MARCH MEETING, MIFP, 20.03.2012

FISICA di un BUON CAFFE'

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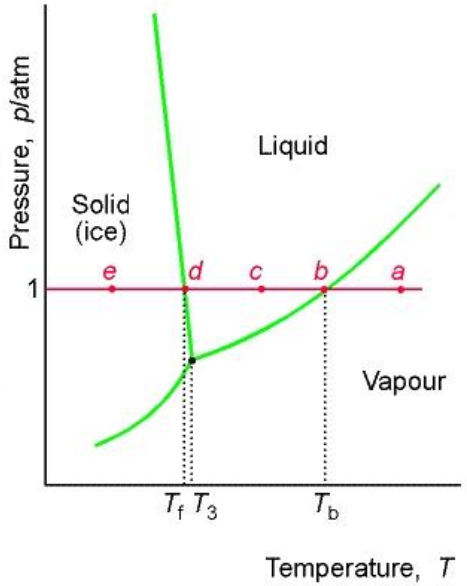
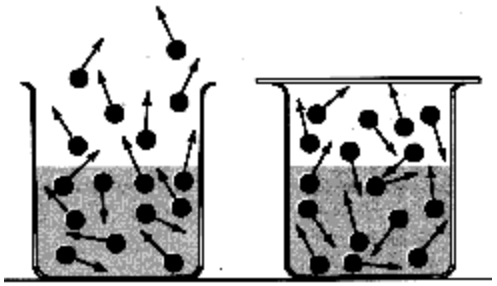
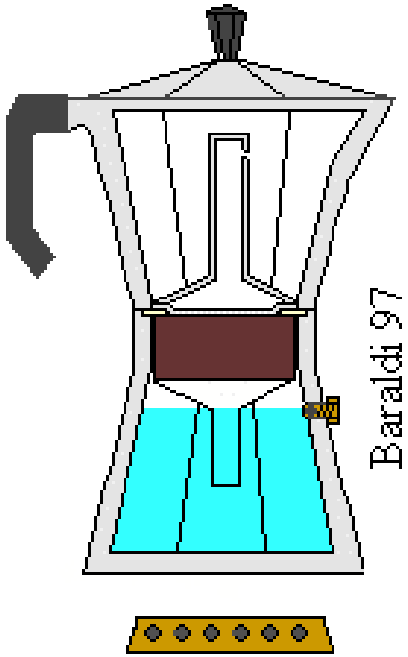
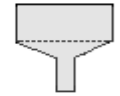
$$\varrho = \frac{(K \times S \times \Delta P \times \rho)}{(L \times \eta)}$$

