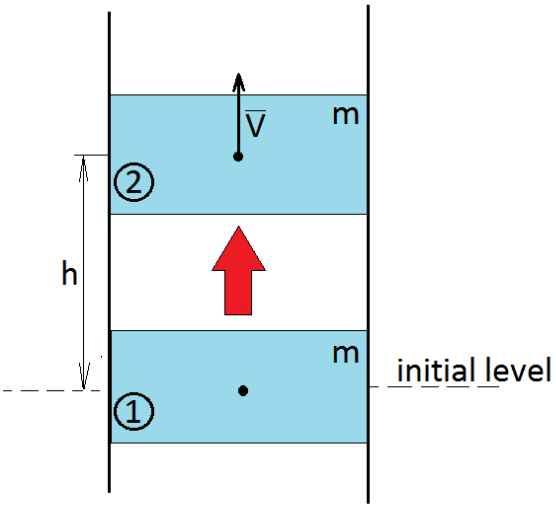
I need someone to double check my math. So, here we go. I need to know how much energy it would take to move (or displace in a 4" tube) 13.6 gallons of water (or 114.6 lbs of water) vertically 6 inches in 1 second. Energy required will need to be in joules.

Solution:



The law of conservation of total mechanical energy:

$$W_1 = W_2\ (1)$$

$$W_1 = E_{kinetic1} + E_{potential1} + \boldsymbol{E_{work}}$$

$$E_{kinetic1} = 0\ (the\ initial\ velocity\ of\ zero)$$

$$E_{potential1} = 0\ (relative\ to\ the\ initial\ level, potential\ energy\ is\ zero)$$

$$E_{work} - this\ energy\ we\ need\ to\ find$$

$$W_1 = E_{work}\ (2)$$

$$W_1 = E_{kinetic2} + E_{potential2}$$

$$E_{kinetic2} = \frac{mV^2}{2}; m = 114.6\ \text{lbs} = 52\ \text{kg}, \text{V} = \frac{6\ \text{inches}}{1\ s} = 0.1524\frac{m}{s}$$

$$E_{potential2} = mgh, h = 6\ \text{inches} = 0.1524m$$

$$W_1 = \frac{mV^2}{2} + mgh\ (3)$$

$$(3) and\ (2) in\ (1):$$

$$E_{work} = \frac{mV^2}{2} + mgh = m\left(\frac{V^2}{2} + gh\right) = 52\ \text{kg}\left(\frac{\left(0.1524\frac{m}{s}\right)^2}{2} + 9.8\frac{N}{kg}\cdot 0.1524m\right) =$$

$$= 78.26\ J$$

Answer: energy is $78.26\ J$