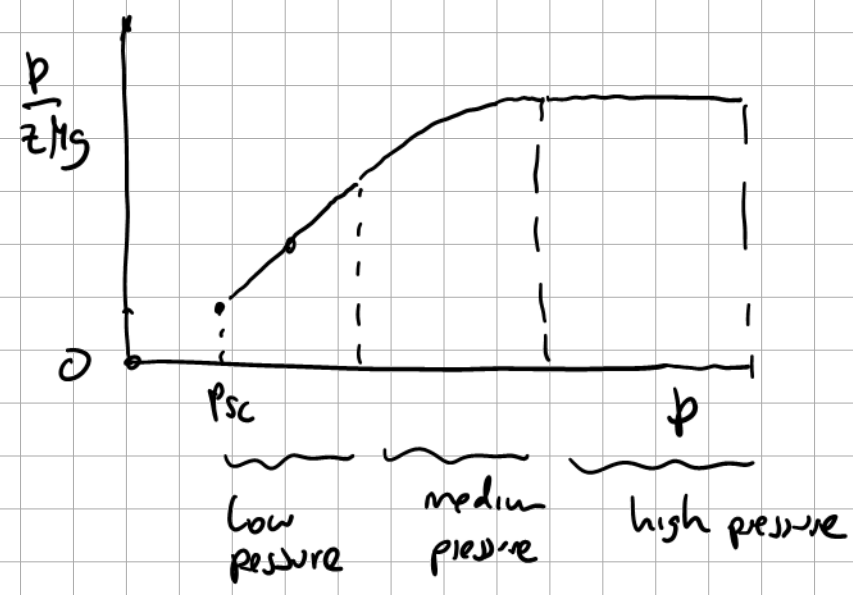
Video 15 - Dry gas IPR (Part 2)

$$q_{\bar{s}} = \frac{2\pi k h}{\ln\left(\frac{r_e}{r_w} - 0.75\right)} \frac{T_{sc}}{p_{sc} T_R} \int_{p_{wf}}^{p_R} \frac{p}{z \mu_g} dp$$



LP ? HP

$$\left(\frac{1}{\mu_g z}\right)_{@p_R} \frac{(p_R^2 - p_{wf}^2)}{2} \qquad \frac{p_R}{(\mu_g z)_{@p_R}} (p_R - p_{wf})$$

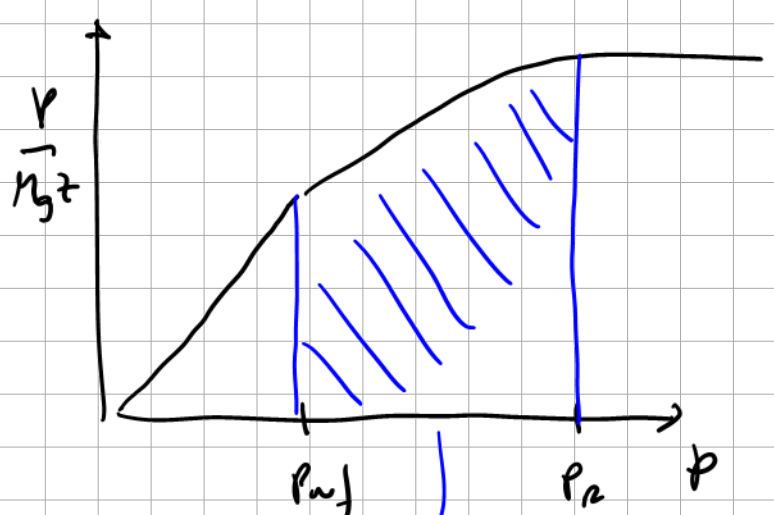
p [bara] $\quad q_{\bar{s}} = [Sm^3/d] \quad p_{sc} = 1.01325$ bara

T [K] $\quad \mu_g = [cp] \quad T_{sc} = 15.56\ ^\circ C$

k [md]

excluding the 2 !

