



Utilities:

Refrigeration and CO₂ recovery.

Intelligent refrigeration technology ...

Refrigeration plants are of central importance in a brewery. With about 40 %, refrigeration is one of the largest electrical power consumers and refrigeration directly influences beer quality.

To realize functional and economical solutions, expertise from both worlds, refrigeration technology and the brewing process, is essential. GEA Brewery Systems has decades of experience and our experts have the necessary technological expertise.

We plan and construct refrigeration plants for any application in the brewing and malting industry, always with regard to the quality of the beer and optimum energy consumption.

The final product is decisive; refrigeration is an essential tool. With integral tailor-made refrigeration management we ensure an optimum refrigeration cycle: The right refrigerating capacity at the right time in the right place. High economic efficiency is accompanied by maximum operational reliability and a long service life.



Experience in brewery refrigeration

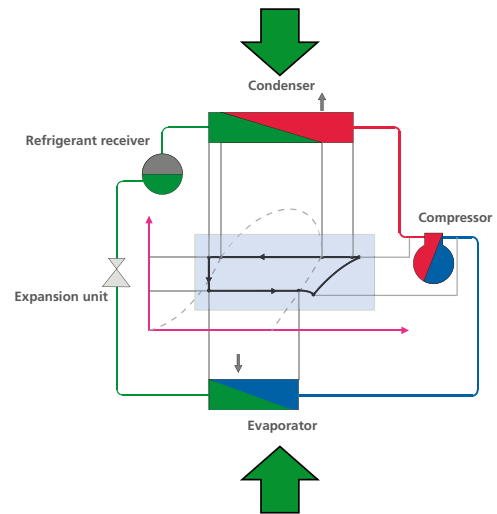
For over 80 years GEA Brewery Systems has been active in the refrigeration sector world-wide. We have built complete units with a refrigerating capacity ranging from 100 to 10,000 kW and can provide excellent references for the modernization and optimization of existing plants. Thanks to our global experience and certifications, we can plan and build according to country-specific conditions – such as technical standards or legal guidelines.

... adapted to the brewing process.

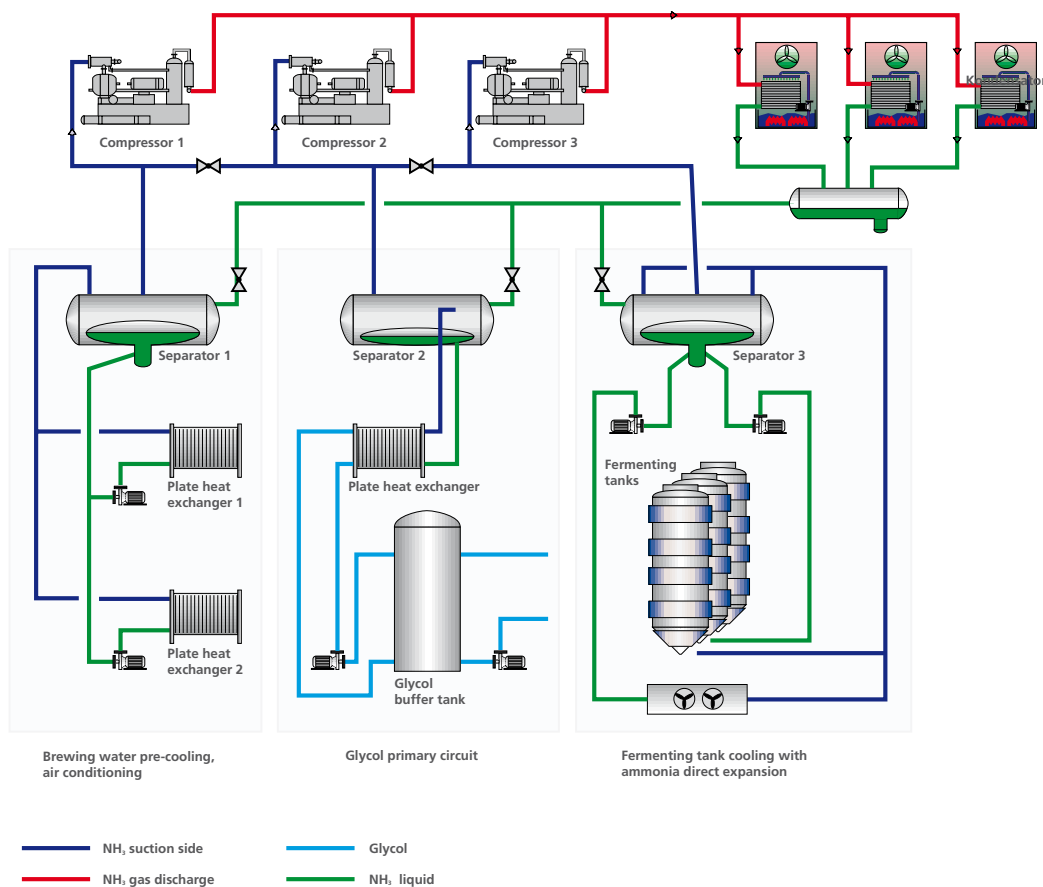
Extremely efficient: multiple-temperature circuit

