

## FORMULAS

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|--|--|--|--|
| $PV = mRT$   |  |  | <b>Adyabatik Proses</b><br>$PV^k = sbt(\text{const.})$<br>$\frac{P_1}{P_2} = \left(\frac{V_2}{V_1}\right)^k$   |
| $\underbrace{E_{\text{in}} - E_{\text{out}}}_{\text{Net energy transfer by heat, work, and mass}} = \underbrace{\Delta E_{\text{system}}}_{\text{Change in internal, kinetic, potential, etc., energies}} \quad (\text{kJ})$ |  |  | <b>Sabit Basınç Prosesi</b><br>$(P=\text{Constant})$<br>$\frac{V_1}{V_2} = \frac{T_1}{T_2}$<br>$Q = \Delta H$<br>$W_{12} = P(V_2 - V_1)$<br>$= mR(T_2 - T_1)$  |
| $Q - W = \Delta U + \Delta KE + \Delta PE \quad (\text{kJ})$   |  |  | <b>Sabit Sıcaklık Prosesi</b><br>$(T=\text{constant})$<br>$\frac{P_1}{P_2} = \frac{V_2}{V_1}$<br>$W_{12} = mRT \ln\left(\frac{V_2}{V_1}\right) = Q$  |
| $\Delta u = u_2 - u_1 = \int_1^2 c_v(T) dT$<br>$\Delta h = h_2 - h_1 = \int_1^2 c_p(T) dT$<br>$h = u + Pv$   |  |  | <b>Sabit Hacim Prosesi</b><br>$(V=\text{sbt}=\text{Constant})$<br>$\frac{P_1}{P_2} = \frac{T_1}{T_2}$<br>$Q = mc_n(T_2 - T_1)$   |
| $C_p = \frac{R \cdot k}{k - 1}$<br>$C_V = \frac{R}{k - 1}$<br>$c_p - c_v = R$<br>$k = \frac{c_p}{c_v}$<br>$\eta = \frac{W_{\text{net}}}{\sum Q_{\text{giren}}}$  |  |  | $W_{12} = \int_1^2 P dv$   |
| $z = \frac{v_{\text{gerçek}}}{v_{\text{ideal}}}$<br>$P_v = zRT$<br>$P_R = \frac{P}{P_{kr}}$<br>$T_R = \frac{T}{T_{kr}}$  |  |  | <p>A p-v diagram with Pressure (p) on the vertical axis and Volume (v) on the horizontal axis. Four curves originate from the same point on the p-axis at low volume. The top curve is labeled <math>n=0</math> and is a horizontal line, labeled <math>P = \text{sabit (const.)}</math>. The middle curve is labeled <math>n=1</math> and is a straight line passing through the origin, labeled <math>T = \text{sabit (constant)} n=1</math>. The bottom curve is labeled <math>1 &lt; n &lt; \infty</math> and is a convex curve, labeled <math>\text{Politropik (polynomial)} n = n</math>. The bottom-most curve is labeled <math>k</math> and is a straight line with a positive slope, labeled <math>\text{Adyabatik (adiabatic)} n = k</math>.</p> |

$$Q - W + \sum m_g (h_g + \frac{v_g^2}{2} + g z_g) - \sum m_c (h_c + \frac{v_c^2}{2} + g z_c) = (m_2 v_2 - m_1 v_1)_{kh}$$

$$\dot{Q} - \dot{W} + \sum m_g (h_g + \frac{v_g^2}{2} + g z_g) - \sum m_c (h_c + \frac{v_c^2}{2} + g z_c) = 0$$

$$\eta_{IM} = \frac{w_{net, \text{çıkan}}}{Q_{giren}}$$

$$\eta_{IM} = 1 - \frac{Q_{çıkan}}{Q_{giren}}$$

$$\eta_{IM, tr} = 1 - \frac{T_L}{T_H}$$

$$COP_{SM} = \frac{Q_L}{w_{net, \text{giren}}}$$

$$COP_{SM} = \frac{1}{(\frac{Q_H}{Q_L}) - 1}$$

$$COP_{SM, tr} = \frac{1}{(\frac{T_H}{T_L}) - 1}$$

$$COP_{IP} = \frac{Q_H}{w_{net, \text{giren}}}$$

$$COP_{IP} = \frac{1}{1 - (\frac{Q_L}{Q_H})}$$

$$COP_{IP, tr} = \frac{1}{1 - (\frac{T_L}{T_H})}$$

$$\oint \frac{\delta Q}{T} \leq 0$$

Siviller, katiller

$$S_2 - S_1 = C_{crt} \cdot \ln \frac{T_2}{T_1}$$

Mükemmel gazlar

$$S_2 - S_1 = C_{V, \text{ort}} \cdot \ln \frac{T_2}{T_1} + R \ln \frac{V_2}{V_1}$$

$$S_2 - S_1 = C_{P, \text{ort}} \cdot \ln \frac{T_2}{T_1} - R \ln \frac{P_2}{P_1}$$

$$\frac{\sum Q}{T} + \sum_{in} m_i \cdot s_i - \sum_{out} m_o s_o + s_{gen} = S_2 - S_1 = \Delta S$$

$$TdS = dU + P_dV \quad S_g - S_c + \text{Suretim} = \Delta S_{\text{sistem}}$$

Açık sistem sürekli rejim

$$TdS = dh - v dP \quad \Delta S_{top} = S_{ur} = m_c s_c - m_g s_g + \frac{Q_{cev}}{T_{cev}}$$

$$\eta_{\text{Turbin}} = \frac{w_{\text{gerçek}}}{w_{\text{izotropik}}}$$

$$\eta_{\text{pompa}} = \frac{w_{\text{izotropik}}}{w_{\text{gerçek}}}$$

$$\eta_{\text{komp.}} = \frac{w_{\text{izotropik}}}{w_{\text{gerçek}}}$$

