

80. The force f that is required to tether the airship of volume V and weight W is given by

$$\begin{aligned} f &= F_b - W = \rho_{\text{air}} g V - \rho_{\text{gas}} g V \\ &= \left(1.21 \text{ kg/m}^3 - 0.80 \text{ kg/m}^3 \right) \left(9.8 \text{ m/s}^2 \right) \left(1.0 \times 10^6 \text{ m}^3 \right) \\ &= 4.0 \times 10^6 \text{ N} . \end{aligned}$$