

ENGINEERING
TOMORROW



Danfoss Solutions for Walk-in Coolers & Freezers - OEMs, North America

Go **Beyond Cool**

With Danfoss, build sustainable and efficient walk-in coolers & freezers. Our wide range of products and market leading application expertise enable you to think forward and meet future refrigerant and energy regulations. Go green and ahead of competition without compromising on performance.



Over

60

product families
approved for lower
GWP refrigerants to
meet each application

coldroom.danfoss.com

A walk-in cooler & freezer solution to meet your every need

Safety has top priority among consumers today and tomorrow. Food safety in the dairy, meat, fisheries and other food industries relies on an unbroken and efficient cold chain from field to fork. This cold chain preservation is also crucial in the pharmaceutical industry.

Found within the cold chain are storage facilities such as walk-in coolers & freezers, also referred to as cold rooms. These facilities store or process both refrigerated and frozen products. They can be at the actual process facility or part of the distribution chain.

Compliance with hygiene and food safety regulations, but also energy regulations, is critical. Whether for a new installation or renovation, other parameters that must be considered when purchasing a cold room include ease of selection, refrigerant choice, installation options, reliability, maintenance and operating costs. These factors have an impact on all market players including owners, and for each application you need a solution to meet the exact demands for refrigeration.

Danfoss offers the widest portfolio of solutions for cold rooms to suit the diverse capacities, temperatures and processes – for plug-in or remote installations, in small and larger sizes. You have a partner by your side who understands your needs and allows you to find the solutions adapted to each situation.

Turn global challenges into growth opportunities



Optimize Food Preservation

1/3 of all food produced in the world is lost or wasted. Food wastage reduction is at the heart of global and local international programs. Cold chain preservation to secure food safety is not an option but an obligation and is another crucial aspect of the global food demand. Danfoss solutions for cold rooms help keep the food fresh and safe for consumption and therefore contribute to reducing food loss and waste.

Tight

temperature control with variable speed solutions and electronic controllers.



Maximize Energy Efficiency

Cost and energy production are among the environmental challenges of tomorrow in many regions. This is why we have been working for a long time, through our portfolio of condensing units, evaporator components, drives, controllers, micro channel heat exchangers, and other components to optimize cold room lifetime, productivity and monitoring.

Up to 35%

energy savings in your cold room system with Danfoss solutions.



Build Sustainable Infrastructure

As the global population continues to grow and moves into cities, the need for food storage equipment increases. Danfoss has a global market presence, selling in over 100 countries and partnering across a wide distribution network. With our products and spare parts available where and when you need them combined with unmatched application expertise, we help meet these challenges by building sustainable and efficient cold rooms.

More than 1 million

Danfoss components sold in cold rooms per year.



Combat Climate Change

The battle for a better environment requires the reduction of direct and indirect greenhouse gas emissions. About 8% of global greenhouse gas emissions annually are generated by food wastage. Synthetic refrigerants like HCFCs and HFCs have a high Global Warming Potential (GWP). Danfoss qualifies its solutions for cold rooms with refrigerants having a lower GWP and contributes to the solutions for a cleaner, safer tomorrow.

64% GWP reduction

when choosing products with R449A refrigerant in your cold rooms rather than R404A.

Driven by the Montreal Protocol, global trends and regulations are transforming the refrigeration industry



Supporting leading industry standards

We support compliance with leading global standards in food safety and energy conservation – and drive development in collaboration with Governmental and Non Governmental Organizations worldwide.



Hazard Analysis Critical Control Point



UL



United States Environmental Protection Agency



Energy Star



Department of Energy



CE Marking



All our products have been specially developed to cover the maximum range of commercial refrigeration applications.



Food Service:
restaurants, catering, etc.



Specialty Retail:
butchers, bakeries, etc.



Process Cooling:
lab/medical, fruit ripening chambers, etc.



Convenience Stores



Discount Stores



Pharmacies

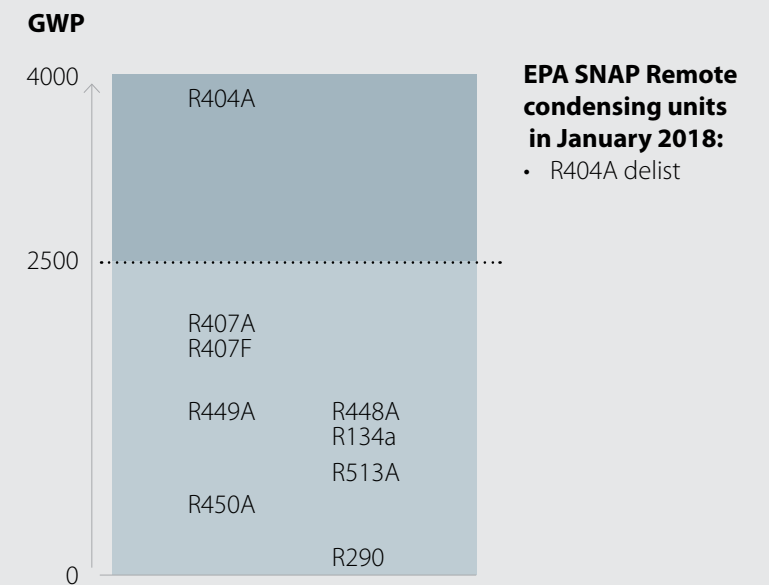
The revolution in the refrigeration market opens up new opportunities

