

52. The cube has side length l and volume $V = l^3$. We use $p = B\Delta V/V$ for the pressure p . We note that

$$\frac{\Delta V}{V} = \frac{\Delta l^3}{l^3} = \frac{(l + \Delta l)^3 - l^3}{l^3} \approx \frac{3l^2\Delta l}{l^3} = 3\frac{\Delta l}{l} .$$

Thus, the pressure required is

$$p = \frac{3B\Delta l}{l} = \frac{3\left(1.4 \times 10^{11} \text{ N/m}^2\right)(85.5 \text{ cm} - 85.0 \text{ cm})}{85.5 \text{ cm}} = 2.4 \times 10^9 \text{ N/m}^2 .$$