

A bearing having diameter of 200mm and radial clearance of 0.15mm, operating at 300rpm with oil of absolute viscosity $Z = 50$ CP. at 120 N/mm^2 . If the speed is to be increased to 500rpm. at Pressure? If radial clearance 0.1mm then what should be absolute viscosity of oil to be used.

Gm - $D = 200 \text{ mm}$.

Radial clearance $\cdot \frac{C_1}{2} = 0.15 \text{ mm}$.

$C_1 = 0.3 \text{ mm}$

$n_1 = 300 \text{ rpm}$

$Z = 50 \text{ CP}$.

$p = 120 \text{ N/mm}^2$

$n_2 = 500 \text{ rpm}$

Clearance $\cdot \frac{C_2}{2} = 0.1 \Rightarrow C_2 = 0.2$

To find \Rightarrow Pressure, Absolute viscosity.

Soln: $\Rightarrow \frac{n_1}{p_1} = \frac{n_2}{p_2} \Rightarrow \underline{\text{condition}}$

$= \frac{300}{120} = \frac{500}{p_2}$

$p_2 = 200 \text{ N/mm}^2$.

for second case, n and p same

$$Z_1 \left(\frac{D_1}{C_1} \right)^2 = Z_2 \left(\frac{D_2}{C_2} \right)^2$$

$$50 \times \left(\frac{200}{0.3} \right)^2 = Z_2 = \left(\frac{200}{0.2} \right)^2$$

$$Z_2 = 23.22 \text{ CP}$$