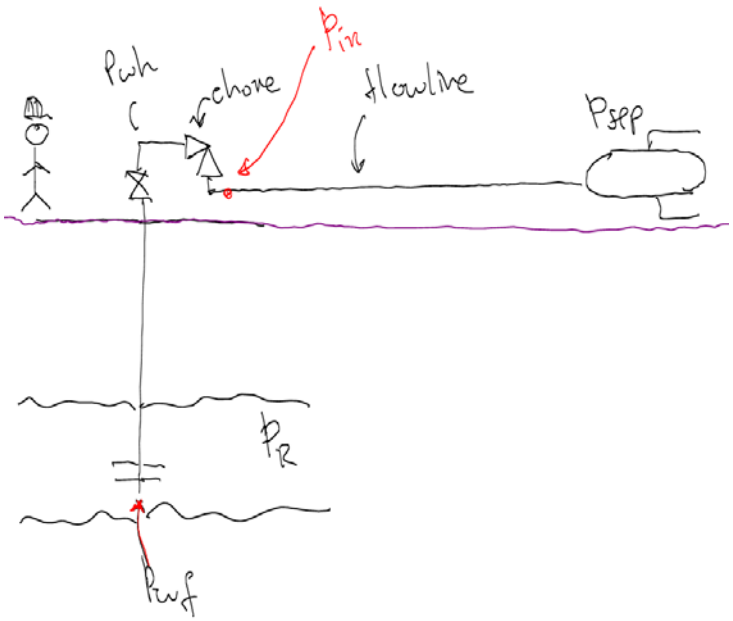
1. For the dry gas production system shown in the figure below, what is the choke pressure drop required (in bar) for the system to deliver a rate of 2.5 E6 Sm³/d.



Inflow equation:

$$q_{\bar{g}} = C_R \cdot \left(p_R^2 - p_{wf}^2 \right)^n$$

With

C_R = 104 Sm³/d/bar^2n

n= 0.9

p_R = 304 bara

Tubing equation:

$$q_{\bar{g}} = C_T \cdot \left(\frac{p_{wf}^2}{e^S} - p_{wh}^2 \right)^{0.5}$$

C_T = 4.41 E4 Sm³/d/bar

S = 0.31

Flowline wellhead-separator:

$$q_{\bar{g}} = C_{FL} \cdot \left(p_{in}^2 - p_{sep}^2 \right)^{0.5}$$

C_{FL} = 4E4 Sm³/d/bar

p_{sep} = 40 bara

2. Based on the choke performance maps shown below, what is (approximately) the required choke diameter (in mm) to provide the desired rate of 2.5 E6 Sm³/d. Use the wellhead pressure and choke pressure drop calculated in exercise 2. Will the choke operate in the critical or subcritical regime?