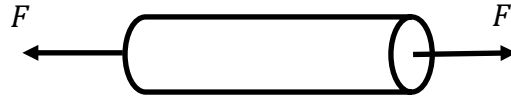


A random force $F \sim N(4,000,200^2)$ N acts on the shaft as shown. The stress of the shaft is calculated by $S = F/A$, where A is the cross sectional area. If the maximum stress is $S_y = 26$ MPa, determine the minimum radius of the shaft so that the probability that the shaft will not fail is at least 0.9999. Hint: 1 Mpa = 10^6 Pa, and 1 Pa = $1 \frac{\text{N}}{\text{m}^2}$.



Solution

8 mm.