

ft²-sec (2.27 W/cm²) on the cold side of the insulation specimens at a point 12 inches (30.5 cm) from the face of the test rig.

[Amdt. 25-32, 37 FR 3972, Feb. 24, 1972]

EDITORIAL NOTE: For FEDERAL REGISTER citations affecting Appendix F to Part 25, see the List of CFR Sections Affected, which appears in the Finding Aids section of the printed volume and on GPO Access.

APPENDIX G TO PART 25—CONTINUOUS GUST DESIGN CRITERIA

The continuous gust design criteria in this appendix must be used in establishing the dynamic response of the airplane to vertical and lateral continuous turbulence unless a more rational criteria is used. The following gust load requirements apply to mission analysis and design envelope analysis:

(a) The limit gust loads utilizing the continuous turbulence concept must be determined in accordance with the provisions of either paragraph (b) or paragraphs (c) and (d) of this appendix.

(b) *Design envelope analysis.* The limit loads must be determined in accordance with the following:

(1) All critical altitudes, weights, and weight distributions, as specified in §25.321(b), and all critical speeds within the ranges indicated in paragraph (b)(3) of this appendix must be considered.

(2) Values of \bar{A} (ratio of root-mean-square incremental load root-mean-square gust velocity) must be determined by dynamic analysis. The power spectral density of the atmospheric turbulence must be as given by the equation—

$$\phi(\Omega) = \sigma^2 L / \pi \frac{1 + \frac{8}{3}(1.339L\Omega)^2}{\left[1 + (1.339L\Omega)^2\right]^{\frac{11}{6}}}$$

where:

ϕ =power-spectral density (ft./sec.)²/rad./ft.

σ =root-mean-square gust velocity, ft./sec.

Ω =reduced frequency, radians per foot.

L =2,500 ft.

(3) The limit loads must be obtained by multiplying the \bar{A} values determined by the dynamic analysis by the following values of the gust velocity $U\sigma$:

(i) At speed V_c : $U\sigma=85$ fps true gust velocity in the interval 0 to 30,000 ft. altitude and is linearly decreased to 30 fps true gust velocity at 80,000 ft. altitude. Where the Administrator finds that a design is comparable to a

similar design with extensive satisfactory service experience, it will be acceptable to select $U\sigma$ at V_c less than 85 fps, but not less than 75 fps, with linear decrease from that value at 20,000 feet to 30 fps at 80,000 feet. The following factors will be taken into account when assessing comparability to a similar design:

(1) The transfer function of the new design should exhibit no unusual characteristics as compared to the similar design which will significantly affect response to turbulence; e.g., coalescence of modal response in the frequency regime which can result in a significant increase of loads.

(2) The typical mission of the new airplane is substantially equivalent to that of the similar design.

(3) The similar design should demonstrate the adequacy of the $U\sigma$ selected.

(ii) At speed V_B : $U\sigma$ is equal to 1.32 times the values obtained under paragraph (b)(3)(i) of this appendix.

(iii) At speed V_D : $U\sigma$ is equal to $\frac{1}{2}$ the values obtained under paragraph (b)(3)(i) of this appendix.

(iv) At speeds between V_B and V_c and between V_c and V_D : $U\sigma$ is equal to a value obtained by linear interpolation.

(4) When a stability augmentation system is included in the analysis, the effect of system nonlinearities on loads at the limit load level must be realistically or conservatively accounted for.

(c) *Mission analysis.* Limit loads must be determined in accordance with the following:

(1) The expected utilization of the airplane must be represented by one or more flight profiles in which the load distribution and the variation with time of speed, altitude, gross weight, and center of gravity position are defined. These profiles must be divided into mission segments or blocks, for analysis, and average or effective values of the pertinent parameters defined for each segment.

