Answer on Question #72281, Physics / Mechanics | Relativity

Question. In a horizontal pipeline pressure falls by $10\ Pa$ b/w 2 points separated by a distance of $1\ km$. The change in kinetic energy/kg of oil flows from one point to the other is (density-oil=$800\ kg/m^3$)?

Given. $\Delta p = 10\ Pa; \rho = 800\ kg/m^3; l = 1\ km.$

Find. $\Delta E_0 - ?$

Solution.

According to Bernoulli's equation

$$p_1 V - p_2 V = \frac{1}{2} m v_2^2 - \frac{1}{2} m v_1^2$$

or

$$\Delta p V = \Delta E.$$

Hence

$$\Delta E_0 = \frac{\Delta E}{m} = \frac{\Delta p V}{m} = \frac{\Delta p}{m/V} = \frac{\Delta p}{\rho} = \frac{10}{800} = \frac{1}{80} = 0.0125\ J.$$

Answer. $\Delta E_0 = 0.0125\ J.$