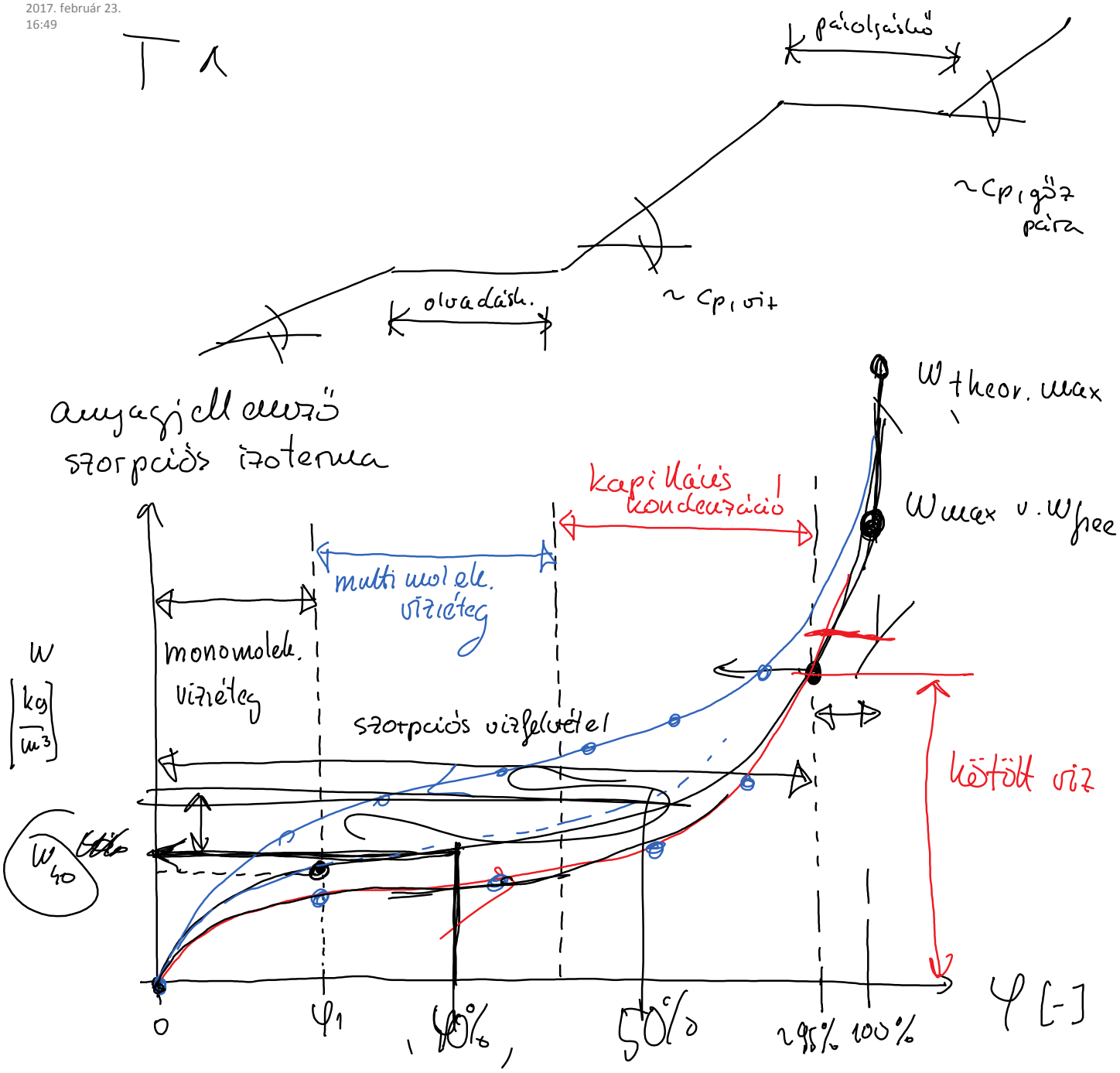
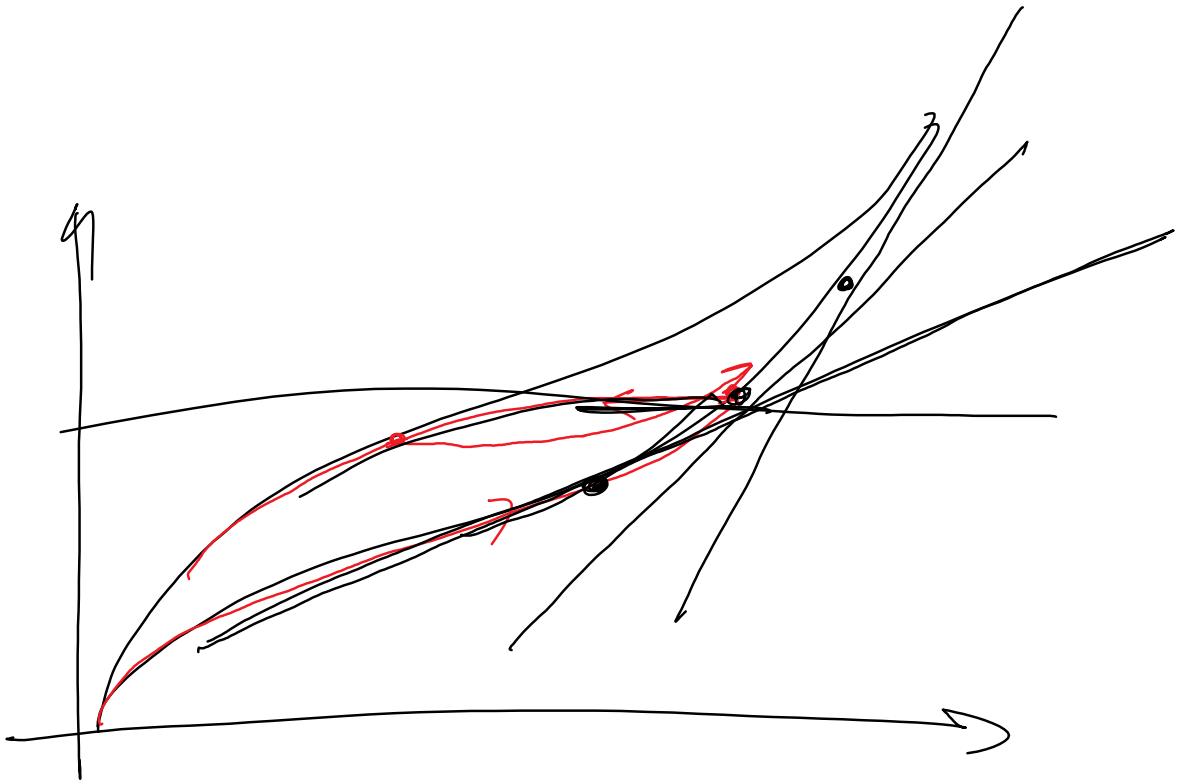