(2) For each of the mission segments defined under paragraph (c)(1) of this appendix, values of \bar{A} and N_0 must be determined by analysis. \bar{A} is defined as the ratio of root-mean-square incremental load to root-mean-square gust velocity and N_0 is the radius of gyration of the load power spectral density function about zero frequency. The power spectral density of the atmospheric turbulence must be given by the equation set forth in paragraph (b)(2) of this appendix.

(3) For each of the load and stress quantities selected, the frequency of exceedance must be determined as a function of load level by means of the equation—

$$N_{(t)} = \sum t N_o \left[P_1 \exp \left(- \frac{|y - y_{\text{one-g}}|}{b_1 \bar{A}} \right) + P_2 \exp \left(- \frac{|y - y_{\text{one-g}}|}{b_2 \bar{A}} \right) \right]$$

where—

t=selected time interval.

y=net value of the load or stress.

$Y_{\text{one-g}}$ =value of the load or stress in one-g level flight.

$N(y)$ =average number of exceedances of the indicated value of the load or stress in unit time.

Σ =symbol denoting summation over all mission segments.

N_o , \bar{A} =parameters determined by dynamic analysis as defined in paragraph (c)(2) of this appendix.

P_1 , P_2 , b_1 , b_2 =parameters defining the probability distributions of root-mean-square gust velocity, to be read from Figures 1 and 2 of this appendix.

The limit gust loads must be read from the frequency of exceedance curves at a frequency of exceedance of 2×10^{-5} exceedances per hour. Both positive and negative load directions must be considered in determining the limit loads.

(4) If a stability augmentation system is utilized to reduce the gust loads, consider-

ation must be given to the fraction of flight time that the system may be inoperative. The flight profiles of paragraph (c)(1) of this appendix must include flight with the system inoperative for this fraction of the flight time. When a stability augmentation system is included in the analysis, the effect of system nonlinearities on loads at the limit load level must be conservatively accounted for.

(d) *Supplementary design envelope analysis.* In addition to the limit loads defined by paragraph (c) of this appendix, limit loads must also be determined in accordance with paragraph (b) of this appendix, except that—

(1) In paragraph (b)(3)(i) of this appendix, the value of $U\sigma=85$ fps true gust velocity is replaced by $U\sigma=60$ fps true gust velocity on the interval 0 to 30,000 ft. altitude, and is linearly decreased to 25 fps true gust velocity at 80,000 ft. altitude; and

(2) In paragraph (b) of this appendix, the reference to paragraphs (b)(3)(i) through (b)(3)(iii) of this appendix is to be understood as referring to the paragraph as modified by paragraph (d)(1).

