

**§ 25.1511 Flap extended speed.**

The established flap extended speed  $V_{FE}$  must be established so that it does not exceed the design flap speed  $V_F$  chosen under §§ 25.335(e) and 25.345, for the corresponding flap positions and engine powers.

**§ 25.1513 Minimum control speed.**

The minimum control speed  $V_{MC}$  determined under § 25.149 must be established as an operating limitation.

**§ 25.1515 Landing gear speeds.**

(a) The established landing gear operating speed or speeds,  $V_{LO}$ , may not exceed the speed at which it is safe both to extend and to retract the landing gear, as determined under § 25.729 or by flight characteristics. If the extension speed is not the same as the retraction speed, the two speeds must be designated as  $V_{LO(EXT)}$  and  $V_{LO(RET)}$ , respectively.

(b) The established landing gear extended speed  $V_{LE}$  may not exceed the speed at which it is safe to fly with the landing gear secured in the fully extended position, and that determined under § 25.729.

[Doc. No. 5066, 29 FR 18291, Dec. 24, 1964, as amended by Amdt. 25-38, 41 FR 55468, Dec. 20, 1976]

**§ 25.1516 Other speed limitations.**

Any other limitation associated with speed must be established.

[Doc. No. 2000-8511, 66 FR 34024, June 26, 2001]

**§ 25.1517 Rough air speed,  $V_{RA}$ .**

(a) A rough air speed,  $V_{RA}$ , for use as the recommended turbulence penetration airspeed, and a rough air Mach number,  $M_{RA}$ , for use as the recommended turbulence penetration Mach number, must be established.  $V_{RA}/M_{RA}$  must be sufficiently less than  $V_{MO}/M_{MO}$  to ensure that likely speed variation during rough air encounters will not cause the overspeed warning to operate too frequently.

(b) At altitudes where  $V_{MO}$  is not limited by Mach number, in the absence of a rational investigation substantiating the use of other values,  $V_{RA}$  must be less than  $V_{MO}$  minus 35 KTAS.

(c) At altitudes where  $V_{MO}$  is limited by Mach number,  $M_{RA}$  may be chosen

to provide an optimum margin between low and high speed buffet boundaries.

[Amdt. 25-141, 79 FR 73469, Dec. 11, 2014, as amended by FAA-2022-1355; Amdt. No. 25-146, 87 FR 75710, Dec. 9, 2022]

**§ 25.1519 Weight, center of gravity, and weight distribution.**

The airplane weight, center of gravity, and weight distribution limitations determined under §§ 25.23 through 25.27 must be established as operating limitations.

**§ 25.1521 Powerplant limitations.**

(a) *General.* The powerplant limitations prescribed in this section must be established so that they do not exceed the corresponding limits for which the engines or propellers are type certificated and do not exceed the values on which compliance with any other requirement of this part is based.

(b) *Reciprocating engine installations.* Operating limitations relating to the following must be established for reciprocating engine installations:

(1) Horsepower or torque, r.p.m., manifold pressure, and time at critical pressure altitude and sea level pressure altitude for—

(i) Maximum continuous power (relating to unsupercharged operation or to operation in each supercharger mode as applicable); and

(ii) Takeoff power (relating to unsupercharged operation or to operation in each supercharger mode as applicable).

(2) Fuel grade or specification.

(3) Cylinder head and oil temperatures.

(4) Any other parameter for which a limitation has been established as part of the engine type certificate except that a limitation need not be established for a parameter that cannot be exceeded during normal operation due to the design of the installation or to another established limitation.

(c) *Turbine engine installations.* Operating limitations relating to the following must be established for turbine engine installations:

(1) Horsepower, torque or thrust, r.p.m., gas temperature, and time for—

(i) Maximum continuous power or thrust (relating to augmented or unaugmented operation as applicable).

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(ii) Takeoff power or thrust (relating to augmented or unaugmented operation as applicable).

(2) Fuel designation or specification.

(3) Maximum time interval between engine run-ups from idle, run-up power setting and duration at power for ground operation in icing conditions, as defined in § 25.1093(b)(2).

(4) Any other parameter for which a limitation has been established as part of the engine type certificate except that a limitation need not be established for a parameter that cannot be exceeded during normal operation due to the design of the installation or to another established limitation.

(d) *Ambient temperature.* An ambient temperature limitation (including limitations for winterization installations, if applicable) must be established as the maximum ambient atmospheric temperature established in accordance with § 25.1043(b).

[Amdt. 25-72, 55 FR 29786, July 20, 1990, as amended by Amdt. 25-140, 79 FR 65528, Nov. 4, 2014]

## § 25.1522 Auxiliary power unit limitations.

If an auxiliary power unit is installed in the airplane, limitations established for the auxiliary power unit, including categories of operation, must be specified as operating limitations for the airplane.

[Amdt. 25-72, 55 FR 29786, July 20, 1990]

## § 25.1523 Minimum flight crew.

The minimum flight crew must be established so that it is sufficient for safe operation, considering—

(a) The workload on individual crewmembers;

(b) The accessibility and ease of operation of necessary controls by the appropriate crewmember; and

(c) The kind of operation authorized under § 25.1525.

The criteria used in making the determinations required by this section are set forth in appendix D.

[Doc. No. 5066, 29 FR 18291, Dec. 24, 1964, as amended by Amdt. 25-3, 30 FR 6067, Apr. 29, 1965]

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## § 25.1525 Kinds of operation.

The kinds of operation to which the airplane is limited are established by the category in which it is eligible for certification and by the installed equipment.

## § 25.1527 Ambient air temperature and operating altitude.

The extremes of the ambient air temperature and operating altitude for which operation is allowed, as limited by flight, structural, powerplant, functional, or equipment characteristics, must be established.

[Doc. No. 2000-8511, 66 FR 34024, June 26, 2001]

## § 25.1529 Instructions for Continued Airworthiness.

The applicant must prepare Instructions for Continued Airworthiness in accordance with appendix H to this part that are acceptable to the Administrator. The instructions may be incomplete at type certification if a program exists to ensure their completion prior to delivery of the first airplane or issuance of a standard certificate of airworthiness, whichever occurs later.

[Amdt. 25-54, 45 FR 60173, Sept. 11, 1980]

## § 25.1531 Maneuvering flight load factors.

Load factor limitations, not exceeding the positive limit load factors determined from the maneuvering diagram in § 25.333(b), must be established.

## § 25.1533 Additional operating limitations.

(a) Additional operating limitations must be established as follows:

(1) The maximum takeoff weights must be established as the weights at which compliance is shown with the applicable provisions of this part (including the takeoff climb provisions of § 25.121(a) through (c), for altitudes and ambient temperatures).

(2) The maximum landing weights must be established as the weights at which compliance is shown with the applicable provisions of this part (including the landing and approach climb provisions of §§ 25.119 and 25.121(d) for altitudes and ambient temperatures).

(3) The minimum takeoff distances must be established as the distances at