

ENGINEERING
TOMORROW



Refrigeration solutions for the Brewing Industry

Precise Temperature Control And **Zero Corrosion**

Danfoss offers a wide range of valves and controls that can help improve energy efficiency, productivity & sustainability.

All

the valves and
controls you need
for your refrigeration
system in the
Brewing Industry.



Precise temperature control from mash to bottle: **Reliable refrigeration solutions** for the brewing industry

In brewing, control is the key word, all the way from mash to bottled product. It is absolutely crucial to be able to control temperatures with a very high degree of accuracy in all the key processes in the brewery: Wort processing, yeast propagation, fermentation and final cooling.

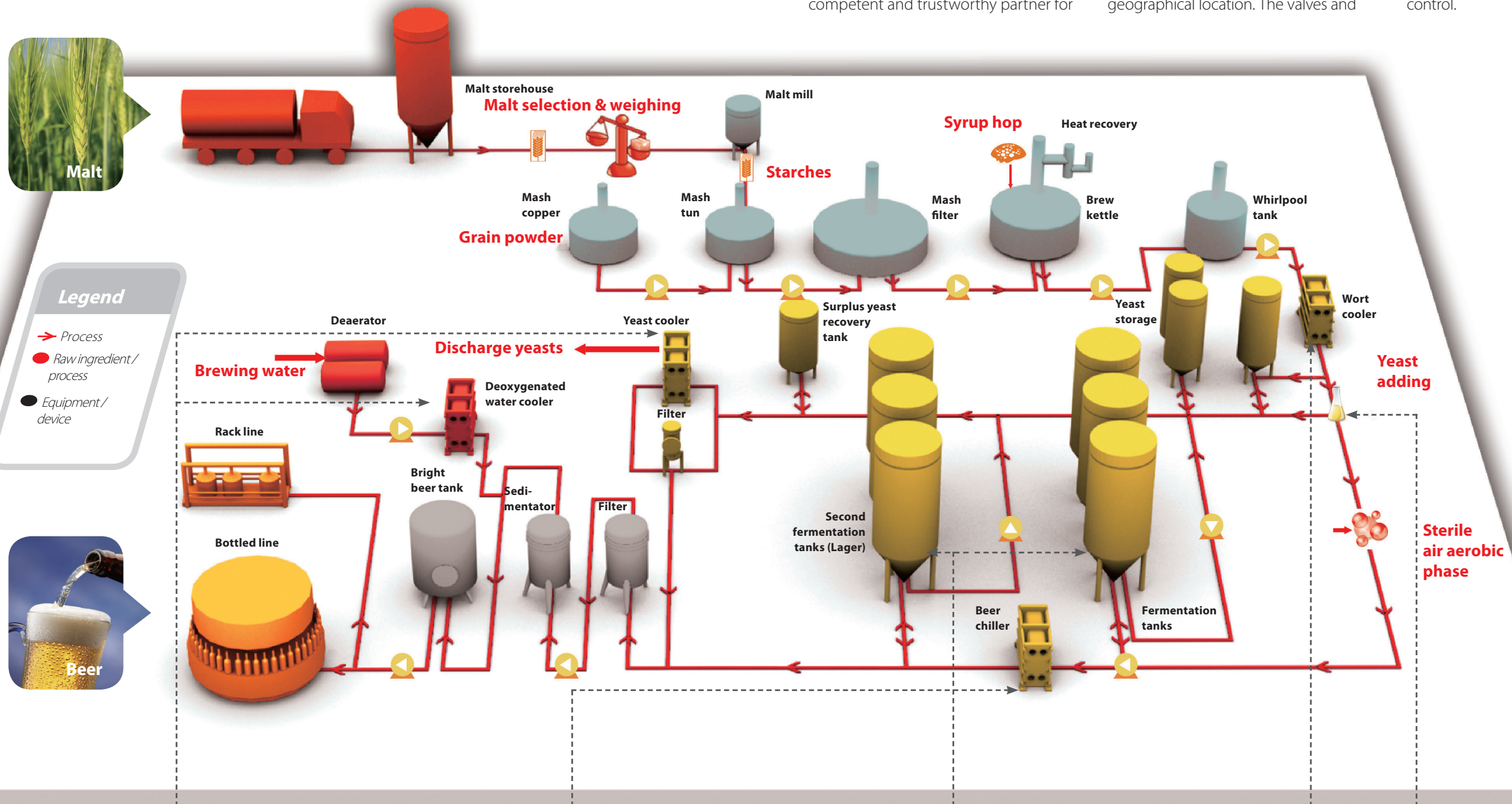
Danfoss has the industrial refrigeration experience and know-how to act as a competent and trustworthy partner for

the global brewing industry – and we have all the refrigeration solutions to provide our customers with accurate temperature control and consistent production flow.

