

ago congelo

When hot turns to cold

Efficient energy supply –
from small plants to industrial large-scale plants



Cooling from waste heat For industry and municipalities

Economic conditions for industrial and agricultural cooling energy generation have changed considerably over the past years. As electricity tariffs are rising constantly but heat is available from decentralized power generation, absorption chillers which use heat instead of electricity, in many cases may economically be more favourable than conventional reciprocating compression chillers.

The ammonia/water absorption chiller named “**ago congeló**” generates cooling energy up to a coolant outlet temperature of -28°C . For this, the chiller primarily requires heat which is generated during the client’s industrial processes or during a CHP plant’s or gas turbine’s power generation. This heat mostly cannot be used otherwise. Compared to reciprocating compression chillers, this system’s electricity demand is only marginal.





minus 28° Celsius

Hot can be this cold.
Thanks to ago.

ago congelò

proven technology
for numerous industrial sectors

Food and beverage industry

Fruit and vegetable storage

Deep freeze and cold storage

Breweries

Chemical industry

Dairy industry

Baking industry



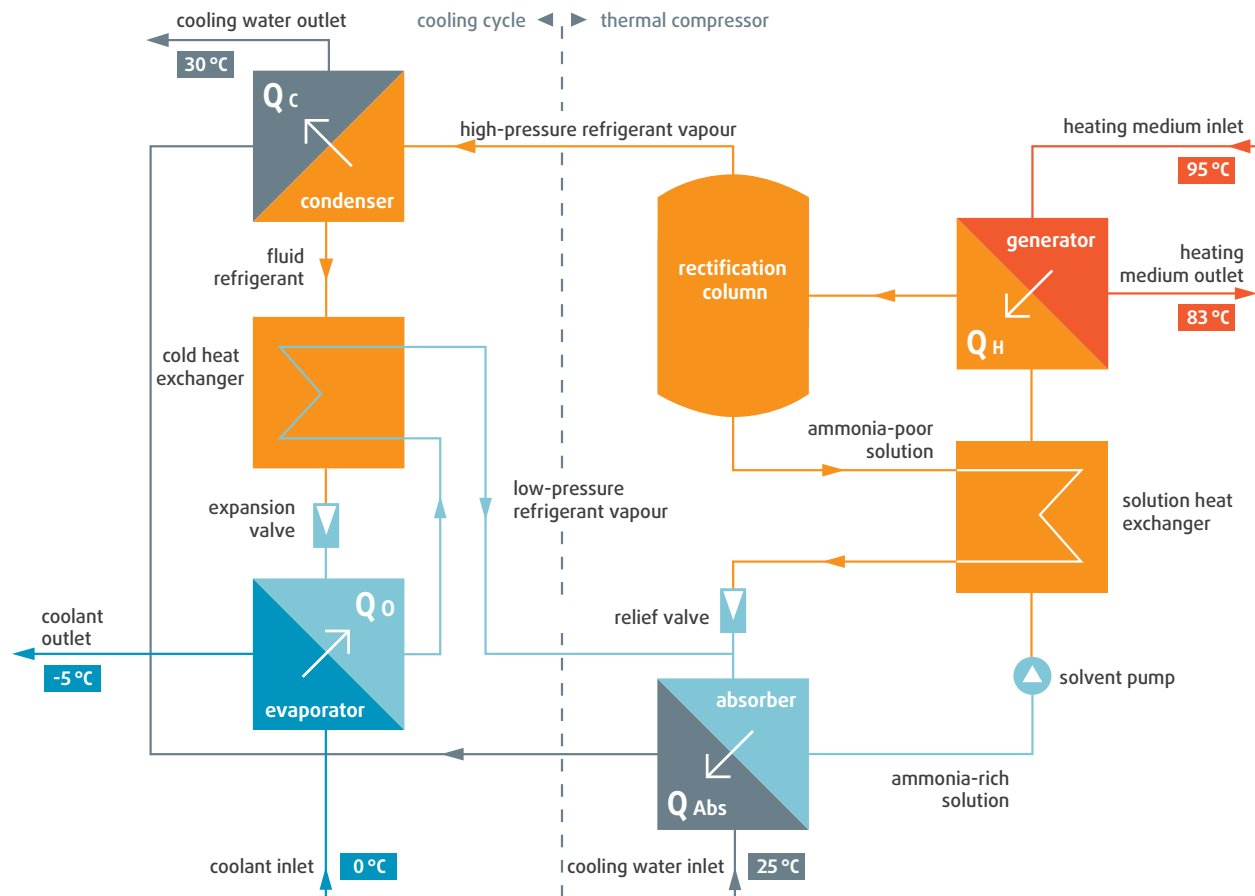
A man with short brown hair and a slight smile, wearing a dark pinstriped suit jacket over a white shirt and blue jeans, is leaning against a metal railing in a brewery. The background shows industrial equipment, including large metal tanks and pipes. A semi-transparent teal box is overlaid on the left side of the image, containing white text.

