

ENGINEERING  
TOMORROW

*Danfoss*

Hospitals

# Optimum fire safety for hospitals with **SEM-SAFE®** high-pressure water mist system

Danfoss Fire Safety A/S

*Cover page: Shanghai Shuguang Hospital, protected with Danfoss SEM-SAFE® high-pressure water mist system*

Reliable fire  
safety for  
people and  
equipment with  
**SEM-SAFE®**

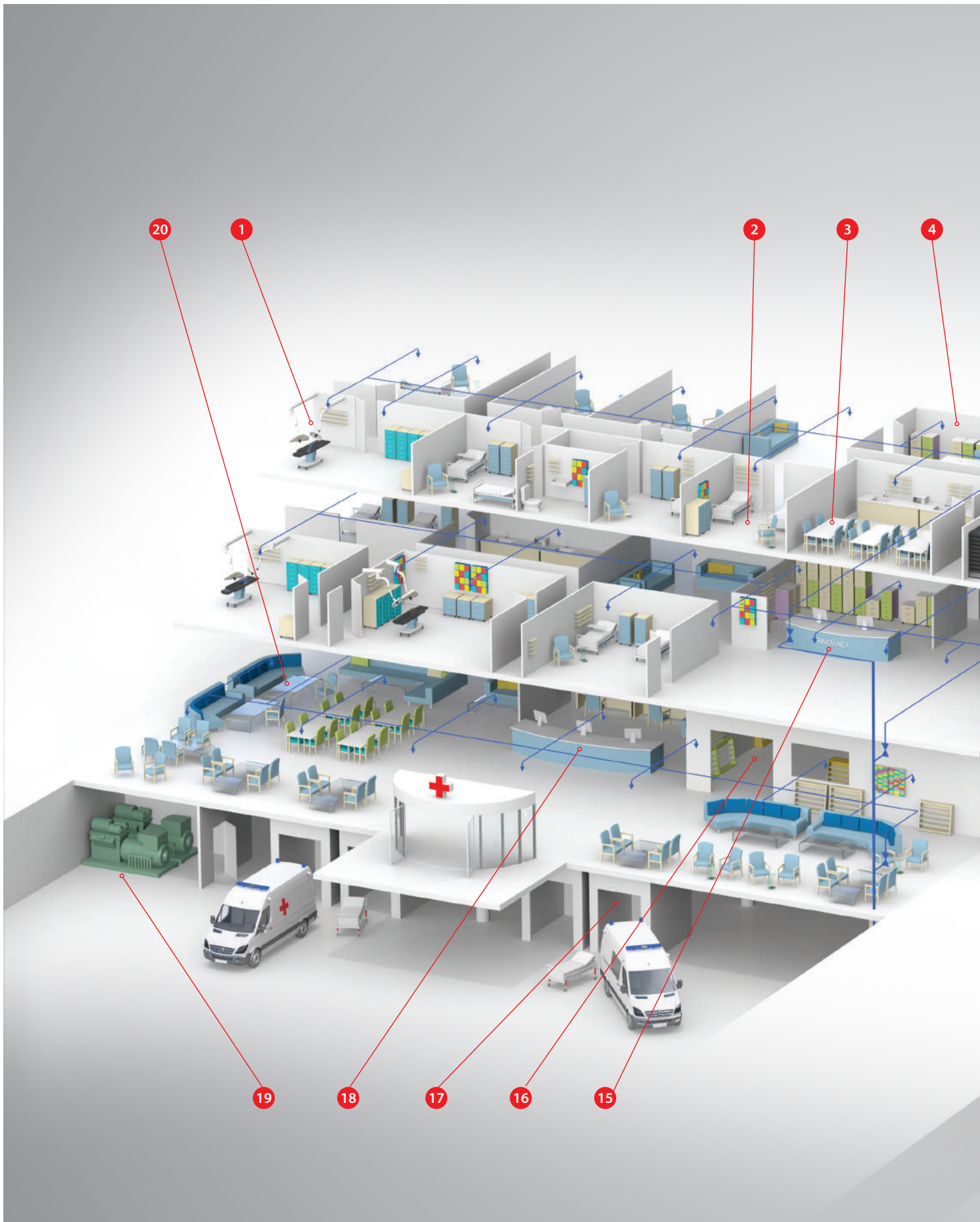
[www.semsafe.danfoss.com](http://www.semsafe.danfoss.com)