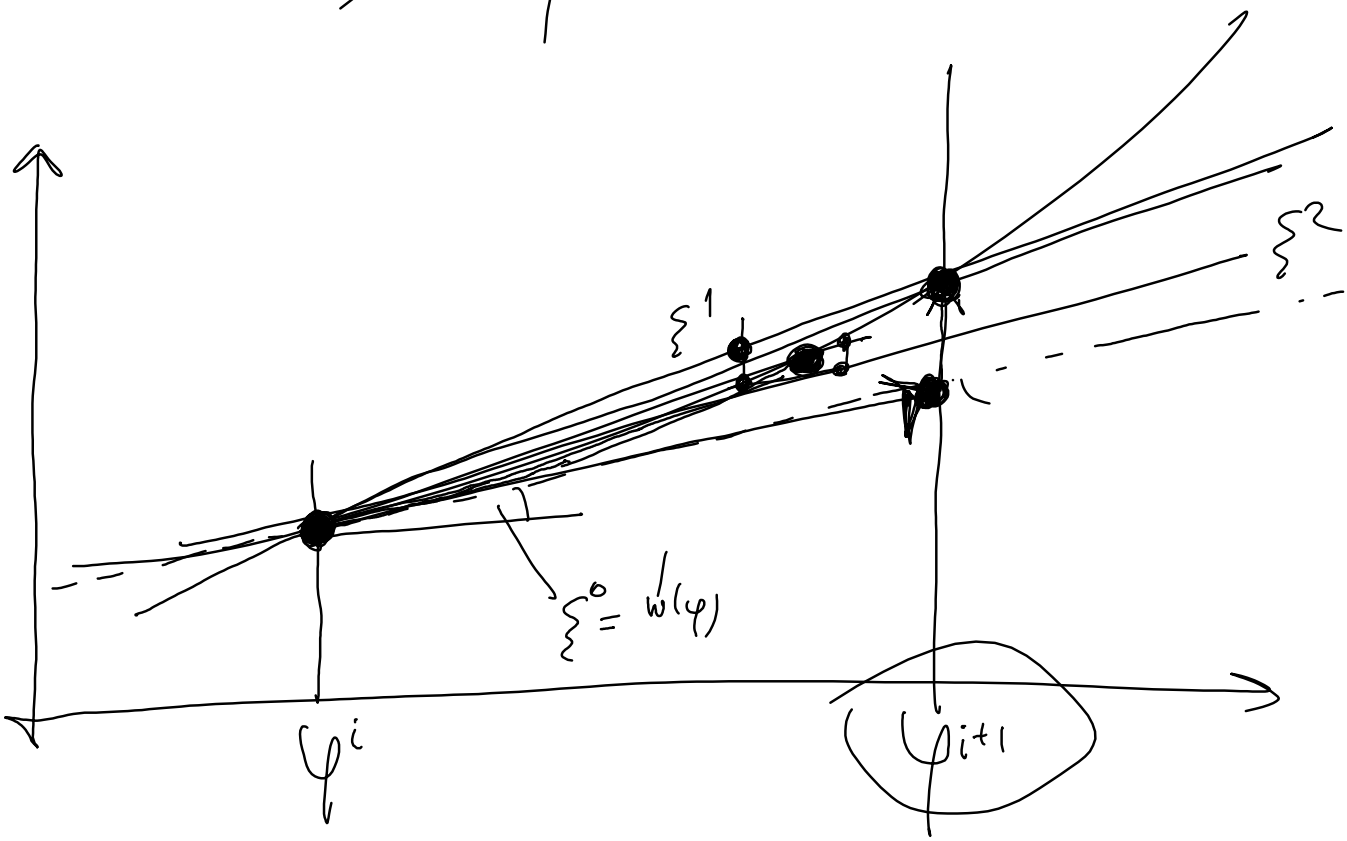
00 - nedvességtartalom függvény