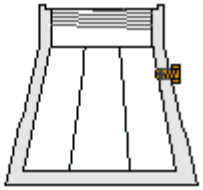


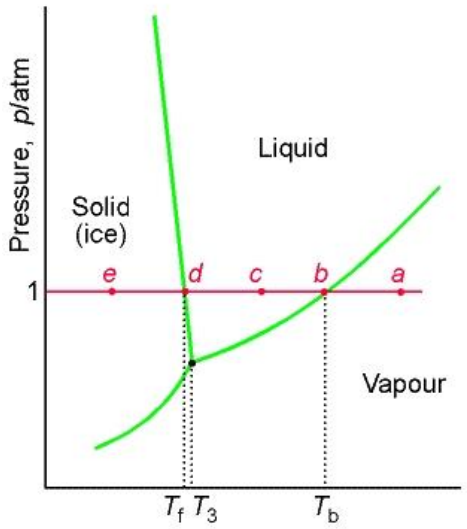
La Moca Italiana

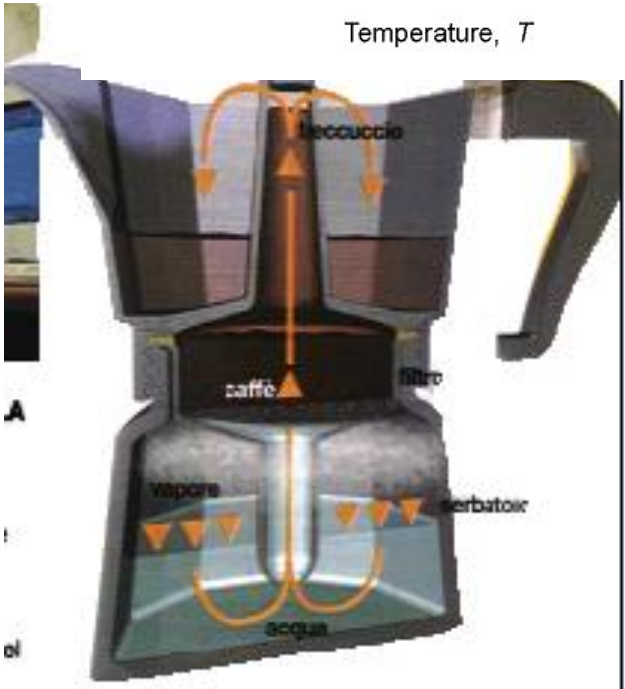










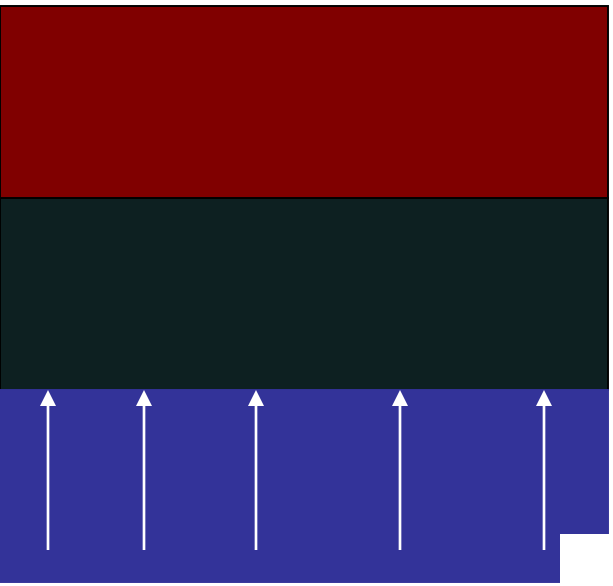


Filtrazione: il Legge di Darcy

$$Q = \kappa S \Delta P \rho / (\eta L) \longrightarrow \Delta P = Q\, \eta\, L/(S \rho\, \kappa)$$

$Q = m/t \sim 200\ g/min$

$P = P_{atm}$



$\eta(^\circ C) = 10^{-3}\ Pa$

S

$S \sim 10\ cm^2$

$L \sim 1\ cm$

$\kappa \sim 10^{-12}$

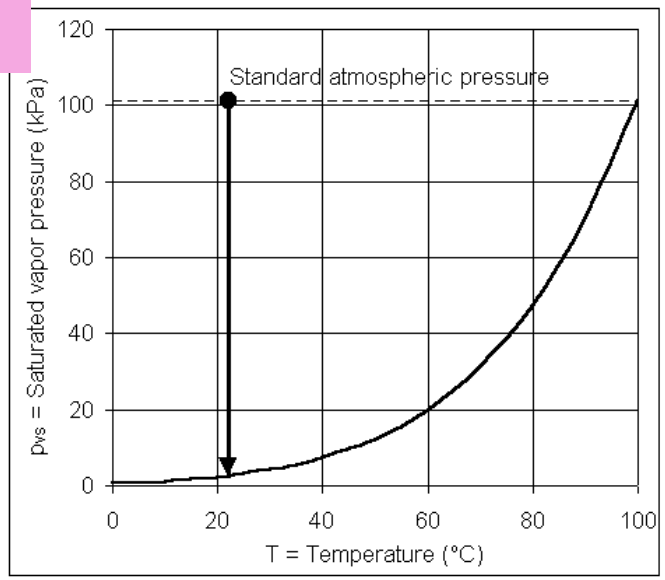


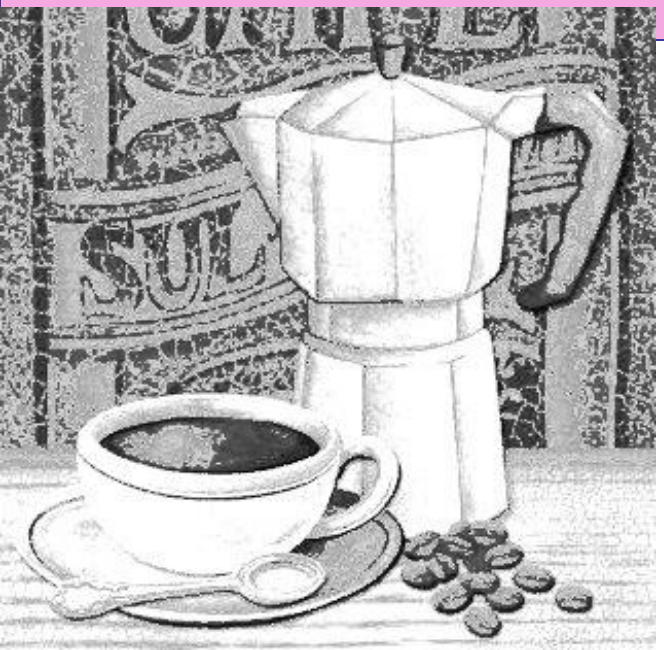
Table 12.1: TEMPERATURE DEPENDENCE OF PRESSURE OF SATURATED WATER VAPOR.

