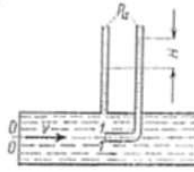


Hydrodynamics pitot tube problem solution

Find the flow velocity u of water in the pipe if the difference in total pressure head, measured by a Pitot tube, and static pressure head is $H = 500\text{mmH}_2\text{O}$.



Solved by Civil Thinking (<https://civilthinking.com>)

$$\underbrace{\frac{P}{\rho g}}_{\text{Static Head}} + \underbrace{\frac{V^2}{2g}}_{\text{Dynamic Head}} + \underbrace{z}_{\text{Elevation Head}} = \text{Total Pressure Head, } H_T \quad (\text{Bernoulli eqn})$$

Hor. $\Rightarrow z = 0$

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$$\Rightarrow \frac{P}{\rho g} + \frac{V^2}{2g} = H_T$$

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$$\Rightarrow H_T - \frac{P}{\rho g} = \frac{V^2}{2g}$$

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$$\Rightarrow 0.5\text{ m} = \frac{V^2}{2g} \Rightarrow V = \sqrt{0.5 \times 2g} = 3.13\text{ m/s}$$

ANS.

This Fluid Mechanics problem was solved by Civil Thinking (<https://civilthinking.com>)

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