

AKM Ammonia Absorption Chillers

Converting Low Grade Heat
into Useful Refrigeration



Who we are and what we do

AKM Industrieanlagen GmbH is a German company located in the North Western town of Haltern am See.

Founded and managed by Refrigeration Engineers & Researchers, AKM develops, designs and manufactures state-of-the-art **Absorption Chillers**, refrigeration machines that utilize heat to cool a fluid down to **-40°C** with a natural & ozone friendly refrigerant: **ammonia**.

In Italy, AKM is represented by Baxter Energia. For over two decades, Baxter Energia promotes energy saving and environmentally friendly technologies, in particular, waste heat driven cooling & power generation machines: absorption chillers, steam turbines and ORC turbines.

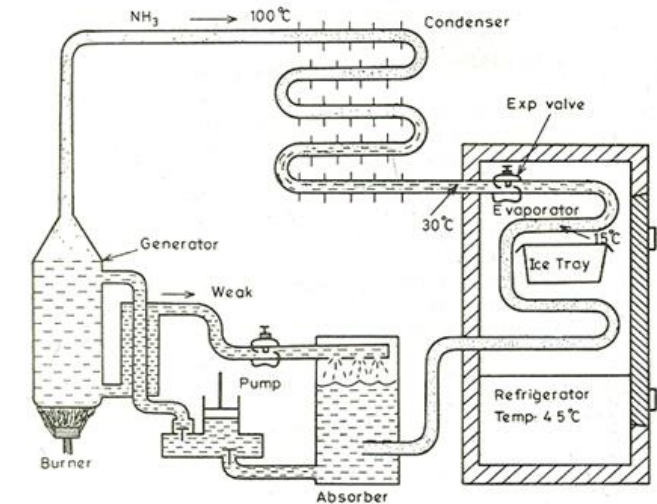
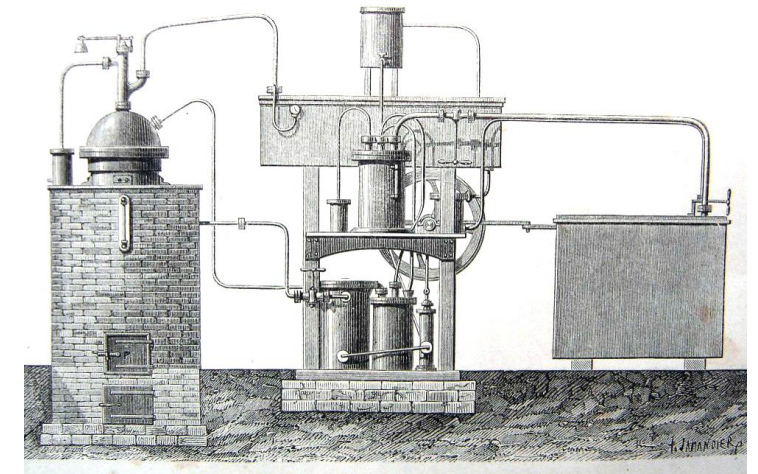
Italian customers can count on a network of Authorized Service Providers with decades of experience in ammonia plants routine and emergency call out maintenance.



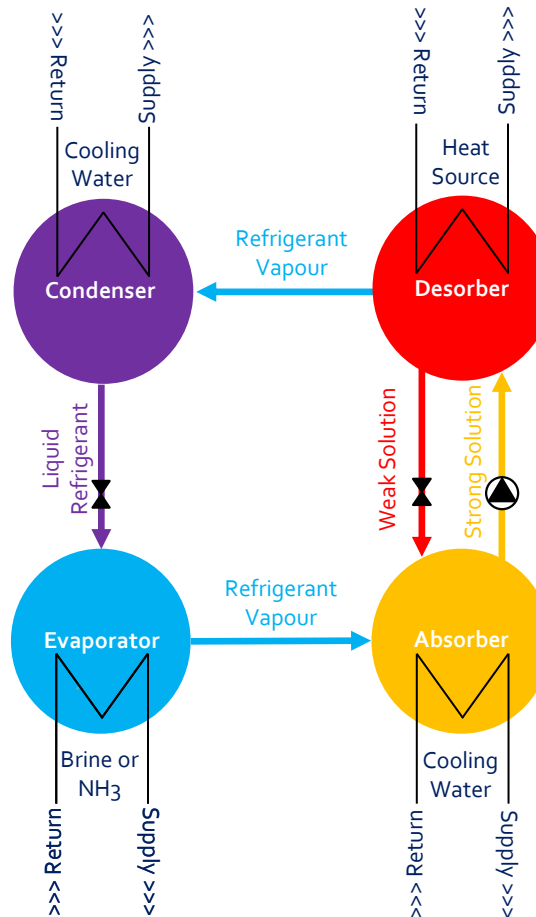
The birth of Absorption Refrigeration

The conversion of heat into usable refrigeration has been used since over 150 years after the invention of the first ice making machine by the French engineer-inventor Ferdinand Carré in 1858.

