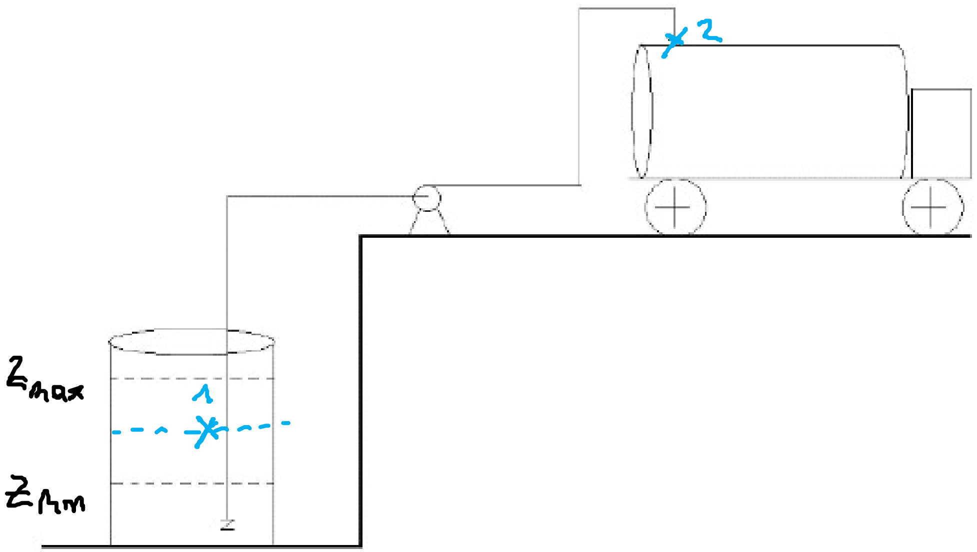
c2)




$Q: 1-5\ l/s$

BEM $1 \to 2$

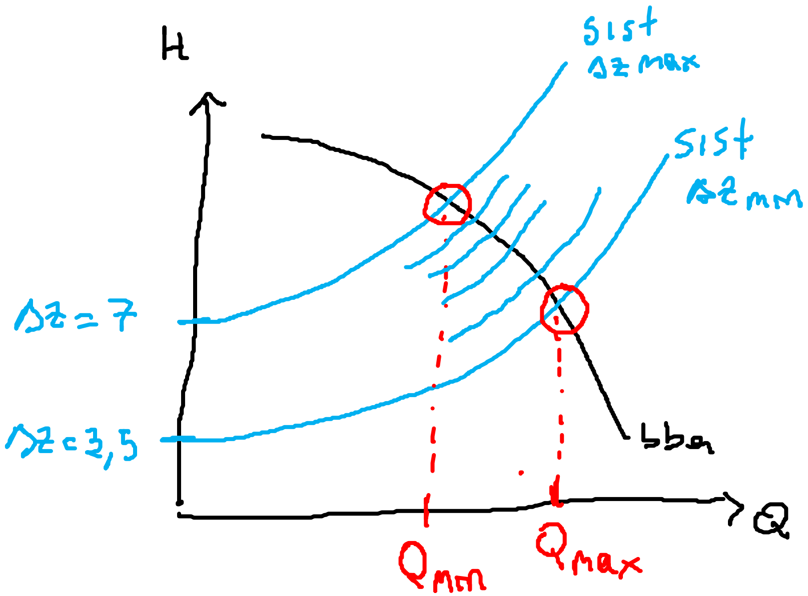
$$\frac{\Delta v^2}{2g} + \Delta z + \frac{\Delta p}{\rho g} + \Delta h_F = H_{sist}$$

$$\frac{v^2}{2g} + (z_2 - z_1) + F\frac{(L_s + L_D)}{D}\frac{v^2}{2g} = H_{sist}$$

$$(z_2 - z_1) + \left(F\frac{55}{0{,}0525} + 1\right)\frac{Q^2[m^3/h]}{1185} = H_{sist}$$

$\Delta z_{min}$ ($z_1$ max) = 3,5 m

$\Delta z_{max}$ ($z_1$ min) = 7 m



Determinación PO

$\text{sup } Q \longrightarrow R_e \xrightarrow{\text{Moody}} F \xrightarrow{\text{BEM}} H_{sist} \xrightarrow{\text{c. bba}} Q$

* $\Delta z = 3{,}5\ m$ $\quad Q = 14\ m^3/h \Leftrightarrow 3{,}9\ L/s$

$F = 0{,}022$

$H = 7{,}5\ m$

dentro de rango de caudal deseado ✓

* $\Delta z = 7\ m$ $\quad Q = 9{,}6\ m^3/h \Leftrightarrow 2{,}7\ L/s$

$F = 0{,}023$

$H = 8{,}9\ m$

¿Cumplir servicio?

- → requerimiento de Q
- → cavitación ($NPSH_d > NPSH_r$)
- → Proximamente

## Cavitación

$$NPSH_d = \frac{P_s}{\rho g} + \frac{v^2}{2g} - \frac{P_{vap}}{\rho g}$$

$$NPSH_d = \frac{P_{atm} - P_{vap}}{\rho g} - (z_s - z_1) - F \frac{L_s}{D} \frac{v^2}{2g}$$

- BEM sup y succión bba.

$$\frac{v^2}{2g} + z_s - z_1 + \frac{P_s - P_{atm}}{\rho g} + F \frac{L_s}{D} \frac{v^2}{2g} = 0$$

$\Delta z_{min} = 1,0\ m$

$Q = 19\ m^3/h \rightarrow v = 1,8\ m/s$

$NPSH_d = 7,4\ m$

$NPSH_r = 3\ m$

$\Delta z_{max} = 4,5\ m$

$Q = 9,6\ m^3/h \rightarrow v = 1,2\ m/s$

$NPSH_d = 4,2\ m$

$NPSH_r = 2,4\ m$

Siempre $NPSH_d > NPSH_r$ ✓ → La bomba $\phi 170$ cumple el servicio