

7.30 This problem calls for us to calculate the precold-worked radius of a cylindrical specimen of copper that has a cold-worked ductility of 15%EL. From Figure 7.19(c), copper that has a ductility of 15%EL will have experienced a deformation of about 20%CW. For a cylindrical specimen, Equation 7.8 becomes

$$\%CW = \left[ \frac{\pi r_0^2 - \pi r_d^2}{\pi r_0^2} \right] \times 100$$

Since  $r_d = 6.4$  mm (0.25 in.), solving for  $r_0$  yields

$$r_0 = \frac{r_d}{\sqrt{1 - \frac{\%CW}{100}}} = \frac{6.4 \text{ mm}}{\sqrt{1 - \frac{20.0}{100}}} = 7.2 \text{ mm} \quad (0.280 \text{ in.})$$