

$$\Re_e=\frac{vD}{\upsilon} \qquad j=\frac{f}{D}\frac{v^2}{2g} \qquad f=\frac{0.3164}{\sqrt[4]{\Re_e}} \qquad \frac{1}{\sqrt{f}}=-2~\log\!\left[\frac{\varepsilon}{3.7D}+\frac{2.51}{\Re_e\sqrt{f}}\right]$$

$$v=C\,\sqrt{R\,j} \quad C=\frac{87\sqrt{R}}{\gamma+\sqrt{R}} \quad C=\frac{100\sqrt{R}}{m+\sqrt{R}} \qquad v=K\,R^{2/3}\,j^{1/2} \quad v=0.849\,C_H\,R^{0.63}\,j^{0.54}$$

$$j=2.587\times10^{-3}\cdot K\cdot v^{1.9}/D^{1.1} \qquad j=0.00092\,\frac{Q^{1.8}}{D^{4.8}} \qquad v=146.2\,R^{5/7}\,j^{4/7}$$

$$h_s=\zeta_s\frac{v^2}{2g} \qquad \zeta=\left(1-\frac{A_1}{A_2}\right)^2 \qquad e_s(t)=610.8\,e^{\frac{17.27t}{237.3+t}}$$

$$NPSH_{disponivel}=\frac{p_{atm}}{\gamma}+\left(z_o-z_B\right)-\frac{v_{asp}^2}{2g}-\Delta H_T-\frac{e_s}{\gamma} \qquad P_{util}=\gamma Qh_B$$

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