

ENGINEERING
TOMORROW

Danfoss

Data Centres

Optimum fire safety in data centres with **SEM-SAFE®** high-pressure water mist system

Danfoss Fire Safety A/S

Reduced cost of ownership with **SEM-SAFE®** for fire fighting

www.semsafe.danfoss.com

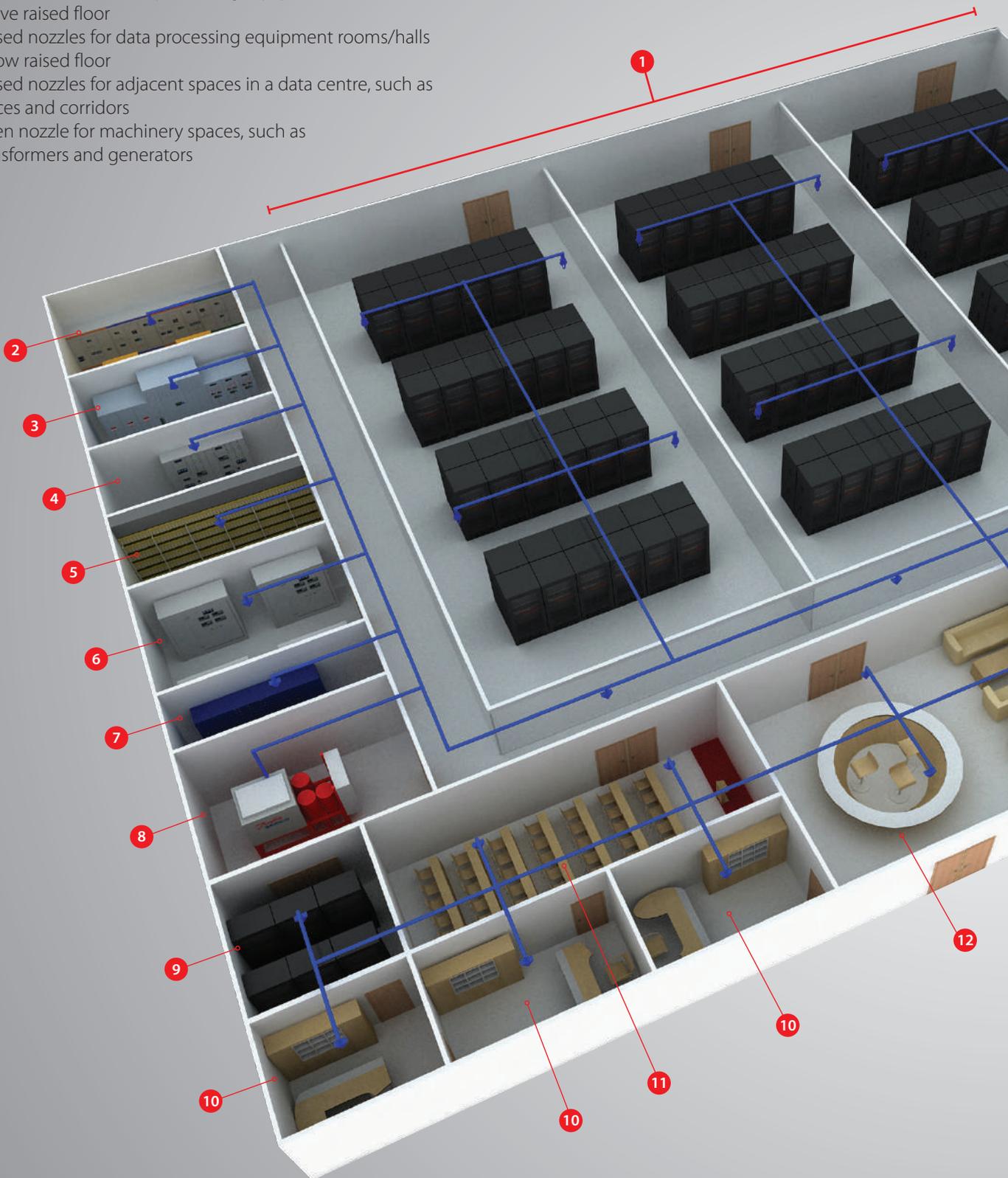
SEM-SAFE®

