

ENGINEERING
TOMORROW



Future Solutions in Industrial Refrigeration

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Refrigerant choice is key to Green Refrigeration

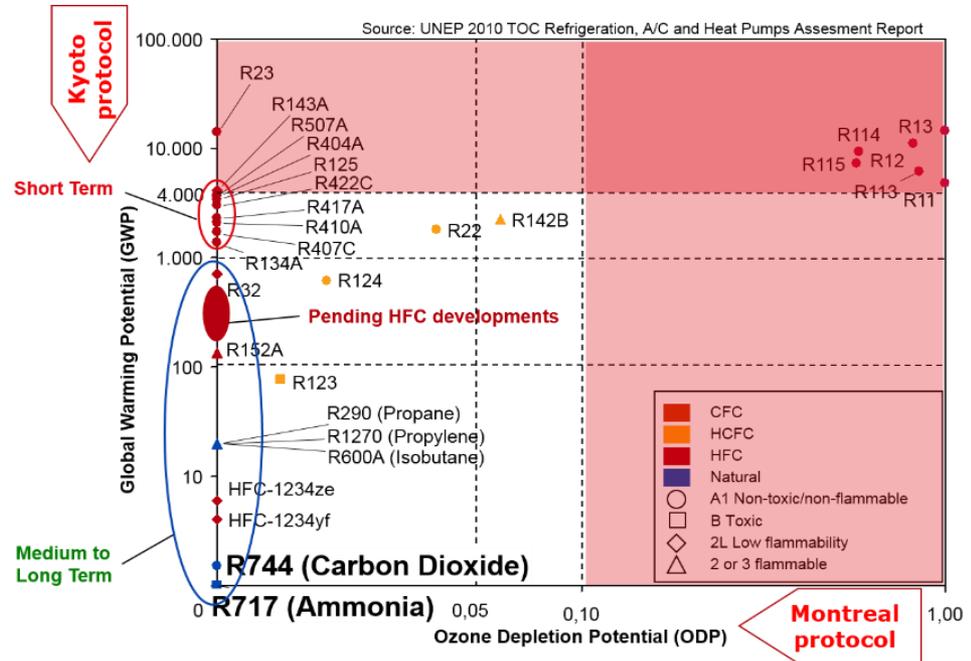
Industrial Refrigeration Systems

Refrigerant choice – key criteria and considerations

- Safety
- Energy efficiency
- Environmental impact (GWP, ODP)

