



Diameter $d = 5 + kx$: $10 = 5 + k(100)$, $k = 0.05$

So $d = 5 + 0.05x$

$$dm = \rho dV = \rho \frac{\pi d^2}{4} dx, \quad dI_o = x^2 dm$$

$$= \frac{\rho \pi}{4} (5 + 0.05x)^2 x^2 dx$$

$$I_o = \frac{\rho \pi}{4} \int_0^{100} (25x^2 + 0.5x^3 + 0.0025x^4) dx$$

$$= \frac{\rho \pi}{4} (25.8(10^6)) \text{ kg} \cdot \text{mm}^2$$

With $\rho = 7830 (10^{-9}) \text{ kg/mm}^3$:

$$\underline{I_o = 158.9 \text{ kg} \cdot \text{mm}^2}$$