

(Kond-3) $d_o = 56 \text{ mm}$, $d_i = 52 \text{ mm}$, $T_b = 50^\circ \text{C}$, $T_w = 29,7^\circ \text{C} \Rightarrow T_f = 40^\circ \text{C}$

$$(21-20): h = 0,943 \left(\frac{\rho_L g k^3 (\rho_L - \rho_v) (h_{fg} + \frac{3}{8} c_{pL} (T_{sat} - T_w))}{L \mu (T_{sat} - T_w)} \right)^{1/4} =$$

$$= \left\{ \begin{array}{l} h_{fg} (50^\circ \text{C}) = 2382 \text{ kJ/kg} \cdot \text{K} \\ \rho_L (40^\circ \text{C}) = 992,2 \text{ kg/m}^3, \rho_v (50^\circ \text{C}) = 0,0906 \text{ kg/m}^3 \quad k_L (40^\circ \text{C}) = 0,633 \text{ W/m} \cdot \text{K} \\ c_{pL} (40^\circ \text{C}) = 4175 \text{ J/kg} \cdot \text{K} \quad \mu (40^\circ \text{C}) = 656 \cdot 10^{-6} \text{ Pa} \cdot \text{s} \end{array} \right\}$$

$$= \frac{4344}{L^{1/4}} \text{ W/m}^2 \cdot \text{K}$$

$$\left. \begin{array}{l} \text{VB utsida: } \dot{Q} = \dot{m}_{kond} \cdot h_{fg} \\ \text{Överförd: } \dot{Q} = h A (T_{sat} - T_w) \end{array} \right\} \dot{m}_{kond} \cdot h_{fg} = h A (T_{sat} - T_w)$$

Sätt in uttrycket för h i ekvationen

$$\Rightarrow \dot{m}_{kond} \cdot h_{fg} = \frac{4344}{L^{1/4}} \cdot \pi d_o \cdot L (T_{sat} - T_w) \quad \text{Lös ut } L$$

$$\Rightarrow L^{3/4} = \frac{\dot{m}_{kond} \cdot h_{fg}}{4344 \cdot \pi d_o (T_{sat} - T_w)} = \frac{7 \cdot 10^3 \cdot 2382000}{4344 \pi \cdot 56 \cdot 10^{-3} (50 - 29,7)} =$$

$$= 1,075 \text{ m}^{3/4}$$

$$\Rightarrow L = 1,075^{4/3} = 1,10 \text{ m}$$