

making of this amendment, and due consideration has been given to all relevant matter presented.

In consideration of the foregoing, Part 4b of the Civil Air Regulations (14 CFR Part 4b, as amended) is hereby amended as follows, effective May 3, 1962:

1. By amending § 4b.1 by amending paragraphs (b) (2), (d) (9), (d) (10), (d) (15), and (d) (16) to read as follows:

§ 4b.1 Definitions.

(b) *General design.*

(2) *Maximum ambient atmospheric temperature.* The maximum ambient atmospheric temperature is the temperature selected by the applicant as the maximum operational limit.

(d) *Speeds.*

(9) V_{DF}/M_{DF} : The demonstrated flight diving speed at which compliance is shown with the applicable flight requirements. (See §§ 4b.190 and 4b.191(a).)

(10) V_F : The design flap speeds for flight loading conditions. (See § 4b.210 (b) (1).)

(15) V_{FC}/M_{FC} : The maximum speed for stability characteristics. (See § 4b.191 (b).)

(16) V_{MO}/M_{MO} : The maximum operating limit speed. (See § 4b.711.)

§ 4b.11 [Amendment]

2. By amending § 4b.11(b) by inserting in the first sentence between the words "required" and "except" the phrase "notwithstanding the applicant may have been issued a provisional type certificate".

3. By amending § 4b.130 by adding new paragraphs (c), (d), and (e) to read as follows:

§ 4b.130 Controllability; general.

(c) Compliance with the "strength of pilots" limits in paragraph (b) of this section need not be demonstrated unless the condition is found to be marginal. In the latter case, they shall not exceed the following pilot control force limits, expressed in pounds:

	Pitch	Roll	Yaw
(1) For temporary application	75	60	180
(2) For prolonged application	10	5	20

Pitch and roll forces shall be measured as applied to the control wheel.

(d) For the purpose of complying with the temporary control force limitations of paragraph (c) of this section, the airplane shall be operated in accordance with approved operating procedure or conventional operating practice including being as nearly trimmed as possible at the prior steady flight condition, except that in the case of takeoff the airplane shall be trimmed in accordance with approved operating procedures.

(e) For the purpose of complying with the prolonged control force limitations of paragraph (c) of this section, the airplane shall be as nearly trimmed as possible.

§ 4b.131 [Amendment]

4. By amending § 4b.131(b) by deleting the first sentence and inserting in lieu thereof the following: "During each of the following controllability demonstrations, a change in the trim control shall not be required. In addition, exertion of more than 50 pounds control force, representative of the maximum temporary force which can readily be applied by one hand, shall not be required."

§ 4b.132 [Amendment]

5. By amending § 4b.132(e) by deleting from the last sentence the symbol " V_{NE} " and inserting in lieu thereof " V_{FC}/M_{FC} ".

§ 4b.141 [Amendment]

6. By amending § 4b.141 by deleting the words " V_{NO} or to M_{NO} , whichever is the lesser" and inserting in lieu thereof " V_{MO}/M_{MO} ".

§ 4b.142 [Amendment]

7. By amending § 4b.142(c) by deleting the word " V_{NO} or to M_{NO} , whichever is the lesser" and inserting in lieu thereof " V_{MO}/M_{MO} ".

8. By amending § 4b.150 to read as follows:

§ 4b.150 General.

The airplane shall be longitudinally, directionally, and laterally stable in accordance with §§ 4b.151 through 4b.158. Suitable stability shall be required in other conditions normally encountered in service if flight tests show such stability to be necessary for safe operation.

§ 4b.150-1 [Deletion]

9. By deleting § 4b.150-1.

10. By amending § 4b.151 by amending the introductory paragraph and paragraphs (a) and (c) to read as follows:

§ 4b.151 Static longitudinal stability.

In the conditions outlined in §§ 4b.152 through 4b.155, the characteristics of the elevator control forces including friction and the elevator control surface displacement shall comply with paragraphs (a) through (c) of this section.

(a) A pull shall be required to obtain and maintain speeds below the specified trim speed, and a push shall be required to obtain and maintain speeds above the specified trim speed, except that if the elevator control forces are not dependent upon the hinge moments of the elevator control surface it shall also be shown that an upward displacement of the elevator trailing edge is required to obtain and maintain speeds below the specified trim speed and a downward displacement of the elevator trailing edge is required to obtain and maintain speeds above the specified trim speed. These criteria shall apply to any speed which can be obtained, except that such speeds need not be greater than the landing gear or the wing flap operating limit speed or V_{FC}/M_{FC} , whichever is appropriate, or need not be less than the minimum speed in steady unstalled flight.

(c) The stable slope of the stick force versus speed curve shall not be less than

0.5 pounds per 3 knots nor shall it exceed a value beyond which control of the airplane is difficult.

§ 4b.151-1 [Deletion]

11. By deleting § 4b.151-1.

12. By amending § 4b.152 to read as follows:

§ 4b.152 Stability during landing.

