

voliteľná úloha

11-5

$w_0 = 0,08$

$w_1 = 0,45$

$\dot{m}_{R0} = 20\,000 \text{ kg/h}$

$t_{R0} = 25^\circ\text{C}$

organika ve vode

$c_{p,R0} = 3,91 \text{ kJ/kg}\cdot\text{K}$

$t_P = 120^\circ\text{C}$

$P_K = 13,3 \text{ kPa}$

$K = 2800 \frac{\text{W}}{\text{m}^2\cdot\text{K}}$

$\dot{m}_P = ?$

$\dot{m}_C = ? \quad t_{ci} = 10^\circ\text{C} \quad t_{ce} - \text{plota kond. par}$

$A = ?$

$w_0 \cdot \dot{m}_{R0} = w_1 \cdot \dot{m}_{R1} \quad \dot{m}_{R1} = \frac{0,08 \cdot 20\,000}{0,45} = 3555,6 \text{ kg/h}$

$\dot{m}_{B1} = 16\,444,4 \text{ kg/h}$

$c_{p,R0} = (w_0 \cdot c_{pS} + (1-w_0) \cdot c_{pL})$

$c_{pS} = \frac{1}{w_0} \cdot (c_{p,R0} - (1-w_0) \cdot c_{pL}) = \frac{1}{0,08} \cdot (3,91 - 0,92 \cdot 4,18) = 0,805 \frac{\text{kJ}}{\text{kg}\cdot\text{K}}$

$h_{R0} = 3,91 \cdot 25 = 97,75 \text{ kJ/kg}$

$t_{R1} = 51,5^\circ\text{C}$

$51^\circ\text{C} \quad 12,97 \text{ kPa}$

$52^\circ\text{C} \quad 13,62 \text{ kPa}$

$x \quad 13,3 \text{ kPa} \quad x_{R0}$

$x = \frac{1}{0,65} (0,33) = 0,5$

$h_{R1} = (0,45 \cdot 0,805 + 0,55 \cdot 4,18) \cdot 51,5 = 137,0 \text{ kJ/kg}$

$h_{B1} = 2593 \text{ kJ/kg} \quad (\text{tab. pro } 51^\circ\text{C})$

$\dot{m}_{R0} \cdot h_{R0} + Q_P = \dot{m}_{R1} \cdot h_{R1} + \dot{m}_{B1} \cdot h_{B1}$

$Q_P = 3555,6 \cdot 137 + 16\,444,4 \cdot 2593 - 20\,000 \cdot 97,75$

$Q_P = 41,17 \cdot 10^6 \text{ kJ/h}$

$\Delta h_{LV} / \text{para } 120^\circ\text{C} = 2202,4 \text{ kJ/kg}$

$\dot{m}_P = Q_P / \Delta h_{LV} = 41,17 \cdot 10^6 / 2202,4 = 18\,694 \text{ kg/h} \Rightarrow \underline{\underline{5,19 \text{ kg/s}}}$ práky káč

$Q_C = \dot{m}_{B1} \Delta h_{LV} / 51^\circ\text{C} = 2379,5 \cdot 16444,4 = 39,12 \cdot 10^6 \text{ kJ/h}$

$\dot{m}_C = Q_C / [c_{pL} \cdot (51 - 10)] = 39,12 \cdot 10^6 / (4,18 \cdot 41) = 228\,320 \text{ kg/h} \Rightarrow \underline{\underline{63,4 \text{ kg/s}}}$ chl. vod.

$A = \frac{Q_P}{k \cdot \Delta t}$
 $= \frac{41,17 \cdot 10^6 \cdot 1000}{3600 \cdot 2800 \cdot (120 - 51)}$
 $= \underline{\underline{59,2 \text{ m}^2}}$