Balance condition: $\boldsymbol{F = mg}$

$$(\boldsymbol{\rho(air) - \rho(He)})\boldsymbol{Vg = mg}$$

$$\boldsymbol{V = \frac{m}{\rho(air) - \rho(He)}}$$

$$\boldsymbol{\frac{4}{3}\pi R^3 = \frac{m}{\rho(air) - \rho(He)}}$$

$$\boldsymbol{R = \sqrt[3]{\frac{3m}{4\pi(\rho(air) - \rho(He))}}}$$

$$\boldsymbol{R = \sqrt[3]{\frac{3 \times 5320}{4 \times 3.14 \times (1.27 - 0.18)}}}$$

$$\boldsymbol{R = 10.52\ (m)}$$

Answer:

$$\boldsymbol{R(min) = 10.52\ (m)}$$