

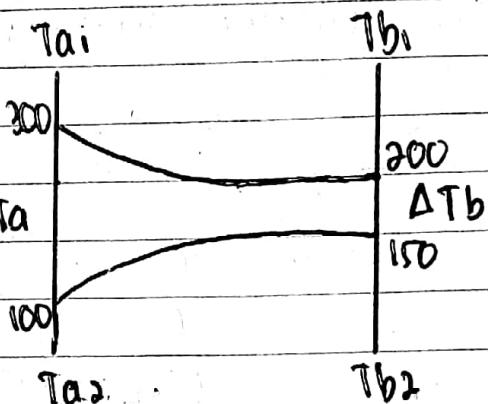
1. Fluida panas memasuki pipa koncentris pada suhu 300°F dan didinginkan hingga 200°F menggunakan fluida dingin yang masuk pada suhu 100°F dan keluar suhu 150°F
- Nilai ΔT_{Imtd}
 - Susunan lebih baik, paralel atau lawan arah

jawab :

→ Paralel Flow

$$\begin{array}{c} a \\ \hline 300^{\circ}\text{F} \longrightarrow \text{cooled} \longrightarrow 200^{\circ}\text{F} \text{ (hot fluid)} \\ 100^{\circ}\text{F} \longrightarrow \text{heated} \longrightarrow 150^{\circ}\text{F} \text{ (cold fluid)} \\ \Delta T_a = 200^{\circ}\text{F} \end{array}$$

$$\begin{array}{c} b \\ \hline \Delta T_b = 50^{\circ}\text{F} \end{array}$$

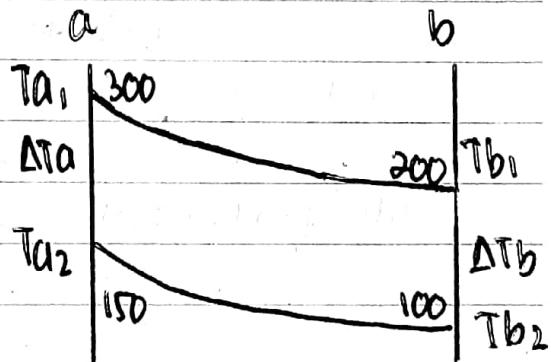


$$\begin{aligned} \Delta T_{\text{Imtd}} &= \frac{\Delta T_a - \Delta T_b}{\ln \left(\frac{\Delta T_a}{\Delta T_b} \right)} = \frac{200^{\circ}\text{F} - 50^{\circ}\text{F}}{\ln \left(\frac{200^{\circ}\text{F}}{50^{\circ}\text{F}} \right)} \\ &= \frac{150^{\circ}\text{F}}{\ln 4} \\ &= 108.20213^{\circ}\text{F} \end{aligned}$$

→ Counter Flow

$$\begin{array}{c} a \\ \hline 300^{\circ}\text{F} \longrightarrow \text{cooled} \longrightarrow 200^{\circ}\text{F} \text{ (hot fluid)} \\ 150^{\circ}\text{F} \longleftarrow \text{heated} \longleftarrow 100^{\circ}\text{F} \text{ (cold fluid)} \\ \Delta T_a = 150^{\circ}\text{F} \end{array}$$

$$\begin{array}{c} b \\ \hline \Delta T_b = 100^{\circ}\text{F} \end{array}$$



$$\begin{aligned} \Delta T_{\text{Imtd}} &= \frac{\Delta T_a - \Delta T_b}{\ln \left(\frac{\Delta T_a}{\Delta T_b} \right)} = \frac{150^{\circ}\text{F} - 100^{\circ}\text{F}}{\ln \left(\frac{150^{\circ}\text{F}}{100^{\circ}\text{F}} \right)} \end{aligned}$$

$$= \frac{50^{\circ}\text{F}}{\ln(1.5)} = 123.315^{\circ}\text{F}$$

Maka yang digunakan adalah counter flow karena memiliki nilai ΔT_{mid} besar sehingga perpindahan panas lebih besar. Sehingga lebih efektif dengan counter flow.