

ENGINEERING  
TOMORROW



# Enhancing **Energy Efficiency** and **Indoor Comfort** in Hotels



It's time  
to change  
the approach

## 25%

energy bill savings  
for hotels with  
Danfoss  
technologies  
and solutions



## New tourism trends **transform** your hotel business

The growing trends in tourism include sustainability, eco-certification, building automation and water stress. These trends require a change of approach for hotels to be competitive and profitable, while delivering exceptional guest experience.

As one of the fastest growing economic sectors, tourism is a high priority sector for UN sustainable development goals. Nowadays, sustainability certification is becoming a mainstream requirement for hotels the world over.

The challenge is to achieve a long-term reduction in energy consumption while continuing to provide guests with the highest levels of comfort.



Energy costs may represent up to **10%** of operating costs



The **2nd** item after personnel costs



About **60%** of energy costs are related to heating, cooling and hot water production

*How can hotels meet environmental regulations with smart investments? As an expert in energy efficient solutions, our answer is simple: look to the future and rethink the energy performance of your hotel.*

### **It's time to change the approach!**

Danfoss already has proven technologies to make hotels efficient, by managing heating, cooling and ventilation and control everything that's happening inside a hotel in terms of its environment.

Danfoss solutions make hotels performance remarkable – proactively managing energy usage and maintaining a healthy, comfortable and productive living environment.



# Danfoss can help you **save energy** in your new-build or renovation project

We deliver our hotel expertise through the most advanced and efficient technologies to support smarter use of electricity and water, reduce running costs and environmental impact, and deliver superior comfort to guests.



## **HVAC**

By using Danfoss solutions it is possible to reduce up to 45% of energy consumption of climate-control systems while ensuring the best comfort for guests. This is also building your hotel's green credentials.



## **Domestic hot sanitary water**

Save at least 15% of hot water costs.  
Reduce water waste, and reach temperature quickly.



## **Refrigeration systems**

Our market-leading expertise in building sustainable and efficient cold rooms with accurate temperature control, meeting HACCP regulations, reduces the energy consumption by up to 30% with better food preservation.



## **Fire fighting systems**

With our solutions, water consumption can be reduced by up to 80% compared to traditional sprinklers.



## **Elevators and lifting**

High-reliability and high-efficiency drives guarantee more than 50% energy savings when modernizing a hydraulic elevator



## **Fresh water**

Deliver high-quality service at lower costs with up to 65% less energy consumption.





## Delivering **superior** indoor **experiences** and guest **satisfaction**

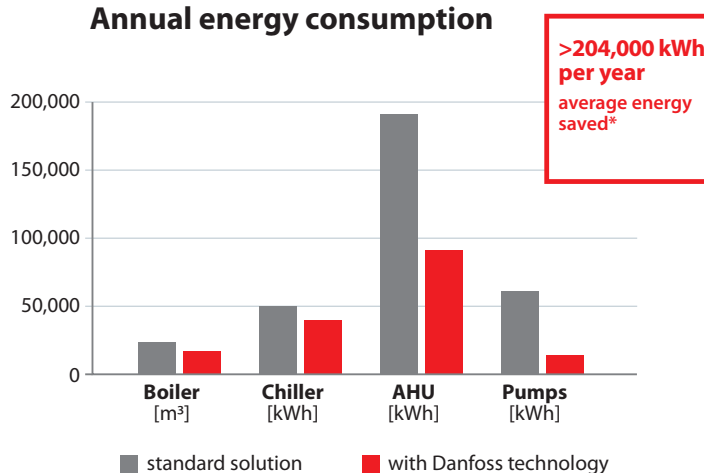
Offer your guests the best indoor experience by providing increased levels of comfort, thanks to perfectly balanced and variable HVAC flow systems

Emotions play an important role in guest satisfaction and loyalty. At Danfoss we know how important it is for you to deliver a reliable and consistent guest experience. We know how critical it is to meet guest preferences and expectations, while optimizing hotel performance to minimize costs and maximize profitability.

HVAC systems represent the highest energy operating cost in the hospitality industry (30-35%).

By using Danfoss solutions it is possible to reduce the energy consumption of climate-control systems by up to 45%, while ensuring the best comfort for guests. This also enhances your hotel's green credentials.

