

ENGINEERING
TOMORROW

Danfoss

Underground Car Parks

Optimum fire safety in underground car parks with **SEM-SAFE**[®] high-pressure water mist system

Danfoss Fire Safety A/S

High cooling effect with **SEM-SAFE**[®] for fire fighting

www.semsafe.danfoss.com

SEM-SAFE[®]

SEM-SAFE® high-pressure water mist system

Only 1 system to cover your entire building!

With SEM-SAFE® high-pressure water mist you can:

Protects an entire building

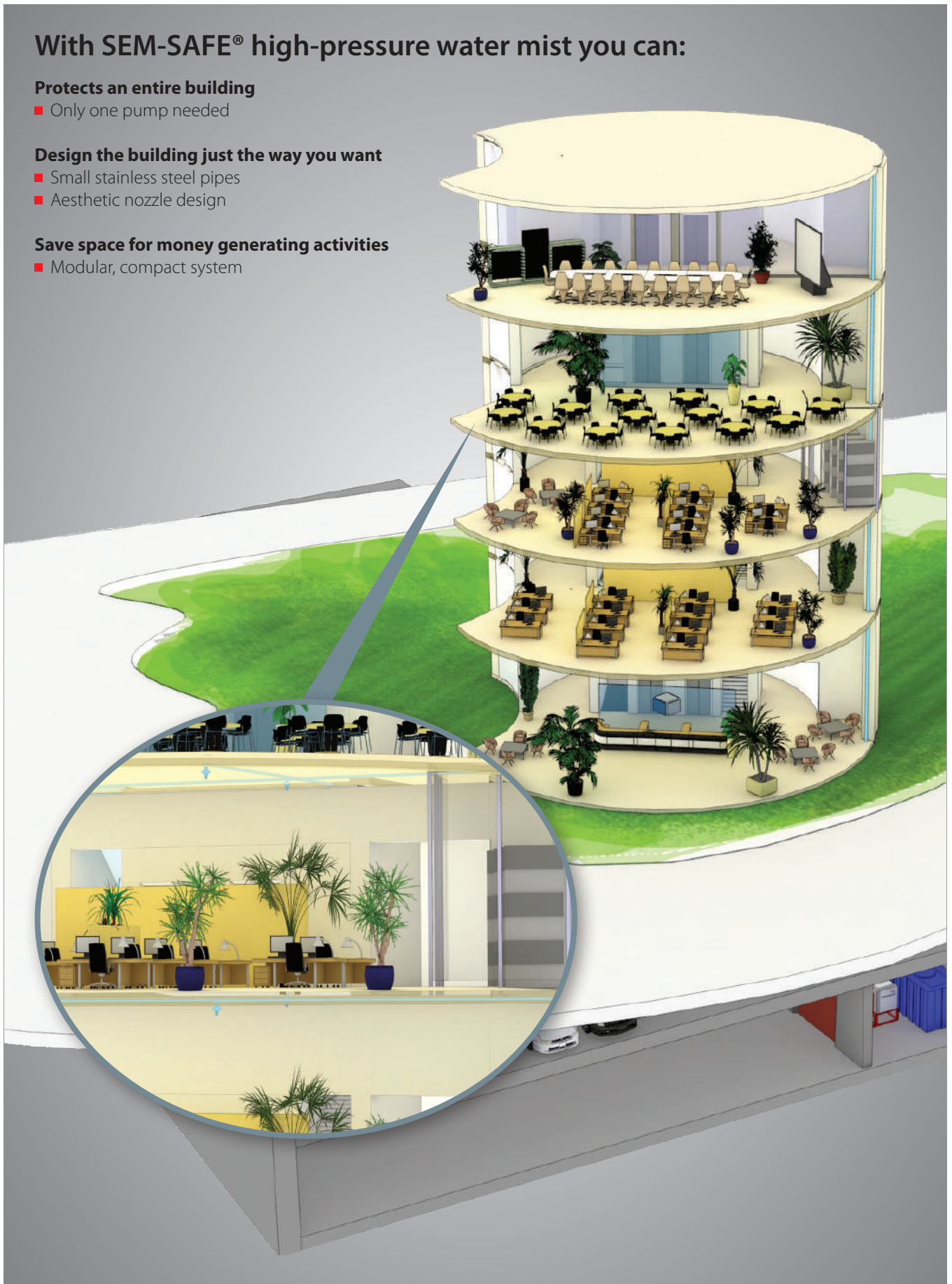
- Only one pump needed

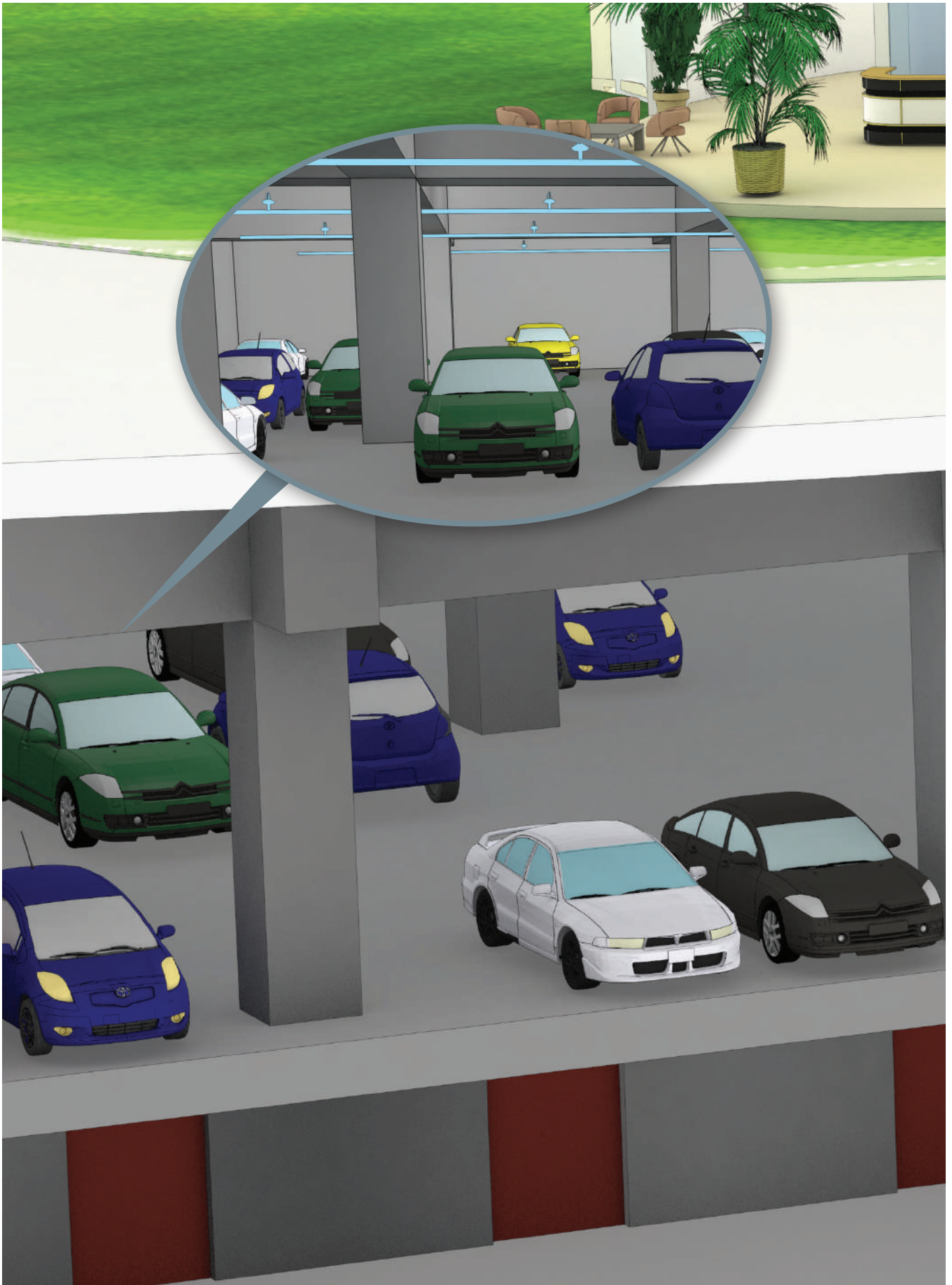
Design the building just the way you want

- Small stainless steel pipes
- Aesthetic nozzle design

Save space for money generating activities

- Modular, compact system





SEM-SAFE® for car parks

Need a fire fighting system that:

- Provides efficient fire protection?
- Can be easily integrated in the architecture of the car park area?
- Is durable in the relatively aggressive environment of a car park?
- Occupies very little space?
- Is easy to install and maintain, due to fewer components needed?

Then SEM-SAFE® is your solution!

Budapest Air Traffic Control Centre - picture from test in underground car park, fully protected with SEM-SAFE® high-pressure water mist system



Underground car parks present a number of fire risks, mainly due to combustible fuels, materials of the vehicles, building structure and area access. A fire in such a place can turn into a disastrous scenario. Thus, it is important for an underground car park to be installed with a reliable fixed fire fighting system. Danfoss has developed a fire fighting solution based on high-pressure water mist dedicated to underground car park areas.

Fire protection of car parks

With small pipe dimensions, large coverage, minimal water consumption, a compact skit unit and simple design, SEM-SAFE® high-pressure water mist is the perfect choice to protect underground car parks, with reliability and safety in mind. The system is safe, efficient and environmentally friendly.



