

If a single failure of any one connecting or transmitting link in the lateral control system would also cause the loss of additional control system(s), compliance with the above requirement must be shown with those additional systems also assumed to be inoperative.

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**§ 23.149 Minimum control speed.**

(a)  $V_{MC}$  is the calibrated airspeed at which, when the critical engine is suddenly made inoperative, it is possible to maintain control of the airplane with that engine still inoperative, and thereafter maintain straight flight at the same speed with an angle of bank of not more than 5 degrees. The method used to simulate critical engine failure must represent the most critical mode of powerplant failure expected in service with respect to controllability.

(b)  $V_{MC}$  for takeoff must not exceed  $1.2 V_{S1}$ , where  $V_{S1}$  is determined at the maximum takeoff weight.  $V_{MC}$  must be determined with the most unfavorable weight and center of gravity position and with the airplane airborne and the ground effect negligible, for the takeoff configuration(s) with—

- (1) Maximum available takeoff power initially on each engine;
- (2) The airplane trimmed for takeoff;
- (3) Flaps in the takeoff position(s);
- (4) Landing gear retracted; and
- (5) All propeller controls in the recommended takeoff position throughout.

(c) For all airplanes except reciprocating engine-powered airplanes of 6,000 pounds or less maximum weight, the conditions of paragraph (a) of this section must also be met for the landing configuration with—

- (1) Maximum available takeoff power initially on each engine;
  - (2) The airplane trimmed for an approach, with all engines operating, at  $V_{REF}$ , at an approach gradient equal to the steepest used in the landing distance demonstration of § 23.75;
  - (3) Flaps in the landing position;
  - (4) Landing gear extended; and
  - (5) All propeller controls in the position recommended for approach with all engines operating.
- (d) A minimum speed to intentionally render the critical engine in-

operative must be established and designated as the safe, intentional, one-engine-inoperative speed,  $V_{SSE}$ .

(e) At  $V_{MC}$ , the rudder pedal force required to maintain control must not exceed 150 pounds and it must not be necessary to reduce power of the operative engine(s). During the maneuver, the airplane must not assume any dangerous attitude and it must be possible to prevent a heading change of more than 20 degrees.

(f) At the option of the applicant, to comply with the requirements of § 23.51(c)(1),  $V_{MCG}$  may be determined.  $V_{MCG}$  is the minimum control speed on the ground, and is the calibrated airspeed during the takeoff run at which, when the critical engine is suddenly made inoperative, it is possible to maintain control of the airplane using the rudder control alone (without the use of nosewheel steering), as limited by 150 pounds of force, and using the lateral control to the extent of keeping the wings level to enable the takeoff to be safely continued. In the determination of  $V_{MCG}$ , assuming that the path of the airplane accelerating with all engines operating is along the centerline of the runway, its path from the point at which the critical engine is made inoperative to the point at which recovery to a direction parallel to the centerline is completed may not deviate more than 30 feet laterally from the centerline at any point.  $V_{MCG}$  must be established with—

- (1) The airplane in each takeoff configuration or, at the option of the applicant, in the most critical takeoff configuration;
- (2) Maximum available takeoff power on the operating engines;
- (3) The most unfavorable center of gravity;
- (4) The airplane trimmed for takeoff; and
- (5) The most unfavorable weight in the range of takeoff weights.

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**§ 23.151 Acrobatic maneuvers.**

Each acrobatic and utility category airplane must be able to perform safely the acrobatic maneuvers for which certification is requested. Safe entry speeds for these maneuvers must be determined.