**SEM-SAFE®**



# SEM-SAFE® high-pressure water mist system

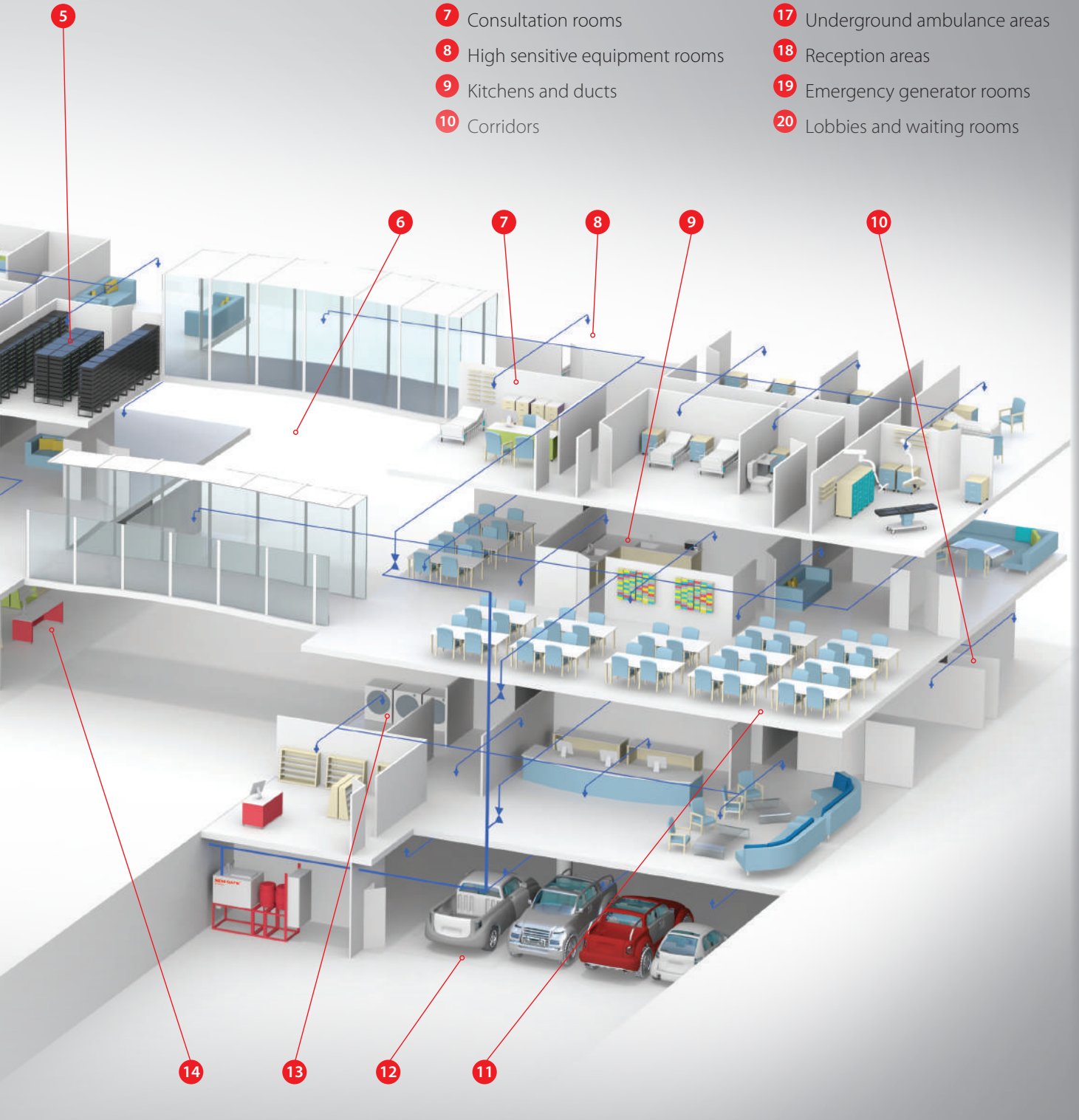
## One single system to protect all areas in the hospital





