Termodinamički zakoni

Prvi zakon termodinamike

- integralni oblik

$$Q = \Delta U + W$$

$$\Delta U = U_2 - U_1$$

$$W = \int_{V_1}^{V_2} p \mathrm{d}V$$

- diferencijalni oblik

$$\delta Q = \mathrm{d}U + \delta W$$

Rad pri promjenama stanja plina

- izobaran proces

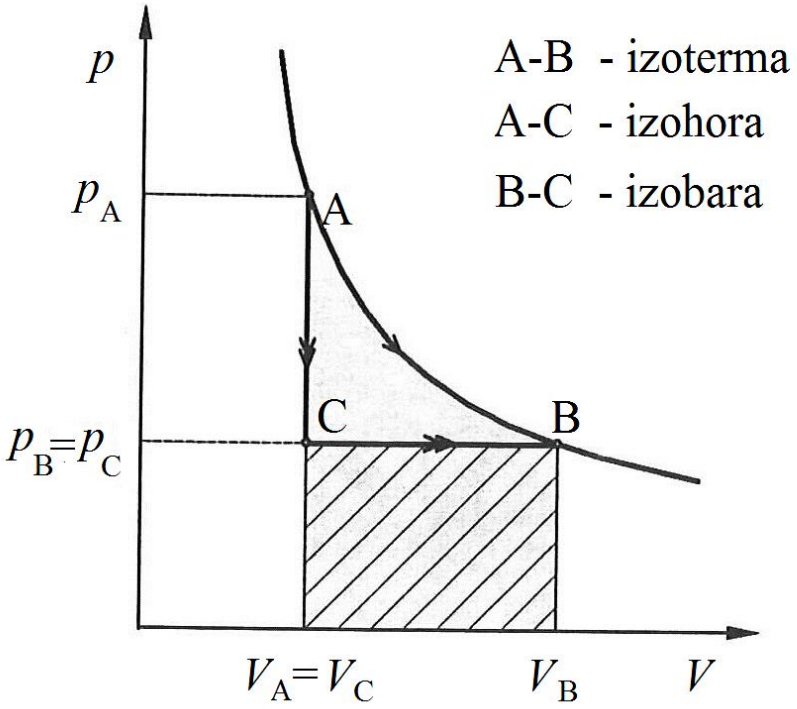
$$W = p(V_2 - V_1)$$

- izoterman proces

$$W = nRT \ln \frac{V_2}{V_1} = nRT \ln \frac{p_1}{p_2}$$

- adijabatski proces

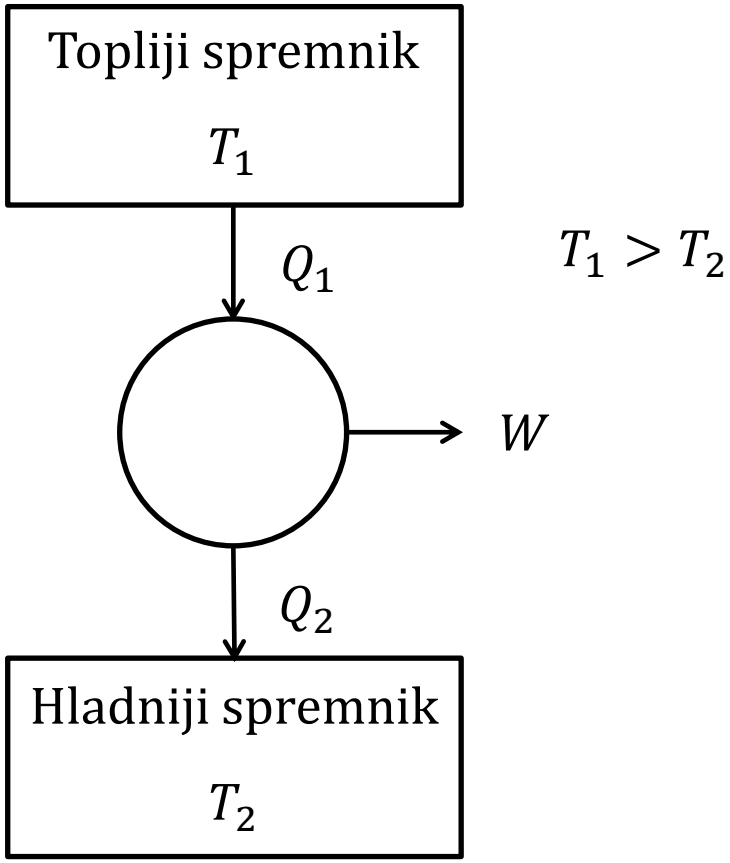
$$W = \frac{nR}{\kappa - 1}(T_1 - T_2)$$



Poissonove jednadžbe

$$\frac{p_1}{p_2} = \left(\frac{V_2}{V_1}\right)^{\kappa} \qquad \frac{T_1}{T_2} = \left(\frac{V_2}{V_1}\right)^{\kappa - 1} \qquad \frac{T_1}{T_2} = \left(\frac{p_1}{p_2}\right)^{\frac{\kappa - 1}{\kappa}}$$

Drugi zakon termodinamike



- rad

$$W = |Q_1| - |Q_2| = Q_1 + Q_2$$

- faktor korisnosti

$$\eta = \frac{W}{Q_1}$$

- Carnotov kružni proces

$$\eta_C = 1 - \frac{T_2}{T_1}$$