

Boundary Work for Polytropic Processes

Boundary Work

$$W_b = \int_{v_1}^{v_2} P dV$$

General Polytropic Work

$$W = \frac{P_2 V_2 - P_1 V_1}{1 - n} \quad (n \neq 1)$$

Const. Pressure Work (n=0)

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

Isothermal Work (n=1) *ideal gas*

$$W = mRT \ln\left(\frac{V_2}{V_1}\right) = mRT \ln\left(\frac{p_1}{p_2}\right)$$

Const. Volume Work (dv=0)

$$W_{b-\text{const vol}} = 0$$