

For to fluider med tetthet ρ_1 og ρ_2 :

$$v_f \approx \sqrt{\frac{g \lambda |\rho_2 - \rho_1|}{2\pi(\rho_2 + \rho_1)} + \frac{2\pi\gamma}{\lambda(\rho_2 + \rho_1)}}$$

der γ = grenseflate spenningen mellom fluidene (N/m)

1 = luft, 2 = vann :

$$\gamma \approx 72.7 \text{ mN/m}$$

$$\rho_1 \approx 1.3 \text{ kg/m}^3$$

$$\rho_2 \approx 1000 \text{ kg/m}^3$$

$$\left. \begin{array}{l} \rho_1 \approx 1.3 \text{ kg/m}^3 \\ \rho_2 \approx 1000 \text{ kg/m}^3 \end{array} \right\} \Rightarrow \begin{array}{l} |\rho_2 - \rho_1| \approx \rho_2 \\ (\rho_2 + \rho_1) \approx \rho_2 \end{array}$$

$$\Rightarrow v_f \approx \sqrt{\frac{g \lambda}{2\pi} + \frac{2\pi\gamma}{\lambda \rho_2}}$$

Kapillarbølger ($\lambda \ll 1.7 \text{ cm}$) : $v_f \approx \sqrt{\frac{2\pi\gamma}{\lambda \rho_2}}$

Tyngdebølger ($\lambda \gg 1.7 \text{ cm}$) : $v_f \approx \sqrt{\frac{g \lambda}{2\pi}}$

$$\begin{aligned} v_f &= \frac{\omega}{k} \Rightarrow \omega(k) = v_f k = \sqrt{g k^{-1} + \gamma k / \rho_2} \cdot k \\ &= \sqrt{g k + \gamma k^3 / \rho_2} \end{aligned}$$