At what speed , the velocity head of water is equal to pressure head of 40 cm of mercury

Solution:

$\mathrm{h} = 40\mathrm{cm} = 0.4\mathrm{m} -$ head mercury column;

Velocity head = $40\mathrm{cm}$ of Hg column $\mathrm{h_w} = \mathrm{h} \cdot 13.6$ cm of water column.

$$\mathrm{h_w} = \frac{\mathrm{v}^2}{2\mathrm{g}}$$

$$\mathrm{v}^2 = 2\mathrm{gh_w}$$

$$\mathrm{v} = \sqrt{2\mathrm{gh_w}} = \sqrt{2 \cdot 9.8 \frac{\mathrm{m}}{\mathrm{s}^2} \cdot 0.4\mathrm{m} \cdot 13.6} = 10.3 \frac{\mathrm{m}}{\mathrm{s}}$$

Answer: velocity head of water is $10.3 \frac{\mathrm{m}}{\mathrm{s}}$

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