

8.3 We may determine the critical stress required for the propagation of an internal crack in aluminum oxide using Equation 8.3; taking the value of 393 GPa (Table 12.5) as the modulus of elasticity, we get

$$\sigma_c = \left[\frac{2E\gamma_s}{\pi a} \right]^{1/2}$$

$$= \left[\frac{(2)(393 \times 10^9 \text{ N/m}^2)(0.90 \text{ N/m})}{(\pi) \left(\frac{0.4 \times 10^{-3} \text{ m}}{2} \right)} \right]^{1/2} = 33.6 \times 10^6 \text{ N/m}^2 = 33.6 \text{ MPa}$$