ENGINEERING
TOMORROW

Refrigeration solutions for the Meat Processing 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 Meat Industry.

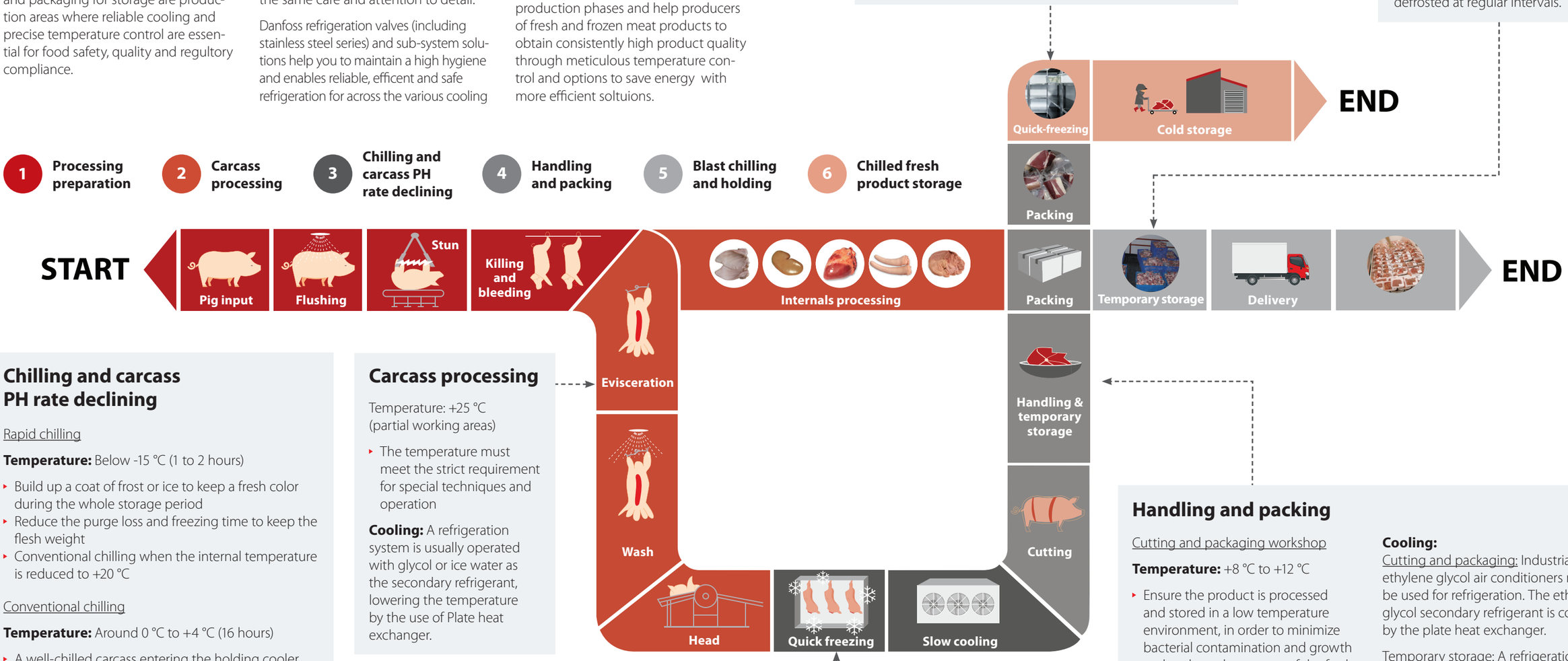
High quality meat and long shelf life: **Precise and stable cooling** and **temperature management** in meat processing

Handling meat processing from live animal to frozen or cooled product requires fast, safe and secure cooling. Carcass processing, handling, chilling and packaging for storage are production areas where reliable cooling and precise temperature control are essential for food safety, quality and regultory compliance.

The refrigeration plant that delivers cooling across the various processing steps for proper meat handling should be made, fitted, and maintained with the same care and attention to detail.

Danfoss refrigeration valves (including stainless steel series) and sub-system solutions help you to maintain a high hygiene and enables reliable, efficent and safe refrigeration for across the various cooling applications and needs, regardless of production scale and geographical location.

Our products and solutions play an active role in several of the critical production phases and help producers of fresh and frozen meat products to obtain consistently high product quality through meticulous temperature control and options to save energy with more efficient soltuions.



Quick-freezing storage

Temperature: -20 °C to -18 °C (freezing)

- After the cutting floor the packed product is transferred to the blast freezer via the chilled plate, and finally sent to the holding or storage freezer after its internal temperature reaches -15 °C

Cooling: A refrigeration system is usually operated with ammonia or CO_2 as the primary refrigerant with tunnel freezer. The freezer needs to be defrosted at regular intervals.

Fresh storing

Temperature: 0 °C to +4 °C (refrigeration house cold-storage)

- The fresh product is conveyed by refrigerated transport vehicles to the marketplace

Cooling: A refrigeration system is usually operated with ammonia (or CO_2) as the primary refrigerant. The ammonia cooler needs to be hot-gas defrosted at regular intervals.