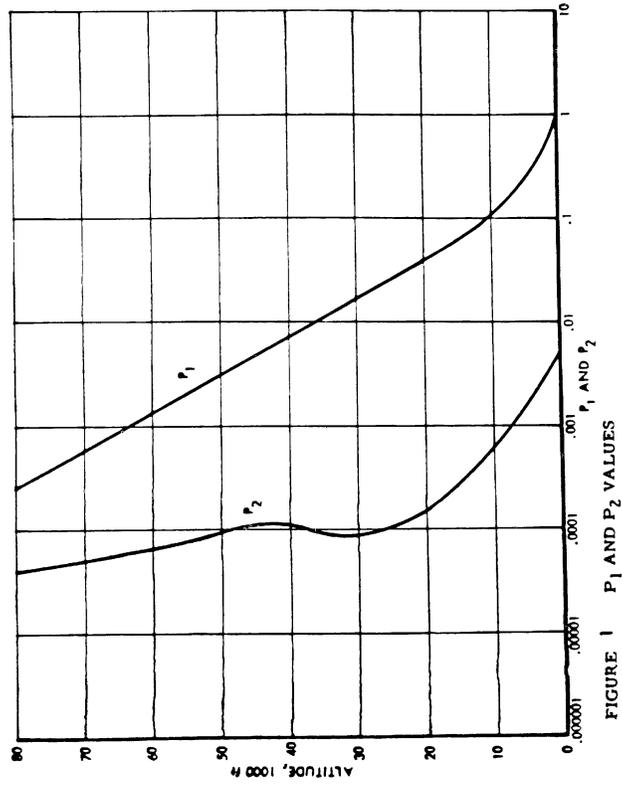


FIGURE 1 P₁ AND P₂ VALUES

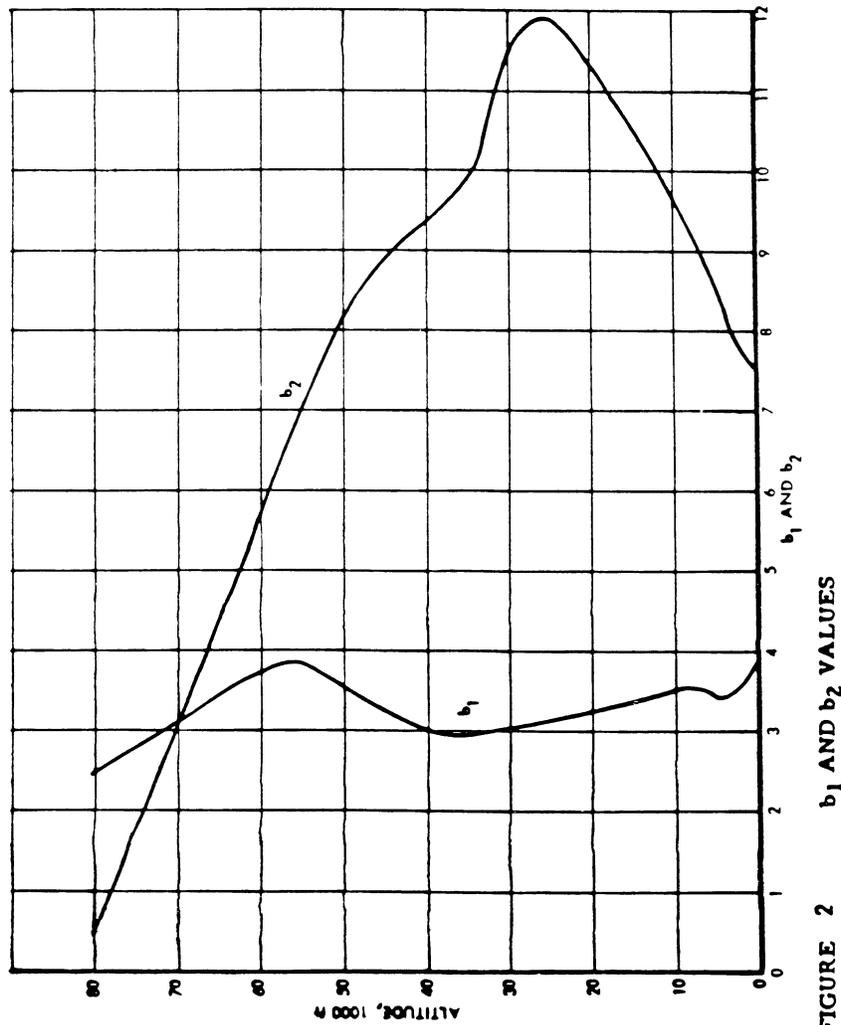


FIGURE 2 b₁ AND b₂ VALUES

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

APPENDIX H TO PART 25—INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

H25.1 General.

(a) This appendix specifies requirements for preparation of Instructions for Continued Airworthiness as required by §§ 25.1529, 25.1729, and applicable provisions of parts 21 and 26 of this chapter.

(b) The Instructions for Continued Airworthiness for each airplane must include

the Instructions for Continued Airworthiness for each engine and propeller (hereinafter designated "products"), for each appliance required by this chapter, and any required information relating to the interface of those appliances and products with the airplane. If Instructions for Continued Airworthiness are not supplied by the manufacturer of an appliance or product installed in the airplane, the Instructions for Continued Airworthiness for the airplane must include