Load Factors and Factors of Safety

Combination

ABS: $y = y_s \pm \sum |y_i|$; RSS: $y = y_s \pm \sqrt{\sum y_i^2}$

SP-8099 Eq. 5: $y = y_W + y_G \pm \eta\,\sigma_r$, $\sigma_r^2 = \sum \sigma_i^2$, $\eta = 3$

JSC-65829: STEL $+\frac{1}{3}$GUST $+0.335$BUF $+\overline{TO} + \sqrt{(\frac{2}{3}GUST)^2 + (0.665BUF)^2 + (TO - \overline{TO})^2}$

SP-8099 Eq. 3 / Titan IV MAL (SP-8099: not recommended for use):

STEL $+\frac{1}{3}$GUST $+0.415$BUF $+\sqrt{(\frac{2}{3}GUST)^2 + (0.585BUF)^2 + DISP^2}$

NASA-STD-5001A (08-05-2008)

Ultimate design load = $\mathrm{FS}_u\times$ limit load; yield design load = $\mathrm{FS}_y\times$ limit load

Metallic (Table 1): prototype FS_u 1.4, FS_y 1.0, qual 1.4; protoflight 1.4, 1.25, acceptance 1.2

Composite (Table 3): uniform 1.4 / 1.5 (prototype / protoflight); discontinuities 2.0

Event envelope

Axial = $n_{x,s} \pm n_{x,d}$; lateral = $\pm(|n_{y,s}| + n_{y,d})$ or $\pm\sqrt{n_{y,s}^2 + n_{y,d}^2}$