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A copper ball with a radius of 1.6 cm is heated until its diameter has increased by 0.18 mm. Assuming an initial temp. of 22°C , find the final temp. of the ball

$$\alpha_{cu} = 17 \times 10^{-6} \frac{1}{\text{K}}$$

convert to diameter

$$d_0 = 3.2 \text{ cm} \quad \Delta d = 0.018 \text{ cm}$$

$$\Delta L = L_0 \alpha \Delta T$$

$$\Delta L = L_0 \alpha (T_f - T_i)$$

$$T_f = \frac{\Delta L}{L_0 \alpha} + T_i$$

$$= \frac{0.018 \text{ cm}}{3.2 \text{ cm} (17 \times 10^{-6} \frac{1}{\text{K}})} + 22^\circ\text{C} = \boxed{353^\circ\text{C}}$$