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$\dot{V} = 900 \text{ l/min}$
ethylalcohol

$P^{\circ}(5^{\circ}\text{C}) = 2,25 \text{ kPa}$
 $P^{\circ}(30^{\circ}\text{C}) = 10,47 \text{ kPa}$

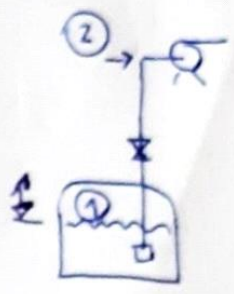
$\rho = 805,6 \text{ kg/m}^3$ $1,61 \cdot 10^{-3} \text{ Pa}\cdot\text{s}$
 $\rho = 777,3 \text{ kg/m}^3$ $0,992 \cdot 10^{-3} \text{ Pa}\cdot\text{s}$

$P_1 = 1,138 \cdot 10^5 \text{ Pa}$
nava utina $\xi_A = 1 \text{ mm}$
 $d = 150 \text{ mm}$
saci las + 1x ventil prius
 $t = 5^{\circ}\text{C}$
kruh 1,5 m
 $t = 30^{\circ}\text{C}$

$$\frac{v_1^2}{2} + \frac{P_1}{\rho} + h_1 g = \frac{v_2^2}{2} + \frac{P_2}{\rho} + h_2 g + e_{dis}$$

\downarrow O. klacim \downarrow O \downarrow ?

$$0 = \frac{v^2}{2} + \frac{P_2 - P_1}{\rho} + h_2 g + e_{dis}$$



$$v = \frac{900 \cdot 10^{-3} \cdot 4}{60 \pi \cdot (0,15)^2} = 0,8488 \text{ m/s}$$

$$Re = \frac{0,8488 \cdot 0,15 \cdot 805,6}{1,61 \cdot 10^{-3}} = 63700$$

$$Re = \frac{0,8488 \cdot 0,15 \cdot 777,3}{0,992 \cdot 10^{-3}} = 99764$$

$$\lambda = \frac{0,25}{\sqrt{\log\left[\left(\frac{6,81 \cdot 99}{Re}\right)^2 + \frac{1}{37}\right]}} = 0,0347 \text{ (5}^{\circ}\text{C)}$$

$$= 0,0342 \text{ (30}^{\circ}\text{C)}$$

5°C

$$0 = \frac{0,8488^2}{2} - \frac{1,138 \cdot 10^5 - 2,25 \cdot 10^3}{805,6} + h_2 g + \left(\lambda \frac{h_2}{d} + \xi \right) \frac{v^2}{2}$$

$$0 = 0,3602 - 138,47 + h_2 \left[g + \frac{\lambda}{d} \frac{v^2}{2} \right] + g \frac{v^2}{2}$$

$$\text{---||---} \quad h_2 [9,81 + 0,0833] + 3,2421$$

$$h_2 = 13,63 \text{ m} \rightarrow \underline{h_2 = 12,13 \text{ m}} \text{ (s keratou 1,5 m)}$$

$$h_2^1 = 12,13 \text{ m}$$

30°C

$$0 = 0,3602 - \frac{1,138 \cdot 10^5 - 10,47 \cdot 10^3}{777,3} + h_2 \left[9,81 + \frac{0,0342}{0,15} \frac{0,8488^2}{2} \right] + 3,2421$$

$$\text{---||---} \quad h_2 [9,81 + 0,0821]$$

$$h_2 = 13,07 \text{ m}$$

$$h_2^{5^{\circ}} - h_2^{30^{\circ}} = 56 \text{ cm}$$

0,6 m pri zachovani bezp. vzdalenosti 1,5 m