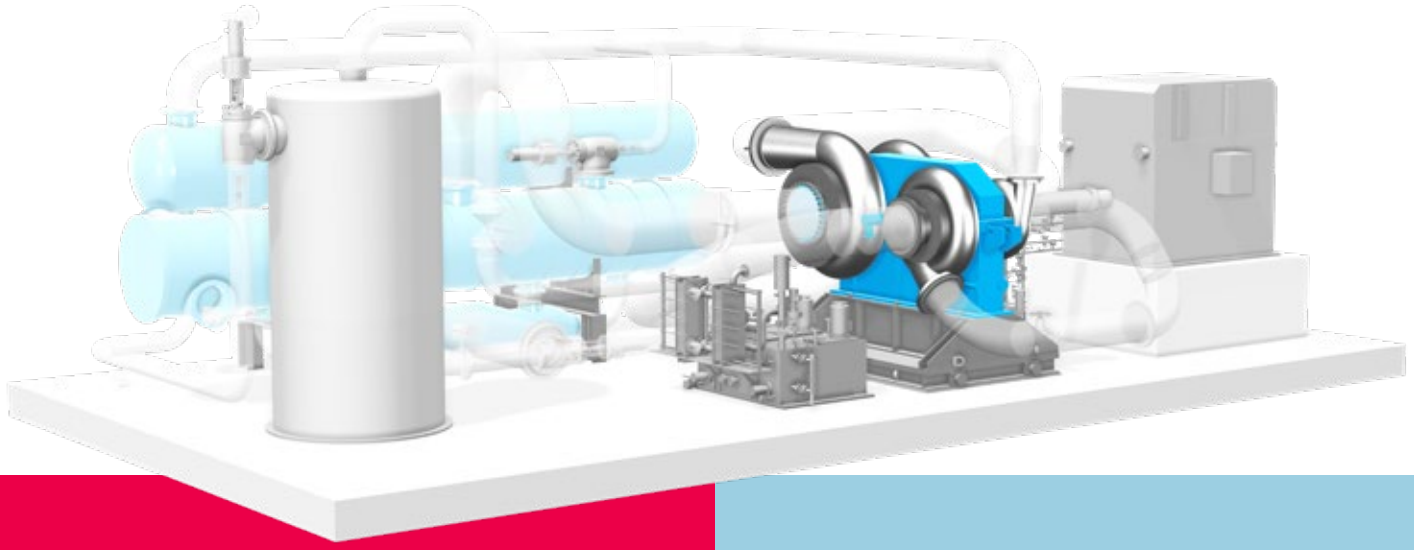
VCC Heat pump



Industrial processes are responsible for using about 50 % of the global heat energy produced, while another 46 % is used for space and water heating. Decarbonization of the thermal energy segment is therefore key to achieving our climate goals.

Improved energy efficiency in industrial processes can lead to substantial primary energy savings and subsequent reduction of CO_2 emissions. Heat pumps will provide an important mechanism to convert low and high temperature waste heat to useful high-quality process heat.

Benefits at a glance

- Reduced primary energy cost
- Eco-friendly heat production
- Reliable production of hot water up to 140 °C and steam up to 300 °C
- Unit production capacity up to 100 MWth

Everllence

Eco-friendly, reliable and efficient heat generation

Electrification of heat supply

Decarbonization of the heating sector and the growth in renewable electricity production lead to an electrification of the heat supply (power-to-heat) while fossil fuels are phasing out.

Re-electrification of industrial processes gains more importance and offers a high potential for waste heat utilization.

System solution

Everllence high temperature heat pumps bring the economic and climate-friendly benefits of domestic heat pumps to large-scale industrial applications. To ensure a process steam supply, Everllence can offer a combined heat pump / vapor compressor or a separate vapor compressor skid that provides the required process conditions.

General competence

Our many years of experience with turbomachinery and reactors in the petrochemical industry and the associated process engineering know-how will support our customers on the path to carbon neutral heat generation.

Refrigerants

Different types of heat transfer fluids with focus on natural refrigerants can be offered for special applications under consideration of:

- Environmental aspects
- Very low global warming potential (GWP)
- Zero ozone depletion potential (ODP)
- Safety concepts

Heat sources

Natural:

- Sea / river water
- Air
- Geothermal energy

Industrial:

- Process waste heat streams
- Process liquid waste streams
- Cooling water
- Sewage water
- Data centers