The French refrigeration pioneer was the first to use Ammonia (NH_3 or R717) as a refrigerant and to utilize heat to separate the Ammonia vapour from the solution.

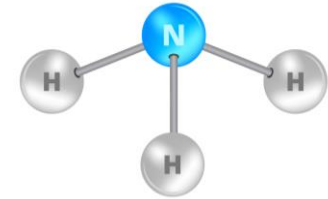


Cycle of AKM Ammonia Absorption Chillers



Main components of AKM chillers

- Desorber
- Condenser
- Evaporator
- Absorber



Refrigerant: Ammonia NH₃ (R717)

Absorbent: Water (R718)

Desorber: the entering thermal energy (hot water, steam etc.) is used to separate ammonia from water.

Condenser: ammonia vapour coming from the Desorber is condensed and returns, as liquid, back to the Evaporator.

Evaporator: liquid ammonia evaporates cooling the transfer fluid and thus, transferring the heat from the refrigeration load to the refrigerant

Absorber: the cycle restarts here with the absorption of the refrigerant vapour by the water. The mixed solution then goes to the Desorber

Natural Inexpensive Refrigerant

Typical heat sources for AKM chillers

AKM can use any heat source **from only 80°C** for generating usable cooling energy. The following is a list of typical heat sources:

Cogeneration: heat recovered from engines and turbines

District heating: hot water or steam coming from district heating networks

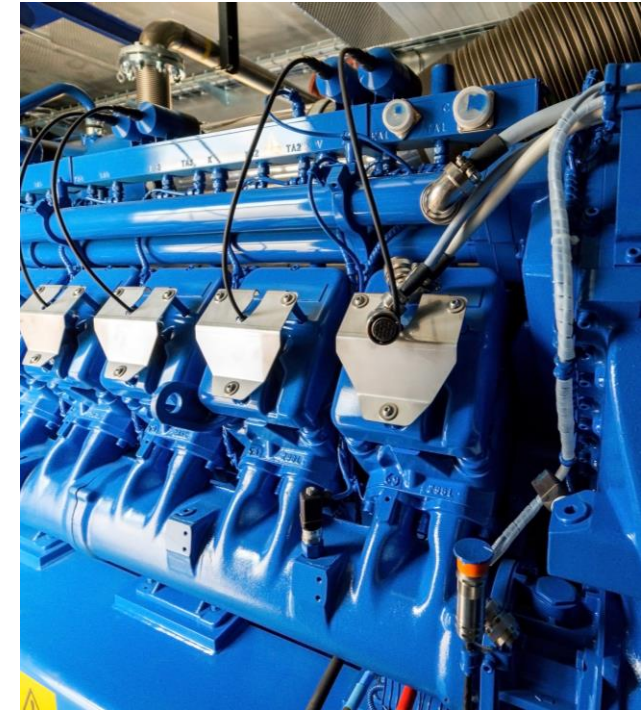
Geothermal: heat from the deep layers of the earth

Solar thermal plants: heat from any type of solar thermal technology

Biomass combustion: hot water or steam generated from the combustion of biomass

Industrial: heat recovered from industrial processes: e.g. flue gases from furnaces and hot air from drying processes.

Incineration plants: heat recovery from the combustion of industrial, municipal and hospital waste



Usage of Ammonia as refrigerant

Ammonia is generally used for:

- Cooling of vegetables and fruits

- Freezing and cooling of fish, poultry and meat

- Freezing of process foods and ice creams

- Cooling of beverages, beer and wine

- Refrigeration of dairy products

- Ice making



Some of the advantages of AKM technology



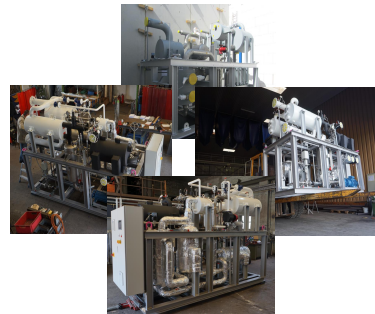
100% use of **stainless steel** for all parts in contact with NH_3 . No need of corrosion inhibitors!
Long life of the chiller!



