

§ 23.149(b) with the wing flaps in the most extended takeoff position, and 1.3  $V_{SO}$ .

(b) For normal, utility, and acrobatic category reciprocating engine-powered airplanes of more than 6,000 pounds maximum weight, and turbine engine-powered airplanes in the normal, utility, and acrobatic category, the reference landing approach speed,  $V_{REF}$ , must not be less than the greater of  $V_{MC}$ , determined in § 23.149(c), and 1.3  $V_{SO}$ .

(c) For commuter category airplanes, the reference landing approach speed,  $V_{REF}$ , must not be less than the greater of 1.05  $V_{MC}$ , determined in § 23.149(c), and 1.3  $V_{SO}$ .

[Doc. No. 27807, 61 FR 5187, Feb. 9, 1996]

#### § 23.75 Landing distance.

The horizontal distance necessary to land and come to a complete stop from a point 50 feet above the landing surface must be determined, for standard temperatures at each weight and altitude within the operational limits established for landing, as follows:

(a) A steady approach at not less than  $V_{REF}$ , determined in accordance with § 23.73 (a), (b), or (c), as appropriate, must be maintained down to the 50 foot height and—

(1) The steady approach must be at a gradient of descent not greater than 5.2 percent (3 degrees) down to the 50-foot height.

(2) In addition, an applicant may demonstrate by tests that a maximum steady approach gradient steeper than 5.2 percent, down to the 50-foot height, is safe. The gradient must be established as an operating limitation and the information necessary to display the gradient must be available to the pilot by an appropriate instrument.

(b) A constant configuration must be maintained throughout the maneuver.

(c) The landing must be made without excessive vertical acceleration or tendency to bounce, nose over, ground loop, porpoise, or water loop.

(d) It must be shown that a safe transition to the balked landing conditions of § 23.77 can be made from the conditions that exist at the 50 foot height, at maximum landing weight, or at the maximum landing weight for altitude

and temperature of § 23.63 (c)(2) or (d)(2), as appropriate.

(e) The brakes must be used so as to not cause excessive wear of brakes or tires.

(f) Retardation means other than wheel brakes may be used if that means—

(1) Is safe and reliable; and

(2) Is used so that consistent results can be expected in service.

(g) If any device is used that depends on the operation of any engine, and the landing distance would be increased when a landing is made with that engine inoperative, the landing distance must be determined with that engine inoperative unless the use of other compensating means will result in a landing distance not more than that with each engine operating.

[Amdt. 23-21, 43 FR 2318, Jan. 16, 1978, as amended by Amdt. 23-34, 52 FR 1828, Jan. 15, 1987; Amdt. 23-42, 56 FR 351, Jan. 3, 1991; Amdt. 23-50, 61 FR 5187, Feb. 9, 1996]

#### § 23.77 Balked landing.

(a) Each normal, utility, and acrobatic category reciprocating engine-powered airplane at 6,000 pounds or less maximum weight must be able to maintain a steady gradient of climb at sea level of at least 3.3 percent with—

(1) Takeoff power on each engine;

(2) The landing gear extended;

(3) The wing flaps in the landing position, except that if the flaps may safely be retracted in two seconds or less without loss of altitude and without sudden changes of angle of attack, they may be retracted; and

(4) A climb speed equal to  $V_{REF}$ , as defined in § 23.73(a).

(b) Each normal, utility, and acrobatic category reciprocating engine-powered airplane of more than 6,000 pounds maximum weight and each normal, utility, and acrobatic category turbine engine-powered airplane must be able to maintain a steady gradient of climb of at least 2.5 percent with—

(1) Not more than the power that is available on each engine eight seconds after initiation of movement of the power controls from minimum flight-idle position;

(2) The landing gear extended;

(3) The wing flaps in the landing position; and