$$Q = \frac{\pi R^4}{8\mu L}\left[(p_1 + \rho g z_1) - (p_2 + \rho g z_2)\right] \qquad j = \frac{f}{D}\frac{v^2}{2g} \qquad f = \frac{64}{\Re_e} \qquad \frac{1}{\sqrt{f}} = -2\log\left[\frac{\varepsilon}{3.7\,D} + \frac{2.51}{\Re_e\sqrt{f}}\right]$$

$$v = C\sqrt{R\,j} \qquad C = \frac{87\sqrt{R}}{\gamma + \sqrt{R}} \qquad C = \frac{100\sqrt{R}}{m + \sqrt{R}} \qquad v = K\,R^{2/3}\,j^{1/2} \qquad j = 1.21\times10^{10}\left[\frac{Q}{CH}\right]^{1.852} D^{-4.87}$$

$$v = 146.2\,R^{5/7}\,j^{4/7} \qquad h_s = \zeta_s\frac{v^2}{2g} \qquad \zeta = \left(1 - \frac{A_1}{A2}\right)^2 \qquad NPSH_{disponível} = \frac{p_{atm}}{\gamma} + (z_o - z_B) - \Delta H_T - \frac{e_s}{\gamma}$$

$$e_s = 610.8\ exp\left(17.27t\,/(237.3+t)\right)$$

$$F = \frac{1}{m+1} + \frac{1}{2N} + \frac{\sqrt{m-1}}{6N^2} \qquad F(\alpha) = \frac{NF - (1-\alpha)}{N - (1-\alpha)} \qquad Q_{eq} = Q_{saída} + 0.55\,Q_{serviço}$$

$$R = \frac{A}{P} = \frac{b\,h + m\,h^2}{b + 2\,h\sqrt{1 + m^2}} \qquad\qquad \theta = 360° - 2\cos^{-1}\left(\frac{h - r}{r}\right) \qquad A = \frac{(\theta - sen\,\theta)\,r^2}{2} \qquad P = r\,\theta$$

$$\overline{K} = \left(\frac{P}{\sum\dfrac{P_i}{K_i^{3/2}}}\right)^{2/3} \qquad\qquad h_c = \sqrt[3]{q^2/g} \qquad v_c = \sqrt{gh_c}$$

$$\frac{Q}{\sqrt{g}} = \frac{\left[(b+mh)h\right]^{1.5}}{\sqrt{b+2mh}} \qquad v_c = \sqrt{gh_{mc}} \qquad E_c = h_c + \frac{h_{mc}}{2} \qquad h_m = \frac{(b+mh)h}{b+2mh}$$

$$\frac{h_1}{h_2} = \frac{1}{2}\left[-1 + \sqrt{1 + \frac{8q^2}{g\,h_2^3}}\right] = \frac{1}{2}\left[-1 + \sqrt{1 + \frac{8v_2^2}{g\,h_2}}\right]$$

$$\frac{h_2}{h_1} = \frac{1}{2}\left[-1 + \sqrt{1 + \frac{8q^2}{g\,h_1^3}}\right] = \frac{1}{2}\left[-1 + \sqrt{1 + \frac{8v_1^2}{g\,h_1}}\right] \qquad \Delta h = \frac{(h_2 - h_1)^3}{4h_1 h_2} \qquad L = 6.9\,(h_2 - h_1)$$

$$Q = k\,c\,A_o\sqrt{2gH} \qquad\qquad c' = c\left(1 + \lambda\frac{U'}{U}\right) \qquad\qquad Q = A_o\sqrt{2gh_p} \qquad Q = c\,A_o\sqrt{2g\,\delta}$$

$$Q = \frac{c}{\sqrt{1 - \beta^4}}\,A_o\sqrt{\frac{2\,\Delta p}{\rho}} \qquad \beta = \frac{d_o}{D} \qquad\qquad Q = \frac{2}{3}\,c\,b\sqrt{2g}\left[H_2^{\,3/2} - H_1^{\,3/2}\right]$$

$$Q = C\,b\sqrt{2\,g\,H^3} \qquad C = \left(0.405 + \frac{0.003}{H}\right)\left[1 + 0.55\left(\frac{H}{H+A}\right)^2\right] \qquad C = 0.41\left(1 + \frac{1}{1000\,H + 1.6}\right)\left[1 + 0.5\left(\frac{H}{H+A}\right)^2\right]$$

$$Q = 1.83\,(b - 0.2\,H)\,H^{3/2}$$

$$Q = 1.38\,H^{5/2} \quad para \quad H < 0.18\ m \qquad Q = 1.46\,H^{5/2} \quad para \quad H > 0.18\ m \qquad Q = 1.86\,b\,h^{3/2} \qquad Q = 1.7\,b\,H^{3/2}$$