LIQUIDI E SOLIDI IDEALI

EQUAZIONI DI STATO

FLUIDO INCOMPRIMIBILE

$v = cost$ $\quad c_p = c_v = c$

$du = c\,dT$ $\quad \Delta u = c\cdot(T_f - T_i)$

$dh = c\,dT + v\,dP$ $\quad \Delta h = c(T_f - T_i) + v(P_f - P_i)$

$ds = \frac{c}{T}\,dT$ $\quad \Delta s = c \ln \frac{T_f}{T_i}$

$- \int_0^1 \rightarrow$

* $c = c_x$ NEL CASO NON SI SAPPIA SE c_v O c_p (POLITROPICHE)

TRASFORMAZIONI

- ISOBARA
- ISOENTROPICA

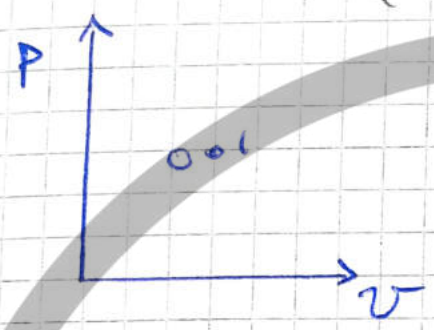
1) ISOBARA: $P = cost$ SCAMBIO DI CALORE ID.

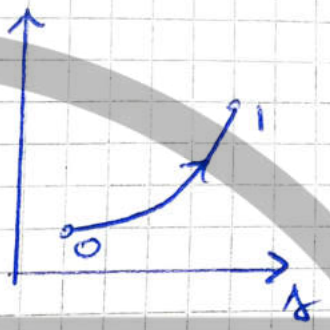
S. CHIUSO	S. APERTO
$q_{in1} = (u_1 + Pv_1) - (u_0 + Pv_0) =$	$q_{in1} = \Delta h$
$= \Delta h$	$l = v(P_{out} - P_{in})$ (→ 0)
$l = -P(v_1 - v_0)$	
I° P	II° P
$q_{in1} = \Delta h$	$\int \frac{\delta q_{in}}{T} = \Delta s$

LIQUIDO IDEALE:

$$q_{in} = \Delta h \overset{!!}{=} c(T_1 - T_0) + v\cancel{(P_1 - P_0)}^{\,0}$$

$$\Delta s \overset{!!}{=} c \cdot \ln\left(\frac{T_1}{T_0}\right)$$





$$\dot{Q} = \dot{m}(h_{out} - h_{in})$$

$$\dot{S}_{irr} = \Delta \dot{S}_{TOT} \left(= \dot{m}_f \Delta s_f + \dot{m}_c \Delta s_c\right) =$$

$$= \dot{m} \cdot f$$

2) ISOENTROPICA $\Delta = cost$ POMPA IS

S. CHIUSO

$L_{in} \left(= -\int P\,dv\right) = \Delta u$

S. APERTO

$L_{in} \left(= \int v\,dP\right) = \Delta h$

➡ LIQUIDO IDEALE

ISO - S + I ⇒ ISO - T

$\Delta s \overset{\downarrow}{=} C \cdot \ln\left(\frac{T_1}{T_0}\right) \Rightarrow \boxed{T_1 = T_0}$

$\downarrow$

0

$L_{(in)} \left(= \dot{m} \int v\,dP\right) = \dot{m}(h_1 - h_0) \overset{\downarrow}{=} v(P_f - P_i)$

BI° P

$L_{(in)} = \dot{m}(h_{out} - h_{in})$

BII° P

$\cancel{\dot{S}_{Q(in)}} - \cancel{\dot{S}_{Q_{out}}} + \cancel{\dot{S}_{irr}} = \dot{m}(\Delta_{out} - \Delta_{in}) \Rightarrow \Delta_{out} = \Delta_{in}$