Our refrigeration valves (including stainless steel series) and sub-system solutions deliver reliable, precise and efficient refrigeration for all breweries, regardless of production scale and geographical location. The valves and

filters can be used with with natural refrigerants such as ammonia (NH₃) and CO₂ for efficient as well as more sustainable cooling in your production flow.

As the diagram shows, Danfoss products and solutions play an active role in several critical production processes that help breweries obtain consistently high quality through meticulous temperature control.



Deoxygenated water preparation

Deoxygenated water is used as fermentation liquid and is also vital in such processes as filtration, attenuation, clarification and tank flushing. Deoxygenated water must remain at the same temperature as the medium it is used to cool, which requires precise temperature control.

Cooling: Ammonia, CO₂ or ethanol brine

Beer chilling

Uniform product quality is dependent on maturation in a strictly controlled temperature regimen. The fermented beer is cooled quickly to a standardised temperature level and left to mature in the bottle or cask.

Cooling: Direct ammonia, CO₂ refrigeration or alcohol/water

Fermentation

Flavor and alcohol content both rely on precise fermentation. To ensure a product of consistent quality and alcoholic content, fermentation temperatures need to be very accurately controlled.

Cooling: Direct ammonia, CO₂ refrigeration or alcohol/water

Wort cooling

Beer quality relies on accurate yeast propagation in the wort. This, in turn, relies on highly precise temperature control to ensure that the boiling wort is cooled as quickly as possible.

Cooling: Ice water, ammonia or CO₂ for direct cooling

Yeast propagation

Yeast propagation means providing sufficient high-quality barm at the right point in the production process. Temperature control at this stage in the beer production is vital.

Cooling: Ammonia or CO₂ cooling



Enabling more **sustainable** and **energy efficient cooling systems** across the food & beverage cold chain



High performing products and solutions
for industrial refrigeration systems

Energy efficiency aims at reducing the amount of energy required to provide products and services. It's all about doing more with less. It is the quickest and most affordable way to decarbonize our economy and ensure reliable and sustainable energy for everyone on the planet. The solutions are already there, and they can be implemented right away. And most have short payback time.

As your technology partner in the green transition, we empower you to meet increasing energy challenges with innovative, reliable solutions. Danfoss offers a wide portfolio of industrial refrigeration valves, controls and sub-system solutions to enable improved and more efficient cooling in the food & beverage processing industries. Our cold storage solutions help you meet increasing energy challenges and reduce food loss by improving cooling and efficiency across the cold chain.

Intelligent Air Purging System

Danfoss IPS8



About Air Purger:

The **Danfoss Intelligent Purging System (IPS)** is an automatic, self-contained operating unit that helps remove non-condensable gases in a safe and energy efficient way. This helps maintain an optimum refrigeration capacity and system efficiency, allowing professionals to achieve maximum system performance.



Maximize system performance

- ▶ Automatic purging response to non-condensable gases in the refrigeration system
- ▶ Continuous monitoring of differential pressure between system refrigerant and purger refrigerant
- ▶ Reduction of plant power consumption
- ▶ 8 point purging functionality
- ▶ Built-in Modbus communication enables easy sharing of essential data



Easy installation and maintenance

- ▶ Cost-effective design with few mechanical and electrical connection interfaces
- ▶ Minimizes the risk of leakage thanks to the hermetic internal cooling system
- ▶ Plug and play, stand-alone unit eases installation and commissioning – low risk of potential error
- ▶ No need for any advanced settings
- ▶ Easy to handle with its compact design
- ▶ Fast and easy pump down before service



Improve operational safety

- ▶ Electronic smart purging helps reduce the risk of refrigerant release to the environment
- ▶ No need for oil management from the ammonia system
- ▶ Self-contained operating unit functions independently from the main plant
- ▶ Easy monitoring of past purging cycles data with operation log
- ▶ Self-diagnostics for unit and system operation to shut down in case of malfunction of Air Purger components
- ▶ Advance Bubbler support functions included
- ▶ LLS 4000 support increase system protection level