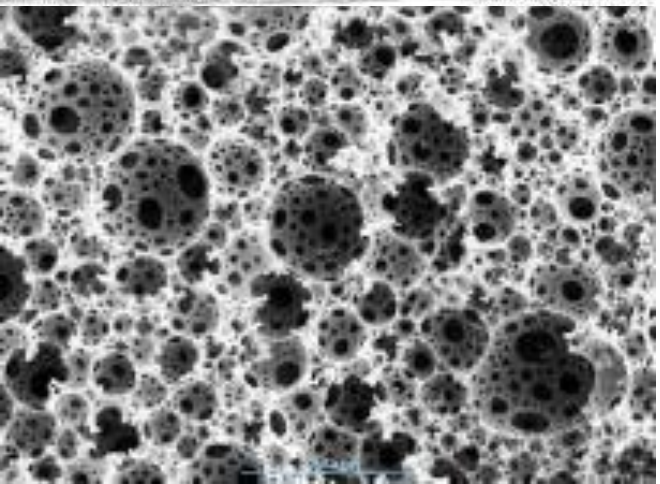
Temperature, $^\circ C$	96.18	99.1	99.6	99.9	100	101	110.8
Pressure, kPa	88.26	98.07	100	101	101.3	105	147

$P(T) = P_{atm} + \Delta P$

$\Delta P \sim 4 \cdot 10^4\ Pa \rightarrow T^* \sim 110^\circ C$

Limitazione del legge di Darcy - l’appertura degli capillari





$$P_c \approx \frac{2\sigma}{r}$$

Filtrazione

$$\Delta P_{\min} \approx \frac{2\sigma}{r}$$

$$r \sim 0.1mm$$

$$\sigma = 0.072.N/m$$

$$\Delta P_{\min} = 0.05atm$$

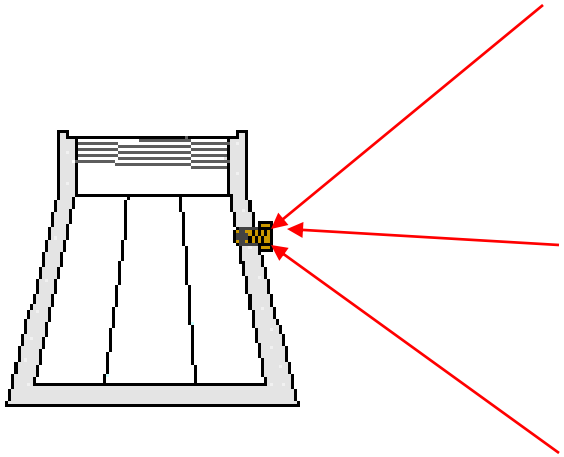
L’esplosione della moca: I.

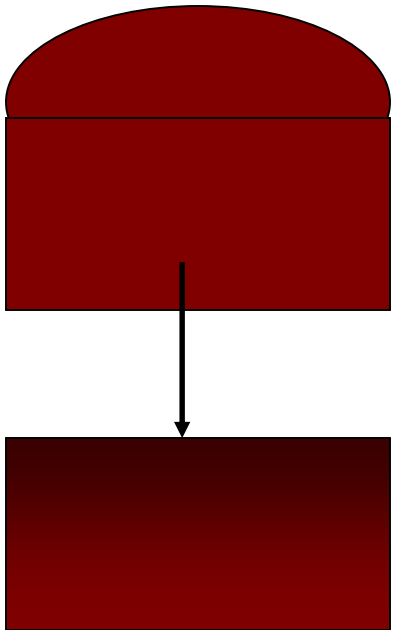
$$PV=m/\mu RT$$

M=150 g, $V=200\ cm^3$

$T_{max} \sim 300\ ^0C \rightarrow P_{max} \sim 10^3 atm$

$E \sim PV \sim 40\ KJ \rightarrow v=200\ m/s$

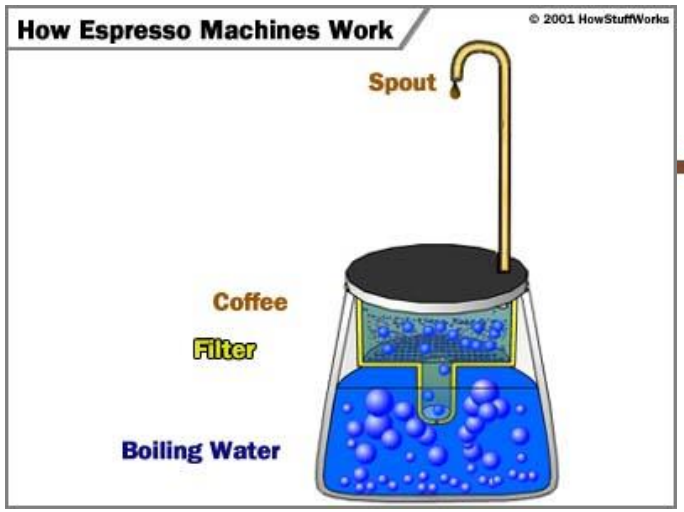




$\kappa \sim 10^{-12}$

$\kappa \sim 10^{-13} \sim 10^{-14}$

Espresso machine



$$\frac{(K \times S \times \Delta P \times \rho)}{(L \times \eta)}$$