

-Pindahkan Panas.

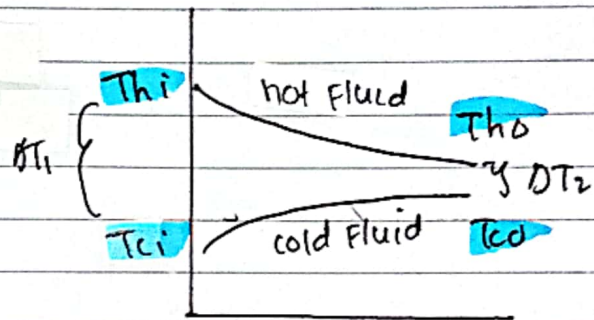
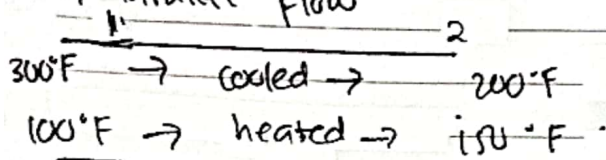
1. Sebuah fluida panas memasuki pipa konsentris pada suhu  $300^{\circ}\text{F}$  dan didinginkan hingga  $200^{\circ}\text{F}$  dengan fluida dingin yang masuk pada suhu  $100^{\circ}\text{F}$  dan keluar bersuhu  $150^{\circ}\text{F}$ . Berapa nilai  $\Delta T_{lm}$  susunan mana yang lebih baik, paralel atau lawan arah?

diket :

•) hot fluid  $\Rightarrow$  in ( $T_{hi}$ ) =  $300^{\circ}\text{F}$   
out ( $T_{ho}$ ) =  $200^{\circ}\text{F}$

•) cold fluid  $\Rightarrow$  in ( $T_{ci}$ ) =  $100^{\circ}\text{F}$   
out ( $T_{co}$ ) =  $150^{\circ}\text{F}$

a). Parallel flow



•)  $\Delta T_1 = T_{hi} - T_{ci}$

$\Delta T_1 = (300 - 100)^{\circ}\text{F}$

$\Delta T_1 = 200^{\circ}\text{F}$

•)  $\Delta T_2 = T_{ho} - T_{co}$

$\Delta T_2 = 200^{\circ}\text{F} - 150^{\circ}\text{F}$

=  $50^{\circ}\text{F}$

$\Delta T_2 = 200^{\circ}\text{F} - 50^{\circ}\text{F}$   
=  $150^{\circ}\text{F}$

$\Delta T_{lm} = \frac{\Delta T_1 - \Delta T_2}{\ln\left(\frac{\Delta T_1}{\Delta T_2}\right)} = \frac{150^{\circ}\text{F}}{\ln\left(\frac{200^{\circ}\text{F}}{50^{\circ}\text{F}}\right)} = \boxed{108,2^{\circ}\text{F}}$

b). counter flow

•)  $\Delta T_1 = T_{hi} - T_{co}$

$\Delta T_1 = 300^{\circ}\text{F} - 150^{\circ}\text{F}$

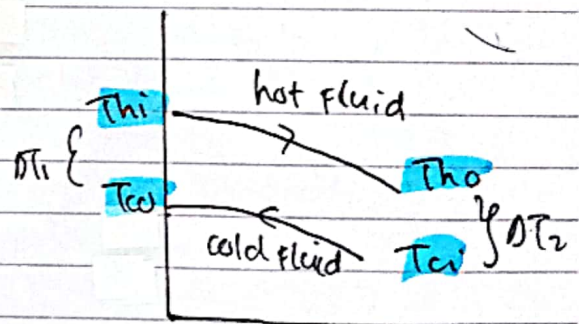
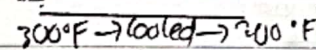
$\Delta T_1 = 150^{\circ}\text{F}$

•)  $\Delta T_2 = T_{ho} - T_{ci}$

$\Delta T_2 = 200^{\circ}\text{F} - 100^{\circ}\text{F}$

$\Delta T_2 = 100^{\circ}\text{F}$

$\Delta T_{lm} = \frac{\Delta T_1 - \Delta T_2}{\ln\left(\frac{\Delta T_1}{\Delta T_2}\right)} = \frac{150^{\circ}\text{F} - 100^{\circ}\text{F}}{\ln\left(\frac{150^{\circ}\text{F}}{100^{\circ}\text{F}}\right)} = \boxed{123,34^{\circ}\text{F}}$



Jadi yang digunakan adalah counter flow karena memiliki  $\Delta T_{lm}$  lebih besar sehingga perpindahan panasnya juga lebih besar