

3-8

III. vřd.

benzín

$$E_A = 0,5 \text{ mm}$$

$$h_1 = 83 \text{ m}$$

$$P_1 - P_2 = 2500 \text{ Pa}$$

$$h_2 = 65 \text{ m}$$

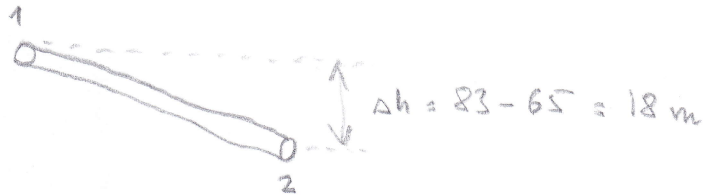
$$L = 965 \text{ m}$$

$$\dot{V} = ?$$

$$d = 0,14 \text{ m}$$

$$\rho = 750 \text{ kg/m}^3$$

$$\lambda = 2,52 \cdot 10^{-4} \text{ Pa} \cdot \text{s}$$



$$v_1 = v_2$$

$$h_1 - h_2 = \Delta h = 18 \text{ m}$$

$$P_1 - P_2 = 2500 \text{ Pa}$$

$$\frac{P_1 - P_2}{\rho} + (h_1 - h_2)g = e_{\text{dřs}} = \lambda \frac{L}{d} \frac{v^2}{2}$$

$$v^2 = \frac{2d}{\lambda L} \cdot \left(\frac{\Delta P}{\rho} + \Delta h g \right) = \frac{2 \cdot 0,14}{2,52 \cdot 10^{-4} \cdot 965} \cdot \left(\frac{2500}{750} + 18 \cdot 9,81 \right)$$

$$v^2 = \frac{0,05215}{\lambda} \Rightarrow v = \frac{0,2284}{\sqrt{\lambda}}$$

Iterace 1: $v = 1 \text{ m/s}$ (odhad)

$$Re = \frac{v d \rho}{\lambda} = \frac{1 \cdot 0,14 \cdot 750}{2,52 \cdot 10^{-4}} = 378767$$

$$\lambda = \frac{0,25}{\left[0,8 \left[\left(\frac{6,81}{378767} \right)^{0,5} + \frac{0,5/140}{3,7} \right] \right]^2} = 0,02793$$

$$v = 1,37 \text{ m/s}$$

Iterace 2: $v = 1,37 \text{ m/s}$ (vřsledek 1. iterace)

$$Re = 518511$$

$$\lambda = 0,02782$$

$$v = \frac{0,2284}{\sqrt{0,02782}} = 1,37 \text{ m/s (iterace 7konverovala)}$$

$$\dot{V} = v \cdot \frac{\pi d^2}{4} = 1,37 \cdot \frac{\pi \cdot 0,14^2}{4} = 0,02109 \text{ m}^3/\text{s} = 1265 \text{ l/min}$$