

$$\eta_{\theta} = \frac{(\Delta h)_{\text{επιτόνωσης}} - (\Delta h)_{\text{αερίων}}}{(\dot{Q}_1)_{\text{ολικό}}}$$

(Δh) ΕΠΙΤΡΩΘΕΩΝ :

(Δh) ΑΠΟΔΙΩΝ :

$$(h_4 - h_6) \cdot 1$$

$$(h_2 - h_1) \cdot (1 - m_1)$$

$$(h_7 - h_8) \cdot (1 - m_1)$$

$$(h_m - h_n) \cdot 1$$

(Q₁) ΟΛΙΚΟ :

$$(h_4 - h_m) \cdot 1$$

$$(h_7 - h_6) \cdot (1 - m_1)$$

ΥΠΟΛΟΓΙΣΜΟΣ ΕΝΘΑΛΠΙΩΝ

ΣΗΜ. Δ

$$P_4 = 50 \text{ bar}$$
$$t_4 = 440 (^\circ\text{C})$$

$$\rightarrow \begin{aligned} h_4 &= 3294 \text{ (kJ/kg)} \\ s_4 &= 6,789 \text{ (kJ/kg}\cdot\text{K)} \end{aligned}$$

ΣΗΜ. Ζ

$$P_7 = 5 \text{ bar}$$
$$t_7 = 440 (^\circ\text{C})$$

$$\rightarrow \begin{aligned} h_7 &= 3356,1 \\ s_7 &= 7,916 \end{aligned}$$

ΣHM. 1

$p_1 = 0,05 \text{ bar}$

$t_1 = 32,898 \text{ (}^\circ\text{C)}$

$v_1 = 0,0010052 \text{ (m}^3\text{/kg)}$

$h_1 = 137,77 \quad r = 2423,8$

$s_1 = 0,4763$

ΣHM. k : $h_k = h_1 + v_1 \cdot (p_k - p_1) = 137,77 + 0,0010052 \cdot (5 - 0,05) \times 10^2$
 $p = 5 \text{ bar} \quad = 138,267 \text{ (kJ/kg)}$

ΣHM. 1

\Rightarrow ΣHM. M

$p = 5 \text{ bar}$

$p = 50 \text{ (bar)}$

$t_1 = 151,84 \text{ (}^\circ\text{C)}$
 $v_1 = 0,0010928$

$h_1 = 640,12$
 $r = 2107,4$

$s_1 = 1,8604 \text{ (kJ/kg} \cdot \text{K)}$

$h_M = h_1 + v_1 \cdot (p_M - p_1) = 640,12 + 0,0010928 \cdot (50 - 5) \times 10^2 =$
 $= 645,037 \text{ (kJ/kg)}$

ΣHM. 6

($p = 5 \text{ bar}$)

$h_6 = h_1 + r \cdot x_6$

$s_4 = s_6 = s_1 + \frac{r}{T} \cdot x_6 \Rightarrow$

$\Rightarrow x_6 = \frac{s_4 - s_1}{r} \cdot T = \frac{6,789 - 1,8604}{2107,4} \cdot (151,84 + 273,15) =$

$= 0,994$

$h_6 = 640,12 + 2107,4 \cdot 0,994 = 2734,875 \text{ (kJ/kg)}$

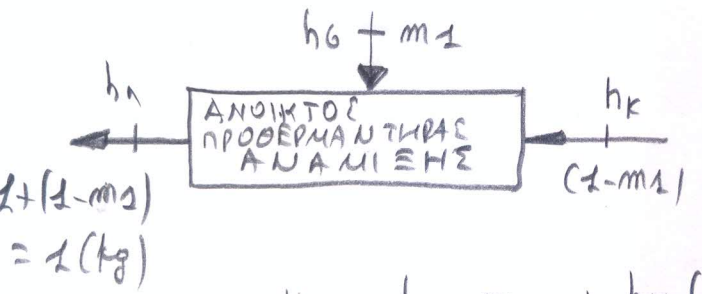
$$h_8 = h_{11} + r \cdot x_8$$

$$S_7 = S_8 = S_1 + \frac{r}{T} \cdot x_8$$

$$x_8 = \frac{S_7 - S_1}{r} \cdot T = \frac{7,916 - 0,4763}{2423,8} \cdot (32,898 + 2 \cdot 3,15) = 0,939$$

$$h_8 = 137,77 + 2423,8 \cdot 0,939 = 2413,718 \text{ (KJ/kg)}$$

Υπολογισμός ποσότητας (m1):



$$1 \cdot h_n = h_6 \cdot m_1 + h_k \cdot 1 + h_k \cdot m_1$$

$$1 \cdot h_n - h_k \cdot 1 = (h_6 - h_k) \cdot m_1$$

$$1 \cdot h_n = h_6 \cdot m_1 + h_k (1 - m_1)$$

$$\rightarrow m_1 = \frac{h_n - h_k}{h_6 - h_k} = \frac{640,12 - 138,267}{2734,875 - 138,267} = 0,193$$

Δh) εντροπών :

$$(h_4 - h_6) \cdot 1 + (h_7 - h_8) \cdot (1 - m_1) =$$

$$(3294 - 2734,875) \cdot 1 + (3356,1 - 2413,718) \cdot (1 - 0,193) = 559,125 + 760,502 = 1319,627 \text{ (KJ)}$$

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$$(h_k - h_1) \cdot (1 - m_1) + (h_u - h_n) \cdot 1 =$$

$$(138,267 - 137,77) \cdot (1 - 0,193) + (645,037 - 640,12) \cdot 1 =$$
$$= 5,318 \text{ (kJ)}$$

(9) Q_{110} :

$$(h_4 - h_1) \cdot 1 + (h_7 - h_6) \cdot (1 - m_1) =$$

$$(3294,0 - 137,77) \cdot 1 + (3356,1 - 2734,875) \cdot (1 - 0,193) =$$
$$3156,23 + 501,328 =$$

$$= 3657,558 \text{ (kJ)}$$

$$\eta_0 = \frac{1319,627 - 5,318}{3657,558} = 0,359$$