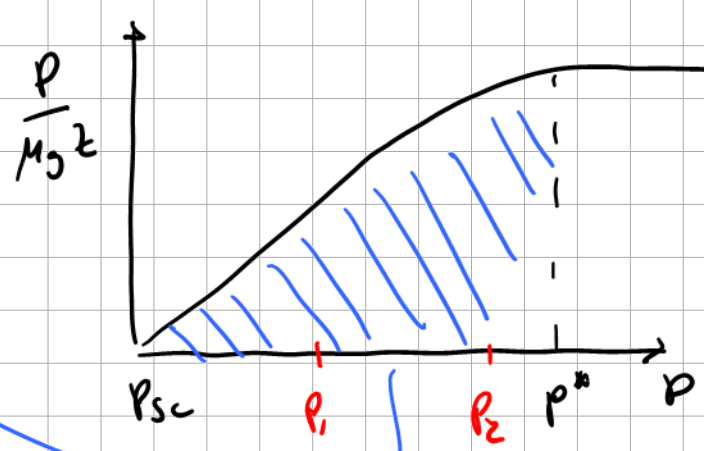
$$q_{\bar{g}} = \frac{k h}{\left(\ln \frac{r_e}{r_w} - 0.75\right) T_R} \underbrace{7.63 \cdot 2 \int_{p_{wf}}^{p_R} \frac{p}{\mu_g z} dp}$$



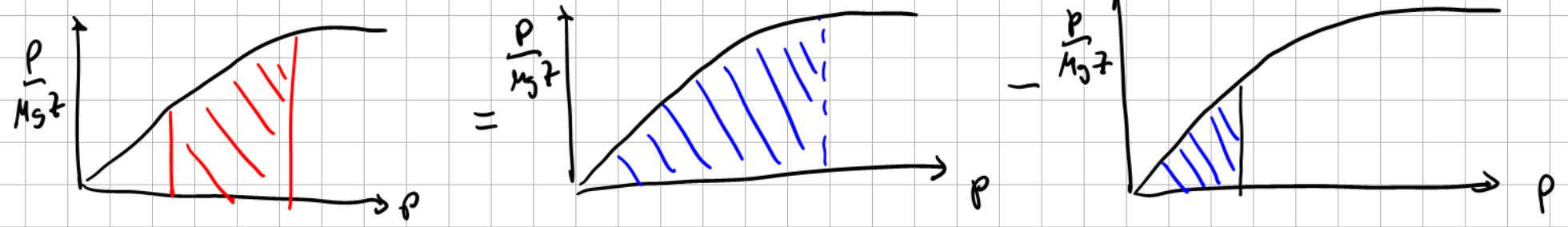
$$\left(\bigcirc - \bigcirc\right)$$

$p_R \quad p_{wf}$

$$m(p^*) = 2 \int_{0 \Rightarrow p_{sc}}^{p^*} \frac{p}{\mu_g z} dp$$



$$2 \int_{p_1}^{p_2} \frac{p}{\mu_g z} dp = 2 \int_{p_{sc}}^{p_2} \frac{p}{\mu_g z} dp - 2 \int_{p_{sc}}^{p_1} \frac{p}{\mu_g z} dp = m(p_2) - m(p_1)$$