### Annual energy consumption



\*Assumption: 160 rooms; restaurant, spa, conference rooms

By choosing technical installations with variable flow rates and perfectly dynamically balanced HVAC systems, you can guarantee the best indoor comfort experience for your guests, thanks to the greater scope for personalized adjustment of each room. The economic advantages of energy savings are also considerable, thanks to the ability to optimize energy consumption.



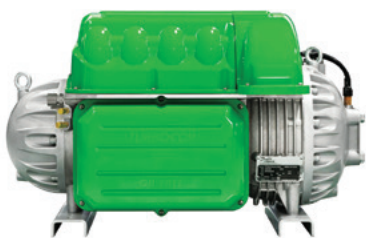
## Heating

The Danfoss heating solutions portfolio covers substations, hydronic balancing, controls and much more. **The NovoCon® S** digital actuator is a real game-changer in hydronic balancing and control. It is designed specifically for our market-leading **AB-QM**, a pressure independent balancing and control valve.



## Ventilation

Efficient fan control is the most crucial aspect in ventilation applications. Our entire portfolio is supported by AC drives specifically designed for energy-efficient HVAC applications. To get optimal performance from your pump and fan applications, you can rely on our dedicated **VLT® HVAC Drive FC 102**.



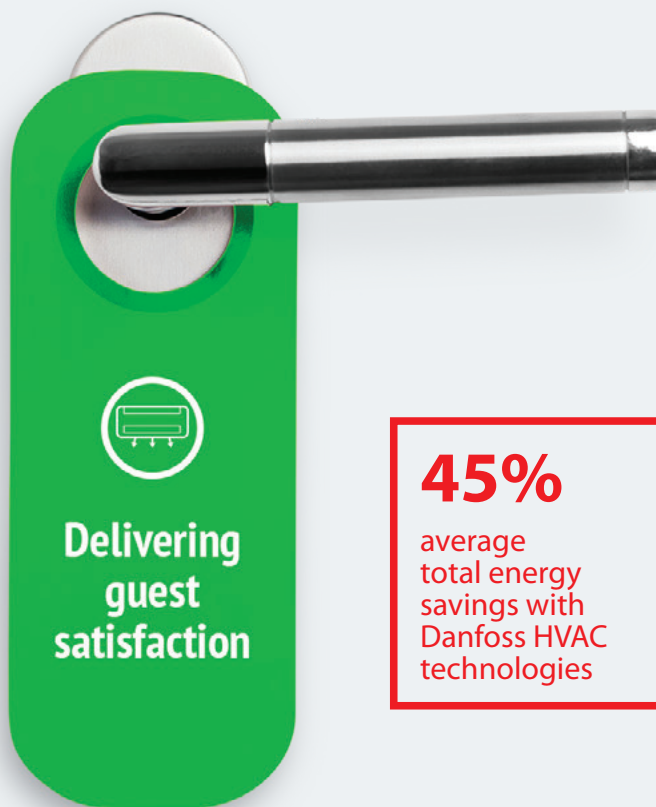
## Air conditioning

When you need to cool down, Danfoss offers the widest set of technologies for efficient air conditioning.

Achieving cool comfort requires a wide range of chiller components including heat exchangers, compressors, drives and valves. Our unique **Turbocor® oil-free** compressors and inverter scrolls offer the highest full- and part-load efficiency in the industry.

## HVAC solutions

# Modernization with minimal disruption



**45%**

average  
total energy  
savings with  
Danfoss HVAC  
technologies

**53%**

average reduction of electrical energy  
consumption

**30%**

average reduction of gas  
consumption

**220€**

average savings/per room with Danfoss  
variable flow and perfectly dynamically  
balanced hydronic systems

Danfoss is the perfect solution, not only for new installation but for retrofit too. It is generally possible to carry out work without closing down the whole hotel, by intervening on single floors or rooms for example, alongside other maintenance or modernization work.

This improves comfort dramatically for staff and guests alike.