**Danfoss provides fire fighting solutions for the following areas:**

- 1 Operating theatres
- 2 Patient rooms
- 3 Staff facilities rooms
- 4 Offices
- 5 Server rooms
- 6 Glass corridors
- 7 Consultation rooms
- 8 High sensitive equipment rooms
- 9 Kitchens and ducts
- 10 Corridors
- 11 Canteens
- 12 Car parks
- 13 Laundry rooms
- 14 Archives
- 15 Pharmacy / Shops
- 16 Storage areas
- 17 Underground ambulance areas
- 18 Reception areas
- 19 Emergency generator rooms
- 20 Lobbies and waiting rooms





# SEM-SAFE® for hospitals

## Need a fire fighting system that:

- Allows for safe evacuation?
- Keeps water damage to a minimum?
- Reduces downtime?
- Is environmentally friendly and 100% harmless to people?
- Is easy to integrate and blend in with other equipment in the hospital?
- Is the optimal technology for high-sensitive equipment?

**Then SEM-SAFE® high-pressure water mist is your solution!**

In line with the medical advanced equipment inside a hospital, Danfoss has developed a state-of-the-art fire fighting technology based on high-pressure water mist which provided optimum fire protection for personnel and surroundings.

### Fire protection of hospitals

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 hospitals against fire, with reliability and cost saving in mind. The system is safe, efficient and environmentally friendly.

### Safe evacuation of patients and staff

- The excellent properties of water mist make this fire fighting technology the best choice for protecting a hospital, where the priority in case of a fire is the safe evacuation of patients
- The system is only activated in areas, where fire is detected. Other areas in the hospital will not be affected

### Functionality and aesthetic design

- The pipes are very small and easy to bend
- Perfect integration with other installation parts such as electrical, mechanical and plumbing equipment present in a hospital
- Aesthetics nozzle design

### Substantial amount saved in damage control

- SEM-SAFE® uses corrosion resistant stainless steel pipes. The water coming from the pipes is clean water. In case of discharge, clean-up is easier, faster and with lower costs
- Reduced water damage

### Simplicity and modularity

- Easy to install in modern hospitals, where the SEM-SAFE® installation will not disrupt any of the desired architectural features
- Perfect solution for old buildings, where valuable historical preservation is important
- The modular and compact SEM-SAFE® system can easily be expanded to cover new sections added to a hospital building

# Benefits of SEM-SAFE® high-pressure water mist system

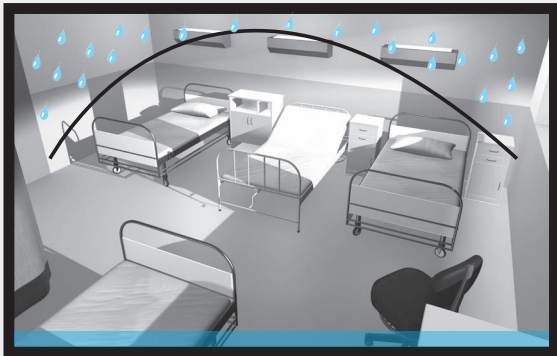
## Tackles fire swiftly and efficiently

- Minimal consumption of water
- Radial heat is blocked efficiently. This helps in protecting against any structural damage by not allowing the flames to expand
- Gentle with the electrical equipment due to small water droplets. Therefore the functionality of the electrical equipment in the hospital is not disrupted and data is saved

