Volumetric flow rate : $d = \frac{1}{2}$ inches $r = \frac{1}{4}$ inches

$r = 0.64$ cm

$r = 0.0064$ m

$$Q = vA$$

$$A = \pi r^2 \rightarrow A = \pi \left[0.0064\right]^2$$

$$A = 0.0001286796351 \ m^2$$

$$Q = \frac{V}{t} = \frac{A \cdot d}{t}$$

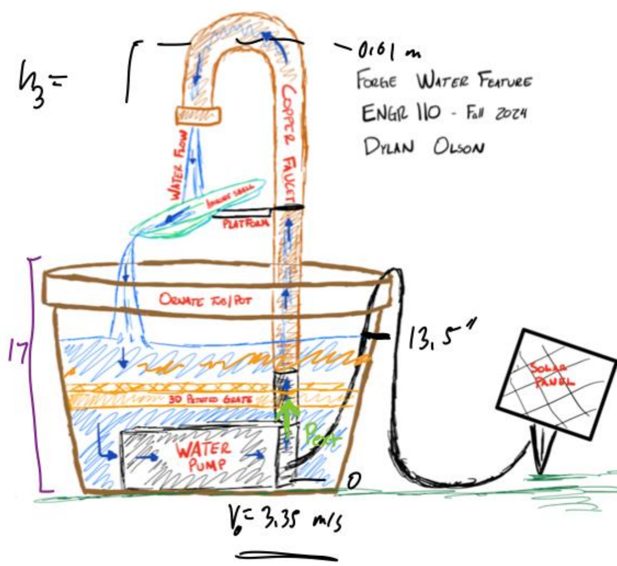
$$\frac{410 \ G}{1 \ H} \cdot \frac{1 \ m^3/s}{951019.3884 \ G/H} = 0.00043111 6342 \ \frac{m^3}{s}$$

$$0.000431116342 = \frac{0.0001286796351 \cdot d}{t} \quad v$$

$$v = 3.35 \ m/s$$

$$h = 0.61 \ [m]$$

$$P_1 + \frac{1}{2}\rho v_1^2 + \rho g h_1 = P_2 + \frac{1}{2}\rho v_2^2 + \rho g h$$



$$\frac{1}{2}\cancel{\rho} v_1^2 + \cancel{\rho} g \cancel{h}^0 = \frac{1}{2}\cancel{\rho} v_2^2 + \cancel{\rho} g h$$

$$\frac{1}{2}(3.35^2) = \frac{1}{2}v_f^2 + g(0.61 - 0.135)$$

$$5.6125 - 4.655 = \frac{1}{2}v_f^2 + 4.655$$

$$0.9575 = \frac{1}{2}v_f^2$$

$$\sqrt{1.915} = v_f \rightarrow v_f = 1.38 \ m/s \ @410 \ GPH$$ Loss of 60%

$$v_f = 1.18 \ @ \ 400 \ GPH$$

$$1.2 \ \& \ 2.4 \ m/s$$