## Domestic hot sanitary water

# Delivering better **indoor experience**

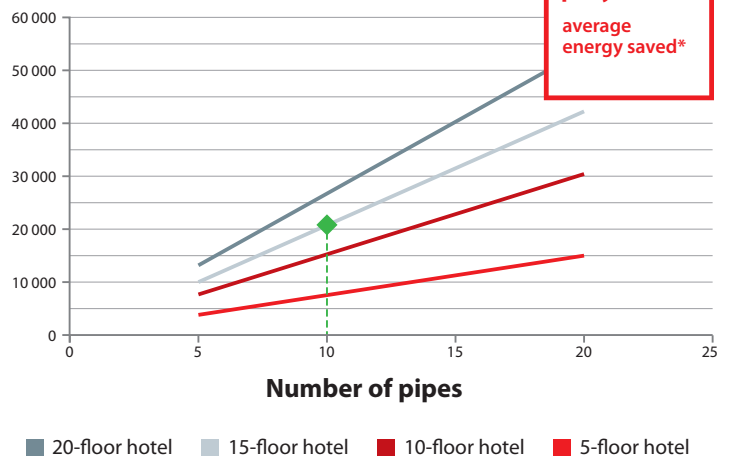
An efficient hot water production system reduces costs and water waste while delivering superior comfort to guests, ensuring better experience and eliminating safety risks

There are various challenges hotels meet in their daily operations when it comes to domestic hot sanitary water, namely: demand for high performance, guest comfort, superior hygiene and a resource-efficient operation. It's no wonder then, that domestic hot sanitary water is the second-largest expense for hotels after HVAC.

Usually, traditional systems will operate at constant flow resulting in huge energy consumption and significant waste of water. By using a smarter Danfoss solution based on the thermal balance of the system which maintains a constant temperature in the plant itself and limits the flow rate in the recirculation pipes to the minimum required level, hotels can ensure the lowest possible consumption while maintaining the best plant performance.

Danfoss supports your hotel with delivering best service to your guests at lowest costs. We offer a complete domestic hot water solution that includes water heaters, storage and charge systems, the hot water valves and temperature controllers. When used together, these meet key challenges including high performance, comfort, hygiene and resource-efficient operation.

### Annual energy savings for pumping



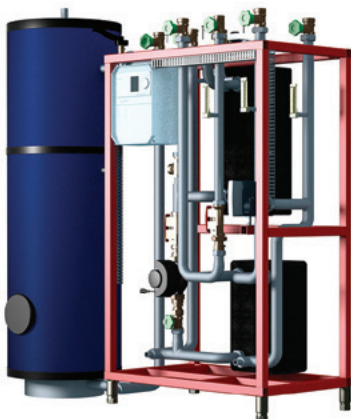
\*Assumption: 15 floors; 10-pipe system



### Legionella prevention and temperature control

Danfoss lead-free multi-function thermostatic balancing valves ensure a proper hydronic balance that avoids long waiting times, whilst reduces energy consumption and water waste.

The valves can be equipped with a thermal or electronic disinfection module, and connected to a simple yet advanced electronic controller designed to optimize the electronic disinfection of DHW systems, thus monitoring all the temperatures and initiating an electronic disinfection cycle when needed.



### Storage Charging System

Water heaters with storage charging systems guarantee hot water availability even at peak loads and ensure low return temperatures in the total operating sequence of a storage recharge, resulting thereby in a lower required volume flow rate.

By choosing Danfoss you can count on a reliable partner with high knowledge and expertise, giving your business the best performance and energy efficiency, the highest comfort and hygiene services, while reducing risk of legionella contamination.

Domestic hot sanitary water

## Reliable hot water supply for superior comfort



Danfoss offers a complete Domestic Hot Water solution including water heaters that can be connected to multiple tanks as well as storage and charge systems, hot water valves that prevent legionella and temperature controllers. When used together, these combine the demand for high performance, comfort, hygiene and resource efficient operation.

### HYGIENE

address risks like legionella with automatic legionella systems

### COMFORT

achieve desired water temperature across all rooms even during peak loads





## Ensuring **quality** and **peace of mind** with cold room solutions

Quality of food and guest satisfaction both have significant impact on the image and reputation of a hotel

On average, over 30% of all wastage is due to a poor cold chain. This represents a huge impact on operation costs. Correct management of food storage guarantees higher quality foods and much less waste.

