

Simulation Information

Masses (lb)

w_R Drogue & Main: 6.21
 w_R Anchor: 0.28
 w_R ARRD: 0.08
 w_P Payload: 8
 w_A Avionics: 3.04
 w_N NOS assembly: 21.56
 w_S Swagelok assembly: 8.35
 w_C Combustion chamber assembly: 9.49

Given:

$$\rho = 0.0765 \text{ lb/ft}^3$$

$$V = 1000 \text{ ft/s}$$

$$A = \pi r^2 = \pi (0.615/2)^2 = 0.2971 \text{ ft}^2$$

From sims $\left\{ \begin{array}{l} C_d = \sim 0.00095 \\ F_d = \sim 108 \text{ lb}_f \\ \text{Thrust} = 200 \text{ lb}_f \end{array} \right.$

From Nose cone shape: $C_{d_N} = 0.15$
 From cylinder: unnecessary.

} For drag force calculation

Calcs to be done

$$F_d = \frac{2C_d}{\rho V^2 A} \rightarrow C_d = \frac{2F_d}{\rho V^2 A} \quad \text{Drag Force}$$

Either axial (y-directional stress) or von-mises stresses

$$\sigma_{cr} = \frac{\pi^2 E}{(k \frac{L}{r})^2}$$