SEM-SAFE® high-pressure water mist system

One FM tested system to protect all areas in the data centre

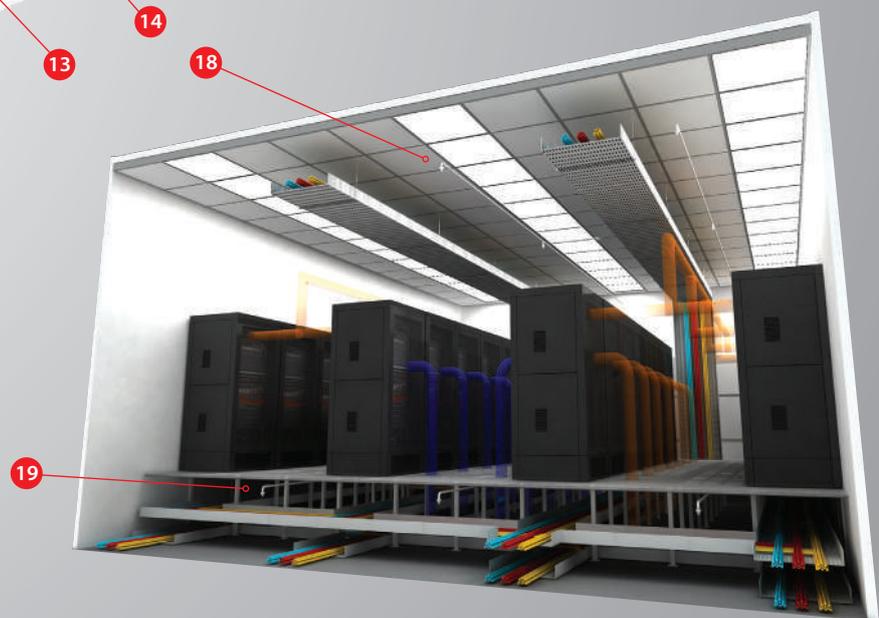
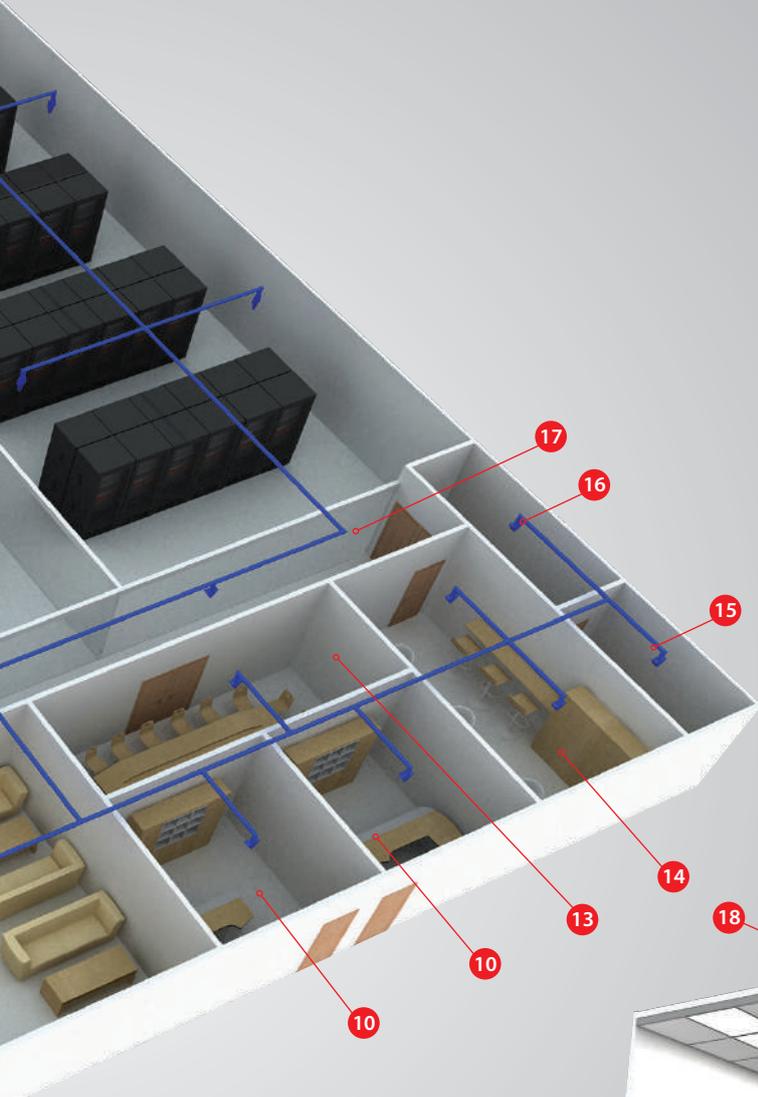
Danfoss has a complete portfolio of nozzles tested according to FM to protect any area in the data centre

