Aufgabe 16

$p_2 = p_3 = 0{,}1\,\text{bar}$, $p_1 = p_4 = 60\,\text{bar}$, $T_1 = 500°C$

③ p_3, Dampfdruckkurve, $x = 0$, $h = h'$, $s = s'$

$h_3 = 191{,}8\ \frac{kJ}{kg}$, $s_3 = 0{,}6492\ \frac{kJ}{kg\,K}$

④ p_4, $s_4 = s_3$, Wassertafel $\Rightarrow h_4 = 198{,}4\ \frac{kJ}{kg}$

① p_1, T_1, Heißdampfgebiet

$h_1 = 3423\ \frac{kJ}{kg}$, $s_1 = 6{,}883\ \frac{kJ}{kg\,K}$

② p_2, $s_2 = s_1$, Nassdampf

linear Interpol. $\Rightarrow s_2' = 0{,}6492\ \frac{kJ}{kg\,K}$, $s_2'' = 8{,}149\ \frac{kJ}{kg\,K}$

$s_2 = s_2' + x_2 (s_2'' - s_2') \Rightarrow x_2 = \frac{s_2 - s_2'}{s_2'' - s_2'} = 0{,}8311$

$h_2' = 191{,}8\ \frac{kJ}{kg}$, $h_2'' = 2584\ \frac{kJ}{kg}$

$\Rightarrow h_2 = h_2' + x_2 (h_2'' - h_2') = 2180\ \frac{kJ}{kg}$

$\eta_{th} = 1 - \frac{h_2 - h_3}{h_1 - h_4} = 0{,}3835$

$\sigma_v = 1 - \frac{h_4 - h_3}{h_1 - h_2} = 0{,}9947$