

ENGINEERING  
TOMORROW

*Danfoss*

Danfoss Solutions for Cold Rooms - Installers/Contractors, Europe

## Go Beyond Cool

With Danfoss, you get more than reliable solutions for cold rooms. Contractor-friendly products built with market leading expertise that are available everywhere enable you to comply easily with regulations and save on installation and maintenance. Make the right choice for optimum protection of perishables, efficient operation and long lifespan.



Over

**60**

product families  
approved for lower  
GWP refrigerants to  
meet each application

[coldroom.danfoss.com](http://coldroom.danfoss.com)



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

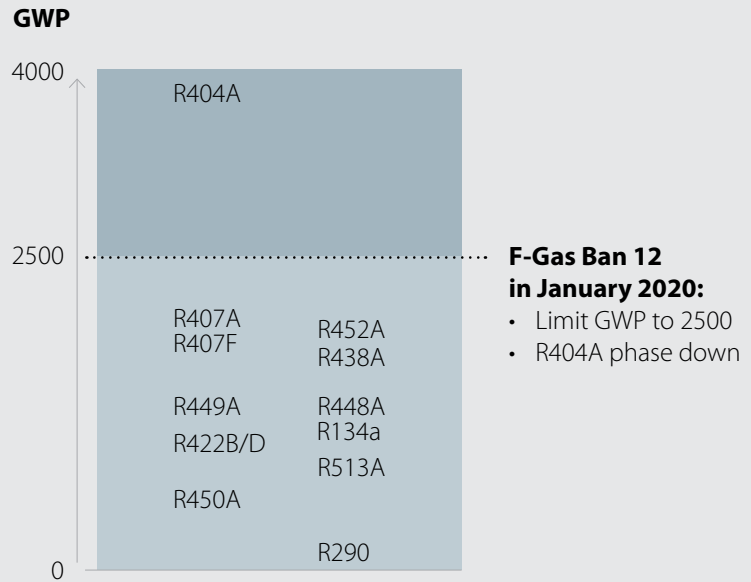
Energy efficiency, urbanization, connectivity, electrification, low GWP (Global Warming Potential) refrigerants, and food safety put high pressure on cold room professionals such as installers, equipment manufacturers, wholesalers, and users.

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 and 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 in commercial refrigeration



## 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 CO<sub>2</sub> 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 up to 20 kg on the largest sizes and safety on flammability is imperative as many of these systems can be accessed by the public. 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 of 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 CO<sub>2</sub>, R290 (Hydrocarbons), or HFO blends.

Learn more and download our brochure on refrigerants at [refrigerants.danfoss.com](https://refrigerants.danfoss.com)

# Go Beyond Cool by creating better solutions

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

Discover our solutions on [coldroom.danfoss.com](http://coldroom.danfoss.com)



## OUTDOOR CONDENSING UNITS

Housed plug and play condensing units providing high energy efficiency, reliability, food safety and low noise operation. Easy to install, service and maintain, using lower-GWP refrigerants, they are all EcoDesign & F-Gas compliant.

### Benefits:

- Fast installation and easy maintenance
- Low noise
- Highly efficient cutting significantly energy costs



## INDOOR CONDENSING UNITS

Open frame condensing units for indoor installation providing energy efficiency and food safety. Qualified for EcoDesign. They are using lower-GWP refrigerants making them F-Gas compliant.

### Benefits:

- Compact & sturdy design
- Available for high ambients
- Highly efficient and cost effective units



## TEMPERATURE CONTROLLERS

Controllers for perfect temperature and food safety.

### Benefits:

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



## 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







# Selection tables

The first table shows examples of products selection based on defined requirements: type of cold room, size and capacity. These are only indicative examples. The second table gives an overview of the condensing units' main features.

Precise your selection by using the **Cold Room module in Coolselector®2** software. With a few clicks, start building your cold room. You can make a precise configuration, with all the needed components. After the calculation is done, a final report can be generated, which will contain all relevant information down to the code number for ordering. Take a look on how easy it is to use.



Download Coolselector®2  
on [coldroom.danfoss.com](http://coldroom.danfoss.com)

Condensing units			
 Optyma™	 Optyma™ Slim Pack		 Optyma™ Plus
	W05	W09	 Optyma™ Plus INVERTER

## General cold room (+4°C / +6°C) MBP @ 32°C ambient temperature - Conditions -10°C / +40°C

Refrigerant		R134a	R448A	R449A	R448A
Capacity (kW) Min./Max.		0.3 to 13.1	3.3 to 10.2	0.7 to 14.9	1.7 to 8.3
Volume (m³) Min./Max.		3 to 300	87 to 220	4 to 340	28 to 195
Expansion valve		T2/TU/TC			
Solenoid valve		EVR 2 to EVR 8	EVR 2 to EVR 6	EVR 2 to EVR 8	EVR 2 to EVR 8
Cold room controller (2 options):	ERC	ERC 211			
	Optyma™ Control	1 or 3 phase			

Danfoss condensing unit ranges are **multi lower GWP refrigerants compatible**. In this table, we are making examples with a refrigerant type for each range. For the evaporator selection, please contact your wholesaler.

