PIPE FLOCCULATION

Q=	10000	m3/d	Re=	2.94E+05	
Q=	0.116	m3/s	Lambda=	1.45E-02	
T=	20	C	hf=	0.10245	m
L=	200	m			
D=	0.5	m			

v=	0.589	m/s
G=	54	sec
tR=	339.3	sec
G*tr=	1.84E+04	

Pipe Type	**Roughness**				
Drawn Tubing	1.50E-06	η=	Kin Visc	1E-06	m2/s
		μ=	Dynam. Vis	0.001002	kg/(m.s)
		ρ =	Density	998.2129	

Type I:

Calculates h_l given Q, ε, d and L

Swamee & Jain developed equation:

$$f = \frac{1.325}{\ln\left[\frac{\varepsilon}{3.7d} + \frac{5.74}{\mathrm{Re}^{0.9}}\right]^2} \qquad 10^{-6} \le \frac{\varepsilon}{d} \le 10^{-2} \qquad 5000 \le \mathrm{Re} \le 10^{8}$$

Darcy - Weisbach equation:

$$h_l = \frac{8fLQ^2}{\pi^2 d^5 g}$$

Type II:

Calculates Q given (ε/d), h_l, L and

Swamee & Jain developed equati

$$\frac{1}{\sqrt{f}} = \left(\frac{8L}{h_l d^5 g}\right)^{0.5} \frac{Q}{\pi}$$

Colebrook formula:

$$Q = -0.965 d^2 \left(\frac{g d h_l}{L}\right)^{0.5} \ln\left(\frac{}{3.}\right.$$

Pa.s

Type III:

d Calculates d given Q, L, h_l, ε

on: Swamee and Jain developed equation

$$d = 0.66\left[\varepsilon^{1.25}\left(\frac{LQ^2}{h_l g}\right)^{4.75} + \nu Q^{9.4}\left(\frac{L}{g h_l}\right)^{5.2}\right]^{0.04}$$

$$\frac{\varepsilon}{7d} + \frac{1.784\nu}{d\sqrt{\frac{g d h_l}{L}}}\Bigg) -$$

Hazen Williams I:

Calculates h_l given Q, ε, d and L

Hazen Williams equation:

$$\frac{h_l}{L} = \frac{4.727}{d^{4.8704}}\left(\frac{Q}{C_{HW}}\right)^{1.852}$$

Hazen Williams II:

Calculates Q given (ε/d), h_l, L anc

Hazen - Willaims equation:

$$\frac{h_l}{L} = \frac{4.727}{d^{4.8704}}\left(\frac{Q}{C_{HW}}\right)^{1.852}$$

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