Energy efficiency, urbanization, connectivity, electrification, low GWP (Global Warming Potential) refrigerants, and food safety put high pressure on cold room professionals such as installers, equipment manufacturers, wholesalers, and users.

The demanding and continuously evolving regulatory landscape represents a profitability risk for all the market players. It also creates opportunities to rethink the ways of designing cold room equipment for cleaner, safer and easier usage and to operate them in a sustainable and efficient way.

Products that are easier to install, use, and maintain are available near you. Intuitive selection tools, local and global technical teams that have the most extensive expertise in cold room components, are backed up by strong support from distribution partners. We go beyond just cold air as our products and solutions are evolving and anticipating new regulations, while offering competitive and reliable solutions across the entire cold room lifespan. Ultimately, we are enabling remote monitoring and paving the way for future connectivity.

Global Warming Potential (GWP) of current and alternative refrigerants for walk-in cooler & freezer applications



Transitioning to lower-GWP refrigerants

Today, when talking about refrigerants and long-term sustainability, Danfoss considers three main parameters that must be aligned to accomplish a real sustainable balance: **affordability, safety, and environment**. In order to enable the market to achieve these CO₂ equivalent reduction targets, Danfoss is actively working on solutions for alternative refrigerants with a pragmatic approach, keeping system efficiency, costs, and safety in mind.

We offer a wide range of products and solutions for low-GWP synthetic and natural refrigerants for refrigeration applications.

Commercial Refrigeration applications are very diverse, including cold rooms, glass door merchandisers, and display

and island cabinets, and can use a variety of refrigeration system designs such as rack or multiplex, self-contained, or, remote condensing units.

Among Commercial Refrigeration applications:

- Hermetically sealed applications are suited for using low GWP refrigerants, which are safe due to their low charge amounts. Many of these systems already use hydrocarbons like R600a and R290 and the EU phase down has required GWP values below 150 from 2022.
- Condensing units have a refrigerant charge that is typically between 10 and 44 lb. Since many of these systems can be accessed by the public, if flammable refrigerants are used, safety is an important

consideration. High GWP or ODP (Ozone Depletion Potential) refrigerants like R404A and R22 have been used for many years, but new alternative, A1- classified HFCs have a GWP less than 60% of R404A. Nevertheless, the impact of higher compressor discharge temperatures on the operating envelope and the impact of refrigerant glide on cooling performance present new challenges.

We believe that the market will quickly move to an average GWP level of around 1500 before slowly seeking more, lower-GWP solutions like CO₂, R290 (Hydrocarbons), or HFO blends.

Learn more and download our brochure on refrigerants at refrigerants.danfoss.com

U.S. Department of Energy (DOE) improves energy efficiency in the U.S. and Canada

In the U.S., the energy conservation standard is called AWEF (Annual Walk-in Energy Factor). In Canada, Natural Resources Canada (NRCan) and the Office of Energy Efficiency have proposed to align with the U.S. standard and is called Amendment 15 to the Energy Efficiency Regulations.



Meeting AWEF in 3 steps



ALL PRODUCTS OFFERED FROM JANUARY 1ST 2020

Effective January 1st, 2020, all medium temperature Condensing Units offered for sale must meet the applicable AWEF levels.



ANNUAL WALK-IN ENERGY FACTOR (AWEF)

AWEF – Ratio of heat removed from the envelope to the total energy input of the refrigeration system over one year.



AFFECTED APPLICATIONS WITHIN REFRIGERATION

Walk-in Coolers & Freezers (including blast chillers, process cooling and preparation rooms).