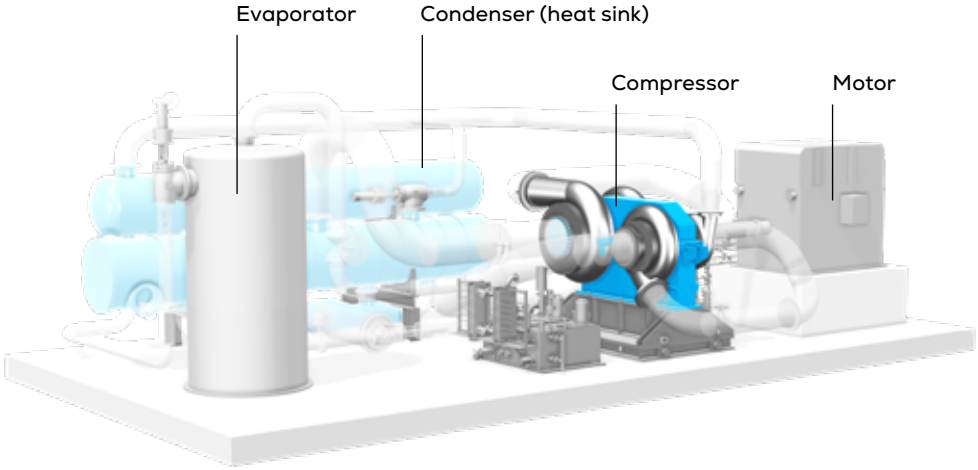
Applications

Hot water or steam supply for industries:

- Chemicals
- Petrochemicals
- Refineries
- Pulp & paper
- Food & beverage

District heating:

- Municipals
- Utilities
- Public or private facilities (e.g. hospitals, universities, industrial areas)

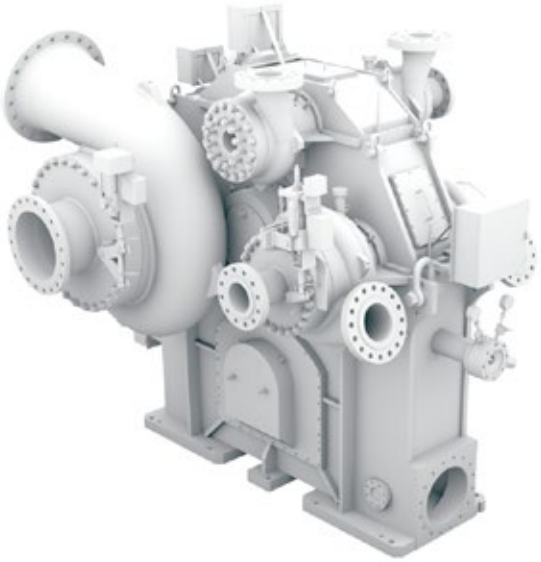


Vapor compression cycle

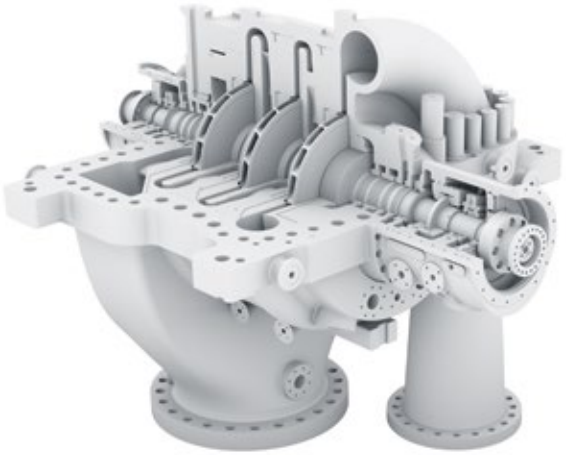
Technical data (per single heat pump unit)

	Unit	Everllence HPS / HPL
Thermal heat capacity per module	MWth MMBtu/h	10 – 100 34 – 340
Heat sink temperature range (hot water / steam*)	°C °F	60 – 300 140 – 572
Steam pressure	bar	Standard up to 20*, higher pressure on request

* Steam production above 2 bar with additional steam compressor



Radial geared compressore (typical)



Centrifugal inline compressor (typical)

Key components

Compressor system
- Radial geared or inline compressor
- Multi-stage design
- Single casing multi-service design
- Separate steam compression system for higher steam pressures
- IGV or speed control
- Base frame mounted
- Fully packaged and tested

Control system
- Process control system for control and operation of the complete heat pump unit
- Interface to plant DCS
- Anti-surge control of compressor unit
- Advanced digital services for remote operation, real time monitoring and predictive maintenance

Driver
- Electrical motor
- Frequency converter for starting and control purpose

Condenser stage
- Various heat exchanger types
- Condenser
- Condenser subcooler

Evaporator stage
- Various heat exchanger types
- Evaporator
- Superheater

Piping
- Of the complete heat pump loop
- Interconnecting piping
- Process valves and instruments

Auxiliaries
- Separate lube oil unit
- Flash box / economizer

Services
- Site services
- Long-term service agreements
- Training

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