Anyone who wants to use refrigeration technology as efficiently as possible will opt for a multi-temperature circuit. The system is divided into circuits with different temperature levels, which are optimally adjusted to the respective consumption of the different refrigeration appliances in the brewing process. Ammonia is recommended as a cooling medium for the cooling of the fermenting and storage tanks; yeast plants and product coolers are cooled with glycol, pre-cooled brewing water is mostly recommended for wort cooling.

The multiple-temperature circuit provides every single consumer with the optimum refrigerant temperature at a reasonable energy level. This saves energy as well as operating costs and benefits the environment – an important aspect.



Generally speaking, the higher the evaporation temperature and the lower the condensing temperature, the more efficient the refrigeration plant.



Intelligent control for optimized processes.

GEA Brewery Systems ensures the optimization of refrigeration processes with intelligent control concepts. Our control systems analyze the prevailing environmental conditions as well as the technological requirements of the brewery and, based on the results, calculate the optimum operating point of the refrigeration plant.

All consumers are supplied with cooling as required, and at the same time, the plant equipment is continuously adjusted to the optimum operating point. The system offers maximum flexibility and reliability, while the electrical energy required for generating the corresponding refrigeration capacity is reduced.

Condensing temperature control depending on the prevailing environmental conditions in order to

- Optimize the drive power of compressor and condenser
- Reduce electric power consumption of the refrigeration compressors

Variable speed refrigerant pumps for

- Supplying the consumers with coolant according to demand
- Reduce amount of circulating coolant
- Less pump drive power

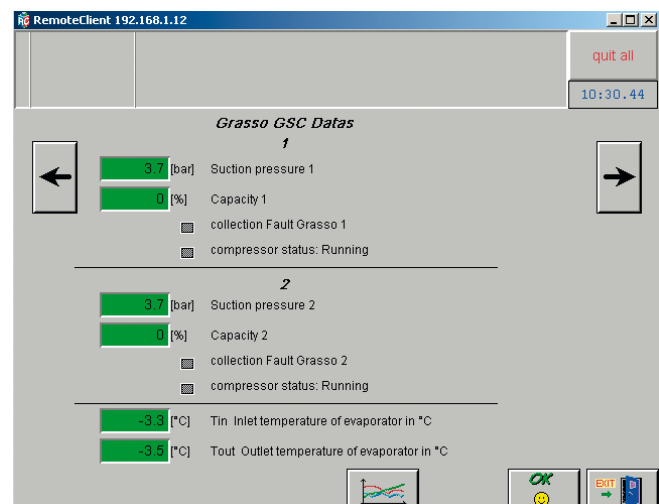
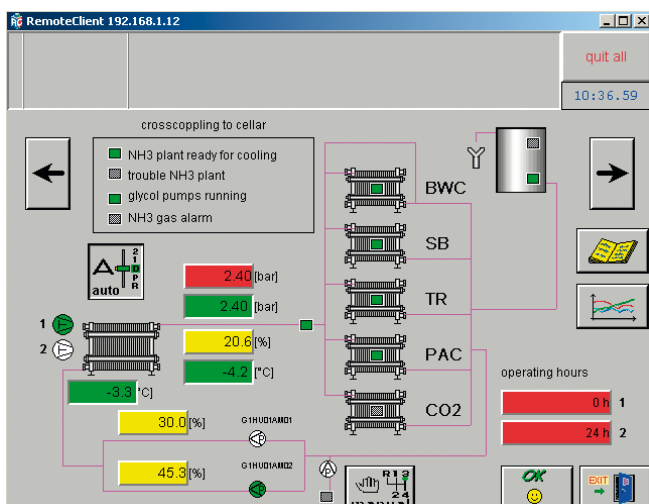


Continuous plant monitoring and data collection

- Enables data evaluation for weak point analysis

Optimum operating conditions

Thanks to their application-specific control systems, our refrigeration plants provide optimum operating conditions.



Excellent experience with ammonia.



GEA Brewery Systems was one of the first refrigeration plant manufacturers to count on the natural refrigerant ammonia.

