Question

A steel wire of diameter 2mm has a breaking strength of 4 into 10 raise to power 5 N what is breaking force of similar steel wire of diameter 1.5 mm?

Answer

Breaking strength is the maximum force that a body (wire) can withstand while being stretched before breaking. Breaking strength is directly proportional to the area of wire:

$$F_{br} \propto A$$

Therefore:

$$\frac{F_1}{F_2} = \frac{A_1}{A_2} = \frac{r_1^2}{r_2^2}$$

where r_1, r_2 are radiuses of wires

$$F_2 = F_1 \frac{r_2^2}{r_1^2} = 4 * 10^5 N \frac{1.5^2}{2^2} = 2.25 * 10^5 \ N$$

Answer: $2.25 * 10^5 \ N$