

LATIHAN 1 PERPINDAHAN PANAS

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OM OT OWOT OF OS OS

1) Fluida panas memasuki pipa pada suhu 300°F dan didinginkan hingga 200°F oleh fluida dingin yang masuk pada 100°F dan dipanaskan hingga 150°F . Fluida harus diarahkan searah dengan aliran paralel atau bertlawanan?

Diketahui

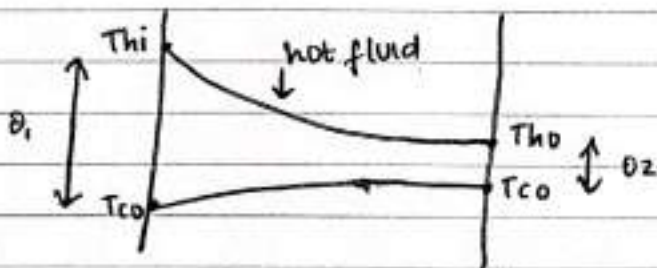
$$300^{\circ}\text{F} = 422,039 \text{ K} \text{ (Fluida panas masuk pipa)}$$

$$200^{\circ}\text{F} = 366,483 \text{ K} \text{ (Fluida panas keluar pipa)}$$

$$100^{\circ}\text{F} = 310,928 \text{ K} \text{ (fluida dingin masuk pipa)}$$

$$150^{\circ}\text{F} = 338,706 \text{ K} \text{ (fluida dingin keluar pipa)}$$

co-current flow / Paralel flow



$$\theta_1 = T_{hi} - T_{ci} = 422,039 \text{ K} - 310,928 \text{ K}$$

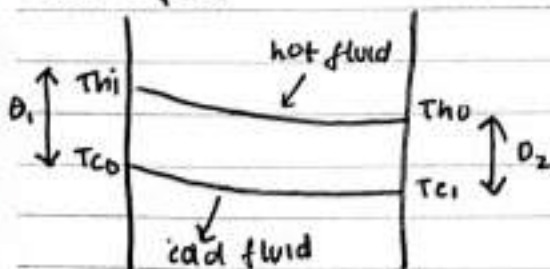
$$\theta_1 = 111,111 \text{ K}$$

$$\theta_2 = T_{ho} - T_{co} = 366,483 \text{ K} - 338,706$$

$$\theta_2 = 27,777 \text{ K}$$

$$\theta_{lm} = \frac{\theta_1 - \theta_2}{\ln \frac{\theta_1}{\theta_2}} = \frac{111,111 - 27,777}{\ln \frac{111,111}{27,777}} = 61,7667 \text{ K}$$

counter flow



$$\theta_1 = T_{hi} - T_{co} = 422,039 - 338,706 = 83,333 \text{ K}$$

$$\theta_2 = T_{ho} - T_{ci} = 366,483 - 310,928 = 55,555 \text{ K}$$

$$\theta_{lm} = \frac{\theta_1 - \theta_2}{\ln \frac{\theta_1}{\theta_2}} = \frac{83,333 \text{ K} - 55,555 \text{ K}}{\ln \frac{83,333 \text{ K}}{55,555 \text{ K}}} = 68,507 \text{ K}$$

Harus diarahkan bertlawanan arah karena θ_m counterflow lebih tinggi sehingga perpindahan panas terjadi di daerah yang sama