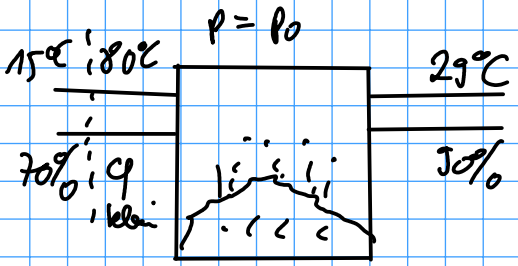
Aufgabe 3



$\Delta \dot{m}_d = 500 \frac{kg}{h}$

Idee: x_1, x_2 berechnen

$$x = \frac{M_W}{M_L} \frac{\varphi p_S(T)}{p - \varphi p_S(T)}$$

$p_S(15°C) = 0{,}017066\ bar$

$x_1 = 0{,}007419$

$= 7{,}419 \frac{g}{kg}$

$p_S(29°C) = 0{,}040093\ bar$

$x_2 = 0{,}02297$

$$x_{1,2} = \frac{\dot{m}_{W1,2}}{\dot{m}_L}$$

$$\dot{m}_{W1,2} = \dot{m}_L x_{1,2}$$

$$\Delta \dot{m}_d = \dot{m}_{W2} - \dot{m}_{W1}$$

$$= \dot{m}_L (x_2 - x_1)$$

$$\Rightarrow \dot{m}_L = \frac{\Delta \dot{m}_d}{x_2 - x_1}$$

$$= 8{,}929 \frac{kg}{s}$$

$$\rho_1 = \frac{p M_L}{R T_1} \left(1 - 0{,}378\, \varphi_1 \frac{p_s}{p}\right)$$

$$= 1{,}219 \frac{kg}{m^3}$$

$$\rho_1 = \frac{\dot{m}_1}{\dot{V}_1}$$

$$\dot{m}_1 = \dot{m}_L + \dot{m}_{W1}$$

$$= \dot{m}_L + \dot{m}_L x_1$$

$$= \dot{m}_L (1 + x_1)$$

$$= 8{,}995 \frac{kg}{s}$$

$$\dot{V}_1 = \frac{\dot{m}_1}{\rho_1} = 7{,}381 \frac{m^3}{s}$$