Answer on Question 56765, Physics, Other

Question:

Suppose that at room temperature, a certain aluminum bar is $1.0000m$ long. The bar gets longer when its temperature is raised. The length L of the bar obeys the following relation: $L = 1.0000 + 2.4 \cdot 10^{-5}T$, where T is the number of degrees Celsius above room temperature. What is the change of the bar's length if the temperature is raised to $17.2°C$ above room temperature?

Solution:

Let's find the final length of the bar when the temperature is raised to $17.2°C$ above room temperature:

$$L_f = 1.0000m + 2.4 \cdot 10^{-5}\frac{1}{°C} \cdot 1.000m \cdot 17.2°C = 1.00041m.$$

Then, the change of the bar's length will be:

$$\Delta L = L_f - L_i = 1.00041m - 1.0000m = 0.00041m = 4.1 \cdot 10^{-4}m.$$

Answer:

The change of the bar's length if the temperature is raised to $17.2°C$ above room temperature will be $\Delta L = 4.1 \cdot 10^{-4}m$.