

# DesiCool lowers DDHA's energy and helps green image

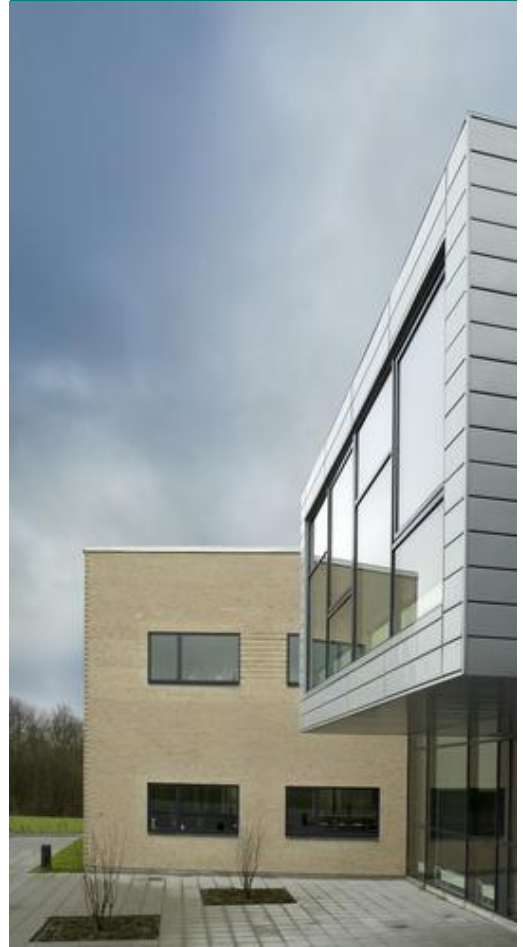
60% of the Danish population live in houses heated by district heating supplied by 400 companies. Their member organization – the Danish District Heating Association (DDHA) - inaugurated new premises in 2006 including Munters DesiCool system. The system was chosen as the DDHA wanted to utilize district heating as energy source and emphasize their environmentally sustainable profile. The DesiCool system creates a comfortable climate for employees in the 2,200m<sup>2</sup> building and in winter benefits from its heat recovery principle. The total energy cost (electricity, water and district heating) for year one amounted to only 4,500 Euro.

In 2008 the premises were enlarged by 1,000m<sup>2</sup> and another DesiCool was installed. The DDHA bring visitors to view the system to emphasize utilization of district heating for other purposes than just heating e.g. for cooling with a DesiCool system. The environmental advantages are evident as the district heating is created from powerplants processing waste. As cooling would traditionally be produced in compressor driven systems, powered by electricity from gas or coal fired powerplants, the green advantages of DesiCool are clear.

DesiCool can be powered by hot water at a temp of 55-60oC and uses nature's own method for humidifying and cooling air in the form of desiccant cooling - a solution all the more effective as it converts surplus heat. Waste heat is converted into cooled and dehumidified air which is then distributed into buildings for better process result and people's indoor comfort.



Reliable, economic and pollution free



## Benefits:

- Environmentally friendly principle without refrigerants
- Energy saving system
- Excess heat used as energy source
- Easy maintenance
- Low running costs



**Munters**

The Humidity Expert



Munters DesiCool system uses this cooling principle to convert surplus heat at DDHA into productive cooling within one unit, which contains neither compressor, cooling surfaces or condensers.

In winter the system provides a bonus as a heat recovery unit, giving a reduction in electricity consumption of 60% compared with cooling using compressors, and a heat recovery efficiency of 90% in winter.

DesiCool produces the best indoor climate yeararound because it has no mixing of air between fresh air and exhaust air. It is always 100% fresh air from DesiCool. DesiCool dehumidifies the air, then cools it in a thermal wheel (rotating heat exchanger) and cools it using an evaporative cooler. The system uses heat as the primary energy source for the cooling process – not electricity.

The desiccant sector contains a rotating Munters desiccant wheel and reactivation coil. The indirect evaporative cooling component cools the exhaust air from the premises so that one can indirectly, via the rotating heat exchanger, cool the warm yet dry air generated after drying. The evaporative cooler in the intake air lowers the temperature of the cool yet dry air from the rotating heat exchanger before it is fed into the building.

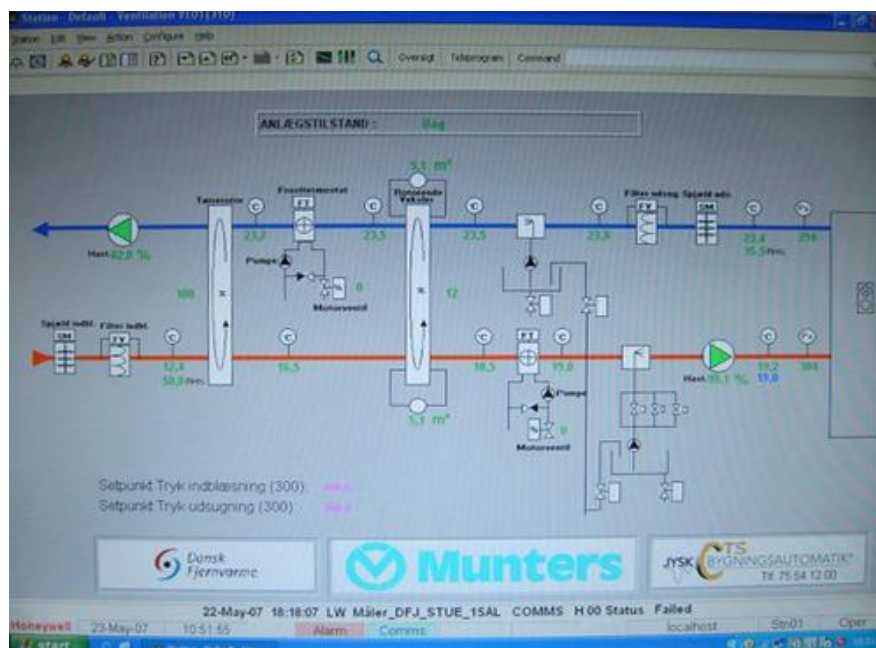
The desiccant wheel has been developed to use water temperatures as low as 60-70°C for the reactivation coil, which provides the opportunity for using surplus heat from e.g. water cooled air compressors. More surplus heating means more savings in energy costs.

In the DesiCool process, using an outdoor design condition in summer, the ratio between supplied heat power and the supplied cooling effect is a factor of 2. For 20°C increase in temperature in the exhaust air through the

reactivation coil, a 10°C temperature reduction in the air supplied is achieved. At lower exterior temperatures, the required heat power is reduced and completely ceases at an exterior temperature of 20°C. The cooling effect is generated by a combination of indirect and direct evaporative cooling.

The heat recovery in winter means that, under normal conditions - i.e. not below -16°C - the unit does not require extra energy to heat the supply air. Traditional air conditioners with heat recovery use rotating heat exchangers for heat recovery. However in Munters system, the speed of the rotating desiccant wheel is changed so the wheel becomes an enthalpy exchanger that transfers not only sensible heat but also moisture from the exhaust air. In tandem with the rotating heat exchanger this provides a temperature efficiency of 90 % and a humidity efficiency of 75 %.

The evaporative cooler works through water being added to Munters corrugated media. The heat required for evaporation is taken from the air flowing between the “corrugated” laminate. This way, the air is cooled and humidified at the same time. For each gram of water evaporated per kg of air, a temperature reduction of 2.5°C is achieved.



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