

ENGINEERING
TOMORROW

Danfoss

High-rise buildings

The intelligent solution to efficient fire fighting with **SEM-SAFE®** high-pressure water mist system

Danfoss Fire Safety A/S



Significant savings

in total building
investment when
using SEM-SAFE®
high-pressure water
mist for fire fighting

www.semsafe.danfoss.com

SEM-SAFE®

One SEM-SAFE® high-pressure water mist system to cover all fire fighting applications in a high-rise building

- 1 Restaurant / Sky bar / Glass protection (OH1)
- 2 Kitchen / Canteen (OH1)
- 3 Hotel / Hospital (OH1)
- 4 Residential (OH1)
- 5 Office / Conference room (OH1)
- 6 Stairs (OH1)
- 7 Data centre (OH1)
- 8 Library (OH1)
- 9 Laundry room (OH3)
- 10 Storage room (OH3)
- 11 Reception / Lobby (OH1)
- 12 Auditoriums (OH4)
- 13 Pump room / Technical room (OH1)
- 14 Underground car park (OH2)

Up to

50%
faster

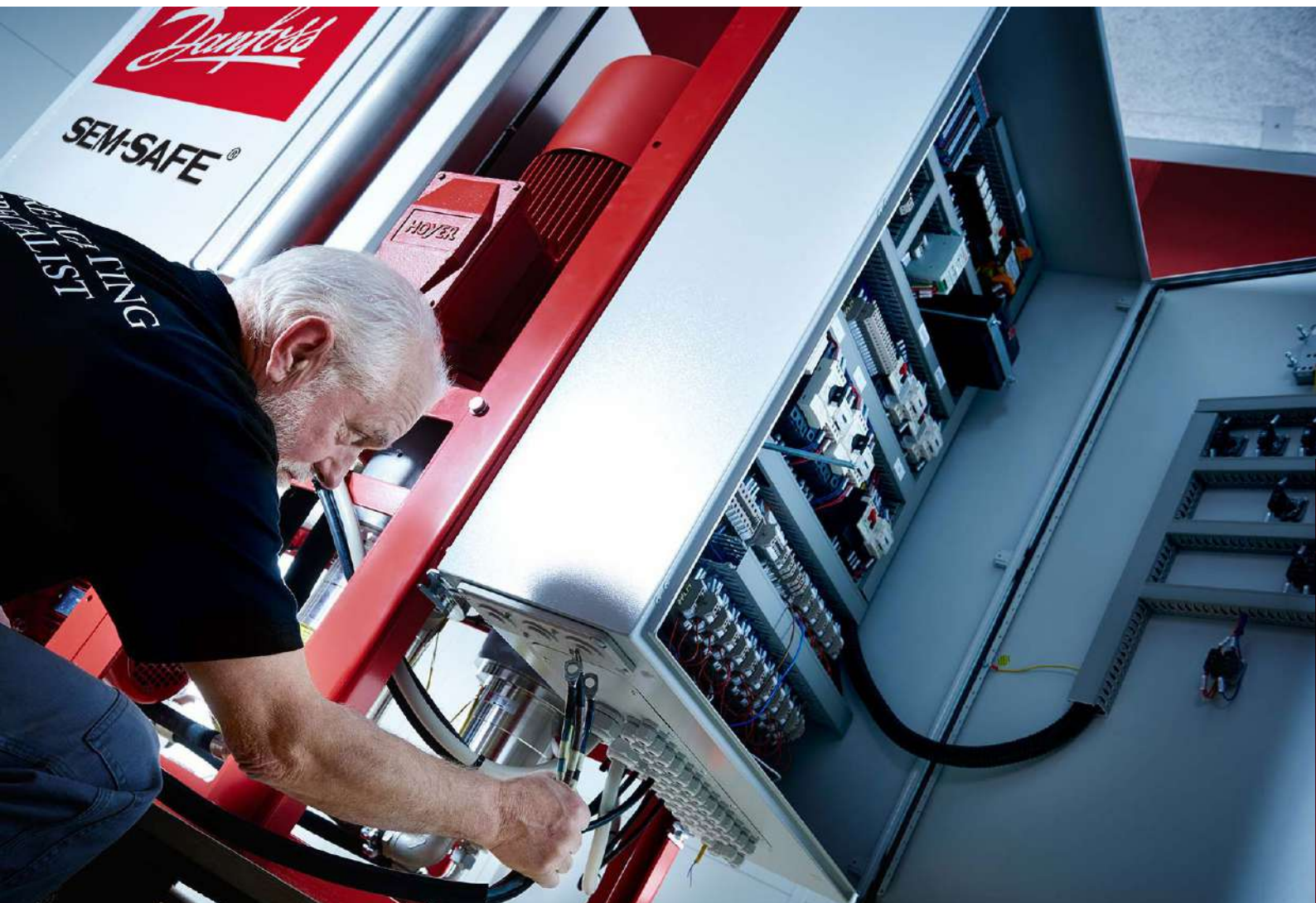
installation of
SEM-SAFE® compared
to traditional sprinkler