The stick force curve and, if required by § 4b.151(a), the elevator angle curve shall have stable slopes and the stick force shall not exceed 80 pounds at any speed between $1.1 V_{S_0}$ and $1.8 V_{S_0}$ with:

- (a) Wing flaps in the landing position;
- (b) The landing gear extended;
- (c) Maximum landing weight;
- (d) Power, or thrust, off on all engines; and
- (e) The airplane trimmed at $1.4 V_{S_0}$ with power or thrust off.

§ 4b.152-1 [Deletion]

13. By deleting § 4b.152-1.

14. By amending § 4b.153 to read as follows:

§ 4b.153 Stability during approach.

The stick force curve and, if required by § 4b.151(a), the elevator angle curve shall have stable slopes at all speeds between $1.1 V_{S_1}$ and $1.8 V_{S_1}$ with:

- (a) Wing flaps in the approach position;
- (b) Landing gear retracted;
- (c) Maximum landing weight; and
- (d) The airplane trimmed at $1.4 V_{S_1}$ and with power sufficient to maintain level flight at this speed.

§ 4b.153-1 [Deletion]

15. By deleting § 4b.153-1.

16. By amending § 4b.154 to read as follows:

§ 4b.154 Stability during climb.

The stick force curve and, if required by § 4b.151(a), the elevator angle curve shall have stable slopes at all speeds between 85 and 115 percent of the speed at which the airplane is trimmed with:

- (a) Wing flaps retracted;
- (b) Landing gear retracted;
- (c) Maximum takeoff weight;
- (d) 75 percent of maximum continuous power for reciprocating engines; maximum power or thrust selected by the applicant as an operating limitation for use during climb (see § 4b.718) for turbine engines; and
- (e) The airplane trimmed at the best rate-of-climb speed except that the speed need not be less than $1.4 V_{S_1}$.

§ 4b.154-1 [Deletion]

17. By deleting § 4b.154-1.

18. By amending § 4b.155 to read as follows:

§ 4b.155 Stability during cruising.

(a) *Landing gear retracted; high speed.* The stick force curve and, if required by § 4b.151(a), the elevator angle curve shall have stable slopes at all speeds from V_{FC}/M_{FC} to the speed equal to $V_{FC} - \left(\frac{V_{FC} - 1.4 V_{S_1}}{2} \right)$ or to 50 knots less than the trim speed specified in subparagraph (4) of this paragraph, whichever

is the lesser speed except that it need not be less than $1.4 V_{s1}$, and the stick force shall not exceed 50 pounds with:

- (1) Wing flaps retracted;
- (2) The most critical weight between maximum landing weight and maximum takeoff weight;
- (3) 75 percent of maximum continuous power for reciprocating engines; maximum cruising power selected by the applicant as an operating limitation (see § 4b.718) for turbine engines, except that the power need not exceed that required at V_{MO}/M_{MO} ; and
- (4) The airplane trimmed for level flight with the power required in subparagraph (3) of this paragraph.

(b) *Landing gear retracted; low speed.* The stick force curve and, if required by § 4b.151(a), the elevator angle curve shall have stable slopes at all speeds from a speed equal to

$$V_{FC} - \left(\frac{V_{FC} - 1.4 V_{s1}}{2} \right)$$

to $1.4 V_{s1}$ and the stick force shall not exceed 50 pounds with the wing flaps and weight as specified in paragraph (a) of this section and with:

- (1) Power required for level flight at a speed equal to $V_{FC} - \left(\frac{V_{FC} - 1.4 V_{s1}}{2} \right)$; and
- (2) The airplane trimmed for level flight with the power required in subparagraph (1) of this paragraph.

NOTE: At altitudes where Mach number is critical, the calibrated airspeed corresponding with M_{FC} may be used to calculate the speed $V_{FC} - \left(\frac{V_{FC} - 1.4 V_{s1}}{2} \right)$.

(c) *Landing gear extended.* The stick force curve and, if required by § 4b.151(a), the elevator angle curve shall have stable slopes at all speeds between $1.4 V_{s1}$ and V_{LE} and the stick force shall not exceed 50 pounds with the wing flaps and the weight as specified in paragraph (a) of this section and with:

- (1) Power required for level flight at V_{LE} ; and
- (2) The airplane trimmed for level flight with the power required in subparagraph (1) of this paragraph.

§ 4b.155-1 [Deletion]

19. By deleting § 4b.155-1.

§ 4b.156 [Amendment]

20. By amending § 4b.156 by inserting between the words "airplane" and "shall" the parenthetical expression "(e.g., V_{FE} , V_{LE} , or V_{FC}/M_{FC})".

§ 4b.157 [Amendment]

21. By amending § 4b.157 by deleting from paragraphs (a) and (b)(1) the words "the operating limit speed" and inserting in lieu thereof the words " V_{FE} , V_{LE} , or V_{FC}/M_{FC} , whichever is appropriate to the airplane configuration".

§ 4b.157-1 [Amendment]

22. By amending § 4b.157-1 by deleting paragraphs (e)(3), (e)(4), and (f)(2).

§ 4b.158 [Amendment]

23. By amending § 4b.158 by inserting between the words "airplane" and

"shall" the parenthetical expression "(e.g., V_{FE} , V_{LE} , or V_{FC}/M_{FC})".