- Closed nozzles for data processing equipment rooms/halls above raised floor
- Closed nozzles for data processing equipment rooms/halls below raised floor
- Closed nozzles for adjacent spaces in a data centre, such as offices and corridors
- Open nozzle for machinery spaces, such as transformers and generators



Danfoss provides fire fighting solutions for areas such as

- 1 Data hall
- 2 Transformer room
- 3 Generator space
- 4 Switchgear room
- 5 Battery room
- 6 UPS room
- 7 Technical room
- 8 Water Mist pump room
- 9 Data centre room
- 10 Offices
- 11 Auditorium
- 12 Reception area
- 13 Conference room
- 14 Canteen
- 15 Kitchen
- 16 Storage room
- 17 Corridor
- 18 Above floor application
- 19 Below floor application



Cross section – a zoom on a part of the data hall

SEM-SAFE® for data centres

Need a fire fighting system that

- Allows you to keep your data centre running while suppressing a fire?
- Provides instant cooling in the fire zone?
- Allows you to keep ventilation running?
- Has no need for shutting fire dampers?
- Permits you to keep doors to protected space open?
- Doesn't harm people?

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

Date centres are the heart of the IT infrastructure and are essential for day-to-day business operations. It is crucial that data centres are fully and properly equipped to handle a fire situation.

With SEM-SAFE® high-pressure water mist from Danfoss, the fight against fire is more efficient, with the ultimate goal of saving lives, limiting equipment damage and keeping the data centre running.

Fire protection of data centres

Normally a double knock pre-action system is used for protecting data centres against fires. This provides you with added safety for your data centre in the unlikely event of accidental release. The piping system is dry and nozzles are closed. When a fire is detected and confirmed by the fire alarm system, the section valve of the SEM-SAFE® system opens and water flows into the actual section pipes. Only nozzles with broken bulbs are activated. This means that only the areas affected by fire will be actively sprayed.



Minimal downtime

Due to the minimal water damage to surrounding equipment and the environment, minimal downtime is achieved. Furthermore you can keep your data centre running while extinguishing the fire.

Safety

The system can be discharged immediately upon detection of a fire – without any threat to human safety.

Scalable

The modular design of the SEM-SAFE® system makes it easy to extend to cover more sections as your data centre gradually expands.

Simplicity

No need to shut off ventilation before releasing the water mist system.

Reliability

Danfoss continues to invest in new approvals as well as in R&D to ensure the most efficient and reliable system performance.

