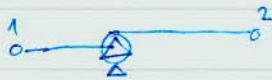


3-15

$$\dot{V} = 3800 \frac{\text{m}^3}{\text{den}}$$



$$\begin{aligned} \rho_1 &= \rho_2 \\ h_1 &= h_2 \\ v_1 &= v_2 \end{aligned}$$

$$e_c = e_{\text{dis}}$$

$$\rho = 900 \text{ kg/m}^3 \quad \eta = 0.04 \text{ Pa}\cdot\text{s}$$

$$L = 32 \text{ km} \quad d = 219 \text{ mm}$$

$$\eta_c = 0.65 \quad \eta_n = 0.82$$

$$v = \frac{\dot{V}}{A} = \frac{3800 \frac{\text{m}^3}{\text{den}}}{86400 \frac{\text{s}}{\text{den}} \cdot \frac{\pi}{4} (0.219)^2} = 1.168 \text{ m/s}$$

$$Re = \frac{v d \rho}{\eta} = \frac{1.168 \cdot 0.219 \cdot 900}{0.04} = 5753$$

$$\lambda = 0.25 / \left\{ \log \left[\left(\frac{681}{Re} \right)^{0.9} + \frac{\epsilon/d}{3.7} \right] \right\}^2$$

$$\epsilon = 0.82 \text{ mm}$$

$$0.06232 \quad 0.000247$$

$$\lambda = 0.25 / 6.709 = 0.03726$$

$$e_{\text{dis}} = \lambda \cdot \left(\frac{L}{d} \right) \frac{v^2}{2} = 0.03726 \cdot \left(\frac{32000}{0.219} \right) \frac{1.168^2}{2} = 3179.52 \text{ J/kg}$$

$$\dot{m} = \frac{3800 \frac{\text{m}^3}{\text{den}}}{86400 \frac{\text{s}}{\text{den}}} \cdot 900 \frac{\text{kg}}{\text{m}^3} = 39.583 \frac{\text{kg}}{\text{s}}$$

$$146999$$

$$P_h = 39.58 \cdot 3179.52 = 125856 \text{ W}$$

$$P_c = P_h / 0.65 \cdot 0.82 = \frac{256991}{220000} \text{ W} = 220000 \text{ W} = 220.000 \text{ kW}$$

$$P_c \cdot 24 = 5280 \text{ kWh} = 6168 \text{ kW}\cdot\text{h}$$