## Feature overview

IP level	IP21	IP54		IP54	IP54
Compressor technology	Reciprocating	Scroll/Reciprocating		Scroll/Reciprocating	Variable speed scroll
Control box (pre-wired panel)	yes	yes		yes	yes
Microchannel condenser	- / yes (A02 version)	yes		yes	yes
Fan speed controller	-	-	yes	yes	yes
Main switch (circuit breaker)	-	-	yes	yes	yes
Filter drier	- / yes (A10 version: combo drier + receiver)	yes (flare)		yes (flare)	yes (flare)
Sight glass	-	yes		yes	yes
Crankcase heater	yes	yes		yes	yes
HP/LP adjustable pressostat	yes	Mechanical		Electronic	Electronic
Fail safe mini pressostat	-	-		Mechanical	Mechanical
Access door(s)	-	-		yes	yes
Acoustic insulation	-	-		yes	yes
Condensing unit electronic controller	-	-		yes	yes
Network connectivity	-	-		yes	yes
Stack mounting	-	-		yes	-
Oil separator	-	-		-	yes



# EcoDesign ... and energy efficiency

The EU EcoDesign directive aims to improve the overall performance of products and thereby protect the environment by reducing indirect CO<sub>2</sub> emissions. Manufacturers must comply to get the CE marking on their products. It includes several lots that impact the HVACR industry and may be complemented by the Energy Labelling Directive.

## High SEPR/COP cuts energy costs

E.g. in a cold room where meat is stored and with 9 kW of cooling capacity.

Optyma™ Plus INVERTER vs mechanically modulated technology\*

9 KW R407F		
UNIT	DANFOSS	MARKET
SEPR	3.84	2.5
USAGE	~ 14 000 kWh	~ 21 600 kWh

**Yearly energy consumption saved: 7 600 kWh**

### Savings based on cost of energy:

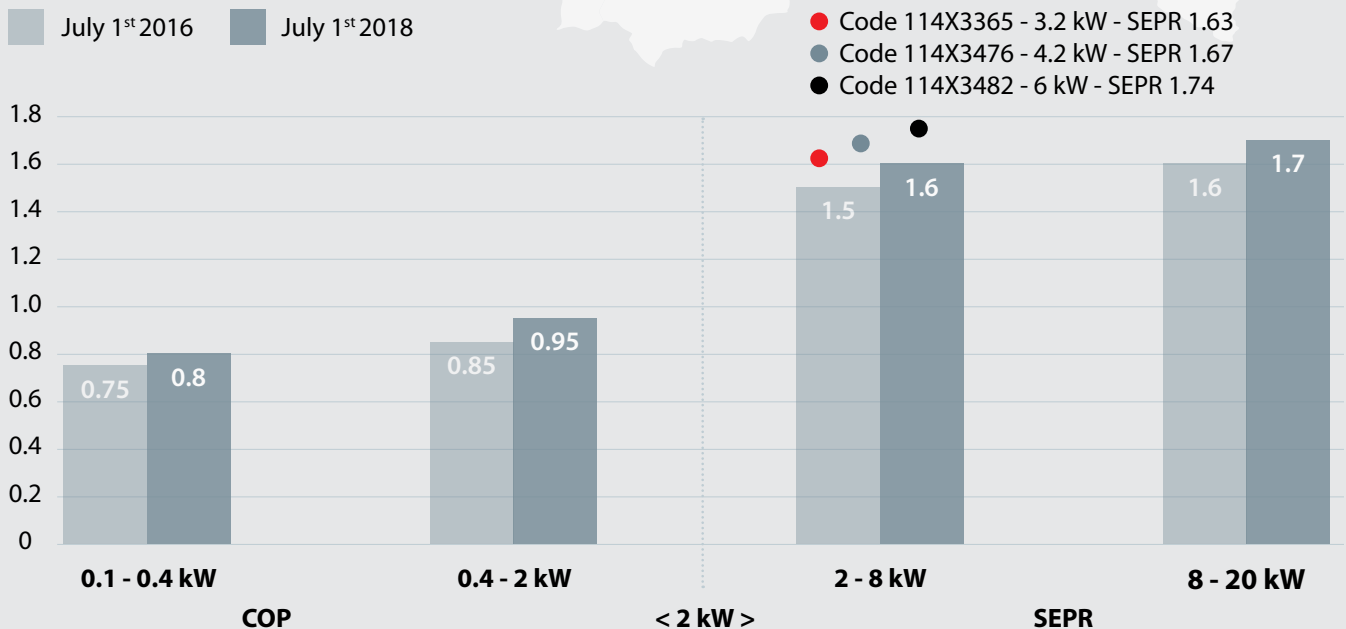
FRANCE: 0.11€ / 1 KWH = 7 600 x 0.11 = 836€  
 UK: 0.15€ / 1 KWH = 7 600 x 0.15 = 1 140€  
 GERMANY: 0.20€ / 1 KWH = 7 600 x 0.20 = 1 520€

