Kälte. Wärme.
Innovationen.

DK-HEAT RECOVERY

Hot water at zero cost

Take advantage of the waste heat of your cooling system for heating potable water and water heating

DK-Heat Recovery – The responsible ability to save energy costs and protect the environment.

Cooling and heating requirements exist in almost all food-processing plants. Refrigeration is essential for the safe production and storage of the product and goods. Simultaneously, a large amount of hot water is used for general hygiene purposes and deep cleaning. The cooling process creates waste heat energy, which is a perfect energy source for water heating using the DK-Heat Recovery.
Free hot water!

Far too many refrigeration systems do not exploit the potential of heat recovery, a missed opportunity to help the environment. On planned closure of the last nuclear power plant in Germany in 2022, the German power supply will have to be provided by conventional fossil fuel fired power stations, as renewable energies will not provide the necessary output. Heat recovery can play an important part in reducing energy consumption and CO_2 emissions. Whether the choice or the mix is nuclear, conventional or renewable energy power – heat recovery offers the cleanest and cheapest partner.

Protect the environment and minimise energy costs!
The potential of the DK-Heat Recovery systems are numerous – and provide opportunities for high financial savings.

Showing the latest DK metrics that the use of waste heat in both small and large refrigeration systems are profitable, environmentally friendly and therefore sound. An example, the restaurant L'Osteria in Dortmund requires approximately. 1,700 litres of potable hot water per day – 7 days a week. Using a 450 litre storage tank and two internal heat exchangers (3 kW and 12 kW), hot water is produced to 51°C.

For larger refrigeration systems DK provides extremely cost-effective solutions. The poultry producer Soanes Poultry in England has a daily demand of 45,000 litres of hot water. A 2,000 litre storage tank with eight 18 kW heat exchangers has been recently installed, which is expected to save 135,000 kWh.

Equally effective is the heat recovery for the supermarket sector with transcritical CO_2 systems. A considerable demand for both heating and potable hot water exists in this sector. The EDEKA supermarket in Greven near Münster requires 750 litres of potable hot water per day. Measurements showed continuous high temperature potable water, which required only a small amount of the available waste heat energy, leaving the remaining waste heat as potential for full winter store heating, as DK have supplied to other EDEKA sites.

For each case, the perfect technical solution!

The DK-Heat Recovery offers heating water of any kind (potable water and/or heating water, and with the DK-Energy Storage Tank in one single container) through different systems (storage system or in a continuous water draw).


Cooling
and heating
in harmony

DK-Heat Recovery

DHW heating in the storage system with internal heat exchangers

Advantages

- Complete use of waste heat with the DK-fully condensing principle-giving water temperatures higher than condensing temperatures
- Perfect safety through twin-walled heat exchanger and enameled tanks
- Optimum water hygiene – certified by the WESSLING authority
- Maximum flexibility through numerous heat exchanger combinations and in-house tank production

Applications

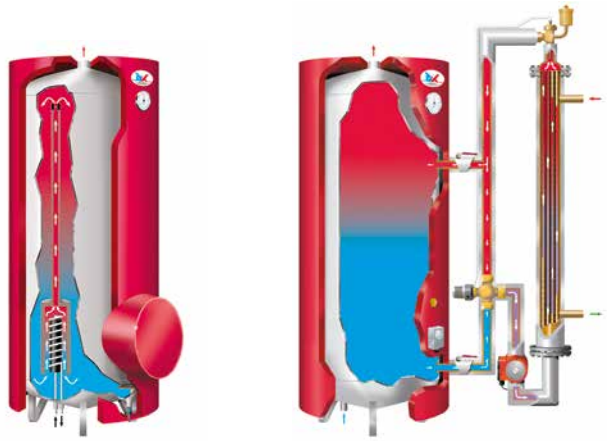
Locations that have individual chillers and for compressor refrigeration pack systems with discharge pipe dimensions up to 35 mm.

DK-Operation principle

- Refrigerant hot gas flows directly through the DK-Heat Exchanger
- Releasing de-superheat energy to the top of the heat exchanger coils
- Releasing of condensing heat content in the lower section of the heat exchanger
- Countercurrent water flows from the bottom of the tank upward through the heat exchanger
- A displacement cylinder inside the heat exchanger ensures the water is always in direct contact with the heat exchanger surface
- Preheating of cold water through the heat of condensation/reheating by overheating due to higher water temperatures than the condensation temperature

Stratified storage

- Hot water is transported via riser thermal route directly to the top of the container.
- Instant hot water is available on demand
- The heat exchanger sited in the cold water lower section of the tank, ensures a uniformly high utilization of both condensing and de-superheat energy transfer.
- The thermal water transfer through the tank requires no pump



DK-Heat Recovery

DHW heating in the storage system with external heat exchangers

Advantages

- The waste heat is used optimally with the aid of a pump and of a 3-way mixing valve
- Perfect safety through twin-walled heat exchanger and enameled containers
- Optimum water hygiene – certified by the WESSLING authority
- Ideal solution for any size application with over 350 heat exchanger options
- Flexibility through mounting option for the heat exchanger on the hot water tank or on the refrigeration system
- The external heat exchanger allows for the mains works responsibility to be with the Plumber or Refrigeration Engineer

Applications

Locations that have larger compressor refrigeration systems with discharge pipe dimensions up to 108 mm.

