HEAT EXCHANGERS

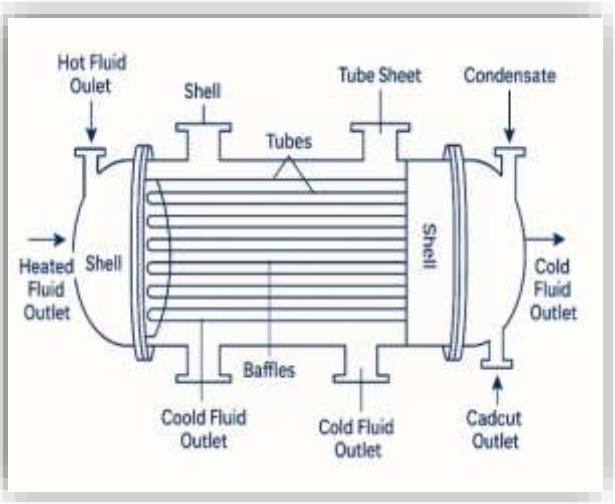
A Heat Exchanger (HE) is equipment used to transfer heat between two fluids without mixing them directly & works on conduction and convection heat transfer principle. It is the process of energy movement from one region or body to another due to a temperature difference. It does not involve the movement of matter (unlike mass transfer).

APPLICATIONS

- Power Plants – Steam condensers, feedwater
- Oil & Gas – Crude oil heaters, gas coolers
- Chemical Processing – Reactors heating/cooling, reboilers
- Food & Beverage – Pasteurizers, juice
- Pharmaceuticals – Purified water heating/cooling
- HVAC – Chillers, heat recovery units

MAJOR COMPONENTS

- ✓ **Shell** which is Outer casing that holds one fluid.
- ✓ **Tubes** carries the second fluid for heat exchanger.
- ✓ **Tube Sheets** or plates holding tubes in place.
- ✓ **Baffles** increases turbulence & heat transfer.
- ✓ **Nozzles** is used for fluid inlet and outlet connections.
- ✓ **Support Structures** for stability and maintenance access.



TECHNICAL PARAMETERS

Parameter	Range / Example
Overall Heat Transfer Coefficient (U)	50 – 6000 W/m²·K (Approx.)
Flow Arrangement	Counterflow, parallel flow, crossflow
Materials	Stainless steel, Hastelloy
Tube Diameter	12–25 mm (common in shell-and-tube)
Tube Pitch	1.25 × tube OD (typical)