6.32 The moduli of resilience of the alloys listed in the table may be determined using Equation 6.14. Yield strength values are provided in this table, whereas the elastic moduli are tabulated in Table 6.1.

For steel

$$U_r = \frac{\sigma_y^2}{2E}$$

$$= \frac{(830 \text{ x } 10^6 \text{ N/m}^2)^2}{(2)(207 \text{ x } 10^9 \text{ N/m}^2)} = 16.6 \text{ x } 10^5 \text{ J/m}^3 \quad (240 \text{ in.-lb}_f/\text{in.}^3)$$

For the brass

$$U_r = \frac{(380 \text{ x } 10^6 \text{ N/m}^2)^2}{(2)(97 \text{ x } 10^9 \text{ N/m}^2)} = 7.44 \text{ x } 10^5 \text{ J/m}^3 \quad (108 \text{ in.-lb}_f/\text{in.}^3)$$

For the aluminum alloy

$$U_r = \frac{(275 \text{ x } 10^6 \text{ N/m}^2)^2}{(2)(69 \text{ x } 10^9 \text{ N/m}^2)} = 5.48 \text{ x } 10^5 \text{ J/m}^3 \quad (80.0 \text{ in.-lb}_f/\text{in.}^3)$$

And, for the titanium alloy

$$U_r = \frac{(690 \text{ x } 10^6 \text{ N/m}^2)^2}{(2)(107 \text{ x } 10^9 \text{ N/m}^2)} = 22.2 \text{ x } 10^5 \text{ J/m}^3 \quad (323 \text{ in.-lb}_f/\text{in.}^3)$$