

Two Phase Flow

Regimes and Pressure Drop



Regimes in Horizontal Pipes



i) *Dispersed bubble flow*



ii) *Annular flow with*



iii) *Elongated bubble flow*



iv) *Slug flow*



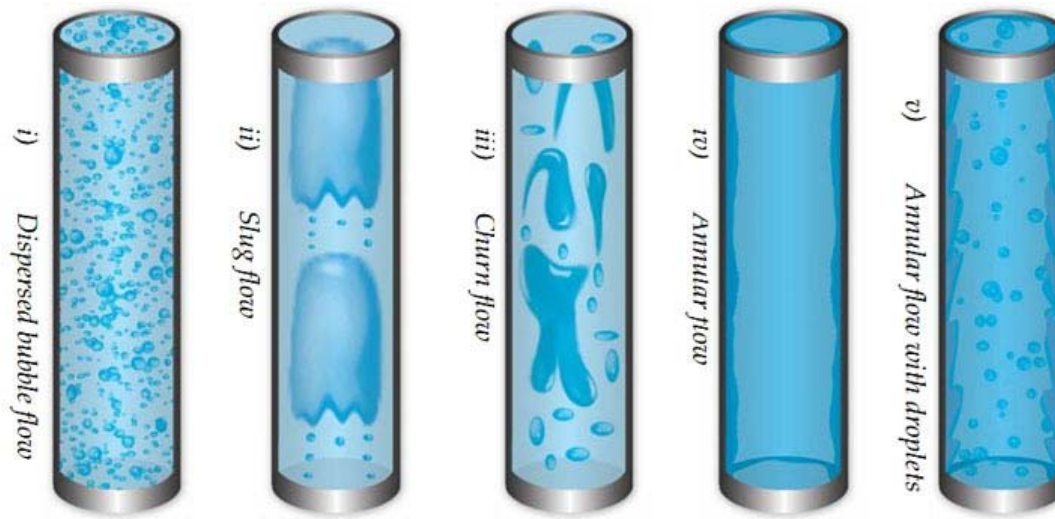
v) *Stratified flow*



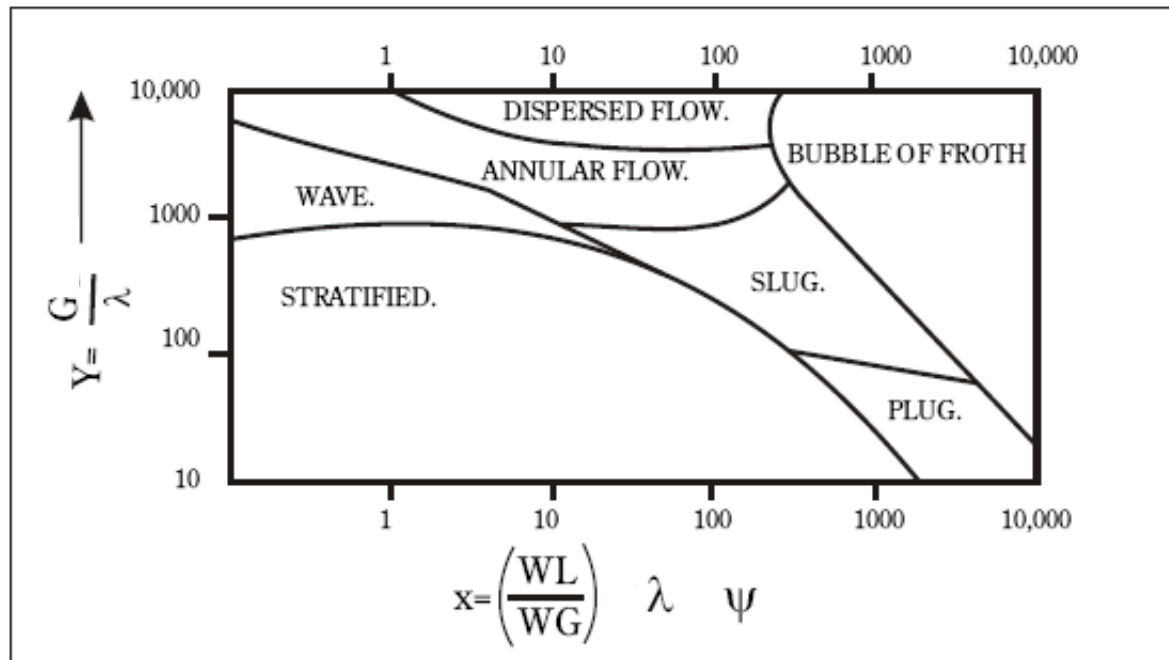
vi) *Stratified wavy flow*



Regimes in Vertical Pipes



Baker Plot



$$\lambda = \sqrt{\frac{\rho_G}{1.2} \frac{\rho_L}{1000}}$$

$$\Psi = \frac{0.073}{\sigma} \left[1000 \eta_L \left(\frac{1000}{\rho_L} \right)^2 \right]^{1/3}$$

$$[\rho] = \text{kg} / \text{m}^3$$

$$[\sigma] = \text{N} / \text{m}$$

$$[\eta] = \text{kg} / (\text{m} \text{ s})$$

$$[G] = \text{kg} / (\text{m}^2 \text{ s})$$



Pressure Drop

Old Formulas (Lockhardt & Martinelly, Dukler, etc

New: **Beggs-Brill-Moody.**
(see Pro II Reference Manual for details)