24. By amending § 4b.160(c)(1) by deleting the phrase "With trim controls adjusted for straight flight at a speed of $1.4 V_{s1}$ " and inserting in lieu thereof "With the airplane trimmed for straight flight at the speed prescribed in § 4b.112(c)(1)".

25. By amending § 4b.160(e) to read as follows:

§ 4b.160 Stalling; symmetrical power.

(e) Straight flight stalls shall be entered with wings level. The roll occurring between the stall and the completion of the recovery shall not exceed approximately 20 degrees.

26. By adding a new § 4b.191 to read as follows:

§ 4b.191 High-speed characteristics.

(a) *Speed increase and recovery characteristics.* (1) Operating conditions or characteristics likely to cause inadvertent speed increases, including upsets in pitch and roll, shall be simulated with the airplane trimmed at any likely cruise speed up to V_{MO}/M_{MO} . Allowing for pilot reaction time after effective inherent or artificial speed warning occurs (see § 4b.603(k)), it shall be demonstrated that the airplane can be recovered to a normal attitude and its speed reduced to V_{MO}/M_{MO} without requiring exceptional strength or skill on the part of the pilot, without exceeding V_D/M_D , V_{DF}/M_{DF} , or the structural limitations, and without producing buffeting which would cause structural damage.

NOTE: Examples of operating conditions or characteristics likely to cause speed increases are: gust upsets, inadvertent control movements, low stick force gradient in relation to control friction, passenger movement, leveling off from climb, and descent from Mach to airspeed limit altitudes.

(2) At all speeds up to V_{DF}/M_{DF} , there shall be no control reversal. Any reversal of elevator control force or tendency of the airplane to pitch, roll, or yaw, shall be mild and readily controllable using normal piloting technique.

(b) *Maximum speed for stability characteristics, V_{FC}/M_{FC} .* V_{FC}/M_{FC} shall be the maximum speed at which the requirements of §§ 4b.132(e), 4b.155(a), 4b.156, 4b.157(a), 4b.157(b), and 4b.158 are required to be met with flaps and landing gear retracted. It shall not be less than a speed halfway between V_{MO}/M_{MO} and V_{DF}/M_{DF} , except that in the altitude range where Mach number is the limiting factor, M_{FC} need not exceed the Mach number at which effective speed warning occurs.

27. By amending § 4b.210(b)(1) to read as follows:

§ 4b.210 General.

(b) *Design air speeds.* * * *

(1) *Design flap speeds, V_F .* The design flap speed for each flap position established in accordance with § 4b.323 (a) shall be sufficiently greater than the

operating speed recommended for the corresponding stage of flight (including balked landings) to allow for probable variations in control of airspeed and for transition from one flap position to another. V_F shall be not less than:

- (i) $1.6 V_{s1}$ with flaps in takeoff position at maximum takeoff weight;
- (ii) $1.8 V_{s1}$ with flaps in approach position at maximum landing weight; and
- (iii) $1.8 V_{s0}$ with flaps in landing position at maximum landing weight.

Where an automatic flap positioning or load limiting device is employed, it shall be permissible to use the speeds and corresponding flap positions programmed or permitted by the device. (See § 4b.323(c).)

28. By amending § 4b.210(b)(4) by adding at the end thereof the parenthetical reference "(See § 4b.711.)"

29. By amending § 4b.210(b)(5) to read as follows:

(b) *Design air speeds.* * * *
(5) *Design dive speed, V_D .* The design dive speed chosen by the applicant shall be used in determining the maximum operating limit speed for the airplane in accordance with § 4b.711.

30. By amending § 4b.212(a) by deleting the introductory paragraph and inserting in lieu thereof the following: "When flaps are intended for use during takeoff, approach, or landing, the airplane shall be assumed to be subjected to symmetrical maneuvers and gusts within the range determined by the following conditions, at the design flap speeds established for these stages of flight in accordance with § 4b.210(b)(1) and with the flaps in the corresponding positions."

31. By amending § 4b.212(b) by deleting from the introductory paragraph the words " V_{FE} speed established in accordance with § 4b.714(c)" and inserting in lieu thereof "the flap design speed chosen for this condition."

32. By amending § 4b.212 by deleting paragraph (d) and amending paragraph (c) to read as follows:

§ 4b.212 Effect of high lift devices.

(c) The airplane shall be designed for the conditions prescribed in paragraph (a) of this section, except that the airplane load factor need not exceed 1.0, taking into account the following effects as separate conditions:

- (1) Propeller slipstream corresponding with maximum continuous power at the design flap speeds V_F , and with takeoff power at not less than 1.4 times the stalling speed for the particular flap position and associated maximum weight; and
- (2) A head-on gust of 25 feet per second velocity (EAS).

33. By amending § 4b.216 by amending paragraphs (c)(4) and (d) to read as follows:

§ 4b.216 Supplementary flight conditions.

(c) *Pressurized cabin loads.* * * *