7.28   In order for these two cylindrical specimens to have the same deformed hardness, they must be deformed to the same percent cold work. For the first specimen

$$\%CW = \frac{A_0 - A_d}{A_0} \times 100 = \frac{\pi r_0^2 - \pi r_d^2}{\pi r_0^2} \times 100$$

$$= \frac{\pi (15 \ mm)^2 - \pi (12 \ mm)^2}{\pi (15 \ mm)^2} \times 100 = 36\%CW$$

For the second specimen, the deformed radius is computed using the above equation and solving for r_d as

$$r_d = r_0 \sqrt{1 - \frac{\%CW}{100}}$$

$$= (11 \ mm) \sqrt{1 - \frac{36\%CW}{100}} = 8.80 \ mm$$