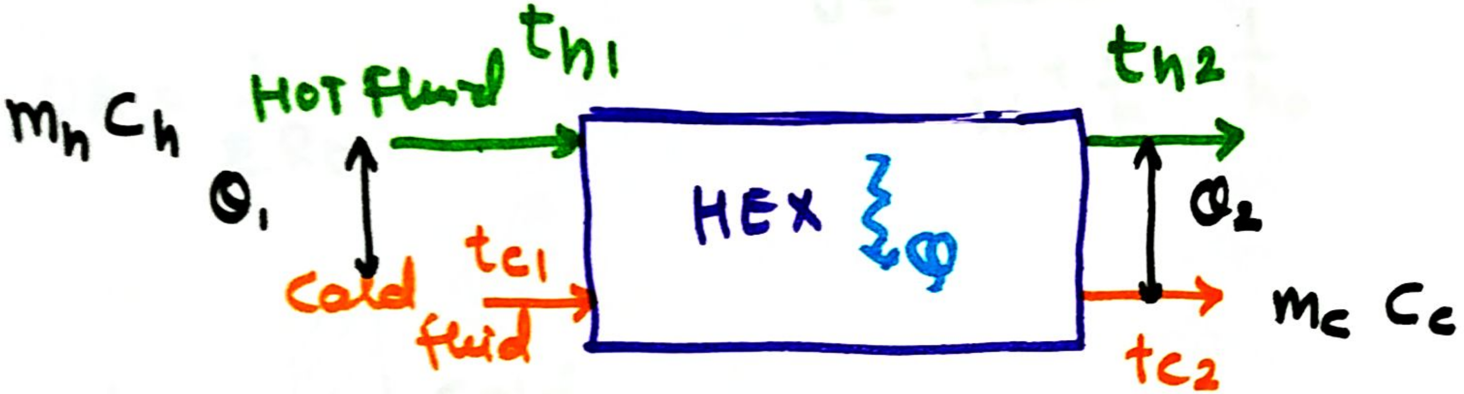
m = mass flow (kg/s)
c = specific Heat (J/kg°c)
t = fluid Temp. (°c)
Δt = change in fluid Temp.

$\varphi_h = \varphi_c = \varphi_{ex}$



Subscripts h and c

h — hot fluid; c — cold fluid

1 and 2

1 — inlet; 2 — outlet

(i) The hot fluid gives up heat

$$\varphi_h = m_h c_h (T_{h1} - T_{h2})$$

(ii) The cold fluid Absorbs heat

$$\varphi_c = m_c c_c (T_{c2} - T_{c1})$$

$$\varphi_{ex} = U A \theta_m$$

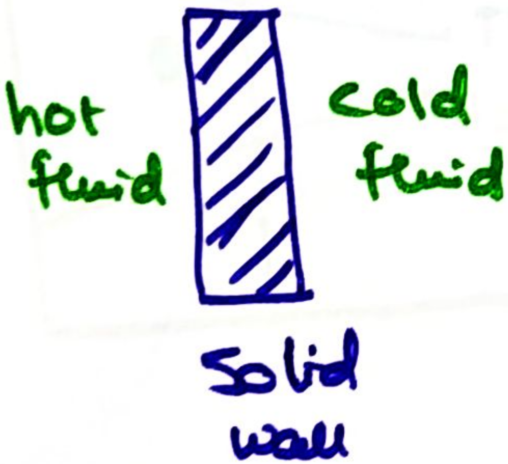
$$\Phi = \frac{\Delta T}{\Sigma R_t}$$

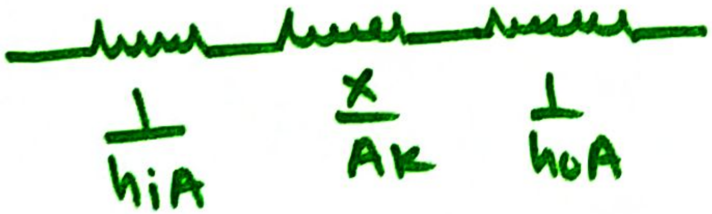
$$= U A \Delta T$$

$$UA = \frac{1}{\Sigma R_t}$$

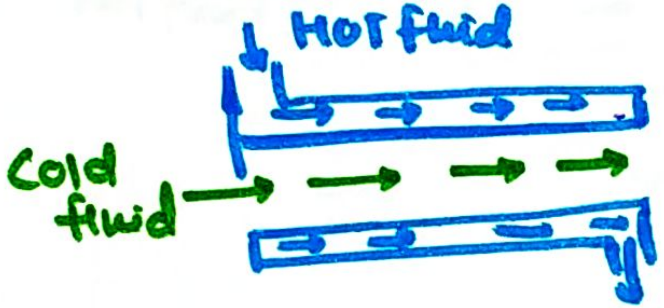
$$UA = \frac{1}{\frac{1}{h_i A_i} + \frac{x}{Ak} + \frac{1}{h_o A}}$$

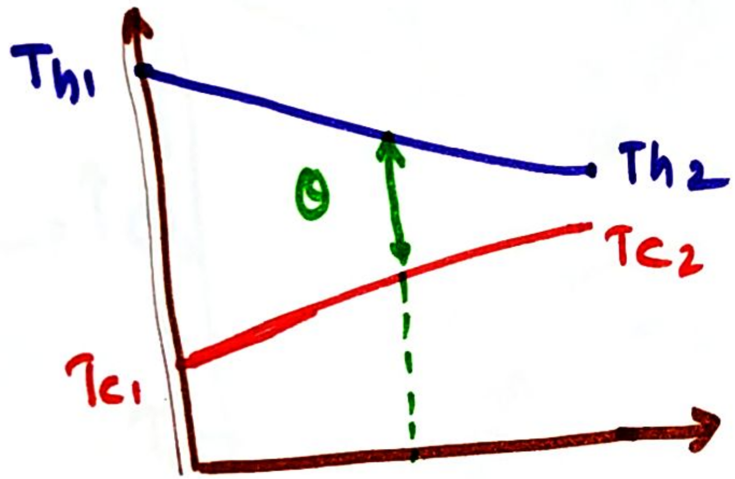
$$U = \frac{1}{\frac{1}{h_i} + \frac{x}{k} + \frac{1}{h_o}}$$





Parallel flow HX





$$\theta = T_h - T_c$$

Counter flow HX