A safer tomorrow **starts with SEM-SAFE®**

It is crucial that high-rise buildings are fully and properly equipped to handle a fire situation. In high-rise buildings, the access for the fire fighting crew can be very difficult, especially on the last levels of the buildings. Also evacuating people presents challenges and limitations.

Having a fixed high-pressure water mist system installed in high-rise buildings can make the fight against fire more efficient, with the ultimate goal of saving lives and limiting property damage.



Imagine a fire fighting system that can put out the fire in seconds, with minimal consumption of water, giving the best possible protection.

With **SEM-SAFE®** – the unique high-pressure water mist system from Danfoss – that is what you get. By using pure water, the high-pressure water mist technology used by the **SEM-SAFE®** system is harmless to humans and environmentally friendly. Its reliability and efficiency has been successfully proven in rigorous fire tests.

Safe for people

The **SEM-SAFE**® high-pressure water mist system for fire fighting helps with controlling of heat, smoke and toxic gas. This can mean a great advantage when it comes to the safe evacuation of the occupants. Also, it can help facilitate access for the fire crew. The system prevents fire from spreading, while lowering temperature.



Minimised down-time

Using high-pressure water mist keeps secondary damage to a minimum due to the low water consumption. Water coming from the pipes is clean water as **SEM-SAFE**® uses stainless steel pipes that are corrosion resistant. In case of system release, the clean-up is easier, faster and incurs lower costs. In addition, the system is only activated in areas where fire is detected. Other areas in the building will not be affected.

Aesthetic design

The Scandinavian design philosophy used for the **SEM-SAFE**® high-pressure water mist nozzle fits well with any interior environment. The nozzle has a beautiful and discrete shape, which will make it blend with the style of the room. In addition, the **SEM-SAFE**® high-pressure water mist nozzle can be manufactured in any color, contributing to a more aesthetically pleasing surrounding for the end user.



Fast installation

The **SEM-SAFE**® high-pressure water mist system is easy to install in modern buildings, but also easy to retrofit in existing buildings. The **SEM-SAFE**® high-pressure water mist pipes have a very small diameter, which makes them easy to bend. High-pressure resistant press fittings are used. This makes the installation of the **SEM-SAFE**® system faster than traditional sprinkler system, which requires time consuming pipe thread cutting.

Best choice for window cooling

The excellent cooling features of the **SEM-SAFE**® high-pressure water mist system make it the perfect choice for protecting glass facades. **SEM-SAFE**® has passed **EN-1364-1 fire resistance test for non-loadbearing elements**. Instead of spraying water on the glass, the **SEM-SAFE**® system atomises the water in front of the glass. This three-dimensional cooling removes the risk of thermal stress cracks associated with traditional water-based sprinkler systems, and allows the use of a cheaper class of glass. This means significant savings for the building investors. In addition, the fire test has been passed by using a standard **CEN SEM-SAFE**® high-pressure water mist nozzle. Traditional sprinkler systems require a dedicated sprinkler for fire protection of glass facade, which can make the sprinkler solution for glass facade more expensive.

