§ 25.147 Directional and lateral control.

(a) **Directional control; general.** It must be possible, with the wings level, to yaw into the operative engine and to safely make a reasonably sudden change in heading of up to 15 degrees in the direction of the critical inoperative engine. This must be shown at 1.3 $V_{S-R_1}$ for heading changes up to 15 degrees (except that the heading change at which the rudder pedal force is 150 pounds need not be exceeded), and with—
1. The critical engine inoperative and its propeller in the minimum drag position;
2. The power required for level flight at 1.3 $V_{S-R_1}$, but not more than maximum continuous power;
3. The most unfavorable center of gravity;
4. Landing gear retracted;
5. Flaps in the approach position; and

(b) **Directional control; airplanes with four or more engines.** Airplanes with four or more engines must be able to make 20° banked turns, with and against the inoperative engines, from steady flight at a speed equal to 1.3 $V_{S-R_1}$, with maximum continuous power, and with the airplane in the configuration prescribed by paragraph (b) of this section.

(c) **Lateral control; general.** It must be possible to make 20° banked turns, with and against the inoperative engine, from steady flight at a speed equal to 1.3 $V_{S-R_1}$, with—
1. The critical engine inoperative and its propeller (if applicable) in the minimum drag position;
2. The remaining engines at maximum continuous power;
3. The most unfavorable center of gravity;
4. Landing gear (i) retracted and (ii) extended;
5. Flaps in the most favorable climb position; and

(d) **Lateral control; roll capability.** With the critical engine inoperative, roll response must allow normal maneuvers. Lateral control must be sufficient, at the speeds likely to be used with one engine inoperative, to provide a roll rate necessary for safety without excessive control forces or travel.

(e) **Lateral control; airplanes with four or more engines.** Airplanes with four or more engines must be able to make 20° banked turns, with and against the inoperative engines, from steady flight at a speed equal to 1.3 $V_{S-R_1}$, with maximum continuous power, and with the airplane in the configuration prescribed by paragraph (b) of this section.

(f) **Lateral control; all engines operating.** With the engines operating, roll response must allow normal maneuvers (such as recovery from upsets produced by gusts and the initiation of evasive maneuvers). There must be enough excess lateral control in sideslips (up to sideslip angles that might be required in normal operation), to allow a limited amount of maneuvering and to correct for gusts. Lateral control must be enough at any speed up to $V_{F_C}$/$M_{F_C}$ to provide a peak roll rate necessary for safety, without excessive control forces or travel.