A cube with sides 100cm at o degree Celsius is heated to 100 degree Celsius. If the sides become 101cm long, find the cubic expansivity of its material.

Solution

The volume at 0 degree Celsius

$$V_0 = l_0^3 = (100\text{cm})^3 = 10^6\text{cm}^3$$

The volume at 100 degree Celsius

$$V = l^3 = (101\text{cm})^3 = 1030301\text{cm}^3 \cong 1.0303 * 10^6\text{cm}^3$$

The cubic expansivity of its material

$$\alpha = \frac{V - V_0}{V_0 \Delta T} = \frac{1.0303 * 10^6\text{cm}^3 - 10^6\text{cm}^3}{100° * 10^6\text{cm}^3} = \frac{0.0303}{100°} = 303 * 10^{-6}/°C$$

Answer: $\boldsymbol{303 * 10^{-6}/°C}$.