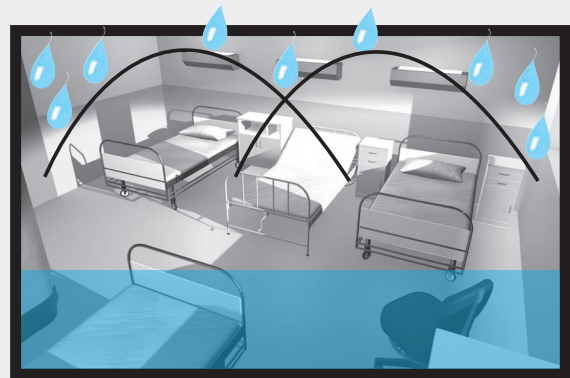
## Cost saving solution

- With fewer nozzles required thanks to optimized spacing and the need for only one pump unit for all applications, installation cost and time as well as required service interventions are considerably reduced
- Our high-pressure pumps are water-lubricated and hence virtually maintenance-free
- With 30% fewer components compared to other competing systems, the SEM-SAFE® system is lighter and more compact. This allows for easier installation, simplified maintenance and valuable space saving
- Cost of water supply is significantly reduced due to less piping, reduced water demand from the water supply, lower taxes and no or significantly smaller water reservoirs
- No need for other technologies. SEM-SAFE® is the perfect solution for fire protection of more sensitive areas such as server rooms and archives

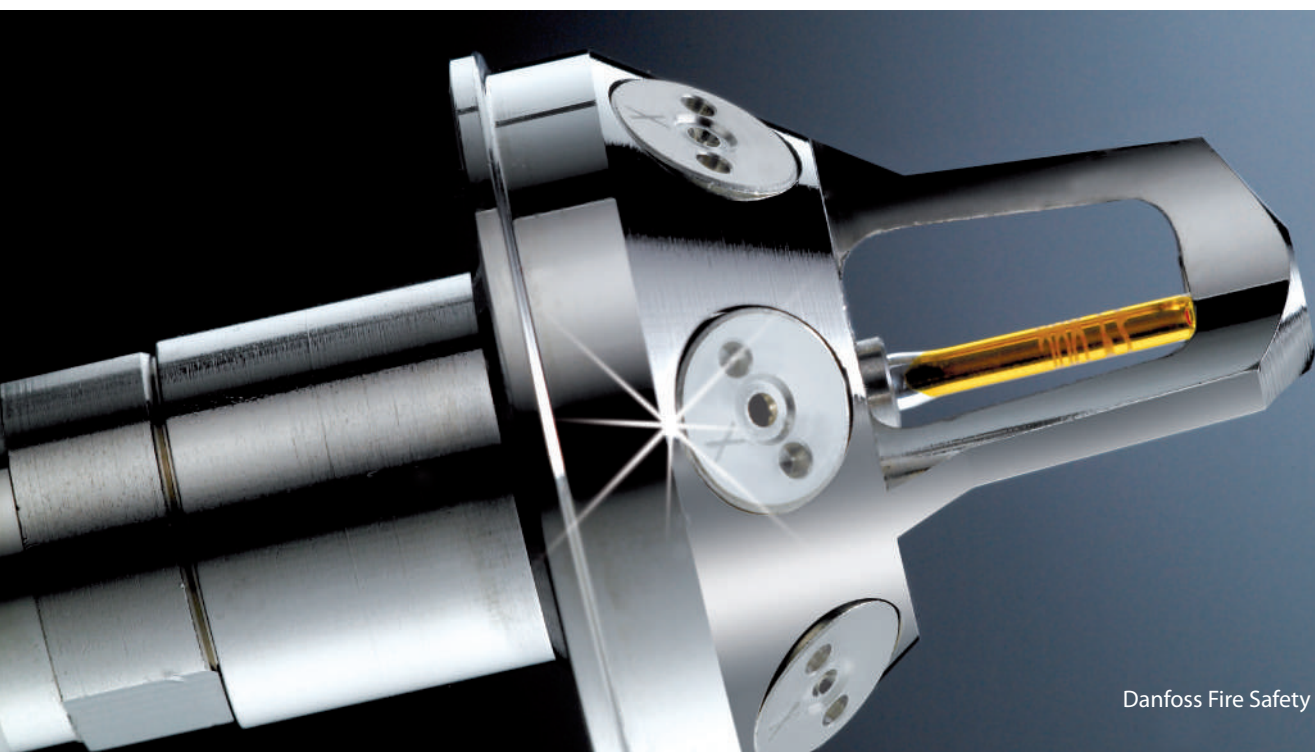
SEM-SAFE®



Traditional sprinkler



SEM-SAFE® uses up to 50% less water when compared to low-pressure water mist systems and up to 80% less water when compared to traditional sprinklers.





