§ 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 \(V_{SR1}\) 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 \(V_{SR1}\), 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
(6) Maximum landing weight.

downward so that the acceleration to this selected trim speed is prompt with
(1) The airplane trimmed at the trim speed prescribed in § 25.103(b)(6);
(2) The landing gear extended;
(3) The wing flaps (i) retracted and (ii) extended; and
(4) Power (i) off and (ii) at maximum continuous power on the engines.

(b) With the landing gear extended, no change in trim control, or exertion of more than 50 pounds control force (representative of the maximum short term force that can be applied readily by one hand) may be required for the following maneuvers:

(1) With power off, flaps retracted, and the airplane trimmed at 1.3 \(V_{SR1}\), extend the flaps as rapidly as possible while maintaining the airspeed at approximately 30 percent above the reference stall speed existing at each instant throughout the maneuver.
(2) Repeat paragraph (b)(1) except initially extend the flaps and then retract them as rapidly as possible.
(3) Repeat paragraph (b)(2), except at the go-around power or thrust setting.
(4) With power off, flaps retracted, and the airplane trimmed at 1.3 \(V_{SR1}\), rapidly set go-around power or thrust while maintaining the same airspeed.
(5) Repeat paragraph (b)(4) except with flaps extended.
(6) With power off, flaps extended, and the airplane trimmed at 1.3 \(V_{SR1}\), obtain and maintain airspeeds between \(V_{SW}\) and either 1.6 \(V_{SR1}\) or \(V_{FE}\), whichever is lower.

(c) It must be possible, without exceptional piloting skill, to prevent loss of altitude when complete retraction of the high lift devices from any position is begun during steady, straight, level flight at 1.08 \(V_{SR1}\) for propeller powered airplanes, or 1.13 \(V_{SR1}\) for turbojet powered airplanes, with—

(1) Simultaneous movement of the power or thrust controls to the go-around power or thrust setting;
(2) The landing gear extended; and
(3) The critical combinations of landing weights and altitudes.

(d) If gated high-lift device control positions are provided, paragraph (c) of this section applies to retractions of the high-lift devices from any position from the maximum landing position to the first gated position, between gated positions, and from the last gated position to the fully retracted position. The requirements of paragraph (c) of this section also apply to retractions from each approved landing position to the control position(s) associated with the high-lift device configuration(s) used to establish the go-around procedure(s) from that landing position. In addition, the first gated control position from the maximum landing position must correspond with a configuration of the high-lift devices used to establish a go-around procedure from a landing configuration. Each gated control position must require a separate and distinct motion of the control to pass through the gated position and must have features to prevent inadvertent movement of the control through the gated position. It must only be possible to make this separate and distinct motion once the control has reached the gated position.

§ 25.149 Minimum control speed.

(a) In establishing the minimum control speeds required by this section, the method used to simulate critical engine failure must represent the most critical mode of powerplant failure with respect to controllability expected in service.

(b) \( V_{MC} \) 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 maintain straight flight with an angle of bank of not more than 5 degrees.

(c) \( V_{MC} \) may not exceed 1.13 \( V_{SR} \) with—

(1) Maximum available takeoff power or thrust on the engines;
(2) The most unfavorable center of gravity;
(3) The airplane trimmed for takeoff;
(4) The maximum sea level takeoff weight (or any lesser weight necessary to show \( V_{MC} \));
(5) The airplane in the most critical takeoff configuration existing along the flight path after the airplane becomes airborne, except with the landing gear retracted;
(6) The airplane airborne and the ground effect negligible; and
(7) If applicable, the propeller of the inoperative engine—

(i) Windmilling;
(ii) In the most probable position for the specific design of the propeller control; or
(iii) Feathered, if the airplane has an automatic feathering device acceptable for showing compliance with the climb requirements of §25.121.

(d) The rudder forces required to maintain control at \( V_{MC} \) may not exceed 150 pounds nor may it be necessary to reduce power or thrust of the operative engines. During recovery, the airplane may not assume any dangerous attitude or require exceptional piloting skill, alertness, or strength to