$$E = \frac{\Delta\sigma}{\Delta\varepsilon} = \frac{400 \ \text{MPa} \ - \ 0 \ \text{MPa}}{0.002 \ - \ 0} = 200 \ \text{x} \ 10^3 \ \text{MPa} = 200 \ \text{GPa} \quad (29 \ \text{x} \ 10^6 \ \text{psi})$$

(c) For the yield strength, the 0.002 strain offset line is drawn dashed. It intersects the stress-strain curve at approximately 750 MPa (112,000 psi).

(d) The tensile strength is approximately 1250 MPa (180,000 psi), corresponding to the maximum stress on the complete stress-strain plot.

(e) The ductility, in percent elongation, is just the plastic strain at fracture, multiplied by one-hundred. The total fracture strain at fracture is 0.115; subtracting out the elastic strain (which is about 0.003) leaves a plastic strain of 0.112. Thus, the ductility is about 11.2%EL.

(f) From Equation 6.14, the modulus of resilience is just

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

which, using data computed above gives a value of

$$U_r = \frac{(750 \ \text{MPa})^2}{(2)(200 \ \text{x} \ 10^3 \ \text{MPa})} = 1.40 \ \text{x} \ 10^6 \ \text{J/m}^3 \quad \left(210 \ \text{in.-lb}_f/\text{in.}^3\right)$$