# Proven experience across the world

For decades, Danfoss has been installing fire protection systems in both new and retrofit hospitals and nursing homes all over the world. The experience we build with each installation and project allows us to provide our customers with the best and most reliable fire fighting solution in the market.

The excellent fire suppression properties, and the system's advantages that allow for sustainability and reliable fire protection of buildings, people and the environment has made SEM-SAFE® the right choice for numerous hospitals, clinics and nursing care homes, such as:

- DNU Skejby University Hospital in Denmark, super hospital in Denmark protected with SEM-SAFE®
- Isala Clinics in The Netherlands, gold awarded hospital protected with SEM-SAFE®
- PTE 400 Hospital in Hungary, large-scale project
- Pikonlinna Hospital in Finland, senior nursing care centre
- Heidelberg Ethianum in Germany, elite surgery clinic

## In-house design

We have the necessary experience and technological know-how to provide you with the optimal fire fighting system based on fire risk analysis for your hospital.

## Tested and approved

The design of the SEM-SAFE® high-pressure water mist system is based on full scale fire tests. For industrial and commercial applications, approvals are obtained by testing according to specifications from, for example, FM, UL and ISO, as well as from the European guideline CEN/TS 14972 and approvals from DBI and VdS.



## Internal HSE&Q system in accordance with

- DS/EN ISO 9001:2015
- DS/EN ISO 14001:2015
- DS/OHSAS 18001:2008



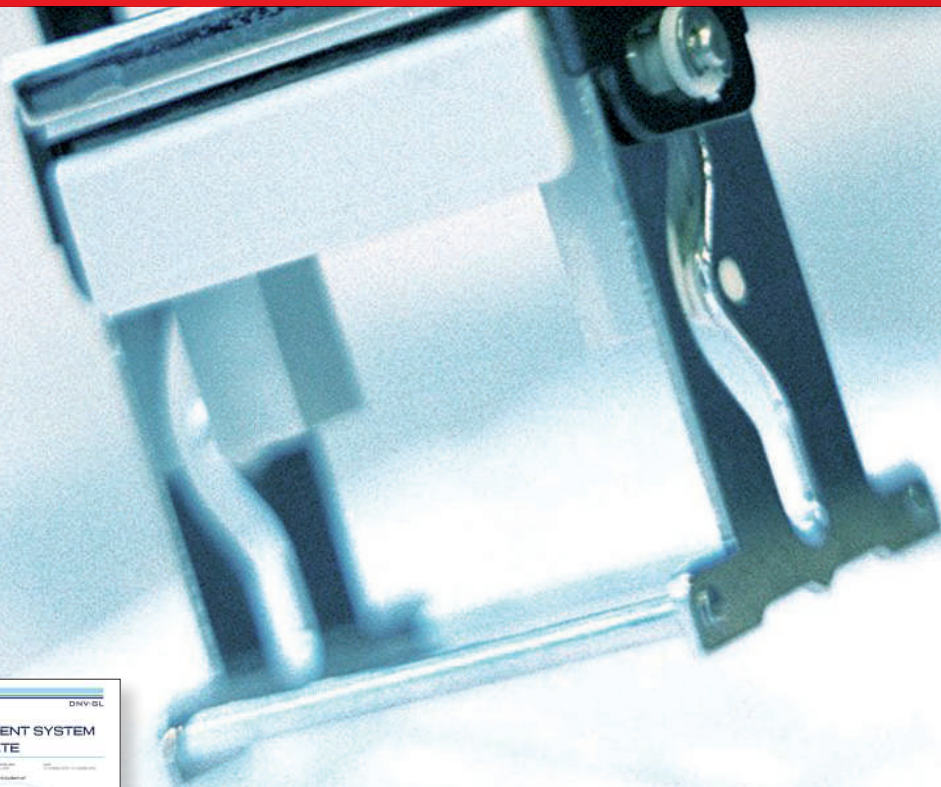
DS/EN ISO 9001:2015



DS/EN ISO 14001:2015



DS/OHSAS 18001:2008



# The intelligent use of water

## How does it work

For a fire to survive, it relies on the presence of the three elements of the 'fire triangle': oxygen, heat and combustible material. The removal of any one of these elements will extinguish a fire.

