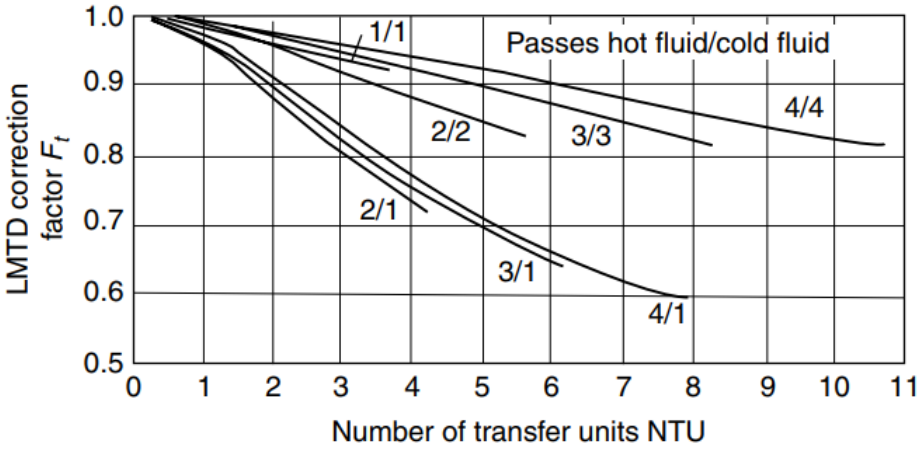
Intercambiadores de calor *PHE*. Consideraciones para el dimensionamiento: coeficientes peliculares

$$G_p = \frac{\dot{m}_p}{Nchp.b.s} \qquad D_H = \frac{4bs}{2(b+s)} \cong 2s;\ b \gg s \qquad Re = \frac{G_p D_H}{\mu} \qquad Nu = \frac{h_p D_H}{\kappa_p} = C Re^a Pr^b \left(\frac{\mu}{\mu_{wall}}\right)^x$$

En régimen turbulento	En régimen laminar
C: 0,15 a 0,40 (0,374)	*C*: 1,86 a 4,50 (3,18)
a: 0,65 a 0,85 (0,67)	*a, b*: 0,33
b: 0,3 a 0,45 (0,33)	*x*: 0,05 a 0,20 (0,15)
x: 0,05 a 0,20 (0,15)	

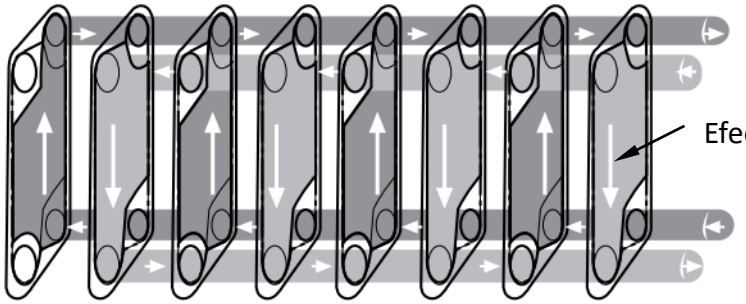


$$\dot{q} = U_d A_t F_t LMTD_{ctc}$$

$$U_d = \left[\frac{1}{h_H} + \frac{e_p}{\kappa_p} + \frac{1}{h_C} + r_{H,f} + r_{C,f}\right]^{-1}$$

$$A_t = \frac{\dot{q}}{U_d F_t LMTD_{ctc}}$$

$$NTU = \begin{cases} \dfrac{(T_{H,in} - T_{H,out})}{LMTD_{ctc}} & C_H = C_{min} \\ \dfrac{(T_{C,out} - T_{C,in})}{LMTD_{ctc}} & C_C = C_{min} \end{cases}$$



Intercambiadores de calor *PHE*. Consideraciones para el dimensionamiento: caída de presión (configuración 1 - 1)

$$L_t = \sqrt{L_p^2 + b^2} \qquad G_p = \frac{\dot{m}_p}{Nchp.b.s}$$

$$\Delta P_p = f\left(\frac{L_t}{D_H}\right)\rho\frac{{u_p}^2}{2} = 8J_f\left(\frac{L_t}{D_H}\right)\rho\frac{{G_p}^2}{2\rho^2} = 8J_f\left(\frac{L_t}{D_H}\right)\frac{{G_p}^2}{2\rho}$$

$$\Delta P = \Delta P_p + \Delta P_{po} \qquad J_f = 0{,}6Re^{-0{,}3} \qquad D_H \cong 2s$$

$$Re = \frac{G_p D_H}{\mu}$$

$$\Delta P_{po} = 1{,}3\frac{\rho u_h^2}{2} = 1{,}3\frac{8\dot{m}_p^2}{\rho\pi^2 d_{hole}^4}$$