Direct cooling of fermentation tanks with ammonia offers significant advantages:

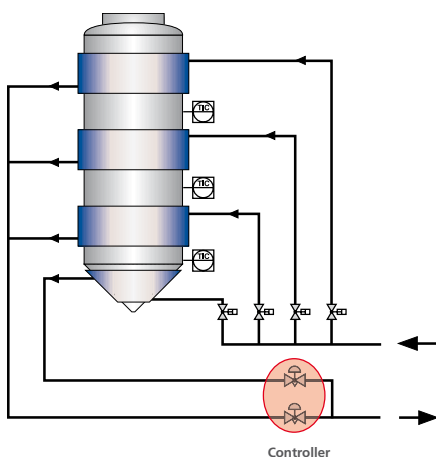
The energy density of the evaporating ammonia is several times higher compared to coolants, such as glycol/water mixtures. This results in smaller pipe diameters and reduced pump capacity. Furthermore, additional transmission losses (usually about 10 %) between ammonia and coolant are eliminated.

Another advantage of direct fermenter cooling with ammonia: the evaporation temperature can be easily controlled over a wide performance and temperature range. Therefore, the technological process is supported by the flexible cooling profile.

The energy savings with direct ammonia cooling compared to indirect cooling with glycol are up to 14%. This technology is unbeatable when it comes to efficiency and cost-effectiveness.

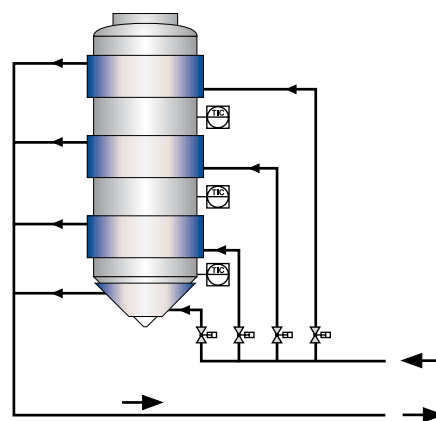
Tank cooling with NH_3 direct expansion

Direct expansion with a variable evaporation temperature of the refrigerant offers very flexible control options.



Tank cooling system with glycol water

Constant flow temperatures prevail during cooling with cooling media. Temperature control is effected by a clocked activation/deactivation of the individual cooling zones.



Efficient CO₂ recovery ...

Besides an efficient cooling management, modern CO₂ recovery plants are another important factor to ensure optimum product quality. Beyond that, this technology offers significant potential for cost savings and contributes to an ecologically responsible production.

As experts in their field, our customers are perfectly aware of how important the purity of the CO₂ is for the quality of the final product. Even the least amount of residual oxygen in the carbon dioxide has a detrimental effect on the flavour stability of the beer.

The utilization of carbon dioxide from the own fermenters guarantees perfect quality control – an advantage that no other source can offer. With the stripping technology, even the CO₂ from early fermentation phases can be recovered.

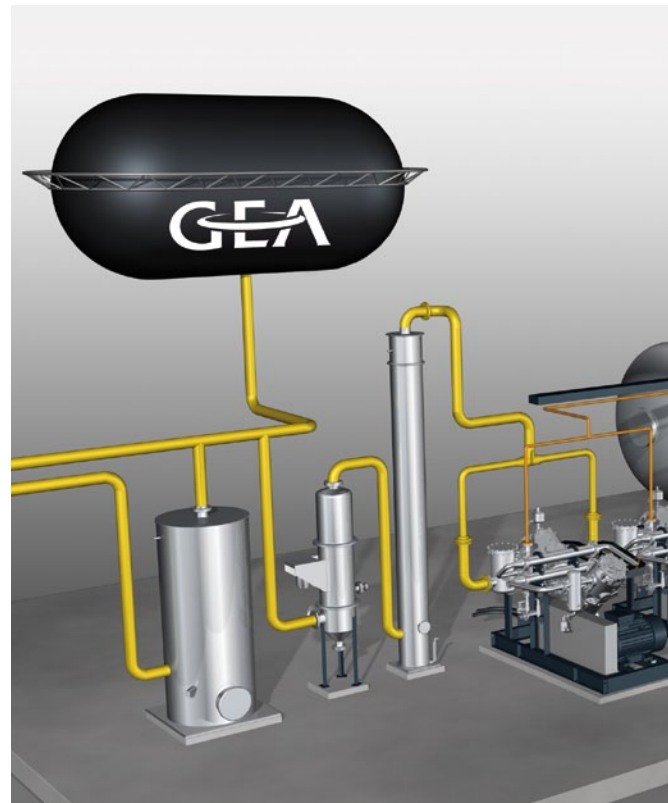
Our customers profit from our networked thinking also in CO₂ recovery: GEA Brewery Systems ensures a perfect and seamless integration of the CO₂ recovery plant into existing or planned energy supply systems. This results in an improved efficiency on the CO₂ and refrigeration side of your plant and in reduced capital investment.

