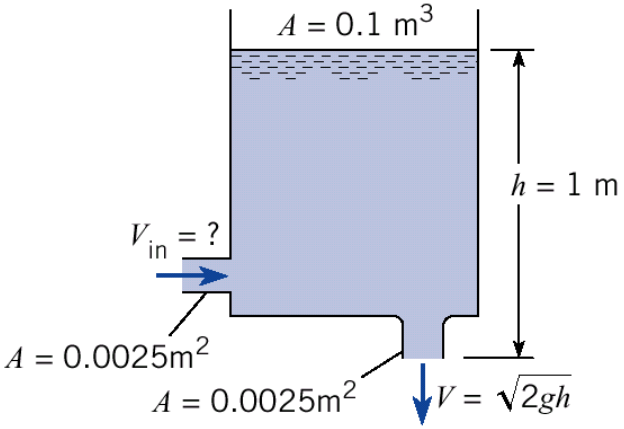
Example Problem

Calculate the inlet velocity Vin from the diagram shown.



$$0 = \frac{d}{dt}\int_{CV} \rho d\forall + \sum_{CS} \rho \vec{\mathbf{V}} \cdot \vec{\mathbf{A}}$$

$$= \frac{d}{dt}(\rho A_{tank} h) - \rho V_{in} A_{in} + \rho V_{out} A_{out}$$

$$= A_{tank}\frac{dh}{dt} - V_{in} A_{in} + V_{out} A_{out}$$

$$= 0.1 * 0.1x10^{-2} - V_{in}(0.0025) + \sqrt{2g * 1}(0.0025)$$

$$\boxed{V_{in} = 4.47\ m/s}$$