U.S. DOE AWEF standards and timing

Equipment Class	Capacity	Minimum AWEF (Btu/W-h)	Enforcement Date
Dedicated Condensing System - Med Indoor	<9,000 Btu/h	5.61	January 2020
	≥ 9,000 Btu/h	5.61	January 2020
Dedicated Condensing System - Med Outdoor	< 9,000 Btu/h	7.60	January 2020
	≥ 9,000 Btu/h	7.60	January 2020
Dedicated Condensing System - Low, Outdoor with a Net Capacity	< 6,500 Btu/h	$6.522 \cdot 10^{-5} \cdot C_{net} + 2.73$	≈ February 2020
	≥ 6,500 Btu/h	3.15	≈ February 2020
Dedicated Condensing System - Low, Indoor with a Net Capacity	< 6,500 Btu/h	$9.091 \cdot 10^{-5} \cdot C_{net} + 1.81$	≈ February 2020
	≥ 6,500 Btu/h	2.4	≈ February 2020

Benefits for everyone



Energy consumption savings when using units with higher AWEF



Standard way to measure the performance



Eco-friendly products



Future-proof units complying with regulations



Coolselector®2 software provides AWEF levels when applicable

Go Beyond Cool by creating better solutions



DEFROSTING, COOLING AND RIPENING:
ERC 21x controllers.



ENVIRONMENTAL SAVINGS, MINIMUM REFRIGERANT USE:
Microchannel condensers, Fan-speed controllers.



SYSTEM CONTROL & SAFETY:
Expansion valves, distributors, filter driers, ball valves, sight glasses, pressure switches and pressure regulators, variable speed technology.



EFFICIENT HOT-GAS DEFROST:
Solenoid valves.



SYSTEM OPTIMIZATION:
Fixed-speed and variable speed compressors and drives.

Your source for walk-in cooler & freezer production

With the widest product portfolio for cold rooms, we offer a powerful combination of expertise and product options that will enhance your cold room design, and increase your bottom line.



Compressors

Designed for refrigeration with high efficiency motors and optimized scrolls. Using lower-GWP and natural refrigerants (fractional models only), with option for vapor and liquid injection for LLZ scroll models in LBP applications.

Benefits:

- Reduce energy consumption
- Deliver high capacity



Components for condensing units or packaged systems

Line components and pressure controls for improved preservation and food safety.

- Filter driers
- Ball valves
- Sight glasses
- Pressure switches
- Fan speed controllers
- Microchannel condensers



Components for evaporators

Thermostatic and electric expansion valves, solenoid valves for energy efficiency and system reliability.

Benefits:

- Help meet upcoming energy and environmental regulations
- Available everywhere through your wholesaler
- Reduction in electricity consumption



Temperature controllers

Thermostats and controllers for tight temperature control and food safety.