CO₂ recovery plants from GEA Brewery Systems offer convincing advantages: maximum purity, maximum operational reliability and low operating costs.



CO₂ recovery on any scale

Since 1987 GEA Brewery Systems has built a large number of CO₂ units, ranging in size from 30 to 2,500 kg/h. Every unit is exactly tailored to the respective brew size, brewing sequence and original wort content. Prefabricated functional units in combination with a standardized process flow ensure smooth installation and commissioning. Therefore investments pay off very quickly.



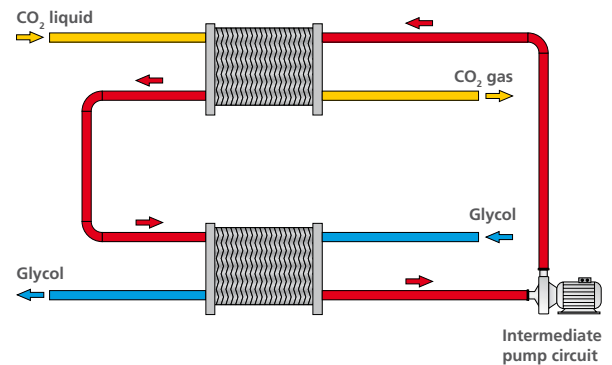
... one cost factor less.

Utilize the potential, save energy

GEA Brewery Systems pays special attention to energy recovery.

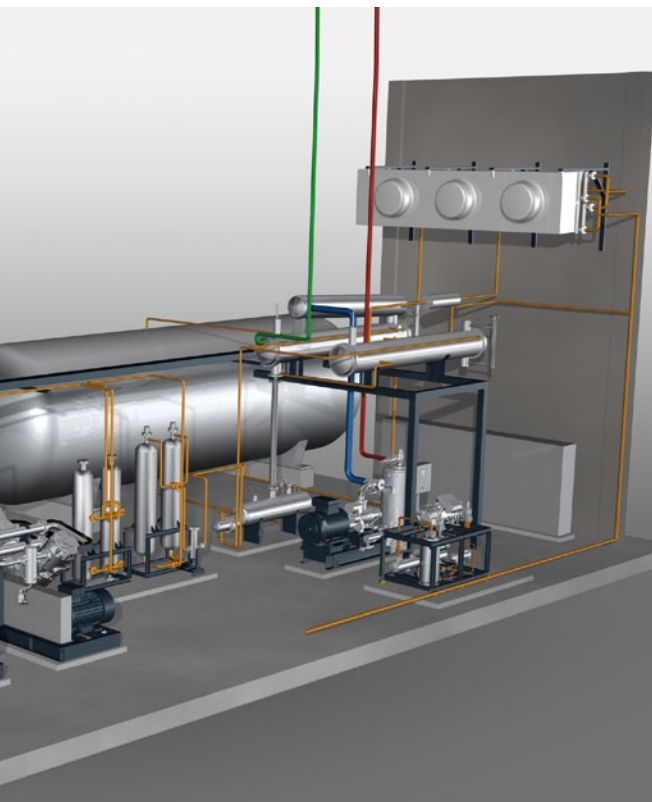
In many breweries, liquid CO₂ is stored at about -25°C and evaporated as needed. Regardless of whether purchased or own CO₂ is used – the evaporating CO₂ always represents a source of energy, which can help reduce the load on the refrigeration system.

With our intelligent system solutions, we ensure that this potential is fully exploited.



Heat recovery

Heat from the return line of the glycol circuit is used for CO₂ evaporation, thus leading to savings during the required recooling in the refrigeration plant.



FACTS & FIGURES:

- Technological competence
- Innovative design with a focus on the brewing process
- Certified quality for high durability and reliability
- Sustainable technological solutions worldwide
- Comprehensive support – from planning to execution and maintenance



We live our values.

Excellence • Passion • Integrity • Responsibility • GEA-versity

GEA Group is a global engineering company with multi-billion euro sales and operations in more than 50 countries. Founded in 1881, the company is one of the largest providers of innovative equipment and process technology. GEA Group is listed in the STOXX® Europe 600 index.

GEA Process Engineering

GEA Brewery Systems GmbH
Huppmann Tuchenhausen

Locations:

Heinrich-Huppmann-Str. 1, 97318 Kitzingen, Germany
Phone +49 9321 303-0, Fax +49 9321 303-603

Am Industriepark 2-10, 21514 Büchen, Germany
Phone +49 4155 49-0, Fax +49 4155 49-2770

gea-brewerysystems@gea.com, www.gea.com

