

## § 25.177

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(v) The airplane trimmed for level flight with the power required in paragraph (b)(1)(iv) of this section.

(2) With the landing gear retracted at low speed, the stick force curve must have a stable slope at all speeds within a range which is the greater of 15 percent of the trim speed plus the resulting free return speed range, or 50 knots plus the resulting free return speed range, above and below the trim speed (except that the speed range need not include speeds less than  $1.3 V_{SR1}$ , nor speeds greater than the minimum speed of the applicable speed range prescribed in paragraph (b)(1), nor speeds that require a stick force of more than 50 pounds), with—

(i) Wing flaps, center of gravity position, and weight as specified in paragraph (b)(1) of this section;

(ii) Power required for level flight at a speed equal to  $(V_{MO} + 1.3 V_{SR1})/2$ ; and

(iii) The airplane trimmed for level flight with the power required in paragraph (b)(2)(i) of this section.

(3) With the landing gear extended, the stick force curve must have a stable slope at all speeds within a range which is the greater of 15 percent of the trim speed plus the resulting free return speed range, or 50 knots plus the resulting free return speed range, above and below the trim speed (except that the speed range need not include speeds less than  $1.3 V_{SR1}$ , nor speeds greater than  $V_{LE}$ , nor speeds that require a stick force of more than 50 pounds), with—

(i) Wing flap, center of gravity position, and weight as specified in paragraph (b)(1) of this section;

(ii) 75 percent of maximum continuous power for reciprocating engines or, for turbine engines, the maximum cruising power selected by the applicant as an operating limitation, except that the power need not exceed that required for level flight at  $V_{LE}$ ; and

(iii) The aircraft trimmed for level flight with the power required in paragraph (b)(3)(ii) of this section.

(c) *Approach*. The stick force curve must have a stable slope at speeds between  $V_{SW}$  and  $1.7 V_{SR1}$ , with—

(1) Wing flaps in the approach position;

(2) Landing gear retracted;

(3) Maximum landing weight; and

(4) The airplane trimmed at  $1.3 V_{SR1}$  with enough power to maintain level flight at this speed.

(d) *Landing*. The stick force curve must have a stable slope, and the stick force may not exceed 80 pounds, at speeds between  $V_{SW}$  and  $1.7 V_{SR0}$  with—

(1) Wing flaps in the landing position;

(2) Landing gear extended;

(3) Maximum landing weight;

(4) The airplane trimmed at  $1.3 V_{SR0}$  with—

(i) Power or thrust off, and

(ii) Power or thrust for level flight.

(5) The airplane trimmed at  $1.3 V_{SR0}$  with power or thrust off.

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### § 25.177 Static lateral-directional stability.

(a) The static directional stability (as shown by the tendency to recover from a skid with the rudder free) must be positive for any landing gear and flap position and symmetric power condition, at speeds from  $1.13 V_{SR1}$ , up to  $V_{FE}$ ,  $V_{LE}$ , or  $V_{FC}/M_{FC}$  (as appropriate for the airplane configuration).

(b) The static lateral stability (as shown by the tendency to raise the low wing in a sideslip with the aileron controls free) for any landing gear and flap position and symmetric power condition, may not be negative at any airspeed (except that speeds higher than  $V_{FE}$  need not be considered for flaps extended configurations nor speeds higher than  $V_{LE}$  for landing gear extended configurations) in the following airspeed ranges:

(1) From  $1.13 V_{SR1}$  to  $V_{MO}/M_{MO}$ .

(2) From  $V_{MO}/M_{MO}$  to  $V_{FC}/M_{FC}$ , unless the divergence is—

(i) Gradual;

(ii) Easily recognizable by the pilot; and

(iii) Easily controllable by the pilot.

(c) The following requirement must be met for the configurations and speed specified in paragraph (a) of this section. In straight, steady sideslips over the range of sideslip angles appropriate to the operation of the airplane, the aileron and rudder control movements and forces must be substantially proportional to the angle of sideslip in a