RELIABLE,
PROFESSIONAL,
BEST QUALITY.
THAT'S MY
EXPERIENCE
WITH AGO.

Jeff Maisel
Gebrüder Maisel Brewery

Absorption Chiller – Mode of operation

Simplified diagram of the absorption chiller's set-up and mode of operation



How does an absorption chiller work? It's simple. With our assistance.

In the refrigeration technology, the term „sorption“ is understood as the ability of a substance to attach gaseous substances to itself. It must be distinguished between absorption and adsorption. In case of adsorption, the gaseous refrigerant is adhered to a solid. The **ago congelò** however uses the physical process of absorption where a fluid medium – in this case water – absorbs the vaporized refrigerant. This process is exothermic which means that energy is released in the form of heat. The absorber consequently must be cooled down in order to work efficiently. As the gaseous refrigerant is now dissolved in the water and is therefore no longer compressible it can easily be conveyed to the higher pressure level of the chiller with just a small amount of electric energy. The electric power consumption of an absorption chiller is only about 3 – 8 % of the refrigerating capacity. Once the water/ammonia

mixture has been brought to the high pressure level it is preheated by internal heat recovery. Afterwards, in the generator it is charged with the actual operating energy in the form of thermal heat (waste heat from processes or CHPs). The ammonia is now boiled out of the water, similar to distillation. In the rectification column, the mixture is separated further and the pure ammonia vapour is leaving the pressure valve towards the condenser. From here, the process again resembles that of a conventional chiller. The refrigerant (ammonia) is liquified, subcooled and relieved to evaporating pressure by an expansion valve. In the evaporator it absorbs the heat from the coolant and evaporates in doing so. This closes the circle and the ammonia again flows to the absorber which „sucks“ the gas instead of a conventional reciprocating compressor.

ago congeló

This is how you can reduce your operating costs and additionally contribute to saving the environment

- ▶ reduction of operating costs by using waste heat as engine
- ▶ reduction of electric power input
- ▶ low maintenance and repair costs
- ▶ long durability, high reliability
- ▶ increase of energy efficiency through trigeneration compared to separate cooling generation
- ▶ use of a natural refrigerant with long-term availability
- ▶ no chemicals are added (just pure ammonia and distilled water)
- ▶ subsidized by government



Why is our technology more advanced than others?

Advantages over reciprocating compression chillers

Lower electric power input, only about 3 – 8 % of the refrigerating capacity

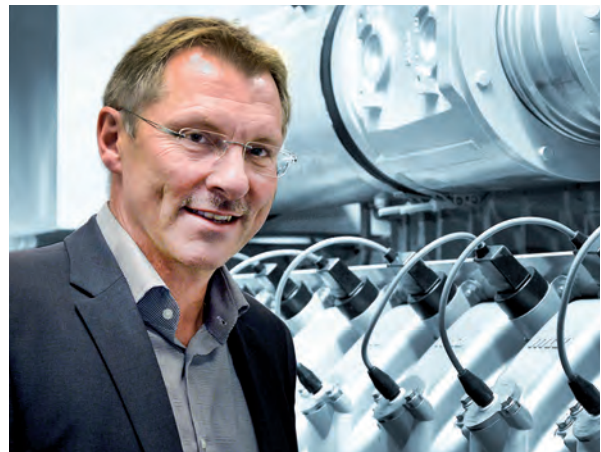
Lower susceptibility to failures due to simple design

No risk of hydrolocks

Advantages over water/lithium bromide absorption chillers

Coolant outlet temperatures of under + 4 to – 28°C possible

No risk of crystallization of the solvent



THE TRIGENERATION
PLANT SUPPLYING
ELECTRICITY, STEAM
AND COOLING IS FOR
US THE MOST ECONO-
MICAL SOLUTION.

