

A brass rod is two metre long at a certain temperature. What is the length for temperature rise of 100 kelvin if the expansivity of brass is  $0.000018/\text{kelvin}$ .

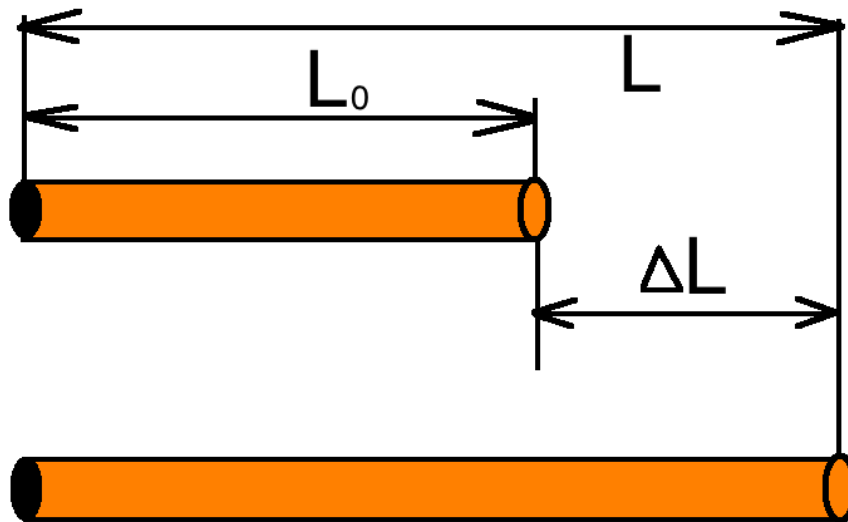
**Solution:**

The change in length measurements of an object due to thermal expansion is related to temperature change by a linear expansion coefficient ( $\alpha = 1.8 \times 10^{-5} \text{K}^{-1}$ ). It is the fractional change in length per degree of temperature change.

Assuming negligible effect of pressure, we may write:

$$\Delta L = L_0 \alpha \Delta T, \quad \text{where } L_0 = 2\text{m} - \text{initial length of the rod}$$
$$L = L_0 + \Delta L = L_0(1 + \alpha \Delta T) = 2\text{m} \cdot (1 + 1.8 \times 10^{-5} \cdot 100\text{K}) = 2.00036\text{m}$$

**Answer:** length of the brass rod for temperature rise of 100 kelvin is 2.00036m.



$$\Delta T = 100\text{K}$$