the engine compartment.

(2) At least two vents arranged to minimize the possibility of both vents becoming obstructed simultaneously.

(3) Filler cap(s) designed to minimize the possibility of incorrect installation or loss in flight.

(4) The remainder of the fuel system from the tank outlet to the engine shall be entirely independent of any portion of the system supplying fuel to the other engine(s).

12. By amending § 3.551(b) to read as follows:

**§ 3.551 Fuel valves.**

(b) Means shall be provided to guard against inadvertent operation of the shutoff valves and to make it possible for the flight personnel to reopen the valves rapidly after they have been closed.

13. By amending § 3.606 by inserting the words "Single-engine" at the beginning of paragraph (d) and by adding a new paragraph (e) to read as follows:

**§ 3.606 Induction system de-icing and anti-icing provisions.**

(e) Multiengine airplanes equipped with sea level engines employing carburetors which embody features tending to reduce the possibility of ice formation shall be provided with a preheater capable of providing a heat rise of 90° F. when the engine is operating at 75 percent of its maximum continuous power.

14. By amending § 3.638 to read as follows:

**§ 3.638 Lines and fittings.**

(a) All lines and fittings carrying flammable fluids in the engine compartment shall be fire resistant, except as otherwise provided in this section. If flexible hose is used, the assembly of hose and end fittings shall be of an approved type. The provisions of this paragraph need not apply to those lines and fittings which form an integral part of the engine.

(b) Vent and drain lines and their fittings shall be subject to the provisions of paragraph (a) of this section unless a failure of such line or fitting will not result in, or add to, a fire hazard.

**§ 3.655 [Amendment]**

15. By amending § 3.655(b)(2) by deleting subdivisions (i) and (ii) and renumbering subdivisions (iii), (iv), (v), and (vi) as (i), (ii), (iii), and (iv), respectively.

**§ 3.668 [Amendment]**

16. By amending § 3.668 by deleting from the first sentence of the introductory paragraph the words "intended for operation under instrument flight rules" and by adding at the end of the paragraph (a) the following note:

NOTE: Power sources are not considered independent if both sources are driven by the same engine.

17. By deleting § 3.683 and § 3.684 and inserting in lieu thereof a new § 3.683 to read as follows:

**§ 3.683 Storage battery design and installation.**

Storage batteries shall be of such design and be so installed that:

(a) Safe cell temperatures and pressures are maintained during any probable charging or discharging condition. No uncontrolled increase in cell temperature shall result when the storage battery is recharged (after previous complete discharge) at maximum regulated voltage, during a flight of maximum duration, under the most adverse cooling condition likely to occur in service. Tests to demonstrate compliance

with this regulation shall not be required if satisfactory operating experience with similar batteries and installations has shown that maintaining safe cell temperatures and pressures presents no problem.

(b) Explosive or toxic gases emitted by the storage battery in normal operation, or as the result of any probable malfunction in the charging system or battery installation, shall not accumulate in hazardous quantities within the airplane.

(c) Corrosive fluids or gases which may be emitted or spilled from the storage battery shall not damage surrounding airplane structure or adjacent essential equipment.

**§ 3.696 [Amendment]**

18. By amending § 3.696 by deleting the word "required" from the first sentence and inserting in lieu thereof "installed".

**§ 3.700 [Amendment]**

19. By amending § 3.700 by deleting from paragraph (e) the word "noncombustible" and inserting in lieu thereof "flame-resistant".

**§ 3.757 [Amendment]**

20. By amending § 3.757(a) by deleting the opening words "True indicated" and inserting in lieu thereof "Calibrated".

21. By amending § 3.780 by adding a new paragraph (d) to read as follows:

**§ 3.780 Performance information.**

(d) The best climb/minimum descent speed with one engine inoperative for multiengine airplanes shall be included. (Secs. 313(a), 601, 603, 72 Stat. 752, 775, 776; 49 U.S.C. 1354(a), 1421, 1423)

Issued in Washington, D.C., on August 24, 1959.

E. R. QUESADA,  
Administrator.

[F.R. Doc. 59-7151; Filed, Aug. 31, 1959; 8:45 a.m.]

