

Heat Pump Drying

Recovery and thermal upgrade of drying energy

Drying is an energy and time intensive process and thermal energy demand is mostly provided by fossil resources. Especially in the food processing industry it is important to increase the energy efficiency of drying processes with respect to product quality and sustainability. The potential of using a heat pump with R744 (CO₂) as a working media is to recover the drying energy in form of cold and moist air and upgrade it into usable drying energy in the form of hot and dry air. This closed-loop heat pump assisted drying process has the potential to reduce the energy demand by around 50-70% compared to conventional open-loop drying processes with fossil resources as energy source. Furthermore, the implementation of a bypass in the air cycle can be examined to further enhance the energy efficiency of the system.

Key features of this system:

- ◆ Thermal capacity of up to 30 kW
- ◆ Product load up to 100 kg
- ◆ Dynamic bypass regulations for increased efficiency
- ◆ Heat pump with natural refrigerant R744
- ◆ Temperature range from 20°C to 80°C
- ◆ Humidity control from 5% to 80%
- ◆ Fossil fuel free drying
- ◆ Industrial sized batch system
- ◆ Combined investigations on product quality and energy efficiency

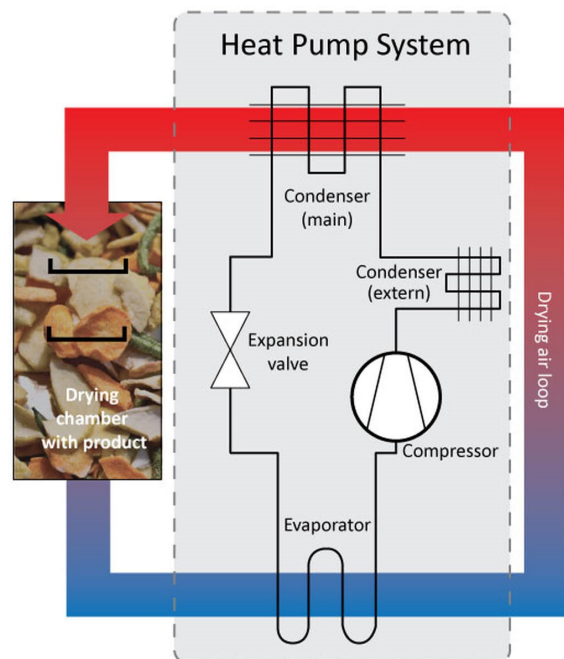


Figure: Principle of heat pump assisted drying

«We may not know or have dried your product yet, but we know how to dry – it is "only" heat and mass transfer!

We have a solid theoretical background, many years of experiences with different products and a state of the art drying laboratory. This enables us not only to dry almost every product, but also to do this with respect to product quality and process sustainability.»

Contact:

Michael Bantle, Senior Researcher, SINTEF Energi AS
Michael.Bantle@sintef.no Phone: +47 41014024



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