Parts made by major international manufacturers including Vahterus **Shell & Plate** type heat exchangers
Very low heat losses
High efficiency also at **low heat source temperatures**
 -10°C evaporation temperature with $<100^\circ\text{C}$ heat source



Made in Germany: high quality design & manufacturing technique



European manufacturer with the major number of installations and highest cumulative operational hours

Installation Examples

Cooling capacity: 420 Kw

Brine Cooling

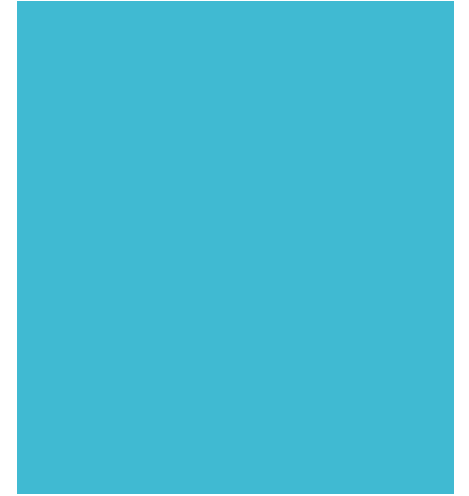
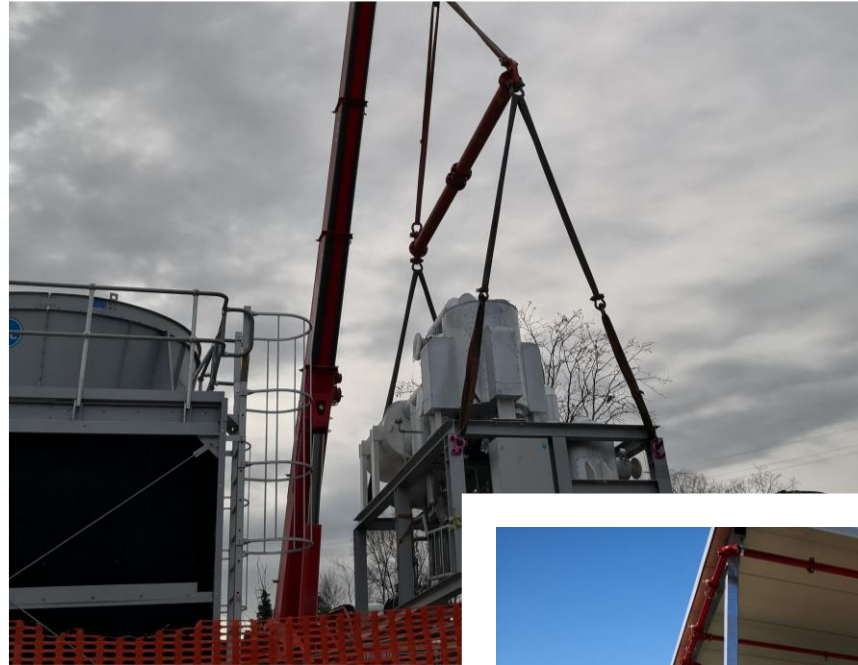
Brine in/out: +5/0°C

Hot water in/out: 95/80°C

Cooling water in/out: 28/33°C

COP = 0.44

App: pharmaceutical



Installation Examples



Cooling capacity: 280 Kw
Brine Cooling
Brine in/out: -3/-8°C
Hot water in/out: 95/80°C
Cooling water in/out: 25/30°C
COP = 0.4
App: food superstore

Installation Examples



Cooling capacity: 950 kW
Ammonia condensation
with booster: +55/-7°C
Hot water in/out: 95/80°C
Cooling water in/out: 26/31°C
COP = 0.4
App: frozen food store
**Ammonia direct
condensation via ammonia
tank**

Installation Example



Cooling capacity: 800 kW

Ammonia condensation with booster: +55/-7°C

Hot water in/out: 95/80°C

Cooling water in/out: 26/31°C

COP = 0.4

App: frozen food store

And many
more....



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Contact Details

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