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

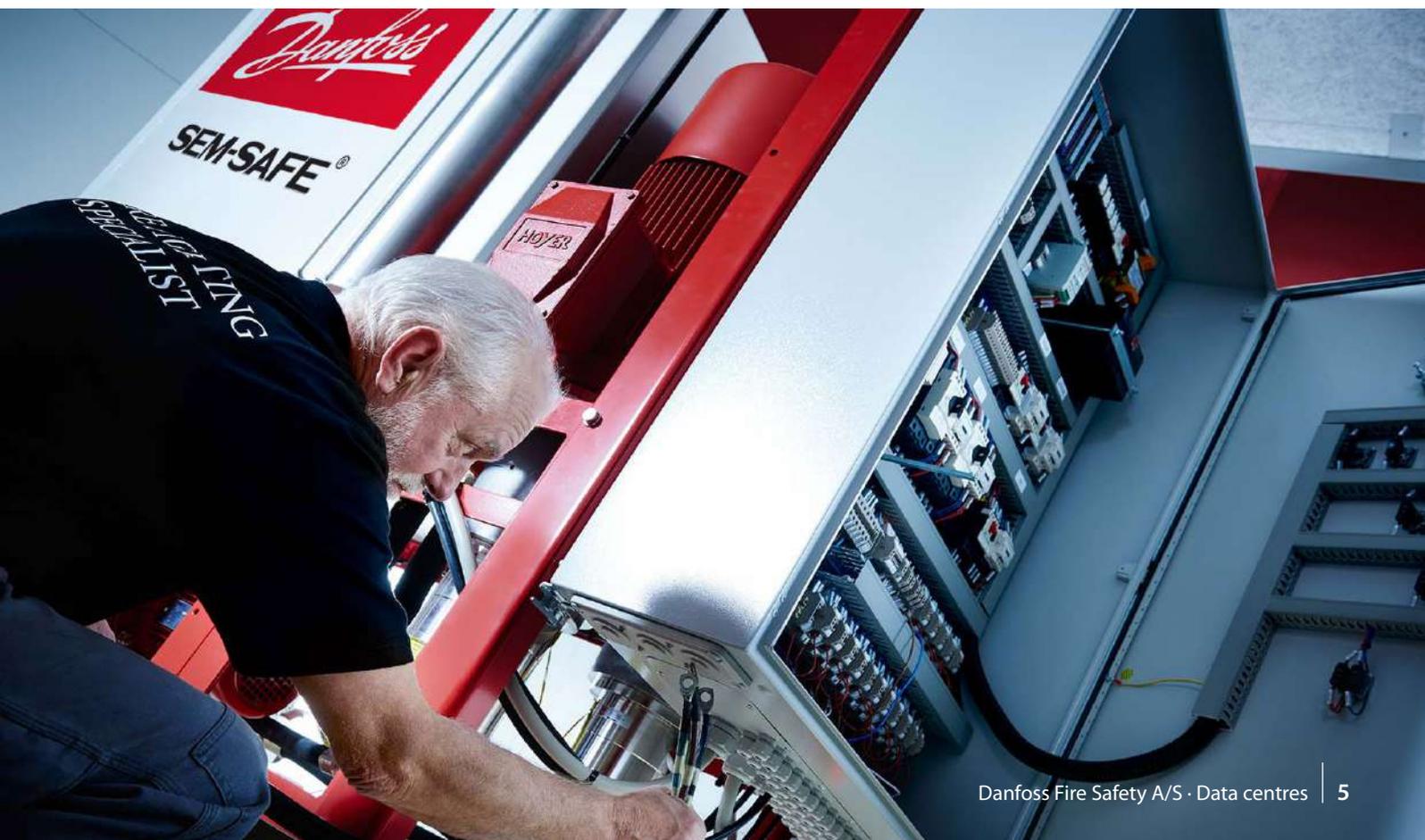
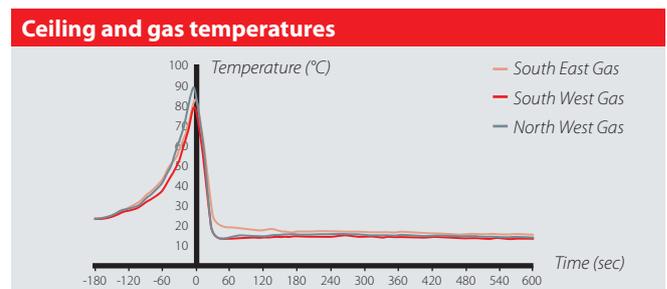
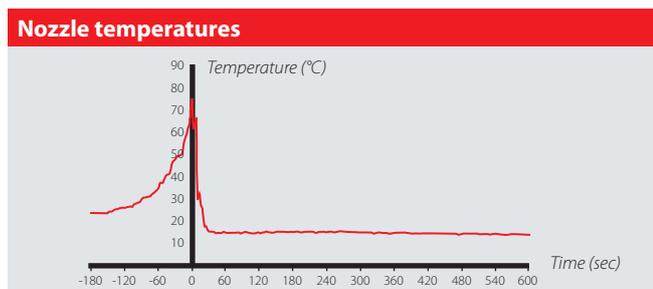
Tackles fire swiftly and efficiently

- Can be instantly activated without the need to seal off and/or evacuate the area
- Immediately cools the fire, preventing fire growth
- Water mist is documented to be harmless to electrical installations (IP23), which enables you to keep your data centre running even while fighting a fire
- With 30% fewer components compared to most competing systems, the SEM-SAFE® system is lighter and more compact. This allows for easier installation, simplified maintenance and valuable space saving
- No over-pressurisation of the fire-affected area when the SEM-SAFE® system is activated
- Only one SEM-SAFE® water mist unit needed to cover all areas of your entire data centre

Cost effective 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
- The SEM-SAFE® system is ideal for both new building projects and for installation in existing facilities
- Our high-pressure pumps are water-lubricated and hence virtually maintenance-free
- The small water droplets evaporate immediately during discharge. The result is minimal water damage to surrounding equipment and the environment, reducing operational downtime to a minimum

Superior cooling properties of the SEM-SAFE® high-pressure water mist system



Proven **experience**

Extensive reference list

For decades, Danfoss has worked successfully with high-pressure water mist for commercial and industrial applications. Mission-critical fire protection for data centres has been implemented for numerous companies all over the world.