Chilling and carcass PH rate declining

Rapid chilling

Temperature: Below -15 °C (1 to 2 hours)

- Build up a coat of frost or ice to keep a fresh color during the whole storage period
- Reduce the purge loss and freezing time to keep the flesh weight
- Conventional chilling when the internal temperature is reduced to +20 °C

Conventional chilling

Temperature: Around 0 °C to +4 °C (16 hours)

- A well-chilled carcass entering the holding cooler shows minimum holding shrinkage, and the rapid temperature reduction is important in reducing the growth rate of microorganisms that may exist on carcass surfaces
- Packing process when the internal temperature reduced to +7 °C

Cooling: A refrigeration system is usually operated with ammonia (or CO_2) as the primary refrigerant. The ammonia cooler needs to be defrosted regularly

Carcass processing

Temperature: +25 °C (partial working areas)

- The temperature must meet the strict requirement for special techniques and operation

Cooling: A refrigeration system is usually operated with glycol or ice water as the secondary refrigerant, lowering the temperature by the use of Plate heat exchanger.

Handling and packing

Cutting and packaging workshop

Temperature: +8 °C to +12 °C

- Ensure the product is processed and stored in a low temperature environment, in order to minimize bacterial contamination and growth and prolong the storage of the fresh product. It is also important to have a proper temperature for the manual working place

Temporary storage workshop

Temperature: 0 °C to +4 °C

- Keep a proper condition of the holding freezer for the acid-drained meat

Cooling:

Cutting and packaging: Industrial ethylene glycol air conditioners may be used for refrigeration. The ethylene glycol secondary refrigerant is cooled by the plate heat exchanger.

Temporary storage: A refrigeration system is usually operated with ammonia (or CO_2) as the primary refrigerant. The ammonia cooler needs to be hot-gas defrosted at regular intervals.

Note; the illustration shows only one of the many possible process setups.

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** removes 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€

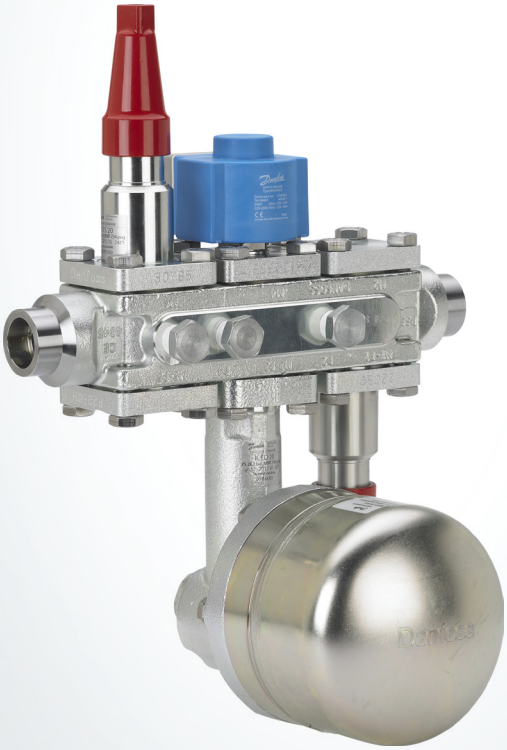
Danfoss IPS8 reduces the content of non condensables to decrease Tc with 1K:

Savings per year **7,500€**

Savings over 20 Year **150,000€**

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

ICFD
Defrost module



Energy Efficient
Hot Gas Defrost

The **ICFD defrost module** for $C0_2$ and Ammonia is a compact liquid-based drain module packaged into our ICF valve station. It unites the well-known benefits of the Danfoss ICF technology with the most efficient defrost method known into one state-of-the-art defrost solution for industrial refrigeration applications.

The ICFD Defrost Module comes in one size and two versions, ICFD 20 – Ammonia and ICFD 20 – CO_2 and is fully compatible with ICF 15-4, ICF 20-4, and ICF 20-6.

Improve defrost performance and reduce energy consumption.

- The solution makes it possible to equip an evaporator with ICF Valve Stations across the wet suction, liquid, hot gas, and defrost drain lines. It provides an impressive range of benefits in respect of improved operational efficiency, easy installation, and energy savings.

Features and benefits

- Reduced energy consumption
- Improved defrost performance
- Improved job site efficiency
- Broad application range
- Easy system design

Fact:
Defrosting is a necessity

Example:

- Two stage NH3 system in a Cold room application
- Numbers of evaporator 12
- Evaporator capacity 80kW
- Defrost duration 45 min
- Number of defrost cycles per day 1
- Number of days in a year with defrost 365
- Electricity cost €/kWh: 0,1€

Measured savings on **Float controlled Hot Gas Defrost** vs. **Pressure controlled:**

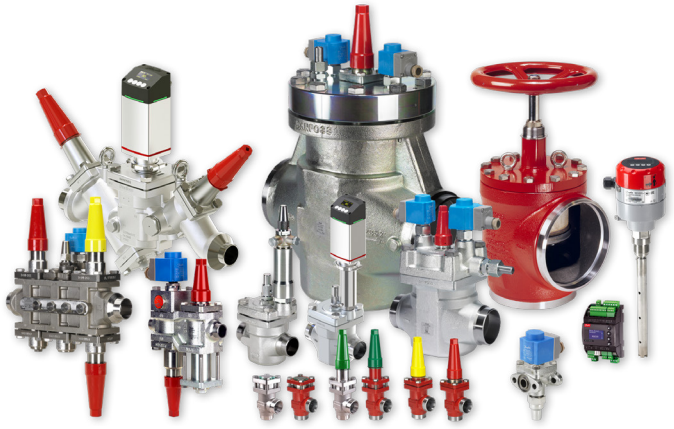
Savings per year **14,000€**

Savings over 20 Year **285,000€**

Reduction of Total Cost of Ownership of a Cold room with 12 evaporators

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 controled 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

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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/

Follow us in **Social Media**

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