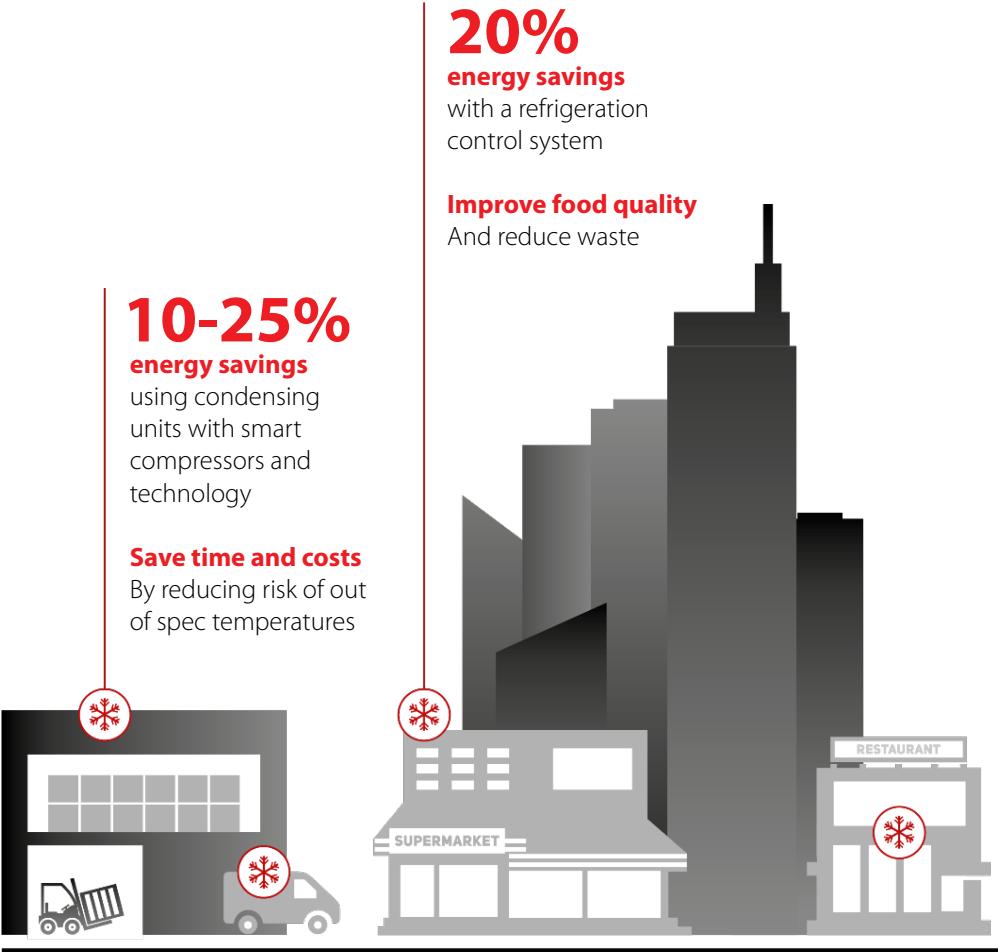
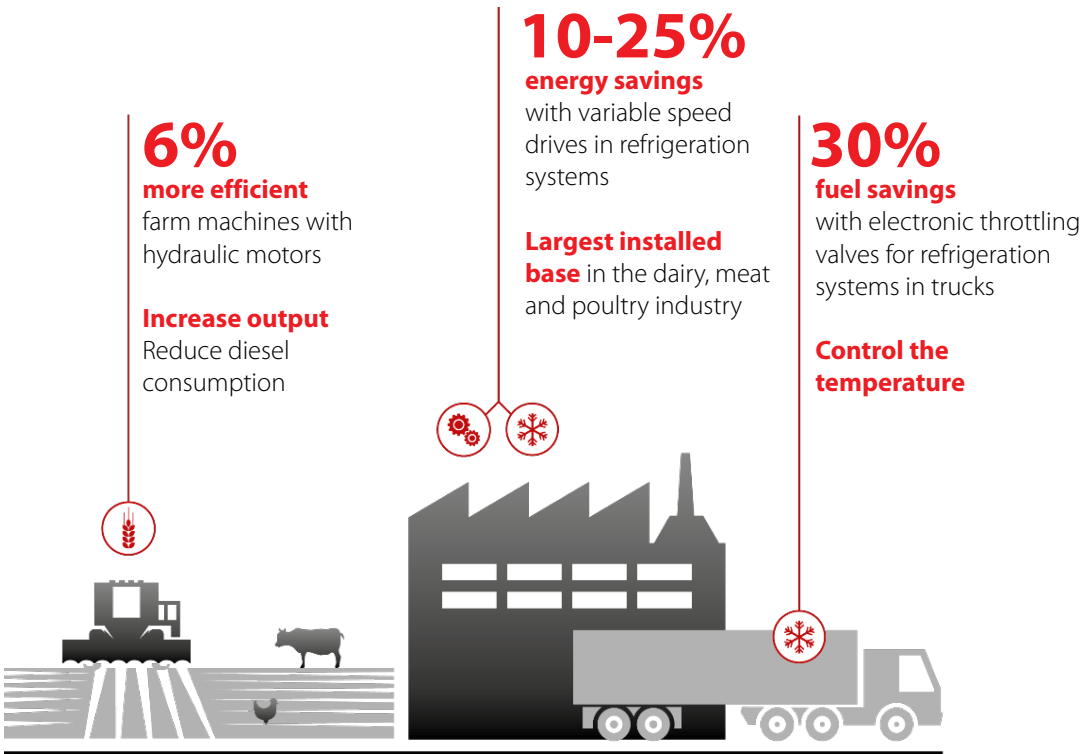
Benefits:

- Minimizing call backs and ensuring customer satisfaction
- Long relay lifetime ensures minimal maintenance costs
- Easy configuration through predefined apps



Scan to discover our solutions on coldroom.danfoss.com

Reducing food loss and waste through all the chain



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Application Development Centers to optimize your walk-in cooler & freezer*



Danfoss Application Development Centers

For Danfoss, designing environmentally conscious products and working towards a more sustainable use of resources are key issues we address through innovation, research, and teamwork.

To drive progress in this area, we've invested in building Application Development Centers (ADC) all over the globe*. Because of our worldwide presence, our engineers are keenly aware of industry trends on both a global and local level. However, another benefit of the ADC is working hand-in-hand with our customers to find new solutions.

When we work together to combine your expert knowledge of cold room systems with our deep understanding of components, we're able to push the envelope of what can be achieved, resulting in creating better cold room solutions.

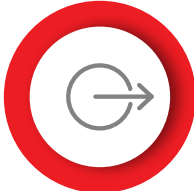
* Danfoss ADCs are today located in:
China - Haiyan and Wuqing
Denmark - Nordborg
India - Oragadam
USA - Baltimore and Tallahassee



COLLABORATE
with experts



INNOVATE
through testing



ACCELERATE
your business



The walk-in cooler & freezer is **business critical**

With decades of experience in cold rooms we not only provide the most comprehensive product and system solutions. We provide unmatched application knowledge and proven reliability, making us a trusted business partner within commercial refrigeration operations.

For more information visit
coldroom.danfoss.com



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