The kitchen zone impacts, on average, at least 10-11% on total hotel energy cost, including food storage and conservation. Historically, Danfoss experience with cold food chain management and our reliable solutions has helped deliver better-tasting food. Our solutions also improve energy efficiency, whilst reducing operating and maintenance costs by up to 30%.

The extremely accurate and precise temperature control ensures high food quality meeting HACCP regulation. In addition, monitoring and reporting systems that can be integrated in any BMS systems, and better management systems, prevent food waste and put you firmly in control.

### The cold room is **business critical**

We provide unmatched application knowledge and proven reliability, making Danfoss a trusted business partner within commercial refrigeration operations.

#### Energy consumption assuming a 9kW cooling capacity cold room where meat is stored

UNIT	Danfoss	Market
SEPR	3.84	2.50
USAGE	~ 14 000 kWh	~ 21 600 kWh

#### 7,600 kWh

annual energy saved by using Danfoss OP+ inverter corresponding to more than 1500€/year

\* Assuming condensing unit with R407F refrigerant

We support compliance with leading global standards in food safety and energy conservation.



Hazard Analysis  
Critical Control  
Point



UL



United States  
Environmental  
Protection  
Agency



Energy Star



CE Marking



Ecodesign





### **Optyma™ Plus INVERTER**

Capacity modulation in a simple and adaptive package

### **Quick and safe installation and service**

Preset parameters and Modbus communication makes start-up and maintenance of the condensing unit effortlessly quick and easy.

### **High SEPR: 3.84 - certified by ASERCOM**

All models in the range are highly efficient and well above EcoDesign 2018 thresholds, contributing to a reduction in energy costs.



### **Accurate temperature control**

Danfoss cooling solutions ensure accurate and precise temperature control. This preserves food quality meeting HACCP regulation. Thanks to better monitoring systems, it is possible to have full control of your cold rooms and act in case of failure or alarm, in order to prevent food waste or safety concerns due to refrigerant leakage.

All models in the range are highly efficient, extremely quiet, reliable and environmentally-friendly thanks to lower GWP refrigerants and compliance with F-Gas regulation. You can rely on solutions well above the EcoDesign 2018 trends, reducing energy costs of your hotel.

## Refrigeration systems

# Modernization with minimal disruption



**30%**

energy consumption savings with variable speed condensing unit

**Best**

better food preservation and less waste thanks to precise temperature control and connected monitoring system

**169€**

annual saving per kW of cooling capacity of your cold rooms

Through a continuous and correct monitoring of temperatures and of alarms, correct management of cold food is obtained, which translates into a guarantee of high-quality food and less waste. The high quality and reliability of Danfoss reduces maintenance costs to a minimum.



Danfoss elevators and lifting solutions

## Elevate **guest comfort** and **safety** to new heights

Increase application performance and streamline processes with energy efficient, adaptive motor control

If you own or manage a hotel and want to ensure your elevators are up to modern standards, check the elevator drive solution you operate.

Smooth movements reduce acoustic noises, eliminate rollback, improve lifetime and secure high level of guest comfort – this is what a Danfoss drive solution guarantees.

In truth, you have probably experienced our solutions already: Danfoss building automation solutions are found in many of the commercial buildings or factories you've ever been to. Thanks to our wide range of elevator and lift drives, we can meet your hotel's individual requirements.

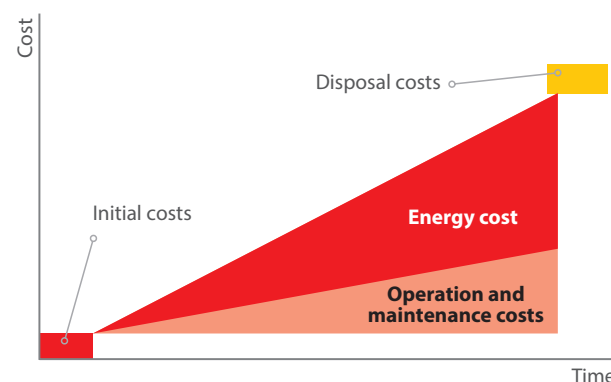
### **A second life for your elevator**

The modernization of an existing hydraulic elevator is a fast, clean and very cost-effective solution, by comparison with an investment in a new elevator. Typically the conversion achieves energy savings of more than 50 percent, and also results in reduced wear and maintenance costs. At the same time, the modernization reduces acoustic noise and results in improved elevator reliability.

