

## Answer on Question #68092 – Physics – Mechanics | Relativity

A surveyor uses a steel measuring tape that is exactly 50.000 m at a temperature of 20°C. The markings on the tape are calibrated for this temperature.

(a) What is the length of the tape when the temperature is 35°C?

### Solution.

Linear thermal expansion coefficients of steel measuring tape:

$$\alpha = 12 \times 10^{-6} \text{ (}^\circ\text{C)}^{-1};$$

The length of the tape when the temperature is 35°C:

$$l = l_0(1 + \alpha(t - t_0)) = 50 (1 + 12 \times 10^{-6}(35 - 20)) = 50 (1 + 0.00018) = 50.009 \text{ m};$$

Thus, the length of measuring tape increase by 9 mm.

### Answer:

50.009 m

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