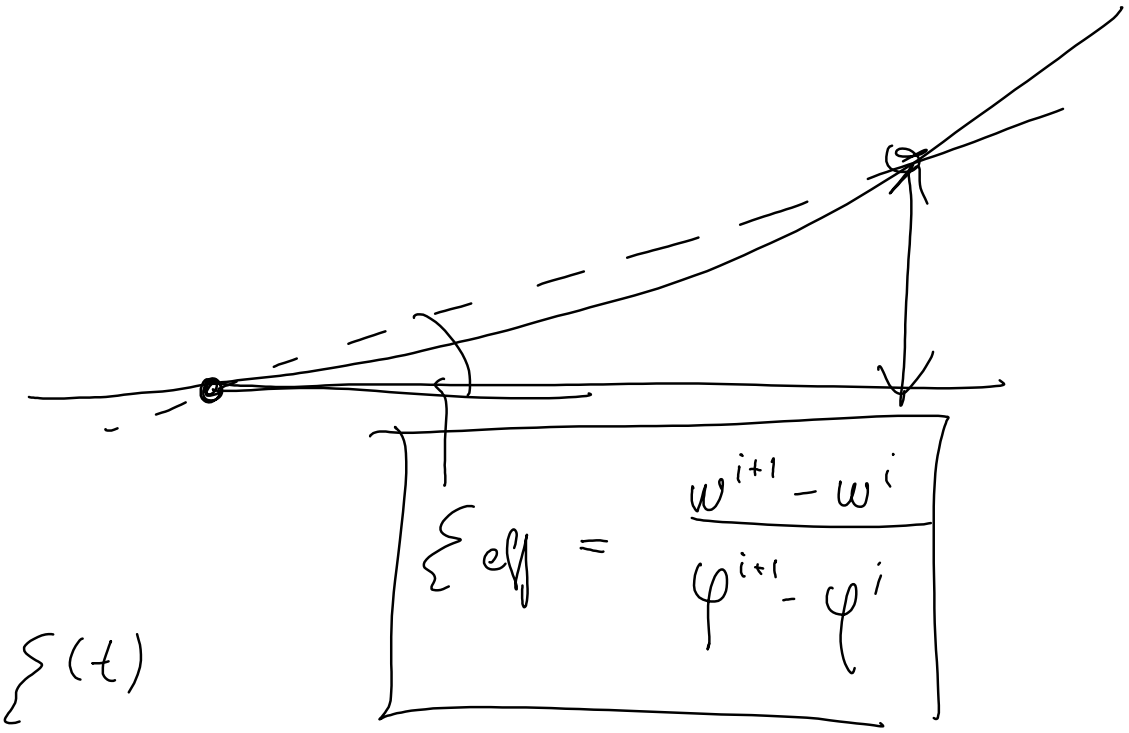
2017. február 23.
16:49

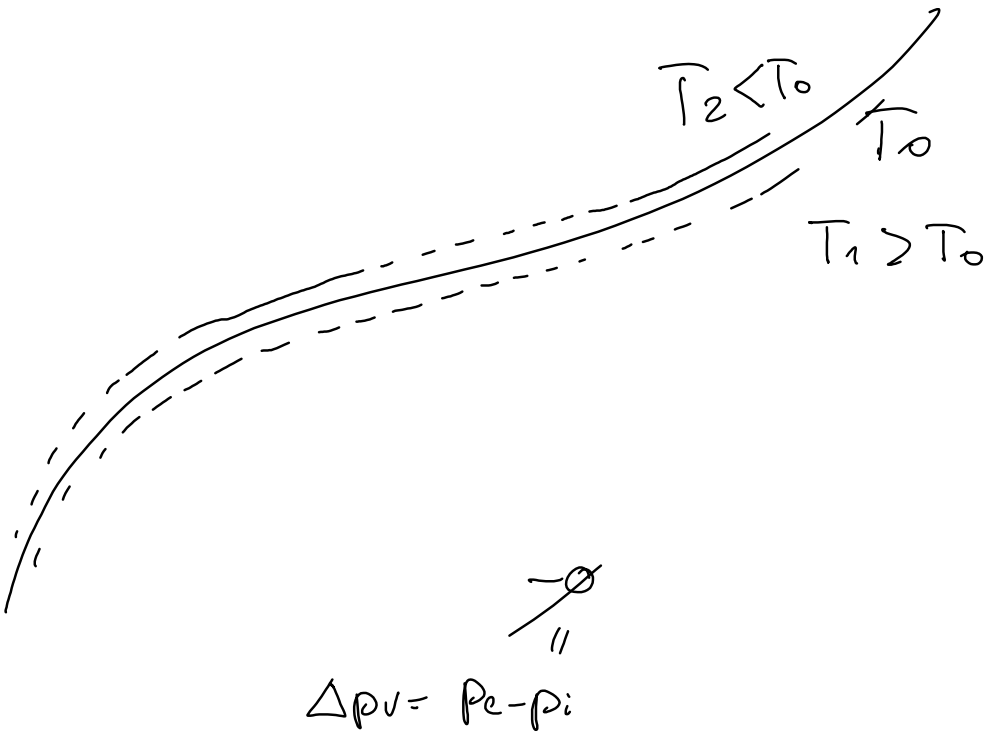




$$\xi = \frac{dw}{d\varphi}$$

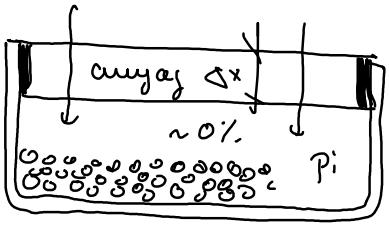



$\xi_{eff} = \frac{w^{i+1} - w^i}{\varphi^{i+1} - \varphi^i}$
$\xi(t)$

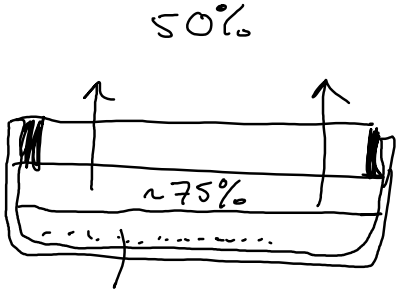

$T_2 < T_0$
T_0
$T_1 > T_0$
$\Delta p_v = p_e - p_i$

T = áll!

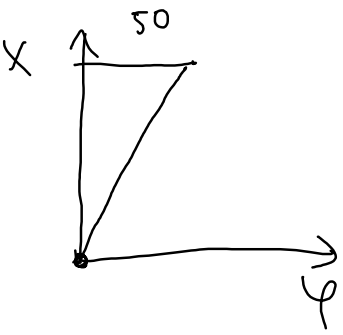
φ = 50% Pe

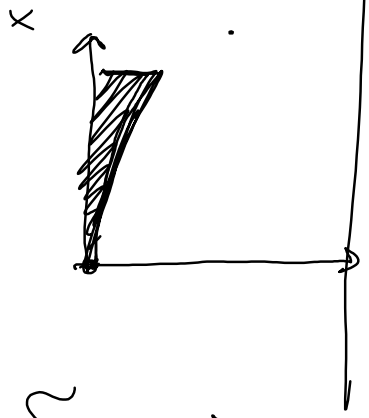


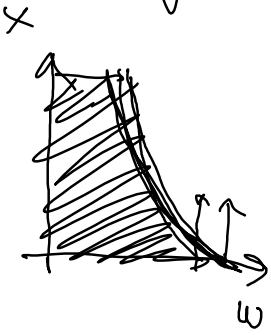
száraz-cup



nedvet-cup





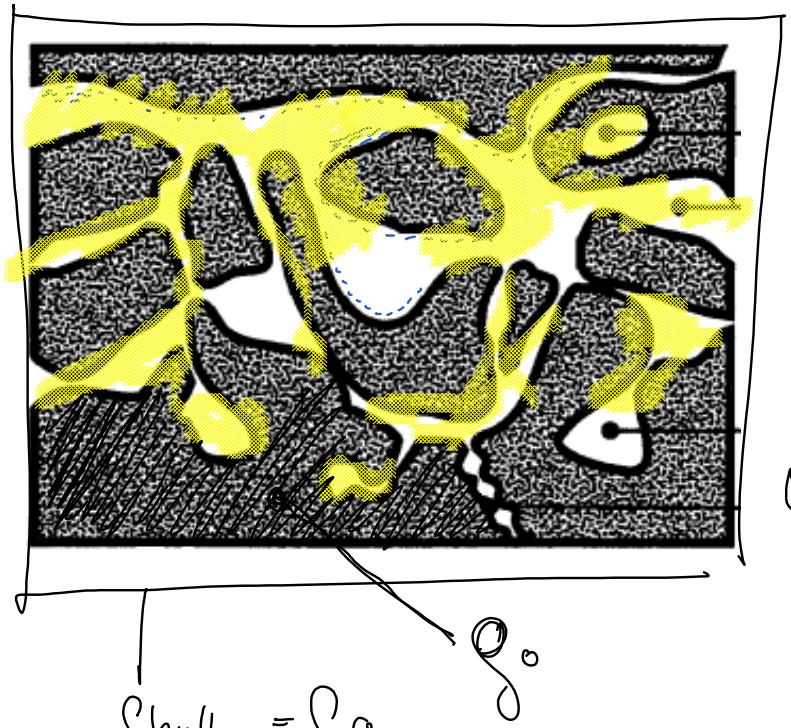


$$g_v = i_{szet} = \frac{\sim_{p0}}{\mu} \frac{\Delta p_v}{\Delta x} \rightarrow \mu$$

$\mu_{száraz} > \mu_{nedvet}$

01 - Anyagszerkezet

2017. február 23.
17:04



$\rho_{bulk} = \rho_{anyag}$

ρ_0

$$u_m = \frac{m_{moist} - m_{dry}}{m_{dry}} =$$

$$= \frac{m_{water}}{m_{dry}} = m\% \quad [-]$$

$$u_v = u_m \cdot \frac{\rho_{water}}{\rho_{dry}} \quad V\% \; [-]$$

$$w = \frac{m_{water}}{V_{tot}} = \left[\frac{kg}{m^3}\right]$$

u_v [V%]

