

(2) The power absorbed by the accessories and services appropriate to the particular ambient atmospheric conditions and the particular flight condition.

(d) For reciprocating engine-powered rotorcraft, the performance, as affected by engine power, must be based on a relative humidity of 80 percent in a standard atmosphere.

(e) For turbine engine-powered rotorcraft, the performance, as affected by engine power, must be based on a relative humidity of—

(1) 80 percent, at and below standard temperature; and

(2) 34 percent, at and above standard temperature plus 50 degrees F. Between these two temperatures, the relative humidity must vary linearly.

(f) For turbine-engine-powered rotorcraft, a means must be provided to permit the pilot to determine prior to takeoff that each engine is capable of developing the power necessary to achieve the applicable rotorcraft performance prescribed in this subpart.

(Secs. 313(a), 601, 603, 604, and 605 of the Federal Aviation Act of 1958 (49 U.S.C. 1354(a), 1421, 1423, 1424, and 1425); and sec. 6(c) of the Dept. of Transportation Act (49 U.S.C. 1655(c)))

[Amdt. 27-14, 43 FR 2324, Jan. 16, 1978, as amended by Amdt. 27-21, 49 FR 44432, Nov. 6, 1984]

#### § 27.51 Takeoff.

(a) The takeoff, with takeoff power and r.p.m., and with the extreme forward center of gravity—

(1) May not require exceptional piloting skill or exceptionally favorable conditions; and

(2) Must be made in such a manner that a landing can be made safely at any point along the flight path if an engine fails.

(b) Paragraph (a) of this section must be met throughout the ranges of—

(1) Altitude, from standard sea level conditions to the maximum altitude capability of the rotorcraft, or 7,000 feet, whichever is less; and

(2) Weight, from the maximum weight (at sea level) to each lesser weight selected by the applicant for each altitude covered by paragraph (b)(1) of this section.

#### § 27.65 Climb: all engines operating.

(a) For rotorcraft other than helicopters—

(1) The steady rate of climb, at  $V_Y$ , must be determined—

(i) With maximum continuous power on each engine;

(ii) With the landing gear retracted; and

(iii) For the weights, altitudes, and temperatures for which certification is requested; and

(2) The climb gradient, at the rate of climb determined in accordance with paragraph (a)(1) of this section, must be either—

(i) At least 1:10 if the horizontal distance required to take off and climb over a 50-foot obstacle is determined for each weight, altitude, and temperature within the range for which certification is requested; or

(ii) At least 1:6 under standard sea level conditions.

(b) Each helicopter must meet the following requirements:

(1)  $V_Y$  must be determined—

(i) For standard sea level conditions;

(ii) At maximum weight; and

(iii) With maximum continuous power on each engine.

(2) The steady rate of climb must be determined—

(i) At the climb speed selected by the applicant at or below  $V_{NE}$ ;

(ii) Within the range from sea level up to the maximum altitude for which certification is requested;

(iii) For the weights and temperatures that correspond to the altitude range set forth in paragraph (b)(2)(ii) of this section and for which certification is requested; and

(iv) With maximum continuous power on each engine.

(Secs. 313(a), 601, 603, 604, and 605 of the Federal Aviation Act of 1958 (49 U.S.C. 1354(a), 1421, 1423, 1424, and 1425); and sec. 6(c) of the Dept. of Transportation Act (49 U.S.C. 1655(c)))

[Doc. No. 5074, 29 FR 15695, Nov. 24, 1964, as amended by Amdt. 27-14, 43 FR 2324, Jan. 16, 1978; Amdt. 27-33, 61 FR 21907, May 10, 1996]

#### § 27.67 Climb: one engine inoperative.

For multiengine helicopters, the steady rate of climb (or descent), at  $V_Y$  (or at the speed for minimum rate of descent), must be determined with—

## § 27.71

- (a) Maximum weight;
- (b) The critical engine inoperative and the remaining engines at either—
  - (1) Maximum continuous power and, for helicopters for which certification for the use of 30-minute OEI power is requested, at 30-minute OEI power; or
  - (2) Continuous OEI power for helicopters for which certification for the use of continuous OEI power is requested.

(Secs. 313(a), 601, 603, 604, and 605 of the Federal Aviation Act of 1958 (49 U.S.C. 1354(a), 1421, 1423, 1424, and 1425); and sec. 6(c) of the Dept. of Transportation Act (49 U.S.C. 1655(c)))

[Doc. No 5074, 29 FR 15695, Nov. 24, 1964, as amended by Amdt. 27-23, 53 FR 34210, Sept. 2, 1988]

### § 27.71 Glide performance.

For single-engine helicopters and multiengine helicopters that do not meet the Category A engine isolation requirements of Part 29 of this chapter, the minimum rate of descent airspeed and the best angle-of-glide airspeed must be determined in autorotation at—

- (a) Maximum weight; and
- (b) Rotor speed(s) selected by the applicant.

[Amdt. 27-21, 49 FR 44433, Nov. 6, 1984]

### § 27.73 Performance at minimum operating speed.

- (a) For helicopters—
  - (1) The hovering ceiling must be determined over the ranges of weight, altitude, and temperature for which certification is requested, with—
    - (i) Takeoff power;
    - (ii) The landing gear extended; and
    - (iii) The helicopter in ground effect at a height consistent with normal takeoff procedures; and
  - (2) The hovering ceiling determined under paragraph (a)(1) of this section must be at least—
    - (i) For reciprocating engine powered helicopters, 4,000 feet at maximum weight with a standard atmosphere; or
    - (ii) For turbine engine powered helicopters, 2,500 feet pressure altitude at maximum weight at a temperature of standard +40 degrees F.
  - (b) For rotorcraft other than helicopters, the steady rate of climb at the minimum operating speed must be de-

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termined, over the ranges of weight, altitude, and temperature for which certification is requested, with—

- (1) Takeoff power; and
- (2) The landing gear extended.

### § 27.75 Landing.

(a) The rotorcraft must be able to be landed with no excessive vertical acceleration, no tendency to bounce, nose over, ground loop, porpoise, or water loop, and without exceptional piloting skill or exceptionally favorable conditions, with—

- (1) Approach or glide speeds appropriate to the type of rotorcraft and selected by the applicant;
- (2) The approach and landing made with—

- (i) Power off, for single-engine rotorcraft; and
  - (ii) For multiengine rotorcraft, one engine inoperative and with each operating engine within approved operating limitations; and
- (3) The approach and landing entered from steady autorotation.

(b) Multiengine rotorcraft must be able to be landed safely after complete power failure under normal operating conditions.

[Doc. No. 5074, 29 FR 15695, Nov. 24, 1964, as amended by Amdt. 27-14, 43 FR 2324, Jan. 16, 1978]

[Doc. No. 5074, 29 FR 15695, Nov. 24, 1964, as amended by Amdt. 27-14, 43 FR 2324, Jan. 16, 1978]

### § 27.79 Limiting height—speed envelope.

(a) If there is any combination of height and forward speed (including hover) under which a safe landing cannot be made under the applicable power failure condition in paragraph (b) of this section, a limiting height-speed envelope must be established (including all pertinent information) for that condition, throughout the ranges of—

- (1) Altitude, from standard sea level conditions to the maximum altitude capability of the rotorcraft, or 7,000 feet, whichever is less; and

- (2) Weight, from the maximum weight (at sea level) to the lesser weight selected by the applicant for each altitude covered by paragraph (a)(1) of this section. For helicopters, the weight at altitudes above sea level may not be less than the maximum weight or the highest weight allowing