70 knots = 118.147 ft/s   Drag Power = D·V in ft-lb/s
(Power Required)

Imperial At Sea level

ft² slugs/ft³ ft/s lbf

$D = .0275 \cdot 127 \cdot \frac{1}{2} \cdot .0023769 \cdot 118.147^2 + \frac{1050.29^2}{\frac{1}{2} \cdot .0023769 \cdot 118.147^2 \pi \cdot 5.63 \cdot 127 \cdot .78}$

(ρ, V^2)

D = **95.89 lbf = 426.54 N**

Drag Power = 95.89 · 118.147 = 11329.113 ft-lb/s

11329.113 → **20.6 hp → 15,360.21 W**

Speed of Sound = $\sqrt{(1.4)(287.058)(288.16)}$ = **340 m/s → 1116.4698 ft/s**

at 7500 ft (2286 m)

ρ = .00189760

$D = .0275 \cdot 127 \cdot \frac{1}{2} \cdot .00189760 \cdot 118.147 + \frac{1050.29^2}{\frac{1}{2} \cdot .00189760 \cdot 118.147^2 \pi \cdot 5.63 \cdot 127 \cdot .78}$

D = 93.8 = 417.24 N

Drag Power = 93.8 · 118.147 = 11081.35 ft-lb/s

11081.35 → **20.15 hp → 15,024.28 W**

$a = \sqrt{(1.4)(273.301)(287.058)}$ = **331.41 m/s → 1087.3 ft/s**

V: 50.1768
lbf = 109.162

Sea level landing config

$D = .0975 \cdot 127 \cdot \frac{1}{2} \cdot .0023769 \cdot 118.147 + \frac{1050.27^2}{\frac{1}{2} \cdot .0023769 \cdot 118.147^2 \pi \cdot 5.63 \cdot 127 \cdot .78}$

$D = 243.37 \text{ lbf} = 1082.56$

Drag Power $= 243.37 \cdot 118.147 = 28753.23$ ft-lbs/s

$28753.23 \rightarrow 52.28 \text{ hp} \rightarrow 38,984.15 \text{ W}$

$a = \sqrt{1.4(287.058)(288.16)} = 340 \text{ m/s} \rightarrow 1116.9698 \text{ ft/s}$

Sea level heavy wing loading

$D = .0275 \cdot 127 \cdot \frac{1}{2} \cdot .0023769 \cdot 118.147 + \frac{1319.53^2}{\frac{1}{2} \cdot .23769 \cdot 118.147^2 \pi \cdot 5.63 \cdot 127 \cdot .78}$

$D = 117.84 \text{ lbf} = 524.18 \text{ N}$

Drag Power $= 117.84 \cdot 118.147 = 13922.66$ lb-ft/s

$13922.66 \rightarrow 25.31 \text{ hp} \rightarrow 18,876.59 \text{ W}$

$a = \sqrt{(1.4)(287.058)(288.16)} = 340 \text{ m/s} \rightarrow 1116.9698 \text{ ft/s}$