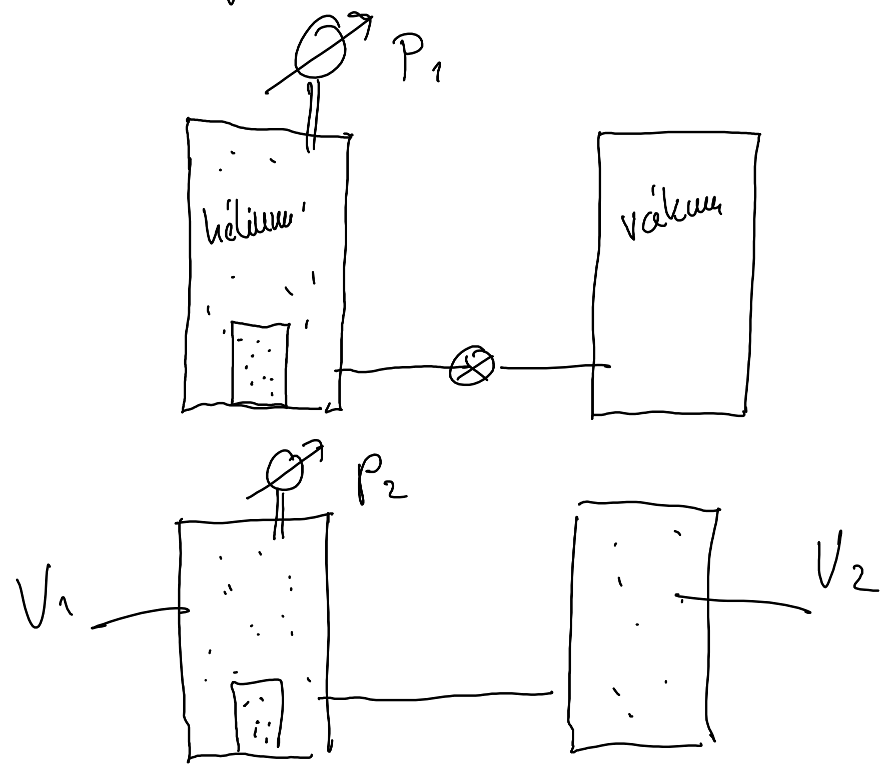
építőanyagok	jellemző	max	elm. max
tégla	1	10-12	20
pórusbeton	3-4	~30	~80
normál beton	~5	~10	~20

ρ_{anyag}

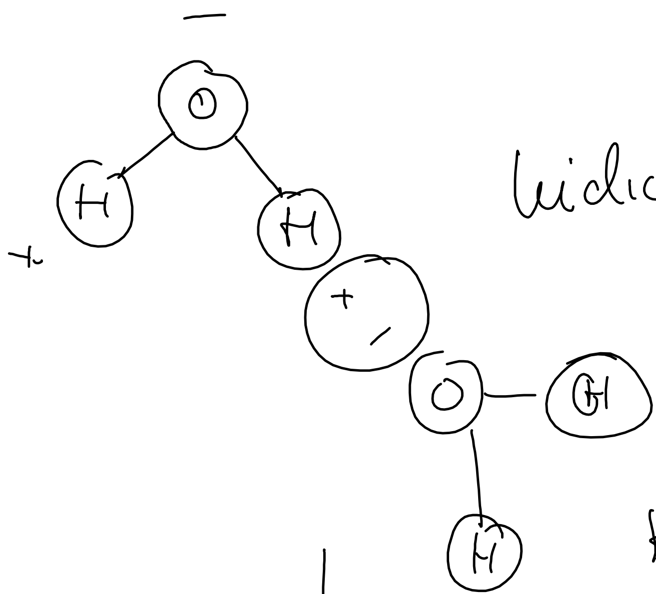
$$P = \frac{V_{void}}{V_{total}} = (0-1) = 1 - \frac{\rho_{anyag}}{\rho} = [-] \text{ v. } \%$$

hélium – piknométer

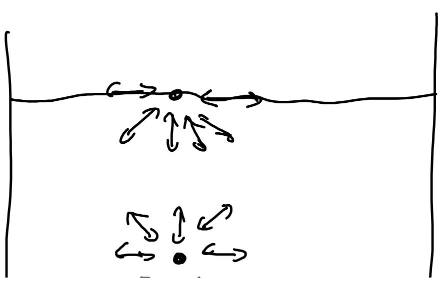
hélium – piknométer

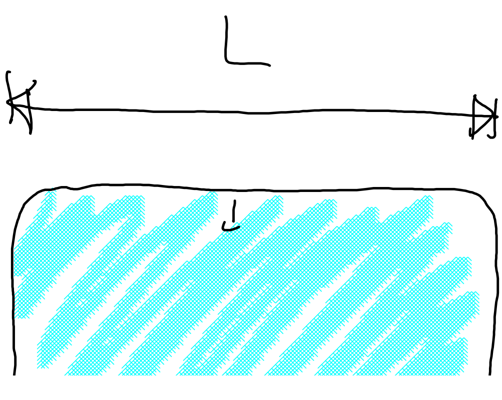


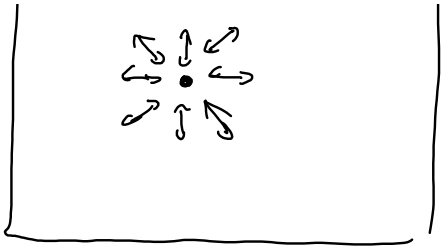
$$V_{void} = V_1 - \frac{V_2}{1 - \frac{p_1}{p_2}}$$

