

FIR számítási zH  
2013

C csop

①

$V = 1200 \text{ l}$

$W = 400 \text{ l/h}$

$T_{BE} = 10^\circ\text{C}$

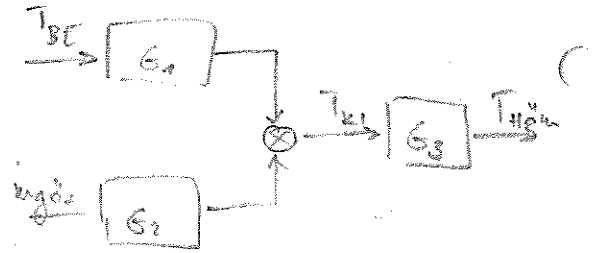
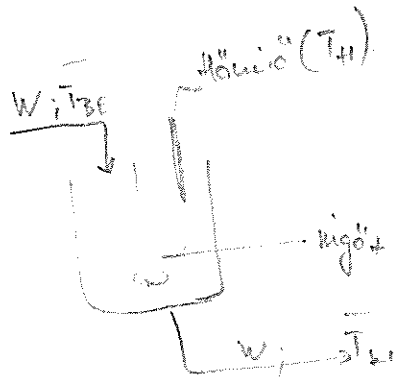
$T_{k1} = 80^\circ\text{C}$

$T = 2400 \text{ Wh/kg}$

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

$T_{H1} = 6 \text{ perc}$

$T_{3E}(\infty) = 5^\circ\text{C} \Rightarrow a = -5^\circ\text{C}$



$$G_1 = \frac{T_{k1}}{T_{BE}} = \frac{1}{\frac{V}{W} s + 1} = \frac{1^\circ\text{C}/\text{C}}{(3 \text{ h}) s + 1}$$

$$G_2 = \frac{T_{k1}}{\text{Hővíz}} = \frac{T}{W \Sigma c_p} = \frac{2400 \text{ Wh/kg}}{0,001 \text{ h} \cdot 1000 \text{ Wh/l} \cdot 4,18} = \frac{1^\circ\text{C}/\text{C}}{3 \text{ h} s + 1}$$

$$= \frac{14,35^\circ\text{C}/\text{C}}{3 \text{ h} s + 1}$$

$$G_3 = \frac{T_{H1}}{T_{k1}} = \frac{1^\circ\text{C}/\text{C}}{(0,1 \text{ h}) s + 1}$$

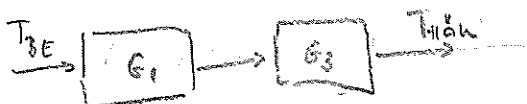
c)  $T_{k1}(t) = \bar{T}_{k1} + \hat{T}_{k1} = \bar{T}_{k1} + a k_1 (1 - e^{-\frac{t}{T_H}})$   
 $= 80^\circ\text{C} - 5^\circ\text{C} \cdot 1^\circ\text{C}/\text{C} (1 - e^{-\frac{t}{3 \text{ h}}})$

d)  $76^\circ\text{C} = 80^\circ\text{C} - 5^\circ\text{C} (1 - e^{-\frac{t}{3 \text{ h}}})$

$0,2 = e^{-\frac{t}{3 \text{ h}}}$

$-1,609 = -\frac{t}{3 \text{ h}} \Rightarrow t = 4,82 \text{ h}$

$T_{H1}(4,82) = 80^\circ\text{C} - 5^\circ\text{C} \left( 1 - \frac{1}{3 \cdot 0,1} \left( 3 e^{-\frac{4,82}{3}} - 0,1 e^{-\frac{4,82}{0,1}} \right) \right)$   
 $= 80 - 3,96 = 76,04^\circ\text{C}$



$T_{H1} = \bar{T}_{H1} + a k_1 k_H \left( 1 - \frac{1}{T_1 - T_H} \left( T_1 e^{-t/T_1} - T_2 e^{-t/T_H} \right) \right)$

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2013

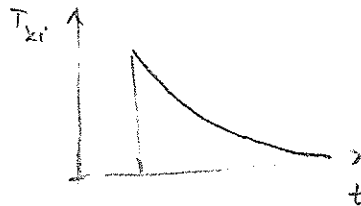
C coop

e,



$$G_2 = \frac{1,435^\circ\text{C/kg/L}}{3h s + 1}$$

a = 50 kg gás, impulzus



Súlyfu:  $T_{ki} = \bar{T}_{ki} + \hat{T}_{ki} = \bar{T}_{ki} + \frac{a k}{T} e^{-t/\tau}$

$$T_{ki} = 80^\circ\text{C} + \frac{50 \text{ kg} \cdot 1,435^\circ\text{C/kg/L}}{3h} e^{-\frac{t}{3h}}$$

$$= 80^\circ\text{C} + \underbrace{23,9^\circ\text{C}}_{\frac{1}{2} = 20^\circ\text{C}} e^{-t/3h}$$

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f,  $\Delta p_{S2} = 0,2 \text{ bar}$   $w_{gás} = 50 \text{ kg/L}$   $q_g = \frac{2 \cdot 10^5 \cdot 18 \cdot 10^{-3}}{8,314 (393)} = 1,1 \text{ kg/L}$

$$\Rightarrow w_{gás, illeni} = 45,38 \text{ m}^3/\text{h}$$

$$\frac{W_{ii}}{W_{max}} = \frac{H}{H_{max}} = 0,5 \Rightarrow W_{max} = 2 \cdot W_{ii} = 30,76 \text{ m}^3/\text{h}$$

$$W_{max} = k_{max} \sqrt{\frac{\Delta p_{rel}}{\rho_{int}}} = k_{max} \sqrt{\frac{0,2 \text{ bar}}{10 \text{ bar}}} = k_{max} \cdot 13,48 \Rightarrow k_{max} = \frac{30,76}{13,48} = \underline{\underline{6,13}}$$

g  $\frac{W}{W_{max}} = \sqrt{\frac{H}{H_{max}}} = \sqrt{0,5} \Rightarrow W_{max} = 64,18 \Rightarrow k_{max} = \underline{\underline{4,76}} \text{ m}^3/\text{h}$

h  $\frac{W}{W_{max}} = e^{4 \cdot 0,5 - 4} = 0,135 \Rightarrow W_{max} = 335,31 \Rightarrow k_{max} = \underline{\underline{24,82}} \text{ m}^3/\text{h}$