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 through testing in accordance with specifications from, for example, FM, UL, ISO and NFPA standards, as well as from the European guideline CEN/TS 14972 and approvals from DBI and VdS.



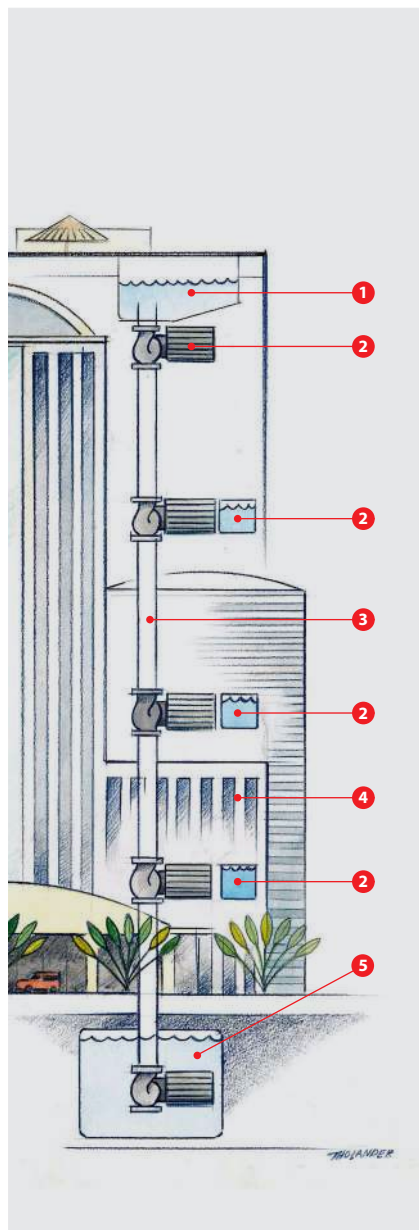
Internal HSE&Q system in accordance with:

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

Money saving solution for high-rise buildings



High-pressure water mist



Traditional sprinkler

- 1 No need to place a large reservoir on top of the building; you can instead use the top floor for penthouse flats.
- 2 No need for sprinkler units on more floors of the building to prevent pressure loss; the space saved can be used for other money generating purposes.
- 3 No need for large diameter pipes; sprinkler systems requires 3 times larger diameter riser pipes than high-pressure water mist systems; money and time in installation is saved with SEM-SAFE®.
- 4 No need for expensive fire resistant glass and expensive dedicated sprinkler for fire protection of glass facade; money can be used for interior decoration, for example.
- 5 No need for large water supply reservoir; the space saved can be used for an integral garage, for example.

OH1 areas: Suspended ceilings and sub floors

	SEM-SAFE® high-pressure water mist	Traditional sprinkler
Coverage area in m ²	25.00	12.00
Flux density (l/min/m ²)	0.50	5.00

OH1 areas: Offices

	SEM-SAFE® high-pressure water mist	Traditional sprinkler
Coverage area in m ²	30.25	12.00
Flux density (l/min/m ²)	0.90	5.00

OH2 areas: Parking garages

	SEM-SAFE® high-pressure water mist	Traditional sprinkler
Coverage area in m ²	18.06	12.00
Flux density (l/min/m ²)	2.69	5.00

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

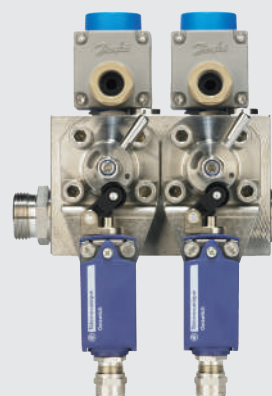
- Highest market spacing (5.5m)
- 100% capacity and spray pattern tested
- Aesthetic nozzle design



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 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®

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