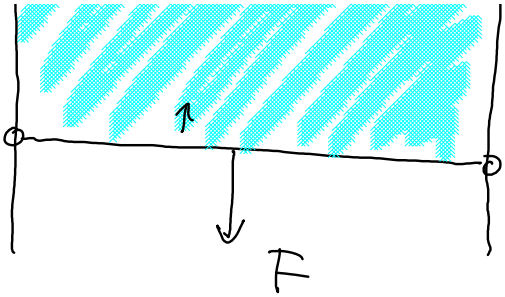


hidrogén kötések





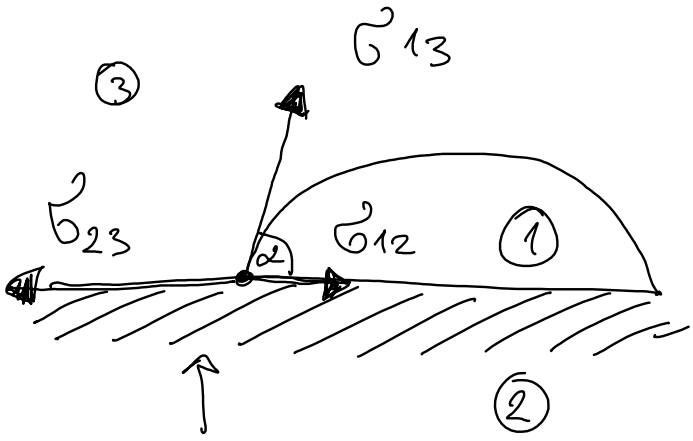


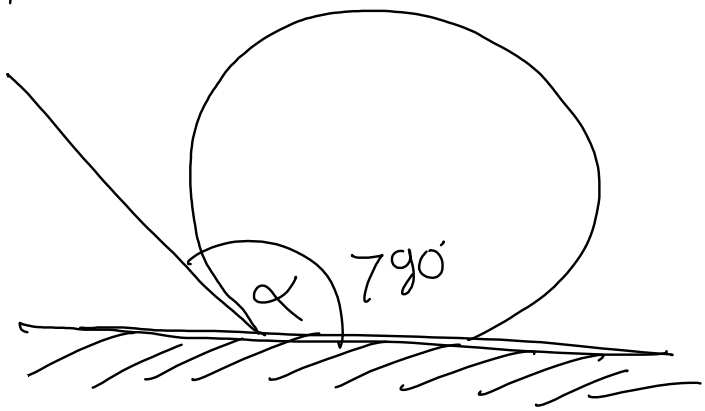


$F = 2L\sigma$ σ - felületi feszültség $[N/m]$

$\sigma(T)$

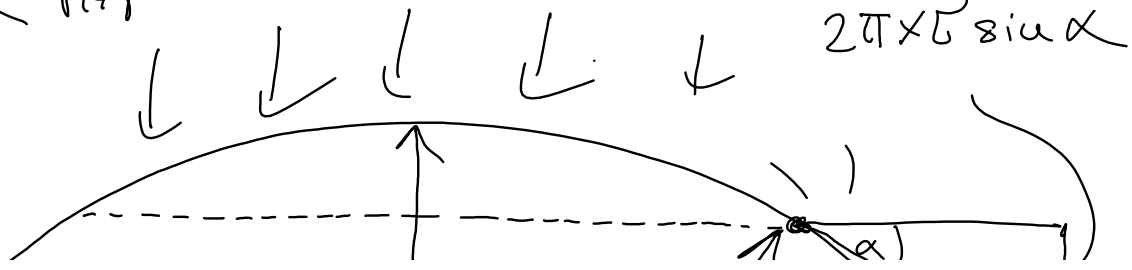
$\sigma_{levegő-víz} = 0{,}072\ N/m$

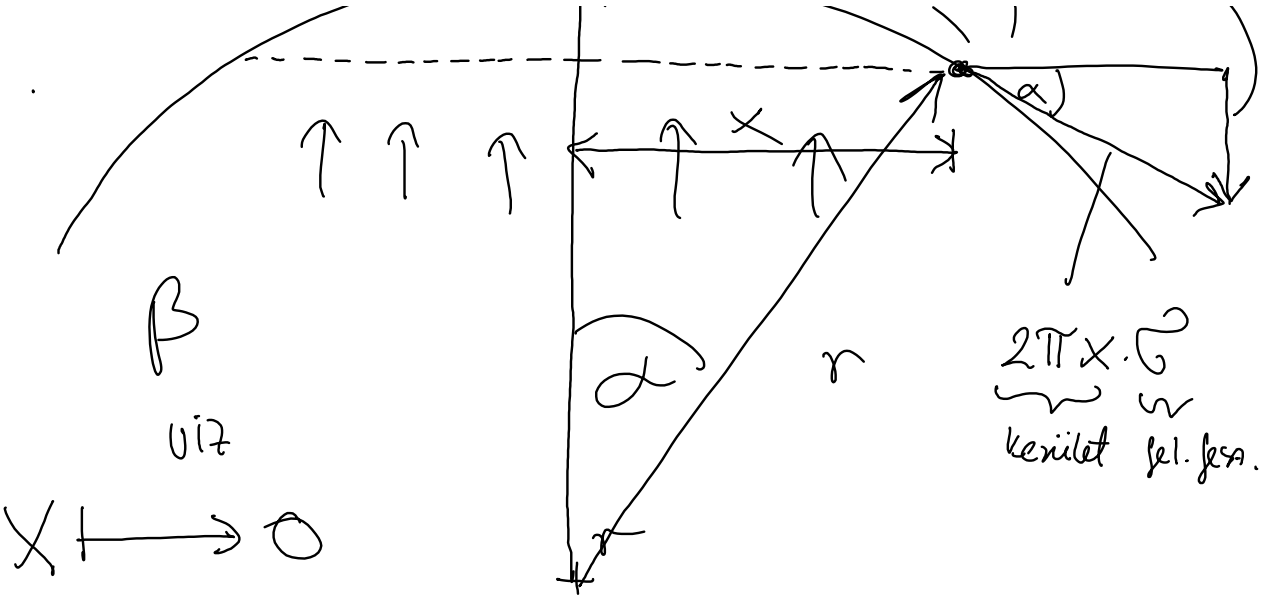




$\sigma_{23} \cdot ds = \sigma_{12}\, ds + \sigma_{13}\, ds \cdot \cos\alpha$

α nagyon





α fajtából $\quad x^2\pi\, p^\alpha$

β fajtából $\quad x^2\pi\, p^\beta$

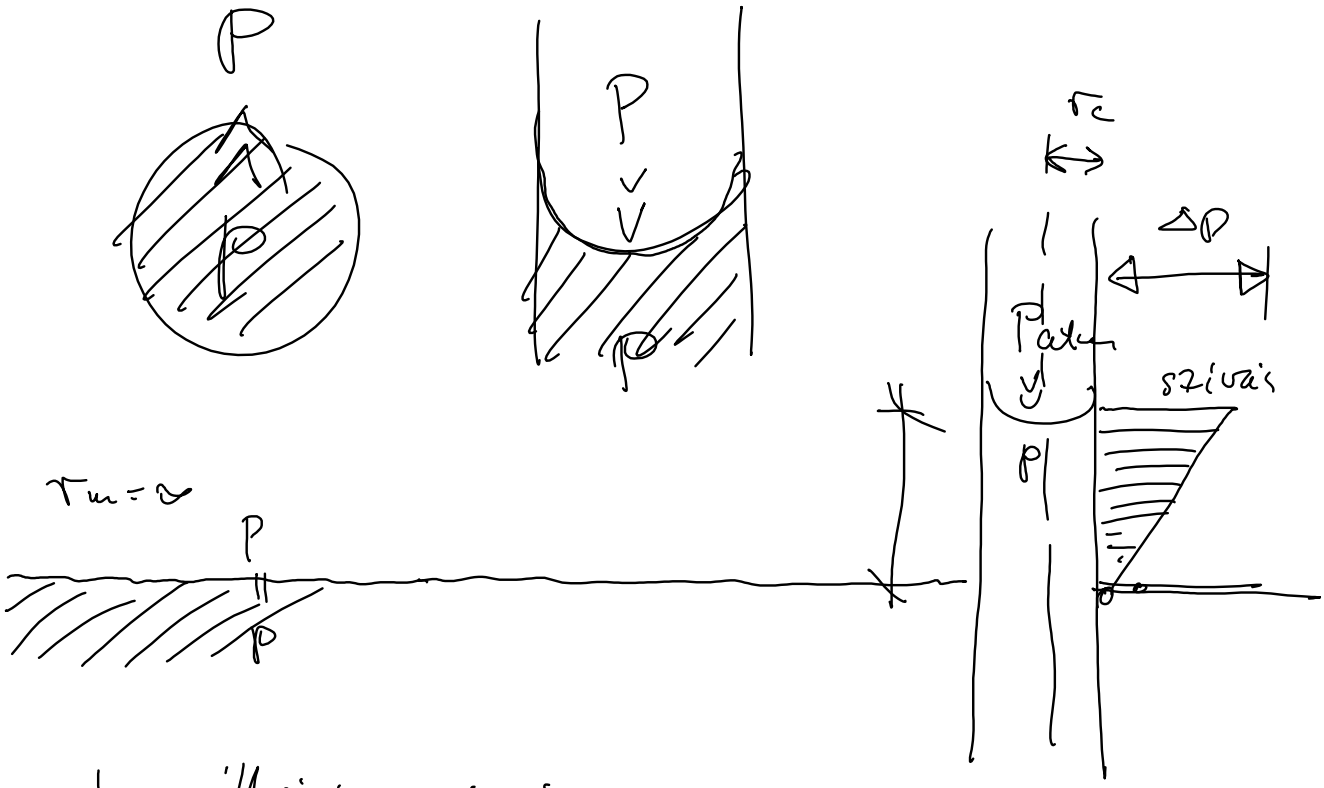
egyensúly! $\Rightarrow$ $\quad x^2\pi p^\alpha + 2\pi x\sigma \sin\alpha - x^2\pi p^\beta = 0$

$x^2\pi p^\alpha$: görbe; $2\pi x\sigma\sin\alpha$: felületi feszültség; $x^2\pi p^\beta$: gömbi

$$\Delta p = p^\beta - p^\alpha = 2\sigma / r_m$$