The **Air purger** remove Non Condensable Gasses (Air) from the cooling system



Example:

- ▶ Two stage NH₃ system in a Cold room application
- ▶ Capacity 300kW on LT and 900kW on MT
- ▶ Annual Power consumption: 2500MWh
- ▶ Electricity cost €/kWh: 0.1€

Danfoss IPS8 reduces the content of non condensables to decrease T_c with 1K:

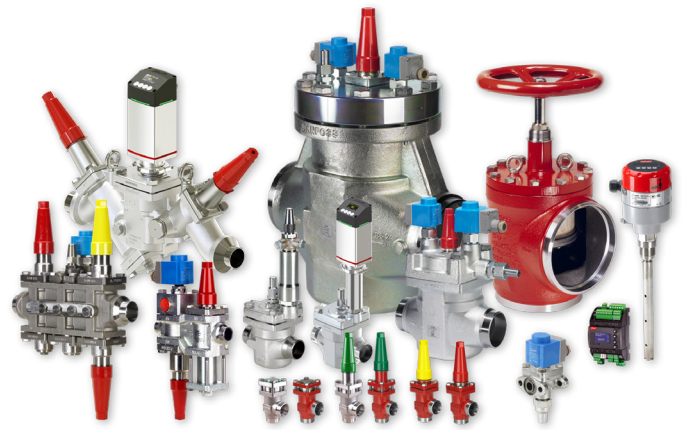
Savings per year **7,500€**

Savings over 20 Year **150,000€**

(LT=Low Temperature, MT=Middle Temperature, T_c=Condensor Temperature)

Flexline™ valve portfolio

Consists of three major valve groups offering solutions ranging from basic to advanced, high level industrial refrigeration systems concepts.



Flexibility

- Smart solutions based upon a complete common modular platform.
- Reduce system complexity and increase reliability.



Innovation

- Innovative design ensures increased system safety and efficiency.
- Improve food safety and quality.

Automatic, regulated valves

ICV Flexline™

- ICM Motor valve, ICS pressure controlled valve and ICLX 2-step solenoid valve in steel



Semi-welded plate heat exchangers

- Excellent heat transfer capabilities, reliable design, operational safety



Manual valves

SVL Flexline™

- Stop valves, filters, regulating valves, check valves, and stop valves in stainless steel and steel



Danfoss AAIM System control*

- Embedded Microprocessor Controls (EMC)
- PLC Supervisory control systems
- Power products: Motor Starters and VFDs
- Combination products utilizing power products and PLC or EMC controls



Advanced system solutions

ICF Multi-functional valve station

- ICF multi-functional valve
- Motor valves ICM, stepper motor
- ICAD, Liquid level control AKS4100
- Advanced evaporator controller
- Digital gas detection
- Intelligent Air purging system



*Only offered in USA and China

Latest in **refrigeration technology**

With more than 90 years of experience in the global refrigeration industry, Danfoss is your reliable partner in innovative refrigeration technology. We are offering you support in finding

sustainable refrigerant solutions. With our wide range of components for industrial refrigeration, Danfoss reduces complexity and optimizes project deliveries. Our global know-how is

always available to you – just contact your local Danfoss representative for more information.

Support Tools for Professionals



Coolselector®2:

Easy selection and calculation software
<https://www.danfoss.com/en/service-and-support/downloads/dcs/coolselector-2/>



3D CAD symbols:

Download symbols and illustrations



Ref-Tools:

Complete overview of spare parts, Product-finder and more relevant HVACR tools.
<https://www.danfoss.com/en/service-and-support/downloads/dcs/ref-tools/>



IR Application Tool:

How a two-stage ammonia plant works.
<https://www.danfoss.com/en/service-and-support/downloads/dcs/industrial-refrigeration-application-tool/>



Application Handbook:

How to select control methods for different refrigeration systems.
<https://www.danfoss.com/en/markets/refrigeration-and-air-conditioning/dcs/industrial-refrigeration/industrial-refrigeration-application-handbook/>

Training for Professionals



Danfoss Learning:

Your personal learning portal is fast, easy and always accessible.
<https://www.danfoss.com/en/service-and-support/learning/>

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