

## § 25.171

after being trimmed, and without further pressure upon, or movement of, either the primary controls or their corresponding trim controls by the pilot or the automatic pilot.

(b) *Lateral and directional trim.* The airplane must maintain lateral and directional trim with the most adverse lateral displacement of the center of gravity within the relevant operating limitations, during normally expected conditions of operation (including operation at any speed from  $1.3 V_{SR1}$  to  $V_{MO}/M_{MO}$ ).

(c) *Longitudinal trim.* The airplane must maintain longitudinal trim during—

(1) A climb with maximum continuous power at a speed not more than  $1.3 V_{SR1}$ , with the landing gear retracted, and the flaps (i) retracted and (ii) in the takeoff position;

(2) Either a glide with power off at a speed not more than  $1.3 V_{SR1}$ , or an approach within the normal range of approach speeds appropriate to the weight and configuration with power settings corresponding to a 3 degree glidepath, whichever is the most severe, with the landing gear extended, the wing flaps (i) retracted and (ii) extended, and with the most unfavorable combination of center of gravity position and weight approved for landing; and

(3) Level flight at any speed from  $1.3 V_{SR1}$  to  $V_{MO}/M_{MO}$ , with the landing gear and flaps retracted, and from  $1.3 V_{SR1}$  to  $V_{LE}$  with the landing gear extended.

(d) *Longitudinal, directional, and lateral trim.* The airplane must maintain longitudinal, directional, and lateral trim (and for the lateral trim, the angle of bank may not exceed five degrees) at  $1.3 V_{SR1}$  during climbing flight with—

(1) The critical engine inoperative;

(2) The remaining engines at maximum continuous power; and

(3) The landing gear and flaps retracted.

(e) Airplanes with four or more engines. Each airplane with four or more engines must also maintain trim in rectilinear flight with the most unfavorable center of gravity and at the climb speed, configuration, and power required by § 25.123(a) for the purpose of

## 14 CFR Ch. I (1–1–07 Edition)

establishing the en route flight paths with two engines inoperative.

[Doc. No. 5066, 29 FR 18291, Dec. 24, 1964, as amended by Amdt. 25–23, 35 FR 5671, Apr. 8, 1970; Amdt. 25–38, 41 FR 55466, Dec. 20, 1976; Amdt. 25–108, 67 FR 70827, Nov. 26, 2002; Amdt. 25–115, 69 FR 40527, July 2, 2004]

### STABILITY

#### § 25.171 General.

The airplane must be longitudinally, directionally, and laterally stable in accordance with the provisions of §§ 25.173 through 25.177. In addition, suitable stability and control feel (static stability) is required in any condition normally encountered in service, if flight tests show it is necessary for safe operation.

[Doc. No. 5066, 29 FR 18291, Dec. 24, 1964, as amended by Amdt. 25–7, 30 FR 13117, Oct. 15, 1965]

#### § 25.173 Static longitudinal stability.

Under the conditions specified in § 25.175, the characteristics of the elevator control forces (including friction) must be as follows:

(a) A pull must be required to obtain and maintain speeds below the specified trim speed, and a push must be required to obtain and maintain speeds above the specified trim speed. This must be shown at any speed that can be obtained except speeds higher than the landing gear or wing flap operating limit speeds or  $V_{FC}/M_{FC}$ , whichever is appropriate, or lower than the minimum speed for steady unstalled flight.

(b) The airspeed must return to within 10 percent of the original trim speed for the climb, approach, and landing conditions specified in § 25.175 (a), (c), and (d), and must return to within 7.5 percent of the original trim speed for the cruising condition specified in § 25.175(b), when the control force is slowly released from any speed within the range specified in paragraph (a) of this section.

(c) The average gradient of the stable slope of the stick force versus speed curve may not be less than 1 pound for each 6 knots.

(d) Within the free return speed range specified in paragraph (b) of this section, it is permissible for the airplane, without control forces, to stabilize on