r_m: meniszkusz görbületi sugár

abban a fajtában nagyobb a nyomás, amely fele a felület jön ki



kapilláris szívás

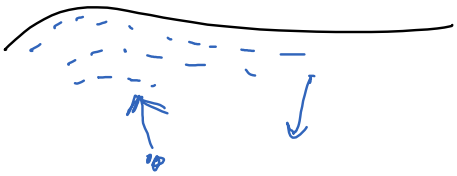
$$T_m = \frac{r_c}{\cos\alpha} \rightarrow p_c = \frac{2\sigma\cos\alpha}{r_c} = \frac{2\sigma}{r_m}$$

$$h = \frac{2\sigma\cos\alpha}{\rho_w \cdot g \cdot r_c}$$

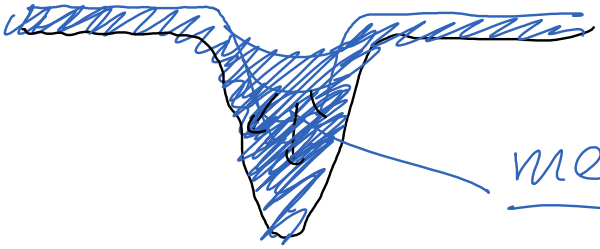
kapilláris kondenzáció

(1) monomolek.

(2) multi réteg.



(3) kapilláris kondenzáció



kapillárisban a víz meniszkusz feletti páranyomás

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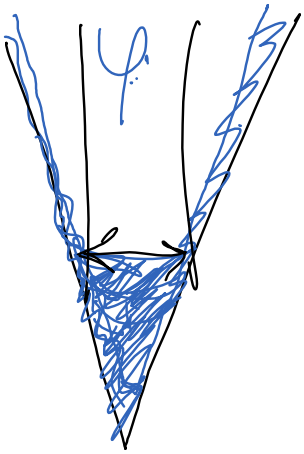
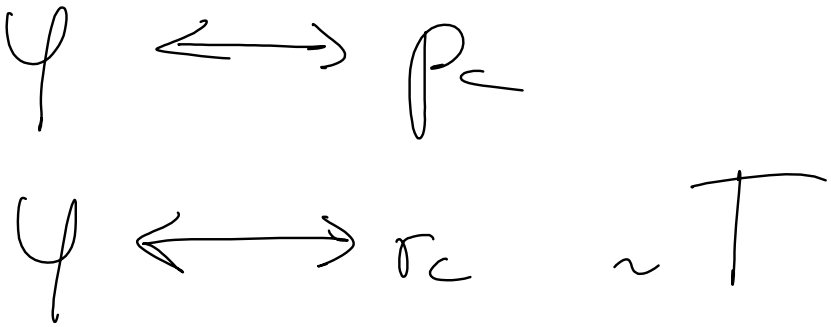
sík vízfelület feletti páranyomással



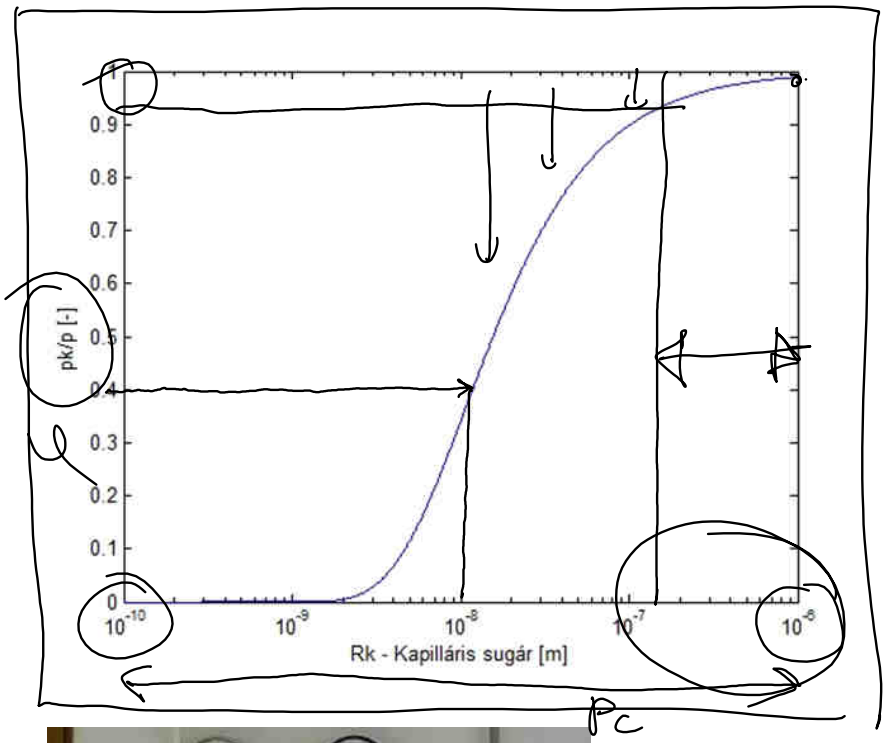
$$\varphi = \frac{p}{p_0} = \exp\left(-\frac{p_c}{\rho_w R_v T}\right)$$

