

$$\Delta p_{\text{dry}} = \frac{f\,H\,\rho_{\text{g}}\,V_{\text{g}}^2}{2R_{\text{h}}\,\varepsilon^2}$$

$$R_{\text{h}} = \frac{\varepsilon D_{\text{w}}}{4(1-\varepsilon)}$$

$$f = \frac{34}{Re} + \frac{1.4}{Re^{0.2}}$$

$$Re = \frac{D_{\text{w}}\rho_{\text{g}}V_{\text{g}}}{(1-\varepsilon)\mu_{\text{g}}}$$