## Solutions

**2.1**

- $\sigma_y(25) = 100 + 0.60/\sqrt{25 \times 10^{-6}} = 100 + 120.0 = 220.0$ MPa.
- $\sigma_y(16) = 100 + 0.60/0.004 = 250.0$ MPa.

**2.2**

- $100 + 0.60/\sqrt{d} \geq 300$ gives $\sqrt{d} \leq 0.003$ m$^{1/2}$.
- $d \leq 9.0$ µm.

**2.3**

- BCC: $2 \times \frac{4}{3}\pi(\sqrt{3}a/4)^3/a^3 = \pi\sqrt{3}/8 = 0.6802$.
- FCC: $4 \times \frac{4}{3}\pi(\sqrt{2}a/4)^3/a^3 = \pi/(3\sqrt{2}) = 0.7405$.

**2.4**

- FCC's closer packing (0.7405 vs 0.6802) carries more close-packed slip systems, so dislocations glide more easily.
- Grain boundaries block dislocation motion; more boundaries (smaller grains) mean more blocking and higher yield.



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