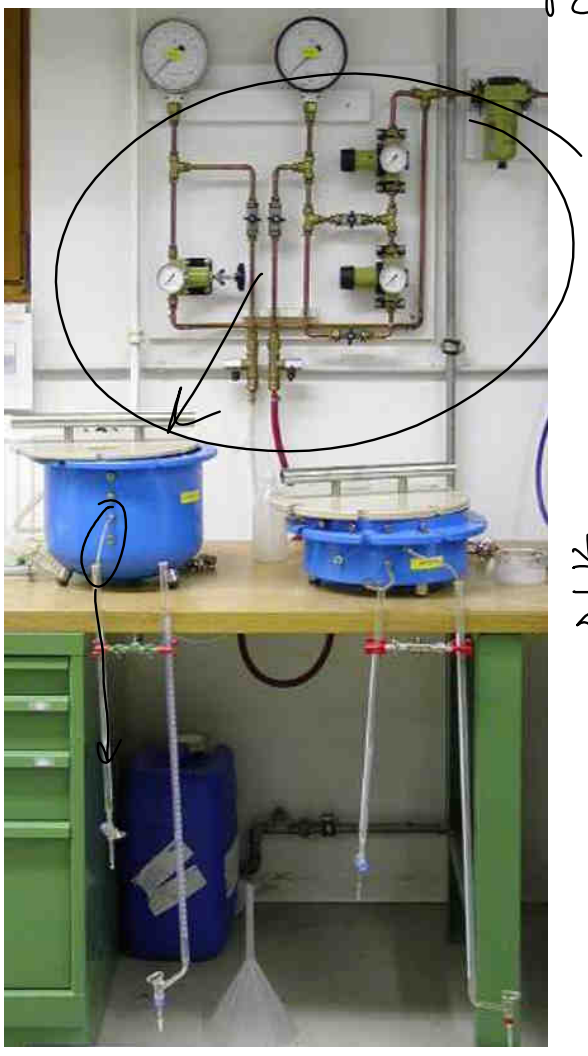
$$= \ln \varphi = \frac{p_c}{\rho_w R_v T}$$

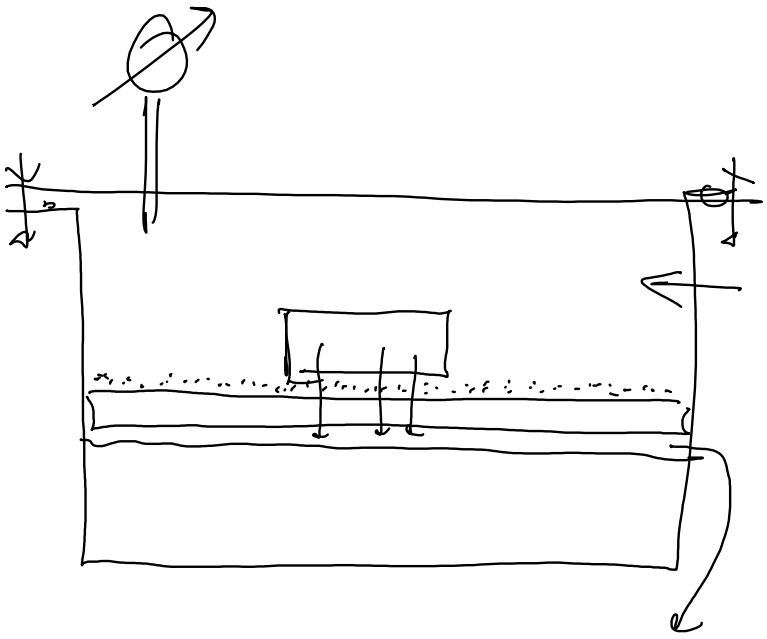


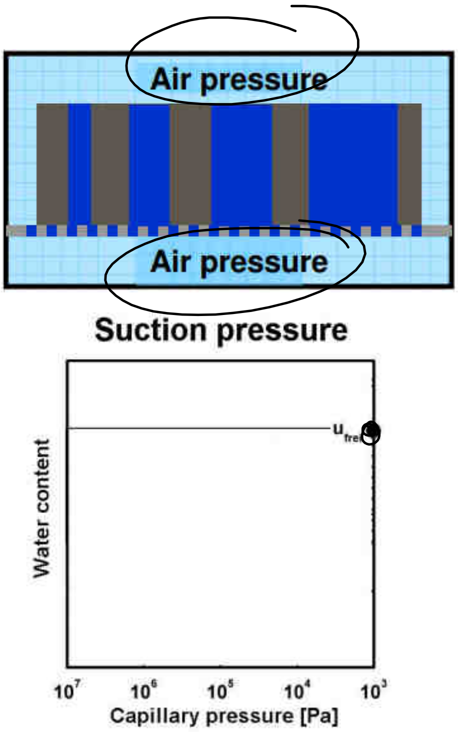
03 - kapilláris kondenzáció, kapilláris vízfelvétel - méréstechnika

