8.10 This problem asks that we determine whether or not a critical flaw in a wide plate is subject to detection given the limit of the flaw detection apparatus (3.0 mm), the value of K_{Ic} (98.9 MPa$\sqrt{m}$), the design stress ($\sigma_y/2$ in which $\sigma_y = 860$ MPa), and $Y = 1.0$. We first need to compute the value of a_c using Equation 8.7; thus

$$a_c = \frac{1}{\pi}\left(\frac{K_{Ic}}{Y\sigma}\right)^2 = \frac{1}{\pi}\left[\frac{98.9 \ \text{MPa}\sqrt{m}}{(1.0)\left(\dfrac{860 \ \text{MPa}}{2}\right)}\right]^2 = 0.0168 \ \text{m} = 16.8 \ \text{mm} \quad (0.66 \ \text{in.})$$

Therefore, the critical flaw is subject to detection since this value of a_c (16.8 mm) is greater than the 3.0 mm resolution limit.