

Full journal bearing

$$d = 1 \text{ in}$$

$$l/d = 1$$

$$W = 250 \text{ lb}$$

$$\omega = 1100 \text{ rpm}$$

$$c = 0.00075 \text{ in}$$

$$\mu = 8 \text{ cP}$$

$$h_o = ?$$

$$H = ?$$

$$\phi = ?$$

$$\phi_s = ?$$

$$S = ?$$

$$T = ? \text{ if SAE 30 oil.}$$

 $p_{\max}$

⊙ - position of min h_o
 e - eccentricity ratio
 a - e

$\mu = 8 \text{ cP}$ corresponding to

$$T = 115^\circ \text{F}$$

To find other values we need the Sommerfeld N :

$$S = \left(\frac{r}{c}\right)^2 \frac{\mu N}{P}$$

$$r = d/2$$

$$r = 0.50 \text{ in}$$

$$r/c = \frac{0.50}{0.00075}$$

$$r/c = 667$$

$$N = \frac{\omega}{60} = \left(\frac{\omega \text{ rev}}{\text{min}}\right) \left(\frac{1 \text{ min}}{60 \text{ sec}}\right)$$

$$N = \frac{1100}{60}$$

$$N = 18.3 \frac{\text{rev}}{\text{sec}}$$

$$P = \frac{W}{ld} \text{ psi}$$

$$P = 250 \text{ psi}$$

$$S = (667)^2 \frac{(8 \times 10^{-6})(18.3)}{250}$$

$$S = 0.26$$

$$\frac{h_0}{e} = 0.59$$

$$\frac{P}{p_{max}} = 0.48$$

$$Q = 60^\circ$$

$$e = 0.4 = \frac{e}{c}$$

$$\left(\frac{f}{e}\right) = 5.8$$

$$\frac{Q}{F_{NL}} = 3.9$$

$$\frac{Q_3}{Q} = 0.5$$

$$h_0 = (0.59)(.00075)$$

$$h_0 = 0.00046 \text{ in}$$

$$Q = 64^\circ$$

$$e = (0.4)(.00075)$$

$$e = 0.00030 \text{ in}$$

$$f = \frac{5.8}{667}$$

$$f = 0.0087$$

100% RECYCLED PAPER
50% RECYCLED FIBER
NO CHLORINE
NO ACID
NO TOXIC
NO HAZARDOUS
NO OZONE
DEPLETING
SUBSTANCES
MADE IN U.S.A.



$$Q = (3.8)(.5)(.00015)(183)(1)$$

$$Q = 0.027 \text{ in}^3/\text{sec}$$

$$Q_s = (.5)(Q)$$

$$Q_s = 0.014 \text{ in}^3/\text{sec}$$

H = heat loss

$$= \frac{2\pi f W r N}{(778)(12)} \text{ Btu/sec}$$

$$H = \frac{(2\pi)(.00015)(250)(0.5)(183)}{(778)(12)}$$

$$H = 0.013 \text{ Btu/sec}$$

P

$$P_{\text{max}} = 0.48$$

$$P_{\text{max}} = 520 \text{ psi}$$