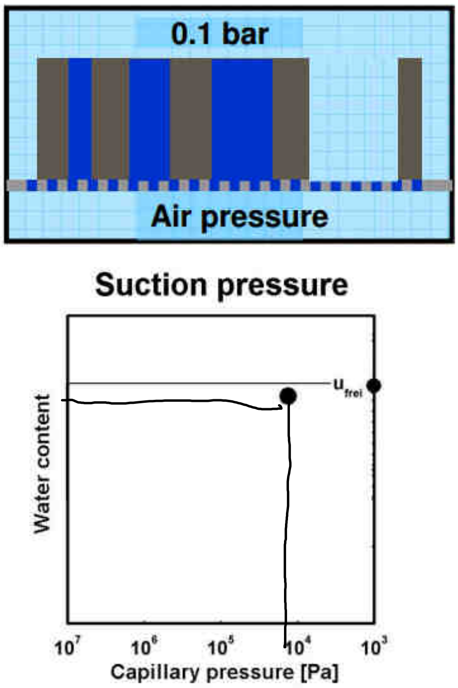
2017. február 23.
21:58

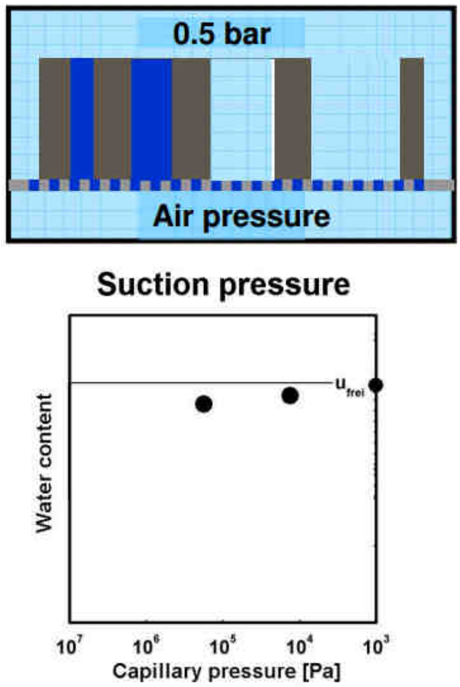


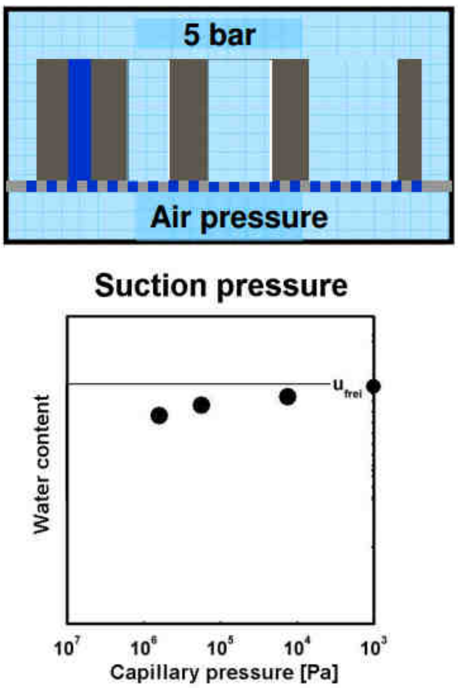


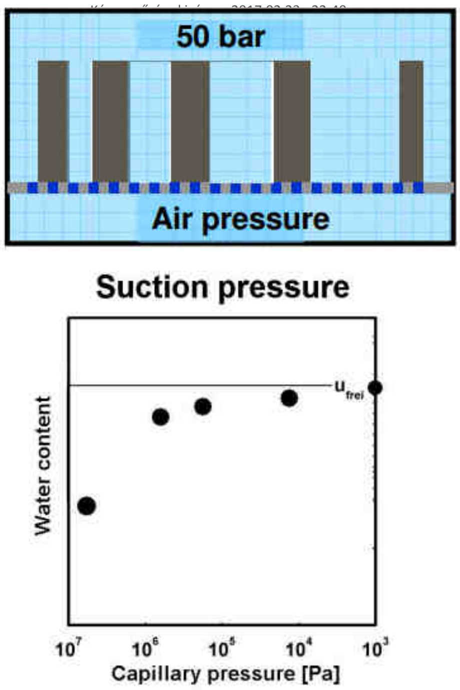


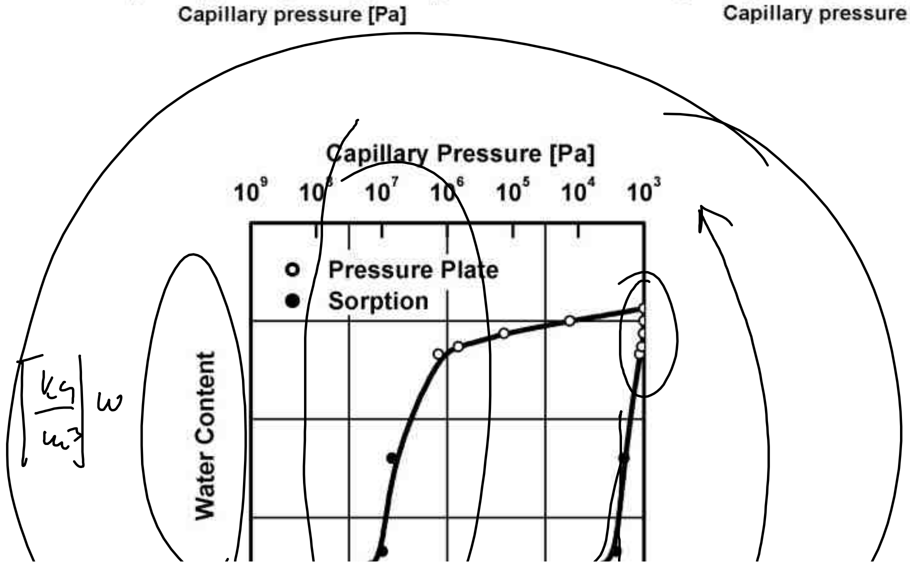

Air pressure
Air pressure
Suction pressure
Water content
u_{frei}
10^7 10^6 10^5 10^4 10^3
Capillary pressure [Pa]

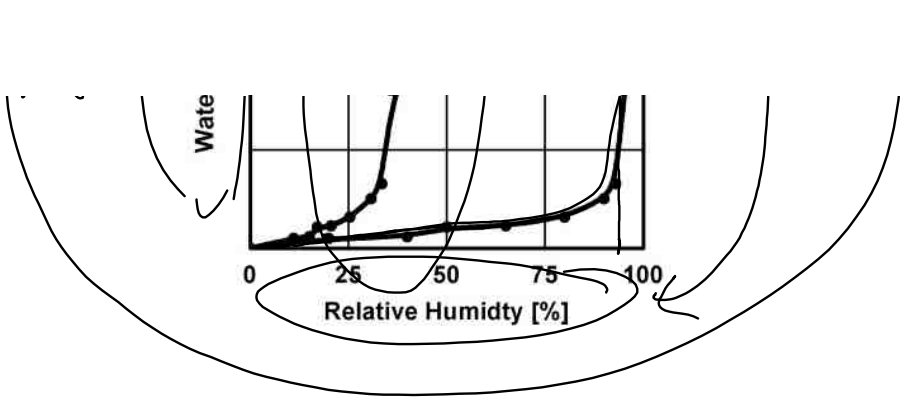

0.1 bar
Air pressure
Suction pressure
Water content
u_{frei}
10^7 10^6 10^5 10^4 10^3
Capillary pressure [Pa]


0.5 bar
Air pressure
Suction pressure
Water content
u_{frei}
10^7 10^6 10^5 10^4 10^3
Capillary pressure [Pa]


5 bar
Air pressure
Suction pressure
Water content
u_{frei}
10^7 10^6 10^5 10^4 10^3
Capillary pressure [Pa]


50 bar
Air pressure
Suction pressure
Water content
u_{frei}
10^7 10^6 10^5 10^4 10^3
Capillary pressure [Pa]


Capillary Pressure [Pa]
10^9 10^8 10^7 10^6 10^5 10^4 10^3
Pressure Plate
Sorption
Water Content


Wate
0
25
50
75
100
Relative Humidty [%]