**1 520€**

annual electricity savings made by your customer in Germany

\* Source: Danfoss

## Optyma™ Plus units with R452A at low temperature comply with EcoDesign 2018



# Benefits for everyone



Energy consumption savings when using units with higher SEPR



Future-proof units complying with regulation



Transparent way to measure the performance of condensing units



Coolselector®2 software provides EcoDesign report



Eco-friendly products

**ENTR Lot 1:** Regulation: 2015/1095, 2015/1094. Professional refrigeration.



## AFFECTED APPLICATIONS WITHIN REFRIGERATION

- Condensing units
- Professional refrigerated storage cabinets
- Blast cabinets
- Process chillers



## 2 STEPS: JULY 1<sup>st</sup> 2016 AND 2018

From July 1<sup>st</sup> 2016, all condensing units placed for the first time on the market in the European Union must comply with the **Minimum Efficiency Performance Standards (MEPS)**. **From July 1<sup>st</sup> 2018**, these MEPS are more stringent.



## SEASONAL ENERGY PERFORMANCE RATIO (SEPR)

SEPR is the value to measure the energy performance of the condensing units:

- For low temperatures: above 2 kW
- For medium temperatures: above 5 kW
- Below these limits, COP remains the value



# Minimum Energy Performance Standards for condensing units

The table shows 2016 and 2018 EcoDesign application requirements for condensing units listed as COP & SEPR.

	Medium temperatures (-10°C)				Low temperatures (-35°C)				
	COP		SEPR**		COP		SEPR**		
kW*	0.2 - 1	1 - 5	5 - 20	20 - 50	kW*	0.1 - 0.4	0.4 - 2	2 - 8	8 - 20
July 1 <sup>st</sup> 2016	1.2	1.4	2.25	2.35	July 1 <sup>st</sup> 2016	0.75	0.85	1.5	1.6
<b>July 1<sup>st</sup> 2018</b>	<b>1.4</b>	<b>1.6</b>	<b>2.55</b>	<b>2.65</b>	<b>July 1<sup>st</sup> 2018</b>	<b>0.8</b>	<b>0.95</b>	<b>1.6</b>	<b>1.7</b>

\* Rated capacity at full load with ambient temperature set at 32°C (Standards: EN13215 and 13771-2).

\*\* The Seasonal Energy Performance Ratio provides cooling performances at standard rating conditions. It is representative of the variations in load and ambient temperatures throughout the year, and calculated as the ratio between annual cooling demand and annual electricity consumption (Standards: EN13215 and 13771-2 and EcoDesign Directive 2009/125/EC).



## Danfoss is with you **all the way**

Danfoss has a global market presence selling in **over 100 countries** and with factories, Application Development Centers (ADC) and laboratories all over the globe\*.

This global footprint ensures the highest level of **customer service and application expertise** with local technical support near you, speaking your language, and understanding your every day needs and challenges. Backed up by a wide distribution network trained to select, specify and sell our products, it's the guarantee that we are by your side, all the way.

For **24/7 support**, we have developed intuitive tools and apps helping you to make the right product selection, choose an alternative refrigerant, troubleshoot your installation or be trained on natural refrigerants or latest Danfoss products.

Learn more.  
Achieve more.

Cold room:

[coldroom.danfoss.com](http://coldroom.danfoss.com)

Product selection:

[coolselector.danfoss.com](http://coolselector.danfoss.com)

Free learning platform:

[learning.danfoss.com](http://learning.danfoss.com)

Refrigerants and Energy Efficiency:

[refrigerants.danfoss.com](http://refrigerants.danfoss.com)

\* Danfoss ADCs are today located in:

China - Haiyan and Wuqing

Denmark - Nordborg

India - Oragadam

USA - Baltimore and Tallahassee

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