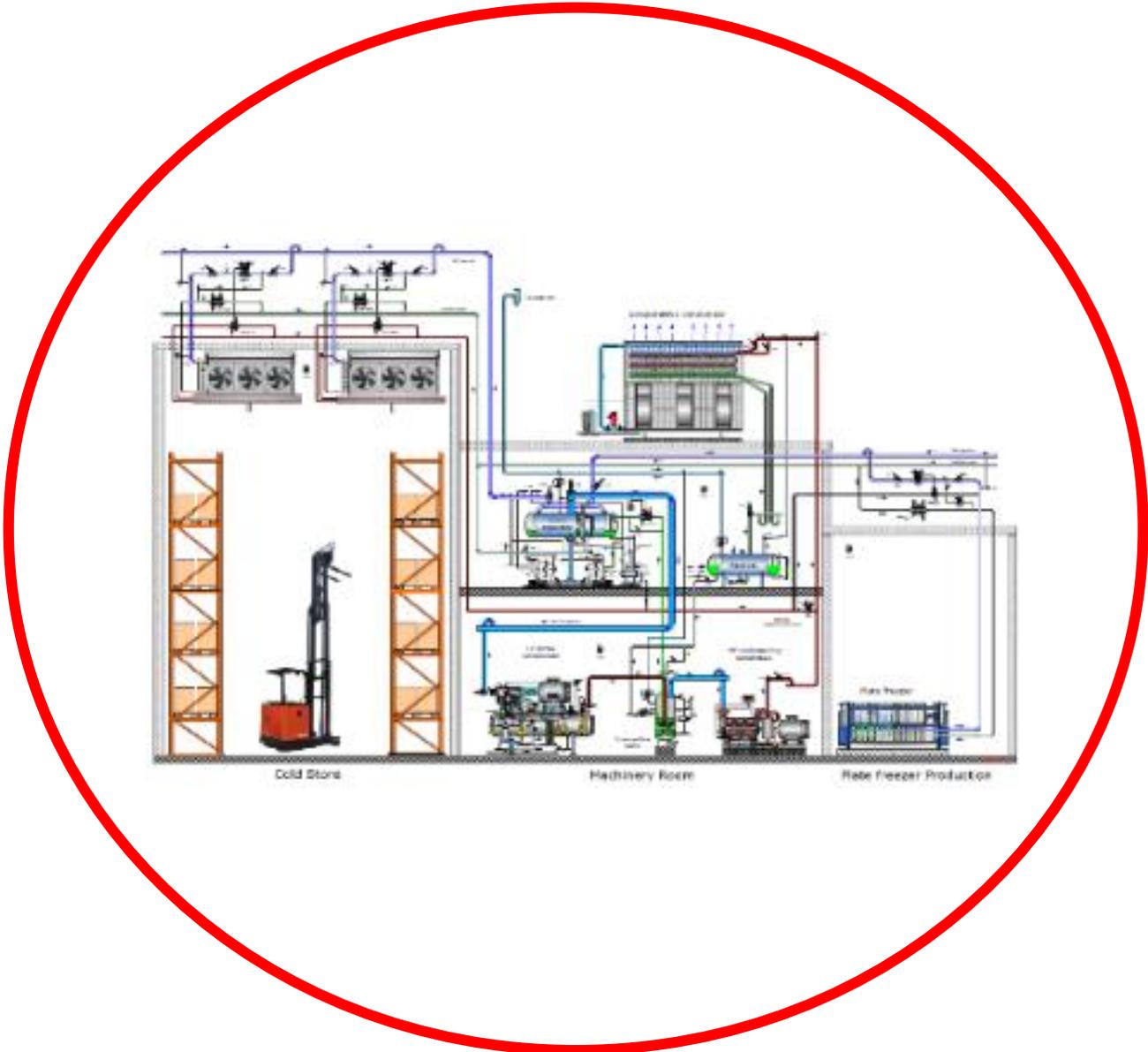
Ideal refrigerant characteristics

- High chemical stability
- Good physical characteristics
- Excellent thermodynamic properties
- Good availability and economical



Ozone Depletion Potential (ODP)
Global Warming Potential (GWP)

Safety and efficiency operation of Industrial Refrigeration systems



Safety and efficiency operation of Industrial Refrigeration systems

Danfoss ready valve station ICF



Saves money - an "all in one" solution

Danfoss formula for efficiency



The Danfoss ICF Valve Station + ICFD Defrost Module

Danfoss Advanced evaporator controller



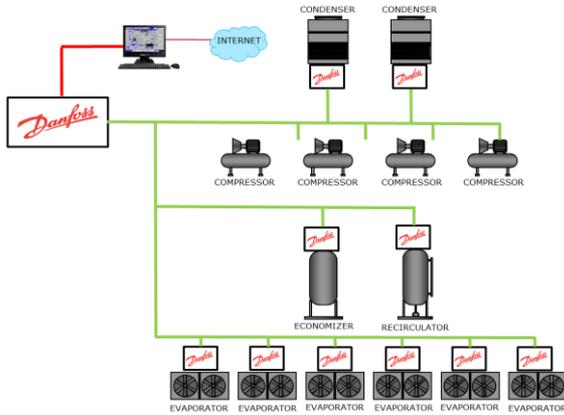
Dedicated for industrial refrigeration applications