The **SEM-SAFE®** high-pressure water mist system goes further. It attacks two elements of the fire triangle: oxygen and heat. The uniqueness of high-pressure water mist is that it combines the suppression effect of gas and sprinkler systems. As well as removing the oxygen like a gas system it simultaneously cools the fire like a traditional sprinkler. The cooling effect additionally lowers the risk of re-ignition.



## 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 minimum 1,700 times. The dense vapour created displaces the flames and quickly extinguishes the fire.

## Decades of pioneering and engineering

As one of the acknowledged pioneers of high-pressure water mist technology, Danfoss operates in-house research, development and manufacturing facilities of all critical components: nozzles, pumps and valves.

This puts us in a unique position to maintain our technological leadership in the future. All our products are made of first-class materials and in a comprehensively tested design.



Nozzle

## Danfoss high-pressure water mist nozzles

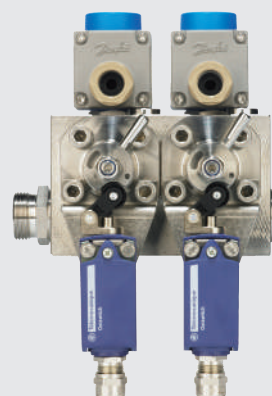
- Highest market spacing (5.5m)
- 100% capacity and spray pattern tested
- Aesthetic nozzle design



Pump

## Danfoss high-pressure pumps

- Lubricated by water, making the pump maintenance free
- World's lightest and most compact
- 95% energy efficient and very low pulsation to reduce noise



Valve

## Danfoss stainless steel valves

- Compact easy installation and operation
- Dirt resistant
- High-corrosion proof

# Total Solution Provider of Certified Fixed Fire Fighting Systems

**Danfoss Fire Safety A/S, an integral member of the Danfoss Group, is a global leader in the sale, development, production and service/commissioning of certified fixed fire fighting systems under the brand name SEM-SAFE®.**

We offer you unparalleled competitive edge through quality and reliable products, uncompromising performance and cost-effective fire fighting systems.

## Innovation is our approach

We have been engineering and pioneering SEM-SAFE® fire fighting systems for decades. This gives us the experience and technological knowledge to provide a complete range of SEM-SAFE® fire fighting systems based on two key technologies: high-pressure water mist and low-pressure CO<sub>2</sub>.

## Engineering a safer tomorrow

From a modern high-rise building to a state-of-the-art university, from a wood church to a super hospital and busy international airport, SEM-SAFE® high-pressure water mist is the optimum fire fighting solution for any building type. The breakthrough that high-pressure water mist represents is to use the same method as traditional sprinklers, but to add the effect of converting the water into steam.

This means that the cooling effect is up to seven times higher than for traditional sprinklers. Combined with the oxygen displacement effect, this can reduce water consumption significantly compared to traditional sprinkler.

Besides a proven track record in buildings, we install SEM-SAFE® fire fighting systems in a wide range of vessels. Safety on board ships is critical, and this places great demands on fire fighting systems. No matter if the journey means transporting goods across oceans on a mega container ship, or a vacation trip to a beautiful island on a luxurious cruise, SEM-SAFE® fire fighting is the perfect choice to protect the vessel and passengers against fire, with reliability and cost-effectiveness in mind. For the demanding marine segment we offer

two fire fighting technologies: SEM-SAFE® high-pressure water mist and SEM-SAFE® low-pressure CO<sub>2</sub>.

## Reaching even higher

Simplicity in design, obtained by using the most advanced technologies, results in the highest operation reliability. All our products are made of first-class materials and in a comprehensively tested design.

## Danfoss is close by

Danfoss and its associates, regional offices and agents constitute a worldwide network that provides comprehensive technical support, installation, commissioning and repair services.

This network ensures that our reputation for fire fighting excellence is maintained and enhanced.

**>50  
years**

of pioneering  
research & testing  
in fire fighting

**SEM-SAFE®**

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