

To find the minimum water flow rate required to heat air from  $0^{\circ}\text{C}$  to  $21^{\circ}\text{C min}^m$  where water enters at  $45^{\circ}\text{C}$  & exits at  $10^{\circ}\text{C min}^m$

Heat lost by water = Heat gained by air

$$\therefore (m \dot{c}_p \Delta T)_{\text{water}} = (m \dot{c}_p \Delta T)_{\text{air}}$$

$$m_w 4.186 \times (45 - 10) = 0.08 \times 1.010 \times (21 - 0)$$

$$\therefore \underline{m_w = 0.0116 \text{ kg/s}}$$

Note: if water was permitted to exit at a temperature higher than  $10^{\circ}\text{C}$  a larger flow rate would be needed.