### **The right drive for your elevator**

Danfoss drives are dedicated to elevators in areas where acoustic noise matters.

- quiet, for elevated comfort
- compact, without compromising on acoustic noise
- reliable, with independently confirmed lifetime of 2.1 million cycles when operating at 45°C ambient temperature
- easy to program, with set-up wizard specifically tailored to elevator applications







### Refrigeration systems

Danfoss drives are known as some of the most innovative and reliable drives worldwide.

The outstanding quality standards and performance of our drives has been proven over more than 50 years.

### Accurate control provides high comfort

Smooth movements reduce acoustic noises, eliminate rollback and improves lifetime.

### Quick commissioning

Reduced costs – Modernization of an existing elevator to use Danfoss drives can be done in a matter of hours.

### Retrofit

Easy to integrate Danfoss drives into a new elevator series or to modernize existing installations.

### Easy integration

All Danfoss drives can be equipped with the most common communication fieldbuses (Modbus, BACnet, Lonworks, PROFINET, DeviceNet) making integration to BMS easy and fast.

Our drives support all commonly used motor types and development is ongoing.

## Danfoss elevators and lifting solutions

## An investment that **pays off**



### Minimal

energy costs with variable speed control of electrical motors

Speed-controlled hydraulic elevators offer a reliable, silent and extremely energy-efficient operation.

Formerly known as maintenance-intensive and prone to failure as soon as journey frequency increased, when equipped with AC drives hydraulic elevators are now quiet, clean and offer frequency-controlled design which enables safe, highly reliable and energy-efficient operation.

### Reduce total cost of ownership

**10%**

the initial cost of danfoss drives only amounts to 10% of the total cost of ownership

**90%**

the remaining 90% covers energy consumption, service and maintenance



Danfoss fire fighting solutions

## Delivering **safety** and **security** to your guests and staff

Danfoss fire fighting systems put out the fire in seconds, with minimal consumption of water and less water damage, giving you the best possible protection

### Danfoss fire fighting solutions

The SEM-SAFE® fire fighting system from Danfoss is the optimum and reliable solution for ensuring fire safety for hotel guests and working personnel, but also for keeping to a minimum the structural and asset damage caused by a fire.

Special attention should be given to critical areas where many people are present: guest rooms, restaurants, kitchens, meeting rooms, garages, etc. Fire safety is a long-term investment that must be carefully planned to ensure the continued success of a hotel.

The goals of a fixed fire fighting system are to efficiently protect lives in case of a fire situation, and to minimize material damage, operational interruptions and the consequent loss of business.

With small pipe dimensions, large coverage, minimal water consumption, a compact skid unit and simple design, **SEM-SAFE® high-pressure water mist is the perfect choice to protect hotels against fire**, with reliability and cost-saving in mind. The SEM-SAFE® system is safe, efficient and environmentally friendly.

### Danfoss cost saving solution

- With less components compared to other competing systems, the SEM-SAFE® system is lighter and more compact. This allows for simplified maintenance and valuable space saving.
- The excellent cooling properties of the SEM-SAFE® high-pressure water mist technology for fire fighting, make it the perfect choice for window cooling. Building investors make significant savings by using a thinner class of glass.
- With fewer nozzles required thanks to optimized spacing and very small pipe dimension, the installation of the system is significantly simplified.
- Our high-pressure pumps are water-lubricated and hence virtually maintenance-free.
- No need for other fire fighting technologies. SEM-SAFE® is the perfect solution for fire protection of more sensitive areas such as server rooms and archives.





### A unique fire fighting system

The SEM-SAFE® high-pressure water mist system is a unique fire fighting system. When water is forced through nozzles, at high-pressure, a super-fine mist is formed that has a two-fold extinguishing effect.

