

Influence of Fiber Length

16.6 This problem asks that, for a glass fiber-epoxy matrix combination, to determine the fiber-matrix bond strength if the critical fiber length-fiber diameter ratio is 40. Thus, we are to solve for τ_c in Equation 16.3.

Since we are given that $\sigma_f^* = 3.45 \text{ GPa}$ from Table 16.4, and that $\frac{l_c}{d} = 40$, then

$$\tau_c = \sigma_f^* \left(\frac{d}{2l_c} \right) = (3.45 \times 10^3 \text{ MPa}) \frac{1}{(2)(40)} = 43.1 \text{ MPa}$$