Intermediate Flow

$$\Delta p = \frac{150\mu u_0 L_b}{D_p^2}\frac{(1-\varepsilon)^2}{\varepsilon^3} + \frac{1.75\rho u_0^2 L_b}{D_p}\frac{(1-\varepsilon)}{\varepsilon^3}$$

Ergun Equation

$$\frac{\Delta p}{\rho u_0^2}\frac{D_p}{L}\frac{\varepsilon^3}{(1-\varepsilon)} = \frac{150}{Re_p} + 1.75$$

Note: equation can be used with gases using average gas density between inlet and outlet.