by the applicant and must not be less than the greatest of the following:

(i) V_1;

(ii) 1.05 V_{MC} determined under § 23.149(b);

(iii) 1.10 V_{S1}; or

(iv) The speed that allows attaining the initial climb-out speed, V_2, before reaching a height of 35 feet above the takeoff surface in accordance with § 23.57(c)(2).

(3) For any given set of conditions, such as weight, altitude, temperature, and configuration, a single value of V_R must be used to show compliance with both the one-engine-inoperative takeoff and all-engines-operating takeoff requirements.

(4) The takeoff safety speed, V_2, in terms of calibrated airspeed, must be selected by the applicant so as to allow the gradient of climb required in § 23.67 (c)(1) and (c)(2) but mut not be less than 1.10 V_{MC} or less than 1.20 V_{S1}.

(5) The one-engine-inoperative takeoff distance, using a normal rotation rate at a speed 5 knots less than V_R, established in accordance with paragraph (c)(2) of this section, must be shown not to exceed the corresponding one-engine-inoperative takeoff distance, determined in accordance with § 23.57 and § 23.59(a)(1), using the established V_R. The takeoff, otherwise performed in accordance with § 23.57, must be continued safely from the point at which the airplane is 35 feet above the takeoff surface and at a speed not less than the established V_2 minus 5 knots.

(6) The applicant must show, with all engines operating, that marked increases in the scheduled takeoff distances, determined in accordance with § 23.59(a)(2), do not result from over-rotation of the airplane or out-of-trim conditions.

[Doc. No. 27807, 61 FR 5184, Feb. 9, 1996, as amended by Amdt. 23–62, 76 FR 75753, Dec. 2, 2011]

§ 23.53 Takeoff performance.

(a) For normal, utility, and acrobatic category airplanes, the takeoff distance must be determined in accordance with paragraph (b) of this section, using speeds determined in accordance with § 23.51 (a) and (b).

(b) For normal, utility, and acrobatic category airplanes, the distance required to takeoff and climb to a height of 50 feet above the takeoff surface must be determined for each weight, altitude, and temperature within the operational limits established for takeoff with—

(1) Takeoff power on each engine;

(2) Wing flaps in the takeoff position(s); and

(3) Landing gear extended.

(c) For normal, utility, and acrobatic category multiengine jets of more than 6,000 pounds maximum weight and commuter category airplanes, takeoff performance, as required by §§ 23.55 through 23.59, must be determined with the operating engine(s) within approved operating limitations.

[Doc. No. 27807, 61 FR 5185, Feb. 9, 1996, as amended by Amdt. 23–62, 76 FR 75753, Dec. 2, 2011]

§ 23.55 Accelerate-stop distance.

For normal, utility, and acrobatic category multiengine jets of more than 6,000 pounds maximum weight and commuter category airplanes, the accelerate-stop distance must be determined as follows:

(a) The accelerate-stop distance is the sum of the distances necessary to—

(1) Accelerate the airplane from a standing start to V_{EF} with all engines operating;

(2) Accelerate the airplane from V_{EF} to V_1, assuming the critical engine fails at V_{EF}; and

(3) Come to a full stop from the point at which V_1 is reached.

(b) Means other than wheel brakes may be used to determine the accelerate-stop distances if that means—

(1) Is safe and reliable;

(2) Is used so that consistent results can be expected under normal operating conditions; and

(3) Is such that exceptional skill is not required to control the airplane.

[Amdt. 23–34, 52 FR 1826, Jan. 15, 1987, as amended by Amdt. 23–50, 61 FR 5185, Feb. 9, 1996, as amended by Amdt. 23–62, 76 FR 75753, Dec. 2, 2011]

§ 23.57 Takeoff path.

For normal, utility, and acrobatic category multiengine jets of more than 6,000 pounds maximum weight and commuter category airplanes, the takeoff path is as follows: