

§ 25.337

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case, the margin may not be reduced to less than 0.05M.

(c) *Design maneuvering speed* V_A . For V_A , the following apply:

(1) V_{S1} may not be less than $V_{S1} \sqrt{n}$ where—

(i) n is the limit positive maneuvering load factor at V_C ; and

(ii) V_{S1} is the stalling speed with flaps retracted.

(2) V_A and V_S must be evaluated at the design weight and altitude under consideration.

(3) V_A need not be more than V_C or the speed at which the positive $C_{N \max}$ curve intersects the positive maneuver load factor line, whichever is less.

(d) *Design speed for maximum gust intensity*, V_B .

(1) V_B may not be less than

$$V_{S1} \left[1 + \frac{K_g U_{\text{ref}} V_c a}{498w} \right]^{1/2}$$

where—

V_{S1} = the 1-g stalling speed based on $C_{NA\max}$ with the flaps retracted at the particular weight under consideration;

V_c = design cruise speed (knots equivalent airspeed);

U_{ref} = the reference gust velocity (feet per second equivalent airspeed) from § 25.341(a)(5)(i);

w = average wing loading (pounds per square foot) at the particular weight under consideration.

$$K_g = \frac{.88\mu}{5.3 + \mu}$$

$$\mu = \frac{2w}{\rho c a g}$$

ρ = density of air (slugs/ft³);

c = mean geometric chord of the wing (feet);

g = acceleration due to gravity (ft/sec²);

a = slope of the airplane normal force coefficient curve, C_{NA} per radian;

(2) At altitudes where V_C is limited by Mach number—

(i) V_B may be chosen to provide an optimum margin between low and high speed buffet boundaries; and,

(ii) V_B need not be greater than V_C .

(e) *Design flap speeds*, V_F . For V_F , the following apply:

(1) The design flap speed for each flap position (established in accordance with § 25.697(a)) must be sufficiently

greater than the operating speed recommended for the corresponding stage of flight (including balked landings) to allow for probable variations in control of airspeed and for transition from one flap position to another.

(2) If an automatic flap positioning or load limiting device is used, the speeds and corresponding flap positions programmed or allowed by the device may be used.

(3) V_F may not be less than—

(i) 1.6 V_{S1} with the flaps in takeoff position at maximum takeoff weight;

(ii) 1.8 V_{S1} with the flaps in approach position at maximum landing weight, and

(iii) 1.8 V_{S0} with the flaps in landing position at maximum landing weight.

(f) *Design drag device speeds*, V_{DD} . The selected design speed for each drag device must be sufficiently greater than the speed recommended for the operation of the device to allow for probable variations in speed control. For drag devices intended for use in high speed descents, V_{DD} may not be less than V_D . When an automatic drag device positioning or load limiting means is used, the speeds and corresponding drag device positions programmed or allowed by the automatic means must be used for design.

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§ 25.337 Limit maneuvering load factors.

(a) Except where limited by maximum (static) lift coefficients, the airplane is assumed to be subjected to symmetrical maneuvers resulting in the limit maneuvering load factors prescribed in this section. Pitching velocities appropriate to the corresponding pull-up and steady turn maneuvers must be taken into account.

(b) The positive limit maneuvering load factor n for any speed up to V_n may not be less than $2.1 + 24,000/(W + 10,000)$ except that n may not be less than 2.5 and need not be greater than 3.8—where W is the design maximum takeoff weight.

(c) The negative limit maneuvering load factor—