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

1) Dispersed bubble flow
2) Slug flow
3) Churn flow
4) Annular flow
5) Annular flow with droplets
\[ \lambda = \sqrt{\frac{\rho_G}{\rho_L}} \sqrt{1.2 \ 1000} \]

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

- \([\rho] = \text{kg} / \text{m}^3\)
- \([\sigma] = \text{N} / \text{m}\)
- \([\eta] = \text{kg} / (\text{m} \cdot \text{s})\)
- \([G] = \text{kg} / (\text{m}^2 \cdot \text{s})\)
Pressure Drop

Old Formulas (Lockhardt & Martinellly, Dukler, etc)

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