6.5 This problem asks us to compute the elastic modulus of aluminum. For a square cross-section, $A_0 = b_0^2$, where b_0 is the edge length. Combining Equations 6.1, 6.2, and 6.5 and solving for E, leads to

$$E = \frac{\sigma}{\varepsilon} = \frac{\frac{F}{A_0}}{\frac{\Delta l}{l_0}} = \frac{F l_0}{b_0^2 \Delta l}$$

$$= \frac{(66{,}700\ \text{N})\left(125 \times 10^{-3}\ \text{m}\right)}{\left(16.5 \times 10^{-3}\ \text{m}\right)^2\left(0.43 \times 10^{-3}\ \text{m}\right)}$$

$$= 71.2 \text{ x } 10^9 \text{ N/m}^2 = 71.2 \text{ GPa } (10.4 \text{ x } 10^6 \text{ psi})$$