Karl Klein
Gropper GmbH & Co. KG Dairy

ago congelò at a glance

Capacities

Refrigerating capacity per module of 50 to approx. 1.000 kW

Coolant outlet temperatures of + 4 to – 28°C

In terms of temperatures and capacity the plants are designed at customer's needs.

Design

Modular design

Compact design by using plate heat exchangers

Simple integration into existing refrigeration systems

Continuous adjustment and design at customer's needs

Compact outdoors installation possible, e.g. cooling tower right on top of the absorption chiller

Usable heat sources

Waste heat from CHPs

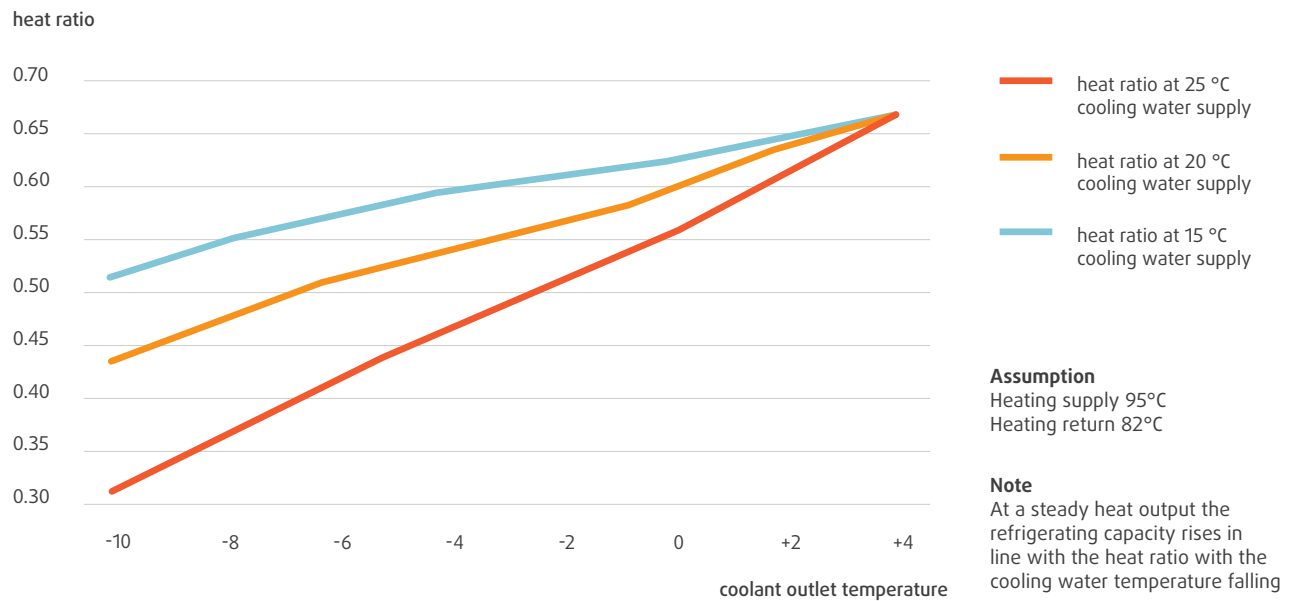
Industrial waste heat in the form of water, vapor or thermal oil

