

## Heat Exchangers Overview

A heat exchanger is a device used to transfer heat between two or more fluids at different temperatures. Heat exchangers are widely used in chemical plants, refineries, power generation, and HVAC systems.

Common Heat Exchanger Types: - Shell and tube heat exchangers - Plate heat exchangers - Air-cooled heat exchangers

Flow Arrangements: Parallel flow heat exchangers allow both fluids to enter at the same end and flow in the same direction. Counterflow heat exchangers allow fluids to flow in opposite directions and typically achieve higher efficiency.

Heat Transfer Equation: The rate of heat transfer is given by  $Q = U \times A \times \Delta T_{lm}$ , where  $U$  is the overall heat transfer coefficient,  $A$  is the heat transfer area, and  $\Delta T_{lm}$  is the log mean temperature difference. Counterflow exchangers generally provide a higher log mean temperature difference than parallel flow exchangers.