Effective fire fighting with SEM-SAFE®

- Suppresses fire in fuel spills.
- Higher cooling capacity of the small water droplets.
- Fast nozzle activation.
- Good control of the thermal environment.

Unique patent nozzle design

- The only upright garage nozzle in the market.
- Tested and accepted by a highly recognized authority, VdS.
- No risk of accidental hit by a car.
- No need to remove the nozzles in order to drain the water, when pressure testing.
- Tested below ceiling 50-100 mm. The nozzles do not need to be flush with the ceiling, therefore the installation is fast and with less costs.
- Up to 50% higher coverage area in comparison with sprinklers. This means fewer nozzles to be installed.

Flexibility in installation

- Flexibility of pipes positioning under the concrete ceiling.
- Easy to integrate with other services required in the cars par (signs, vents, security systems, etc.).

Minimal water consumption

- Up to 50% less water used in comparison with sprinkler.
- By using SEM-SAFE®, the cost of water supply is significantly reduced.

Space saving

- The compact and modular SEM-SAFE® pump unit has a small footprint, occupying less than half the space needed for the parking area for one car.

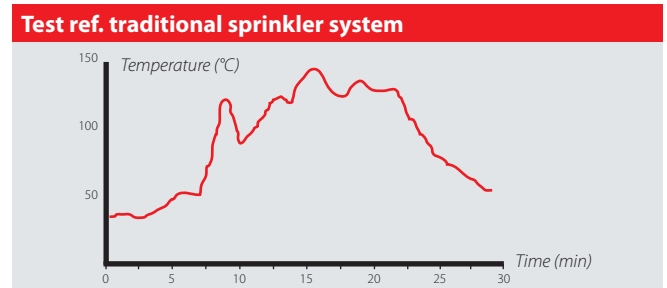
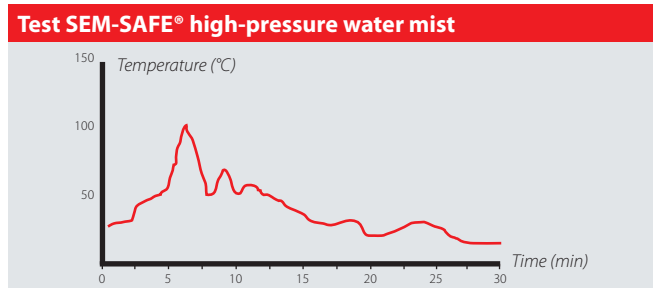
Benefits of SEM-SAFE® high-pressure water mist system

Tackles fires swiftly and efficiently

- Immediately cooling of smoke gasses, preventing flashover
- Reduced extinguishing time due to rapid and water discharge
- Minimal consumption of water
- Immediately cools the fire, preventing fire growth
- With up to 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

Cost saving solution

- With fewer nozzles required thanks to optimized spacing and the need for only one pump unit for all protected 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 stainless steel pipes are extremely corrosion-proof and dirt resistant to prevent malfunctions, e.g. clogging that usually affects other types of pipes
- The high-pressure pumps are water-lubricated and hence virtually maintenance-free



Average ceiling gas temperature



Safe & reliable solution

Proven experience

The SEM-SAFE® high-pressure water mist system has proven to be the optimal fire protection solution for protecting the entire basement and car park of ANS-III, which is an addition to the Budapest Air Traffic Control Centre. One SEM-SAFE® system protects the basement, including OH2 area, such as garage, as well as OH1 and OH3 areas.

In-house design

We have the experience and technological knowledge to provide you with the optimal fire fighting solution based on fire risk analysis made for your car park. Danfoss can help with design of the right fire fighting system for the car park as well as show the performance of our SEM-SAFE® high-pressure water mist system via our live fire tests.