Danfoss Gas Detection



Plug and Play Gas Detection solution

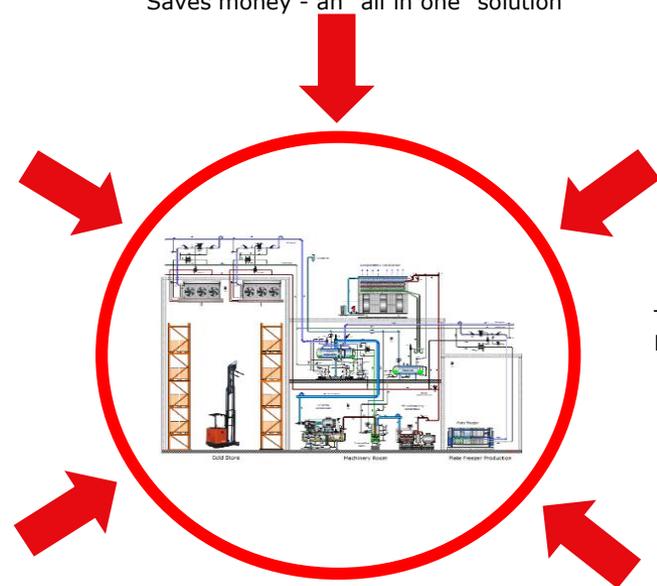
Danfoss system and application solutions



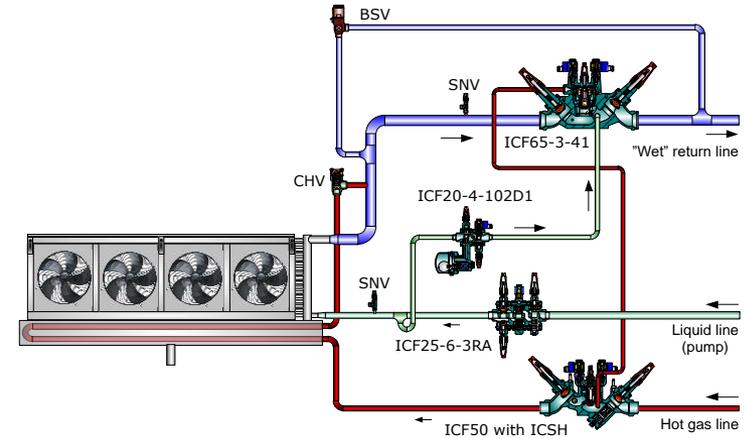
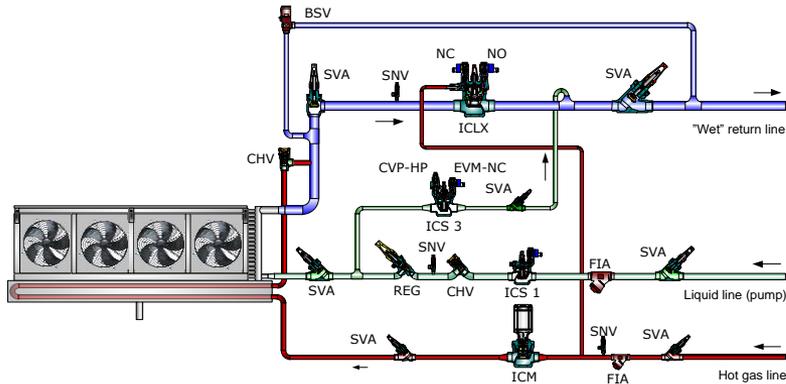
Danfoss Intelligent Air Purger



Reduction of plant power consumption



Safety and Service with Danfoss Valve station ICF



- Saves money - an "all in one" solution
- One valve - several valve functions
- Based on advanced technology providing an environmentally friendly solution
- Saves time - "all in one" solution
- Easy handling - compact design
- Easy welding - disassembly not necessary
- Unique design makes it easy to access the valves during service
- Low internal volume - minimal refrigerant loss during service



Danfoss formula for efficiency

The Danfoss ICF Valve Station + ICFD Defrost Module

It is a formula that 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.



