

Door weight

$$1.0 \text{ g/cm}^3 \cdot 45.72 \text{ cm} \cdot 22.86 \text{ cm} \cdot 0.635 \text{ cm} = 663.676$$

$$663.676 \times 10^{-3} \times 9.81 = 6.51066 \text{ N}$$

$$= 1.46365259816$$

Acetal Plastic Gear

$$\tau = 1.4636 (.75") = 1.09774094916 \text{ lb}$$

$$\frac{2\tau}{D_p} = \frac{2(1.097)}{1.5} = 1.46365459916$$

$$V = 60 \text{ rpm} \cdot \pi (1.5) \cdot \frac{1}{12} = 23.5619449 \text{ FPM}$$

$$\sigma = \frac{W_t P_a}{F_y} \frac{12000 + V}{12000}$$

Teeth: 48

Lewis Factor: $\approx .405$

$$= \frac{(1.463)(1.5")(12000 + 23.5619)}{(3/16")(.405)(12000)}$$

$$= 28.96846377 \text{ Psi}$$

Youngs Modulus For Acetal Plastic = 10^{10} Psi