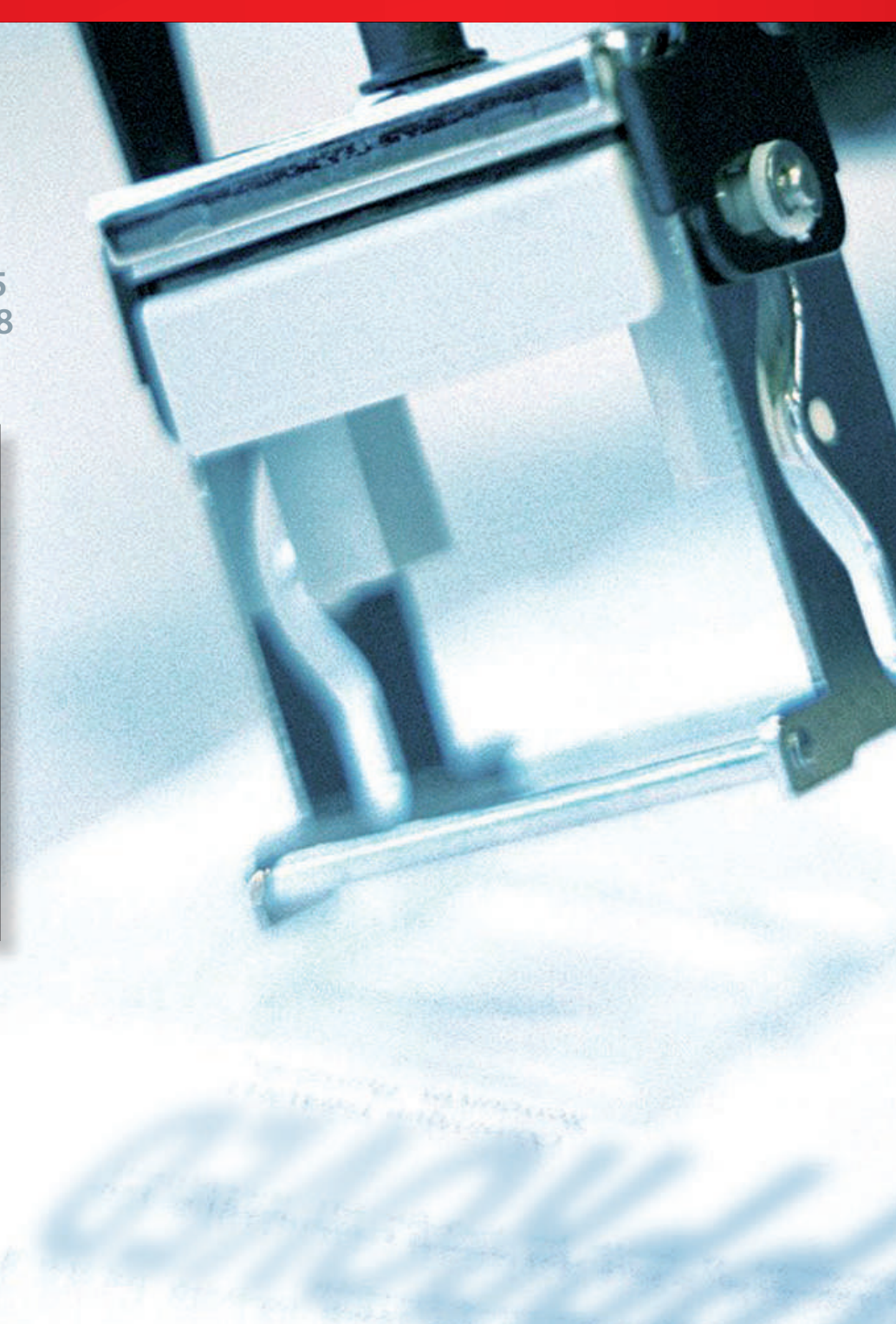
Tested and approved

We provide a unique and complete fire protection system for car parks and basement garages (OH2), fully approved by VdS, an internationally recognized authority. As a high quality and reliable system, SEM-SAFE® has successfully passed difficult fire and component test criteria.



Internal HSEQ system in accordance with

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



Zertifikat Certificate

Anerkennung von Bauteilen und Systemen

Approval of Components and Systems

Name of the holder:
 Danfoss Service A/S
 Fire Protection
 Mittelstraße 9
 DK-5000 Odense C

Anzahl der Bauteile No. of parts	gültig von / valid from	gültig bis / valid until	gültig bis / valid until
S 41 2004	7	01.01.2015	31.12.2015

Approved for fire protection:
 Hochdruck-Feinsprüh-Feuerlöschesystem /
 High-pressure fine water spray fire extinguishing
 system
 "SEM-SAFE"

Zweck /
 zum Schutz von OH2-Risiken gemäß Anlage 3
 for the protection of OH2-risks according to enclosure 3

Approbationsnummer:
 Basis der Approbation:
 VdS 2344:2005-12
 VdS 2542:1997-06 Entwurf / draft

Köln, den 08.08.2015

Rüdiger Mann
Leiter der Approbation

Wilko Vahrhorst
Leiter der Zertifizierung

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

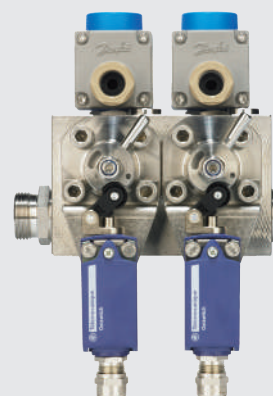
- High spacing
- 100% capacity and spray pattern tested
- Aesthetic nozzle design



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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