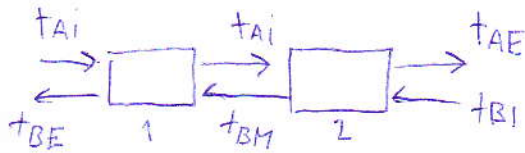


10-2



A - ethanol B - voda

$$t_{Ai} = 78^\circ\text{C} \quad t_{Ae} = 20^\circ\text{C}$$

$$t_{Bi} = 10^\circ\text{C} \quad t_{Be} = 65^\circ\text{C}$$

$$\dot{m}_B = 0,28 \text{ kg/s}$$

$$k_1 = 1400 \text{ W/m}^2\text{K}$$

$$k_2 = 230 \text{ W/m}^2\text{K}$$

$$c_{PA} (49^\circ\text{C}) = 2889,97 \text{ J/kgK}$$

$$c_{PB} (37,5^\circ\text{C}) = 4182 \text{ J/kgK}$$

$$\Delta h_{v\dot{P},A} (78^\circ) = 837412 \text{ J/kg}$$

$$\dot{m}_A \cdot (c_{PA} \cdot (t_{Ai} - t_{Ae}) + \Delta h_{v\dot{P},A}) = \dot{Q} = \dot{m}_B \cdot c_{PB} \cdot (t_{Be} - t_{Bi})$$

$$\dot{m}_A \cdot (2,890 \cdot (78 - 20) + 837,4) = 0,28 \cdot 4,182 \cdot (65 - 10)$$

$$\dot{m}_A = 0,06408 \text{ kg/s} \Rightarrow \underline{\underline{230,7 \text{ kg/hod}}}$$

$$\dot{m}_A \cdot \Delta h_{v\dot{P},A} = \dot{Q}_1 = \dot{m}_B \cdot c_{PB} \cdot (t_{Be} - t_{Bm})$$

$$t_{Be} - t_{Bm} = \frac{\dot{m}_A}{\dot{m}_B} \frac{\Delta h_{v\dot{P},A}}{c_{PB}} = \frac{0,06408}{0,28} \frac{837,412}{4,182}$$

$$t_{Be} - t_{Bm} = 45,227$$

$$\underline{\underline{t_{Bm} = 19,173^\circ\text{C}}}$$

$$\dot{Q}_1 = \dot{m}_A \Delta h_{v\dot{P},A} = 0,06408 \cdot 837,412 = 53,66 \text{ kW/s}$$

$$\dot{Q}_2 = \dot{m}_A \cdot c_{PA} \cdot (t_{Ai} - t_{Ae}) = 0,06408 \cdot 2,890 \cdot (78 - 20) = 10,79 \text{ kW/s}$$

$$\Delta T_{LS1} = \frac{(78 - 65) - (78 - 19,17)}{\ln \frac{78 - 65}{78 - 19,17}} = \frac{13 - 58,83}{\ln \frac{13}{58,83}} = 30,36^\circ\text{C}$$

$$\Delta T_{LS2} = \frac{(78 - 19,17) - (20 - 10)}{\ln \frac{78 - 19,17}{20 - 10}} = \frac{58,83 - 10}{\ln \frac{58,83}{10}} = 27,56^\circ\text{C}$$

$$\dot{Q} = k \cdot A \cdot \Delta T_{LS}$$

$$\left. \begin{aligned} A_1 &= \frac{\dot{Q}_1}{k_1 \Delta T_{LS1}} = \frac{53,66}{1,4 \cdot 30,36} = 1,26 \text{ m}^2 \\ A_2 &= \frac{\dot{Q}_2}{k_2 \Delta T_{LS2}} = \frac{10,79}{0,23 \cdot 27,56} = 1,69 \text{ m}^2 \end{aligned} \right\} A = A_1 + A_2 = \underline{\underline{2,95 \text{ m}^2}}$$