Waste heat from post combustion processes

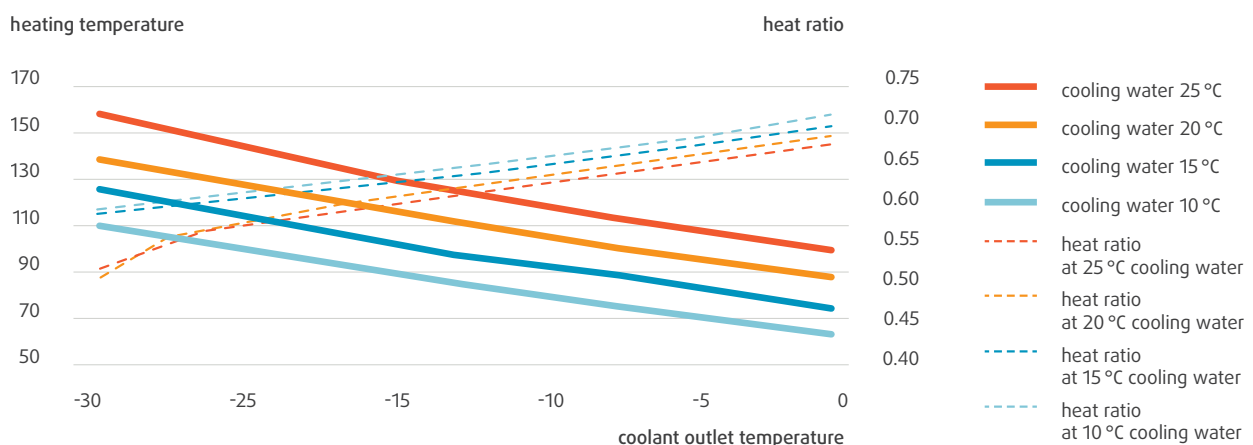
ago congeló

Economical, ecological, no compromise

Heat ratio when using waste heat from a CHP



Optimum heating medium temperature for maximum heat ratio



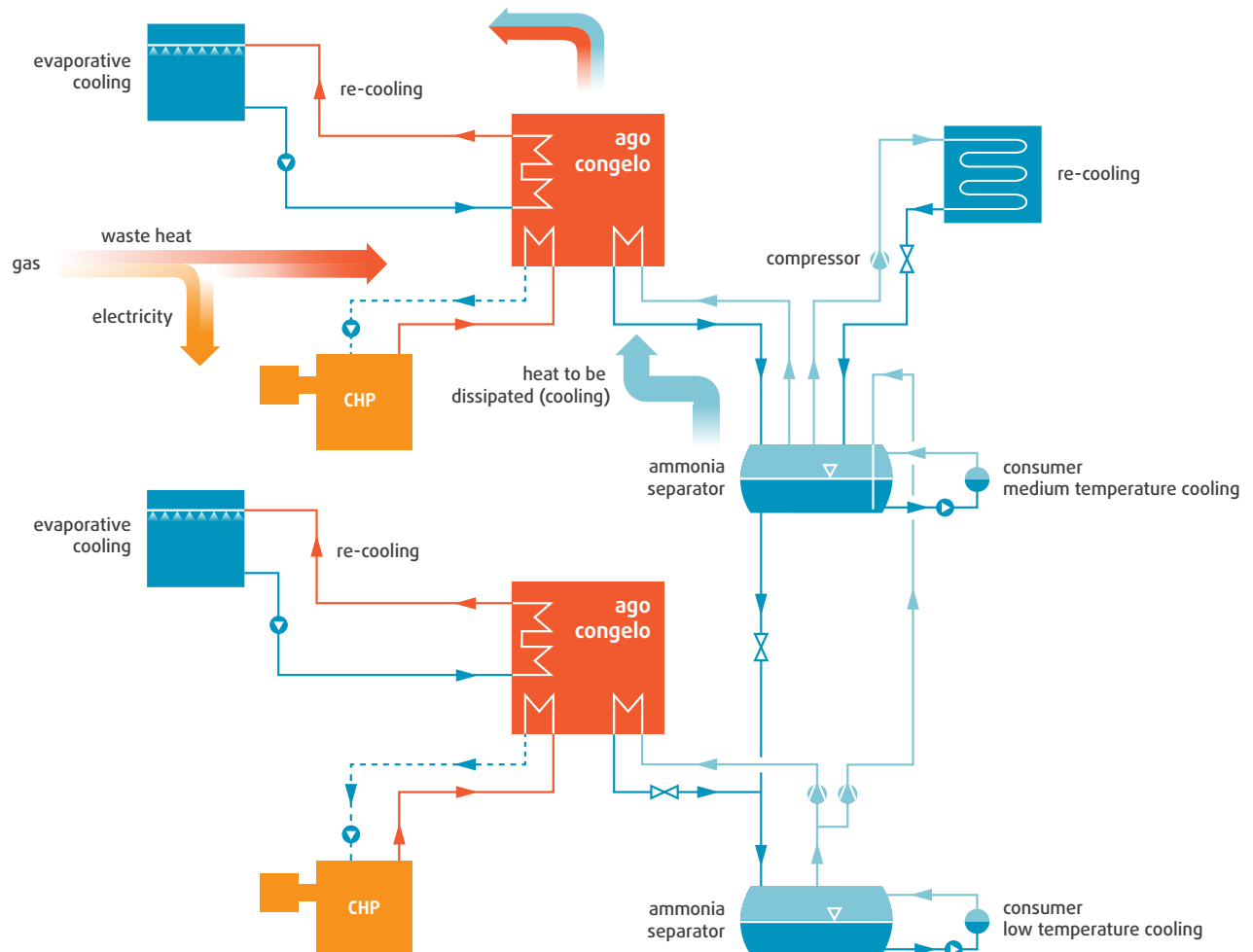
We are pleased to design your plant adjusted to your parameters.

