

Carbon Steel Gear

$$T = 1.463654599 \cancel{(12.4)} (1")$$

$$= \cancel{17.5638551916 \text{ in}}$$

$$\text{Tangential Load} = 2T$$

$$= 2 \left(\frac{1.463654599 D_p}{17.56385519} \right)$$

$$= 1.46365499 \cancel{17.56385519}$$

$$V_p = 60 \text{ rpm} \times \pi (2 \text{ in})^2 \times \frac{1}{12 \text{ ft}} = 31.41592654 \text{ FPM}$$

Teeth = 20 Lewis factor = .320

$$\sigma = \frac{17.56385519}{1.25 \times .320 \times 12000}$$

$$\sigma = \frac{W + Pd}{F_y} \frac{(12000 + V)}{1200}$$

$$= \frac{(17.56385519)(2 \text{ in}) (12000 + 31.41592654)}{(1.25)(.320)(12000)}$$

$$\sigma_{\text{Bending}} = \cancel{88.04918627} \text{ Psi}$$

1117 Carbon Steel Modulus of Elasticity = 27550 Ksi

$$\sigma_{\text{Bending}} = 7.337432189 \text{ Psi}$$