Selected references

- Equinix, Netherlands
- Equinix (former Digital Realty Trust), France
- Digital Realty Trust, UK
- Equinix (former Telecty) Condorcet, France
- Equinix (former Telecty), Germany
- Yandex, Finland

For more references, please contact Marketing via semsafe@danfoss.com.

In-house design

We have the experience and technological knowledge to provide you with the optimal fire fighting solution based on a fire risk analysis made for your data centre.

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, the European guideline CEN/TS 14972 and approvals from VdS, FM and DIFT.

For data centers in particular, Danfoss have received the FM Approvals Class 5560, Approval Identification Number: 3058726. Additionally, FM HC-1 approval can be used in corridors and offices approved for 5 meters ceiling height for temperature of 57°C and 68°C. The SEM-SAFE® high-pressure water mist system from Danfoss has successfully passed FM fire test for machinery spaces.

Results from test demonstrate the excellent performance of the SEM-SAFE® high-pressure water mist system in comparison with competitors:

- up to 20% less water per nozzle
- significantly less water demand in design area
- only 2 nozzles activated during tests for above floor application

Internal HSEQ system in accordance with

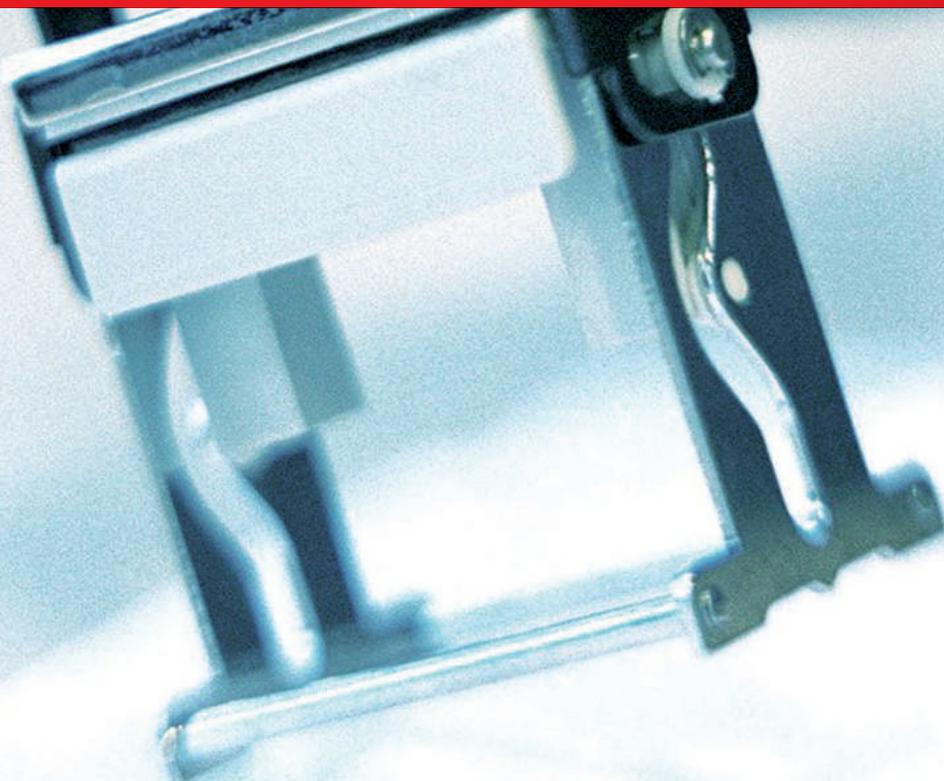
- DS/EN ISO 9001:2015
- DS/EN ISO 14001:2015
- DS/OHSAS 18001:2008



S412003
S414003



3058726



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 nozzle

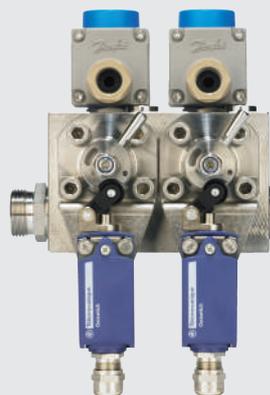
- Highest market spacing (5.5m)
- 100% capacity and spray pattern tested
- Aesthetic nozzle design



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 CO₂.

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 CO₂.

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®

Danfoss Fire Safety A/S · Middelfartvej 9 · DK-5000 Odense · Denmark
Tel. +45 7488 7800 · E-mail firesafety@danfoss.com · www.semsafe.danfoss.com

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