

# What Are Industrial Heat Pumps?

A heat pump is a solution that transfers heat from one location (the source) to another (the sink) using a refrigeration cycle or a thermodynamic process. The primary purpose of a heat pump is to move thermal energy in the opposite direction of spontaneous heat transfer, absorbing heat from a cold space and releasing it to a warmer one. This process can be used for both heating and cooling applications. By opting for a natural refrigerant heat pump over a natural gas boiler, you will see lower greenhouse gas emissions, higher energy efficiency, renewable energy integration, long-term cost savings, and the potential to recover waste heat from industrial processes.

## Here are some key aspects of their role in industrial settings:

### Applications

#### District Heating and Cooling

Using a centralized system to meet heating and cooling requirements for multiple buildings within a district allows for energy efficiency and reduced environmental impact compared to individual systems in each building. It also enables a more flexible and sustainable energy infrastructure that can adapt to changes in energy sources and demands.

#### Industrial Process Heating and Cooling:

Many industrial processes require precise control of temperatures for optimal efficiency and product quality. Heat pumps can be integrated into some of these processes up to 185 °F (85C), to provide reliable heating or cooling, contributing to improved manufacturing processes and cost-savings.

#### Building Heating and Cooling:

Heat pumps are commonly used for temperature control in industrial buildings, warehouses, and office spaces. They provide a cost-effective and energy-efficient solution for maintaining comfortable indoor temperatures.

### Benefits

#### Waste Heat Recovery:

In industrial processes, there is often excess heat generated as a byproduct. Heat pumps can capture this waste heat and redistribute it for useful purposes, reducing overall energy consumption and enhancing sustainability.

#### Environmental Impact: Scope 1 and 2 Emissions

By utilizing natural refrigerant heat pumps, industrial facilities and buildings can reduce their reliance on fossil fuels for heating and cooling. This transition to more sustainable energy sources can lead to a decrease in greenhouse gas emissions and a move to decarbonization.

#### Energy Efficiency:

One of the primary advantages of heat pumps is their high energy efficiency. Instead of generating heat directly, they move it from one place to another, making them more energy-efficient compared to traditional heating or cooling methods. This is particularly important in industrial settings where energy consumption is a significant factor.

**With heat pumps, 1 kWh of electricity generates on average 4kWh of heat**

## Efficiency of Heat Pumps

Ambient heat

1 kWh of electricity

4 kWh of heat

1 kWh of electricity

1 kWh of electricity generates on average 4 kWh of heat

Electricity

 Source: DW