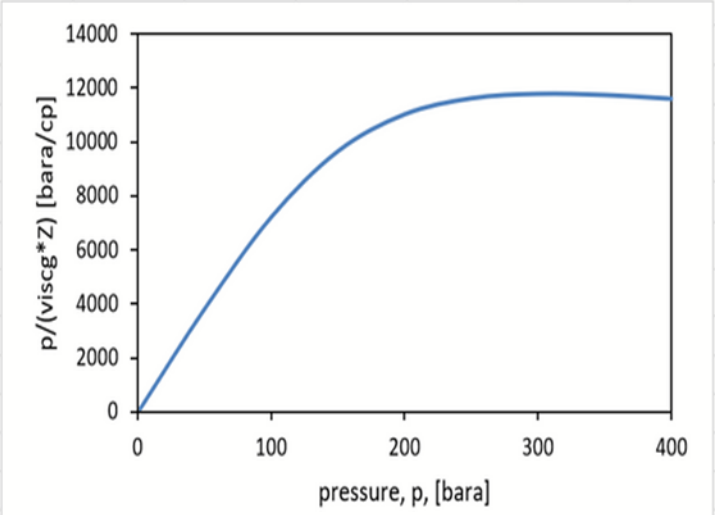


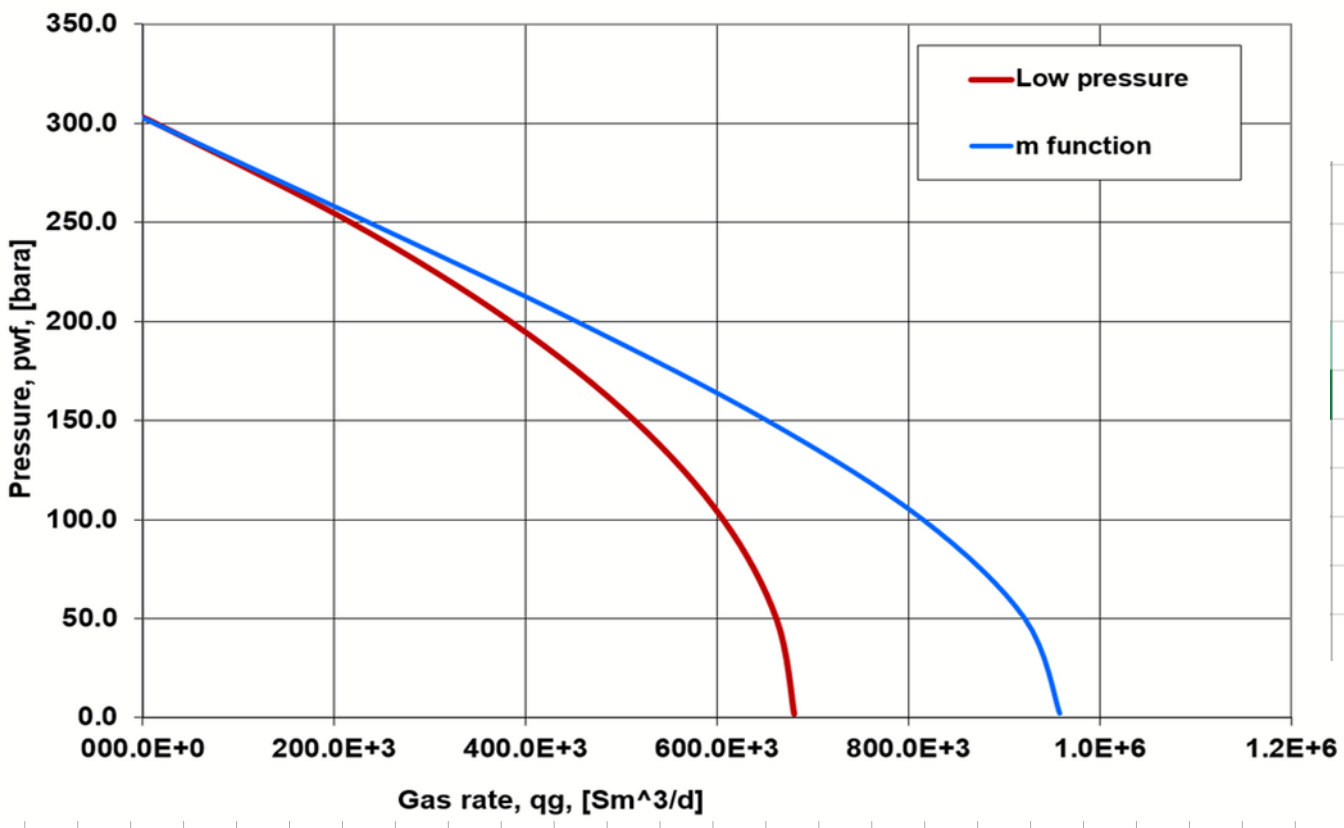
IPR oil

$$q_o = 7.63 \frac{kh}{\left(\ln\left(\frac{re}{rw}\right) - 0.75 + S\right) T_R} \left[m(P_R) - m(p_{wf})\right]$$?

Well Data		
pR	[bara]	400
TR	[C]	105
TR	[K]	378
z_R	[-]	1.069
$deng_R$	[kg/m3]	276
$Viscosity_R$	[cp]	0.032

p [bara]	Z [-]	deng [kg/m3]	viscg [cp]	p/viscg*Z [bara/cp]
2	0.997	1.5	0.013	152
50	0.932	39.6	0.014	3825
100	0.882	83.6	0.016	7224
150	0.859	128.8	0.018	9662
200	0.867	170.2	0.021	11029
250	0.899	205.1	0.024	11622
300	0.948	233.6	0.027	11788
350	1.006	256.8	0.030	11745
400	1.069	276.1	0.032	11607





pwf bara	LP - qg [Sm3/d]	m(p) [bara2/cp]	qg [Sm3/d]
303.0	000.0E+0	5026555	000.0E+0
300.0	13.4E+3	4955852	13.5E+3
250.0	217.4E+3	3783006	237.1E+3
200.0	384.3E+3	2645766	453.9E+3
150.0	514.1E+3	1603483	652.6E+3
100.0	606.8E+3	750299.5	815.2E+3
50.0	662.5E+3	191885.9	921.7E+3
2.0	681.0E+3	226.2864	958.2E+3