

Answer on Question #49630-Physics-Mechanics-Kinematics-Dynamics

A metal bar is loaded by an axial force P . The bar is circular in cross-section with diameter $d = 1.25$ inches. If the normal stress is $\sigma = 5000$ psi., what is the load P in pounds?

Solution

The load P is given by the formula

$$P = \sigma A,$$

where $A = \frac{\pi d^2}{4}$ is an area of circular cross-section.

Thus,

$$P = \sigma \frac{\pi d^2}{4} = \frac{\pi}{4} \cdot (1.25)^2 \cdot 5000 = 6136 \text{ lb.}$$

Answer: 6136 lb.