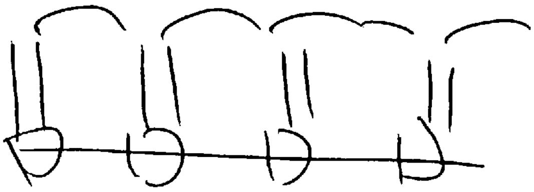
7//

1 bar
32°C



112 bar

$n = 1.28$

$R_p = 112$

$r_p = 112^{1/4} = 3.253$

$W/\text{cycle} = 4 \frac{n}{n-1} p_i V_i \left(r_p^{\frac{n-1}{n}} - 1\right)$

$\dot{W} = 4 \frac{n}{n-1} p_i \dot{V}_i \left(r_p^{\frac{n-1}{n}} - 1\right)$

if $\dot{W} = 1 \text{ kW}$

then $1 = 4 \frac{1.28}{1.28-1} \times 100 \times \dot{V}_i \left(3.253^{\frac{1.28-1}{1.28}} - 1\right)$

$\therefore \dot{V}_i = 0.001858 \text{ m}^3/\text{s}$

$= 6.687 \text{ m}^3/\text{h}$. (@ 32°C & 1 bar)

at standard SSL conditions

$\dot{m} = \frac{p_i \dot{V}_i}{R T_i} = \frac{p_s \dot{V}_s}{R T_s}$

$\therefore \dot{V}_s = 6.687 \times \frac{15+273}{32+273} \times \frac{100}{101.325} = \underline{6.232 \text{ m}^3/\text{kWh}}$

$\frac{T_f}{T_i} = r_p^{\frac{n-1}{n}} \quad = (32+273)\ 3.253^{\frac{1.28-1}{1.28}}$

$= 394.8 \text{ K}$

$= \underline{121.8 \text{ °C}}$