Lecture notes

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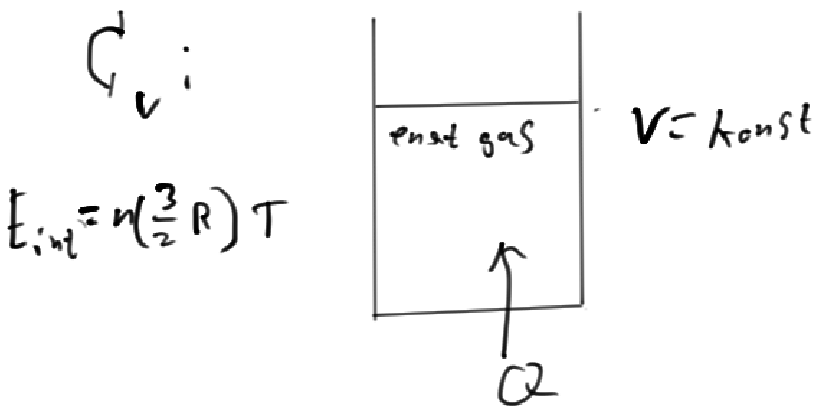
Kretsprocesser

$$Q_{in}$$
$$Q_{ut}$$
$$e = \frac{W_{netto}}{Q_{in}}$$

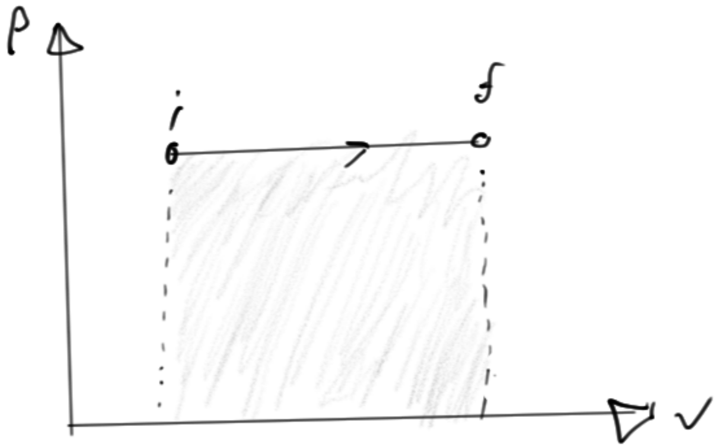
Specifika värmet

$$Q = mc\Delta T$$
$$Q = \ nC_p\Delta T$$
$$Q = \ nC_v\Delta T$$



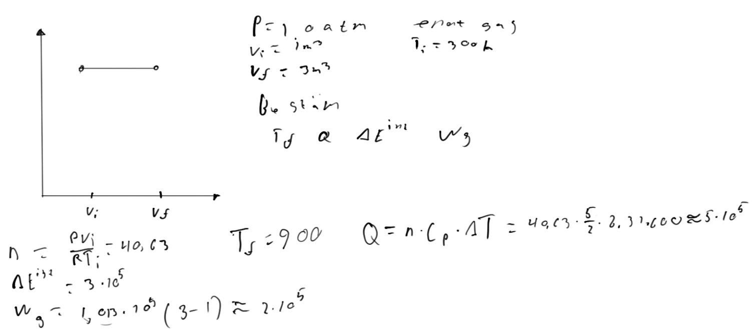
1:a huvudsatsen

$$dQ = dE^{int} + dW_g$$
$$\text{här } dW_g = 0$$
$$dQ = dE^{int}$$
$$Q = \Delta E^{int} = n\frac{3}{2}R * \Delta T$$
$$\underline{C_v = \frac{3}{2}R}$$
$$\underline{C_v = \frac{5}{2}R}\text{två atomig gas}$$



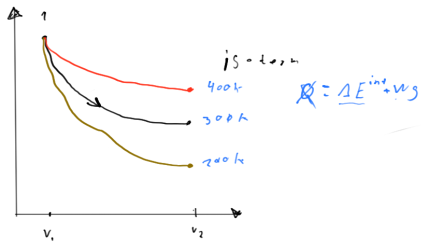
$PV_f = nRT_f$ Allmäna gas lagen

$$Q = \Delta E^{int} + W_g$$
$$Q =, mC_p \Delta T \; E^{int} n \frac{3}{2} R * \Delta T = nC_v \Delta T$$
$$nC_p(T_f - T_i) = nC_v(T_f - T_i) + Wg$$
$$dW_g = PdV = \int_i^f Pdv = P(V_f - V_i)$$
$$nC_p(T_f - T_i) = nC_v(T_f - T_i) + P(V_f - V_i)$$
$$nC_p(T_f - T_i) = nC_v(T_f - T_i) + nR(T_f - T_i) \rightarrow$$
$$\underline{C_p = C_v + R}$$



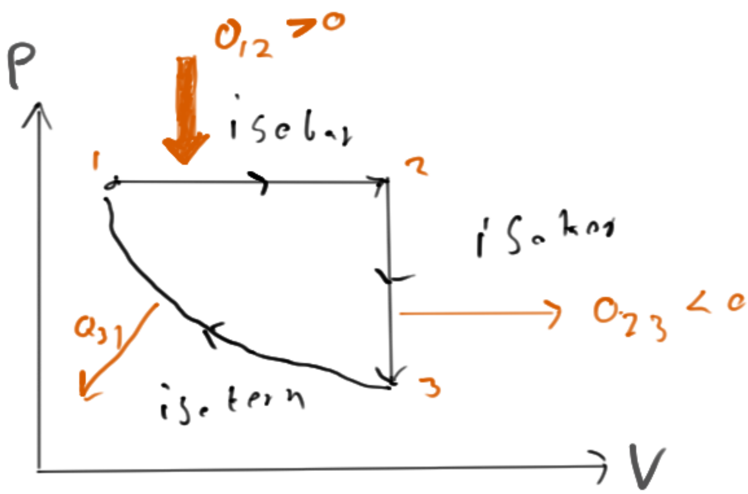
	enat	tvåat
C_v	$\frac{3}{2}R$	$\frac{5}{2}R$
C_p	$\frac{5}{2}R$	$\frac{7}{2}R$

Adiabatisk process



För en isoterm gäller PV=konst. För en adiabat gäller $PV^{\left(\frac{C_p}{C_v}\right)} = konst = PV^{\gamma}$

	isokor	isobar	isoterm	adiabat
Q	$nC_v(T_2 - T1)$	$nC_p(T_2 - T_1)$	$nRT\ln\left(\frac{V_2}{V_1}\right)$	0
ΔE^{int}	$nC_v(T_2 - T_1)$	$nC_v(T_2 - T_1)$	0	$nC_v(T_2 - T_1)$
W_{gas}	0	$P(V_2 - V_1)$	$nRT\ln\left(\frac{V_2}{V_1}\right)$	$nC_v(T_1 - T_2)$



Verknings grad $e = \frac{W_g}{Q_{tillf}} = \frac{\sum Q}{\sum Q_{pos}}$