heat ratio = refrigerating capacity / heat output
 refrigerating capacity = heat ratio x heat output
 heat output = refrigerating capacity / heat ratio

Examples of how the ago congelo can be integrated

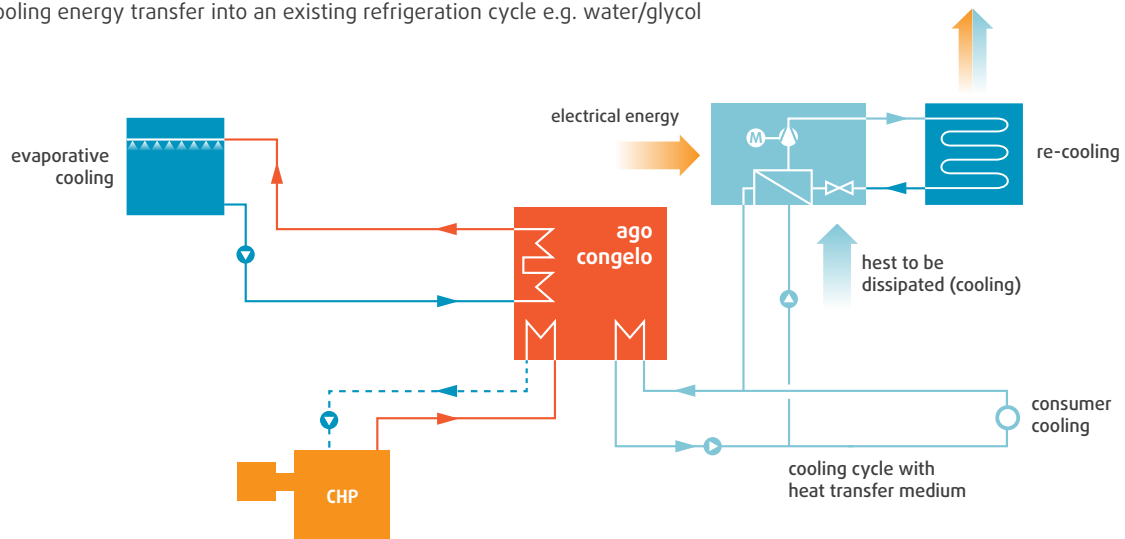
Example 1 and 2

Direct integration on the liquid separator for normal cooling of a pump driven cooling plant or cascade system for low temperatures



Example 3

Cooling energy transfer into an existing refrigeration cycle e.g. water/glycol



ago congelo

The solution for your cogeneration project

**We have pleasure in
estimating the profitability
of our plant for your
special application**

**For our design we require
the following parameters:**

Available waste heat capacity
or required refrigerating capacity

Heating temperature:
supply and return

Refrigerant outlet temperature

Place of installation and wet
bulb design temperature or
cooling water temperatures

**Contact us at
congelo@ago.ag
or +49 9221 602-0**



A BIOGAS PLANT WAS ONLY AN OPTION FOR ME WITH FULL HEAT USAGE. TOGETHER WITH AGO I COULD IMPLEMENT A SUSTAINABLE ENERGY CONCEPT.

Till-Erik Meyer, Farmer



ago congelo cooling potatoes and carrots for an agricultural business. The heat comes from a 500 kw Biogas CHP Plant.

Your efficiency is our expertise

Since 1980 our company has been focused on efficient energy supply facilities for industrial customers and municipalities. In addition to plant development and implementation, we also offer service and consulting.

Thus, the name AGO has long become a synonym for efficiency, reliability and technological competence regarding engineering and construction of heating, cooling and ventilation plants, biomass cogeneration plants, combined heat and power plants and trigeneration plants.

