

### Determination of Heat Transfer Co-efficient for Shell and Tube Heat Exchanger in Parallel Mode

#### Objectives:

- To study the Shell and Tube Heat Exchanger
- To determine the Heat Transfer Co-efficient for Shell and Tube Heat Exchanger in parallel mode
- To calculate the overall Heat Transfer Co-efficient for Shell and Tube Heat Exchanger in parallel mode

#### Apparatus required:

Shell and Tube Heat Exchanger

#### Apparatus Description:

Heat Exchanger Service unit contains an insulating water bath and a magnetic drive pump. For flow control, control valve are provided at cold water and hot water line. The Hot water bath is of recycled type with PID controller. Temperature sensors are installed at various and appropriate locations to record the temperature of fluids at the time of running the experiment. Flow sensors are provided for hot water, cold water measurement.

#### Theory:

A transfer types of heat exchanger in one on which both fluids pass simultaneously through the device and heat is transferred through separating walls. In practice, most of the heat exchangers used are transfer type ones.

The transfer type exchangers are further classified according to flow arrangement as:

- Single pass
- Multiple Pass

A simple example of transfer type of heat exchanger can be in the form of a tube arrangement in which one of the fluids is flowing through the inner tube and the other through the annulus surrounding it. The heat transfer takes place across the walls of the inner tube.

The heat lost by the hot fluid can be calculated

$$q_h = \text{heat transfer rate to the hot water}$$

$$q_h = m_h C_{ph} (T_{hi} - T_{ho})$$

Heat taken by the cold fluid can also be calculated

$$q_c = \text{Heat Transfer rate to the cold water}$$

$$q_h = m_c C_{pc} (T_{co} - T_{ci})$$

$$Q_{avg} = \frac{q_c + q_h}{2}$$

$$U = \frac{Q_{avg}}{A \Delta T_m}$$

# Lab Manual Heat Nd Mass Transfer

**Edward Leamington Nichols**



## **Lab Manual Heat Nd Mass Transfer:**

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