DK-Operation principle

- At 100% run capacity of the refrigeration system, cold water is passed over the double wall heat exchanger and fed heated to the top of the hot water tank.
- However, when a multi stage refrigeration system is running at reduced capacity. A pump with thermally controlled 3-way mixing valve allows the DK system to operate a bypass mode – mixing cold & heated water onto the heat exchanger inlet in order to produce higher water leaving temperatures off the heat exchanger.

DK-Heat Recovery

Energy efficiency and water hygiene in line – certified by WESSLING

Food processing companies can use up to 25 percent of their total energy consumption for hot water. Using the DK-Heat Recovery system this hot water is free, a remarkable cost advantage.

The DK-Heat Recovery Systems have always had the advantage of being legionella safe, this has now been confirmed with the confirmation of the WESSLING seal of approval. Wessling GmbH is one of the leading companies in the engineering service, analysis and water sampling for the protection against legionella. Wessling confirms: The design of DK-Heat Recovery systems prevents the growth of legionella. The construction of heat recovery and working under real field conditions was monitored and checked in operation. The DK storage systems meets the requirements of DVGW (German Technical and Scientific Association for Gas and Water) working sheets W551 and that independent on storage tank content.

Three advantages in one system: lower costs, less CO_2, zero legionella risk

WESSLING
Quality of Life

Konstruktiver Legionellenschutz
SICHERHEIT & HYGIENE

Prüfnummer: 1016-CAL-001

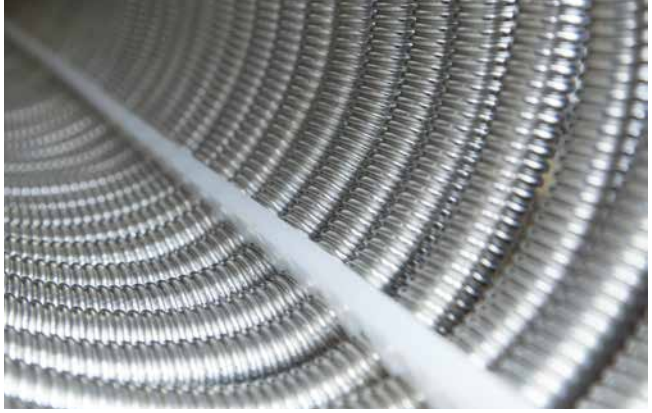
WESSLING GRUPPE
Oststraße 7 | 48341 Altenberge
WWW.WESSLING.DE

DK hygienic kit
Energetic supervision of legionella control plus optimal corrosion protection

The complete storage tank is heated up to the desired nominal temperature in the requested time by the DK hygienic kit. If the desired temperature is reached by the waste heat of the cooling unit the legionella protection function is not activated. This new safe function minimizes the demand of additional energy.

The pump and piping are fitted at the storage tank and so assembly is not necessary.

There is a maintenance and permanent corrosion protection for conservation of value integrated in the DK hygienic kit as well.



DK-Heat Recovery

Potable hot water and heating water heating in a SINGLE container

DHW heating is carried out in a continuous process to produce a water store

In this single tank solution, heating water is heated with the waste heat from the refrigeration plant to create a hot water energy store. The potable water is heated to high temperatures in a continuous process, without stoning which ensures optimum protection against legionella.

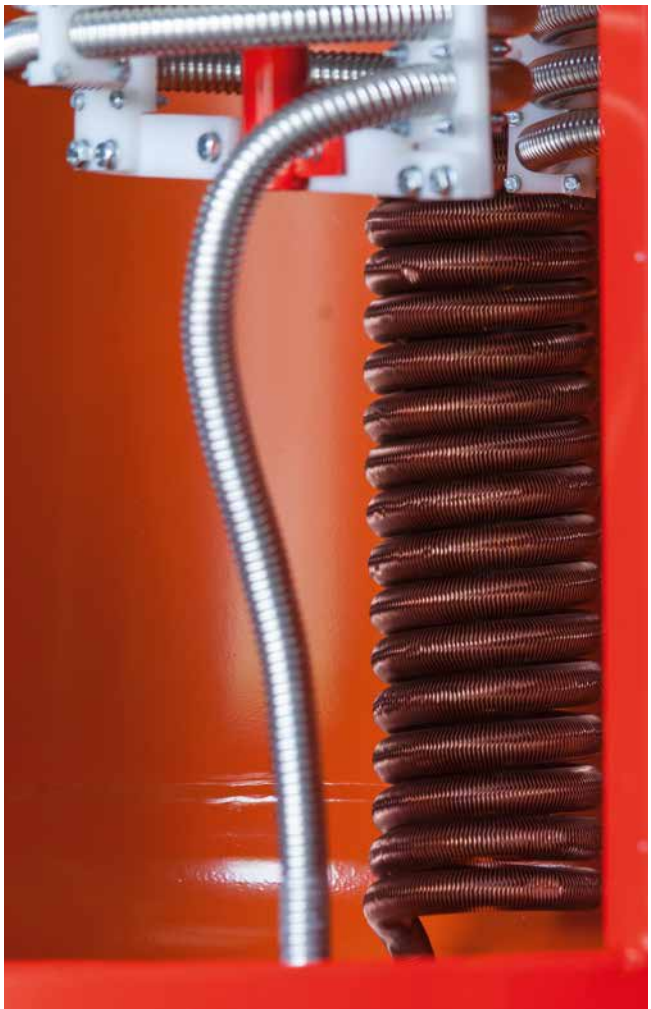
This system was proofed and sealed by the company Wessling – not only according to SVGW – Arbeitsblatt W551 for Germany but also for Austria due to ÖNORM B5019:2011. As a result each of our DK energy storage tanks leaves us with the testing seal including registration number 1016-CAL-004.

