greenchiller.eu

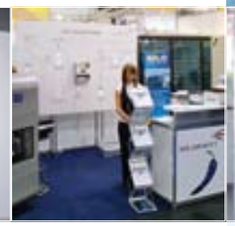
ASSOCIATION FOR SORPTION COOLING E.V.

GREEN CHILLING

GREEN CHILLER

The Berlin-based industry association for sorption cooling was founded in 2009 by leading manufacturers and research institutions in this area as a platform for the development of the market for thermally driven cooling technology.

It includes in its ranks the majority of European manufacturers of sorption cooling machines and other expert partners.



APPLICATION

Sorption cooling processes can be powered by the waste heat from combined heat and power units (CHP), from production processes or by solar heat. As a result, cooling using heat makes sense from an energy point of view and is in many cases economically feasible.

Energetic and operational efficiency of the systems require careful planning: from the selection of the procedure to the correct setting of the temperatures for heating, cooling and re-cooling.

Green Chiller supports the launch of this technology on the market and the proliferation of expert knowledge.

GREEN CHILLING

Some 15% of the electrical energy generated in Germany is used to power cooling and air-conditioning systems. For this reason, energy efficiency and the use of renewables both play an important role in cooling technology when it comes to meeting environmental protection targets.

Sorption systems make cooling possible using waste heat or solar heat as the operating power. During operation and maintenance, the systems prove their superiority by being able to use environmentally-friendly refrigerants. The result is that the emission of CO_2 and other substances which are damaging to the environment is reduced significantly. The low consumption of electrical energy and the use of local heat sources are not only eco-friendly, they also help to stabilise power networks and safeguard resources and value-creation chains in the increasingly tense environment of energy policy.

GREEN CHILLING

ENERGY-SAVING AND ECOLOGICAL REFRIGERANTS

TECHNOLOGY

In the evaporator of a chiller machine, the refrigerant evaporates due to the absorption of heat at a low temperature and low pressure. While the vapour of the refrigerant is extracted from the evaporator using a mechanical compressor in compression cooling systems and the pressure is increased, sorption cooling systems use a solution circuit (absorption) or porous solids (adsorption) to do this. In both of these cases, these are referred to as “thermal compressors”.
Electrical energy is only needed in systems with sorption cooling for auxiliary units like pumps and ventilators. The actual powering of the system is generated from solar and waste heat.

SORPTION COOLING USING WASTE HEAT AND SOLAR HEAT FOR COOLING

ABSORPTION

Absorption cooling systems have been in use commercially since the start of the 20th century and have proven themselves in a multitude of areas thanks to their robustness and long service life.
If properly maintained, a service life of many decades is nothing rare. The use of absorbers, particularly in the large-scale ranges above 300 kW, is quite widespread.
The absorption process uses the absorption capability of a solution to absorb the vapour of the refrigerant.
Commonly used working pairs for this are water-lithium-bromide solutions or ammonia-water solutions. Increasing the pressure is done during the liquid phase using a solution pump. In the generator, the solution boils due to the addition of heat (operating heat).
The refrigerant is driven out as vapour and flows to the condenser where it turns to liquid. The solution, which is low in refrigerant, flows back to the absorber.

ADSORPTION

Adsorption cooling systems have been in use in the large-scale range for a number of decades. The latest developments in the area of sorption materials and control engineering have made possible the development of smaller, more efficient units over the last few years. A number of young German companies in particular count among the pioneers and market leaders in this area.
The adsorption process uses highly-porous solids like silica gels or zeolites for adsorbing the vapour from the refrigerant. The refrigerant used is usually water.
Since the solid adsorber gradually becomes saturated over time, a number of adsorbers are usually used on a switching basis. The regeneration of the adsorbers happens by applying the operating heat, upon which the bound refrigerant is driven out again (desorption).
The refrigerant is then liquefied in a condenser and returned to the evaporator.

POWER

Depending on the procedure and the machine, the usable heating temperatures lie somewhere between 60°C and 100°C.

As a result, potential sources of heat for operations are:

SOLAR THERMAL HEAT
Renewably generated operating heat with the additional advantage of the use of the otherwise wasted heat of large solar power
DISTRICT HEATING
CO_2-neutral by uncoupling the heat from the electricity generation
COMBINED HEAT AND POWER UNITS
Local coupled generation of electricity and heat is supplemented with the provision of a cooling function
WASTE PROCESS HEAT
Exploitation of otherwise unused or minimally used waste heat
BIOMASS HEATING
Use of renewable resources

ADDRESS

Green Chiller
Association for Sorption Cooling e.V.
Stendaler Str. 4
D-10559 Berlin
Germany

CONTACT

Email **info@greenchiller.eu**
Phone +49 [0] 172 965 14 76
Telefax +49 [030] 44058859

SORPTION COOLING