As well as cooling the fire like a traditional sprinkler, it simultaneously starves the fire of oxygen-like gas systems. When the mist comes into contact with flames, it evaporates and expands a minimum of 1,700 times. The dense vapour created displaces the flames and quickly extinguishes the fire.



### Danfoss solution



### Standard solution



## Danfoss fire fighting solutions

## Danfoss intelligent **use of water and space**



The SEM-SAFE® system by Danfoss provides effective fire protection. It activates fast in the areas where a fire is detected, by cooling the temperature and absorbing smoke particles. This controls the fire and prevents it from spreading.

The SEM-SAFE® high-pressure water mist system is easy to install in modern hotels, but also easy to retrofit in existing hotels where the system will blend well with the surroundings and not disrupt any of the original architectural features. SEM-SAFE® is perfect for renovation of historic buildings.

**ONE** single SEM-SAFE® high-pressure water mist system from Danfoss can protect all area in the hotel

**30%** reduction in the number of nozzle, pipes and fittings will make installation faster, thus reducing total costs



Danfoss fresh water solutions

## Meeting hotels' **fresh water** demand with **unique** and widest **energy efficient** product portfolio

Fresh water resources are becoming increasingly scarce the world over. Many hotels are located on the coast or islands where fresh water is scarce, or where it is simply impractical to extend mains water pipe networks.

The principal challenge with the desalination of water is that it requires a lot of energy. Salt dissolves into water with relative ease, where it forms strong chemical bonds that are difficult to break. This is why experience, technology and innovation are central to any unique value proposition for desalination.

Combine the need for fresh water with energy efficiency, and the benefit of working with single provider for the whole desalination plant system becomes obvious.

In fact, by combining the right mix of optimized technologies by Danfoss, up to 65% more energy efficiency can be delivered. There are four core technologies: drives, pumps, energy recovery system and flow control devices.

### **Desalination** growing demand

Desalination is in demand as it allows hotels in water-deprived areas to have their own fresh water source

1%



Today, only 1% of the world's population receives water from desalination and this is expected to increase

57%



The past five years have seen a 57% increase in desalination plant capacity

14.4%



Frost & Sullivan expects the global mobile treatment market to grow at a compound annual growth rate (CAGR) of 14.4% by 2020





### High Pressure Pumps

High-power axial piston pumps offer precise and energy-efficient operation, even at partial load. As they are easy to maintain and extremely compact, these pumps are driving more and more small to large-sized SWRO plants around the world. The largest pumps have outputs of up to 88 m<sup>3</sup> /hour.



### Energy Recovery Devices

The latest Danfoss iSave energy recovery devices (pressure exchanger and booster pump) provide up to 94% efficiency. Flexible and compact, these devices are as easy to install as they are to operate. Outputs of up to 70 m<sup>3</sup>/hour are available.



### Drives

In the harsh operating environment of a desalination plant, drives must be capable of precise and optimized operation. Flexibility is another key characteristic, offering the ability to drive all kinds of motors, pumps and cooling systems. Drives must also compensate for peaks and troughs in the power supply, as well as harmonic distortion.



### Pressure and fluid control devices

Proven and reliable pressure and fluid control devices can be adapted to harsh environments such as SWRO plants.

## Danfoss fresh water solutions

# Danfoss – your **partner** for **desalination**



**Up to 65%**

energy savings  
with Danfoss  
technologies

Danfoss is ideally positioned to support its customers with optimized, cost-effective and energy-efficient desalination. In addition to its full range of products

**25%**

### Up to 15-25% of energy savings:

Desalination system with Danfoss high-pressure pumps and Danfoss drives

**60%**

### Up to 60% of energy savings:

Desalination system with Danfoss energy recovery devices (iSave) and Danfoss drives

**65%**

### Up to 65% of energy savings:

Desalination system with Danfoss high-pressure pumps, Danfoss drives and Danfoss energy recovery devices (iSave)

# Danfoss

## Your Hotel Sector Partner

We deliver our hotel expertise through the most advanced and efficient technologies to support smarter use of electricity and water, reduce running costs, improve environmental impact and deliver superior guest comfort.



**HVAC**



**Domestic hot sanitary water**



**Refrigeration systems**



**Fire fighting systems**



**Elevators and lifting**



**Fresh water**

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