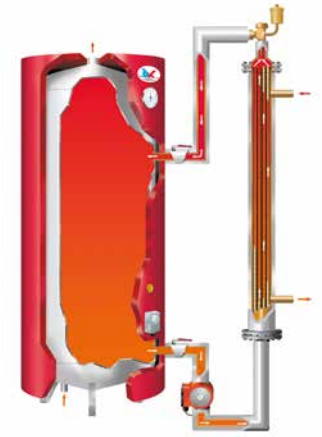
For potable water heating a stainless steel spiral tube heat exchanger is installed, which has several advantages:

- The water is constantly turned in the spiral pipe by the formation of turbulence. This creates an optimal heat exchange between the storage medium and the potable water.
- The desired temperature is achieved quicker due to the increased surface due to the corrugation of the tube.

Depending on the customer requirements, DK can offer to use the waste heat to the potable water, heating water or a combination of all.

The DK philosophy has remained true for the past 39 years – to be a craft business, listening to our customers and fulfilling many customer requests. Maximum flexibility is achieved by having all of our tanks and heat exchangers designed and manufactured in-house and offering numerous heat exchanger combinations.





DK-Heat Recovery
Heating water

Applications, such as supermarkets, which have little need for hot potable water can harness the waste heat of the refrigeration system, for store space heating.

DK Heat Recovery with internal heat exchangers
Heat exchangers from CU ribbed tube to be installed in single-walled design in plain steel container.

Advantages
- This system does not require a charge pump, thus conserving energy and the cost of a charge pump can be saved.

DK Heat Recovery with external heat exchangers
Heat exchangers made of a copper sheath tube with retracted, walled copper finned tubes are mounted on plain DK-container or directly on the pack system.

Advantages
- Optimal solution for any application, having over 350 and tube heat exchanger options
- Silting in heating systems – by magnetite – can be a problem for some other systems. This problem will not occur in the DK-Heat Recovery because no small cannulas are present and there is a cleaning option at each heat exchanger. Cleaning and flushing of the heat exchangers and tank can be carried out without removal.

DK Heat Recovery for CO_2 refrigeration systems
Potable water and heating water heating

Potable water heating
For more than eight years DK have been supplying systems for optimal utilization of waste heat from transcritical CO_2 refrigeration systems for potable water heating. Nearly 600 systems are now installed with more than 2,000 doublewalled working heat exchangers (as of August 2018).

Heating water heating
In previous years, eco-friendly energy design in German supermarkets was held back. Due to a strict separation between the refrigeration and plumbing trades, together with a misunderstanding of the technology surrounding using waste heat energy to heat water. Low cooling loads & condensing temperatures in winter concerned the refrigeration contractor & the plumber had always worked with standard fossil fuel systems. This situation has changed radically – particularly in transcritical CO_2 refrigeration systems. On demand this system can be driven as transcritical in the winter to heat the supermarket without assistance from a fossil fuel fired boiler.

New CO_2 heat exchanger for heating water heating
Since 2013 DK has provided systems for waste heat utilization for building heating purposes. DK have now added a new development using a finned copper tube exchanger. This new exchanger has a larger free cross-section area, resulting in the need for less individual heat exchangers, whilst offering an increased level of heat transfer.

DK-Heat Recovery for heating and drinking water heating in only one tank
The DK-storage system for heating water heating for CO_2 refrigeration systems also offers a stainless steel spiral tube heat exchanger installed for potable water heating. The advantages of the new CO_2 heat exchanger for heating water heating use for heating are now enhanced with the ability to provide potable hot water in the same container and in a continuous process.

DK-Heat Recovery

Conclusion

Save energy costs and help protect the environment, are the order of the day. This is what the DK-Heat Recovery stands for. View the DK efficiency calculator on our website to determine how waste heat recovery makes sense. DK provides for every application the optimal solution – DK is the leading manufacturer in Europe and offering our customers the largest product range.

Cool Solution – Hot Performance – DK

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