Pressure control

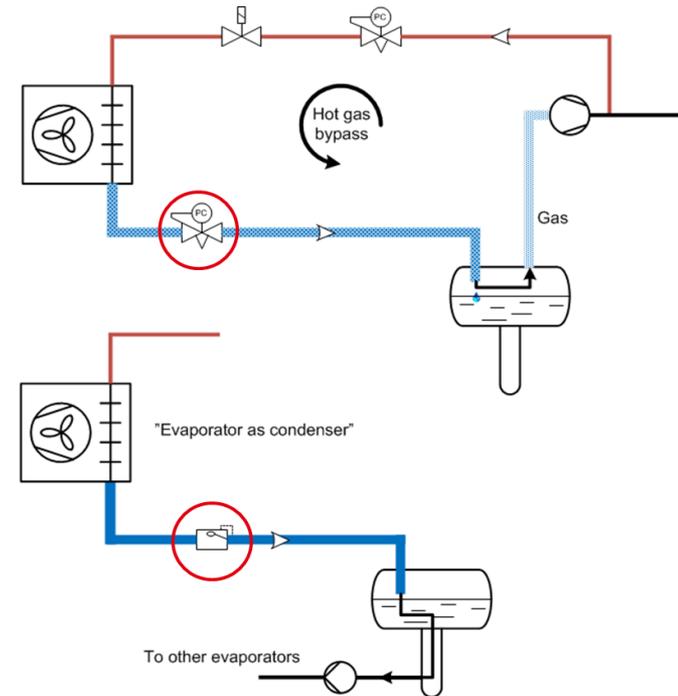
- Defrost => Drain liquid and gas
- Hot gas bypass (blow-by)
 - Increase compressor load
 - Increase energy consumption

Liquid drain

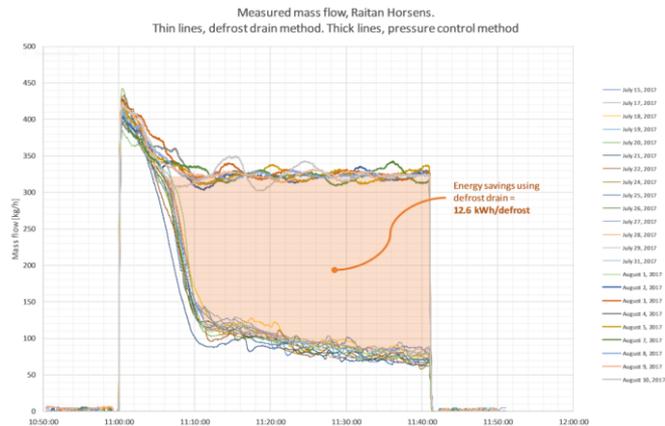
- Defrost => Drain liquid
- Decrease hot gas consumption
 - Decrease compressor load
 - Decrease energy consumption

Benefit

- Reduction of blow-by gas by up to 90%
- Less loading of compressors
- Reduce hot gas consumption
- Reduced energy consumption



Compressor energy savings



Customer Benefit (end-user)

- Reduction of blow-by gas by up to 90%
- Eliminates need to re-compress blow-by gas
- Less loading of compressors
- Reduce hot gas consumption

Customer Value (end-user)

- Reduced energy consumption



Assumptions:

Evaporator: 41 kW @ -25C (12 TR, @ -13°F)

Defrost 40 min. Once a day

Savings: 12.6 kWh per defrost

Industry current rate: EU 28 countries 2017: 0.15 EUR

Danish Energy Ministry: <https://ens.dk/service/statistik-data-noegletal-og-kort/priser-paa-el-og-gas>

Calculation:

Evaporator/year: 12.6 x 0.15 x 360

680 EUR

Per Evaporator /Year



DANFOSS COOLING

“At Danfoss Cooling, we keep people, products and the planet cool.”





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