



# Fire Fighting Solutions

For Marine Applications

# Danfoss Semco A/S

Total Solution Provider of Certified Fixed Fire Fighting Systems



*Danfoss Semco, Odense, Denmark*



# Fighting fire – as easy as blowing out a match



Imagine a total fire fighting solution provider that offers you the technology most suitable for your application. Technology that puts out the fire in seconds, with minimal damage, while giving you the best possible protection. At Danfoss Semco, that is what you get.

## Reaching even higher

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

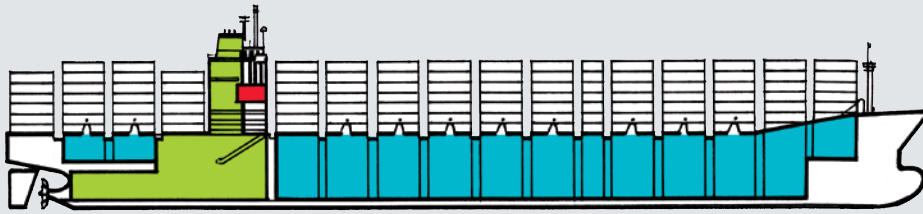
## The fast growing technology

Water mist technology is now one of the most progressive fire fighting technologies within the marine segment. Danfoss Semco was one of the pioneers in this market and has proven expertise with installations worldwide.

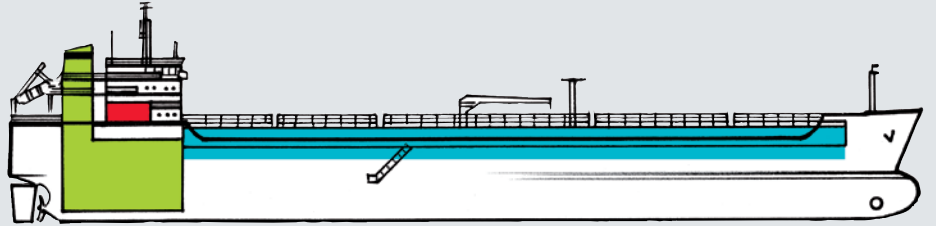
## Danfoss Semco is close by

Danfoss Semco 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.

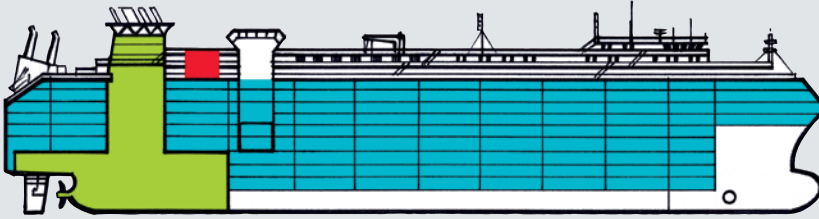




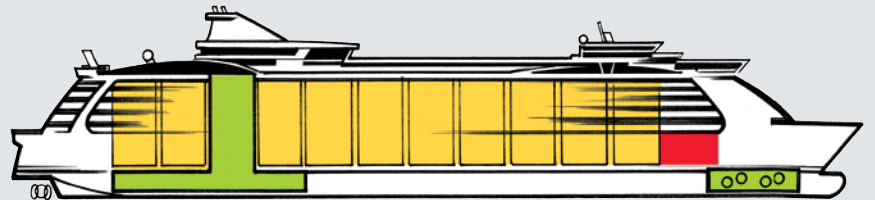
CONTAINER & BULK CARRIERS



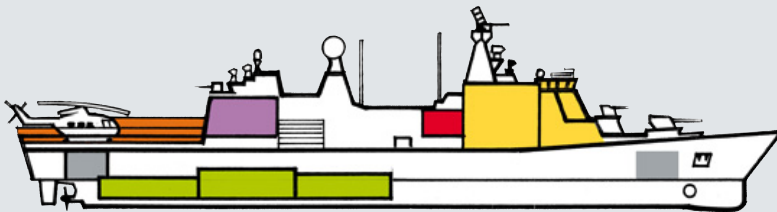
TANKERS



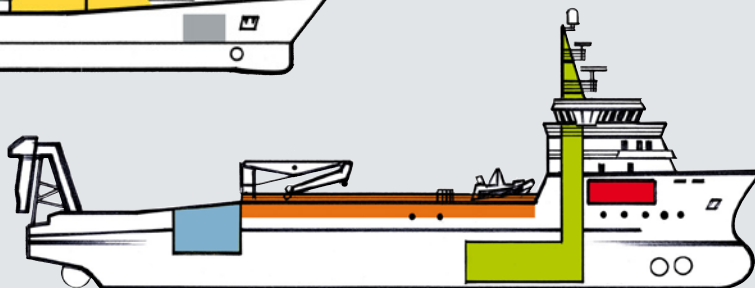
RO-RO & PCTC



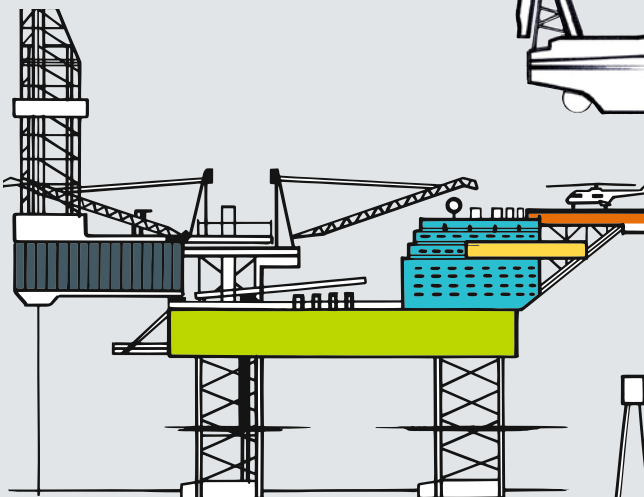
PASSENGER & CRUISE



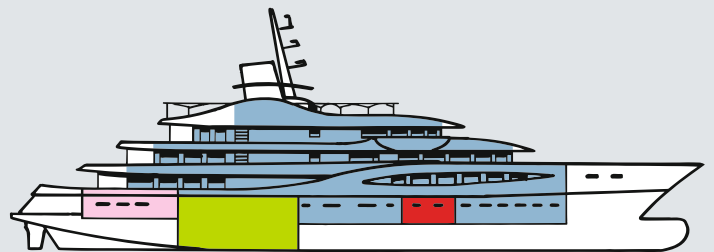
NAVY & PATROL



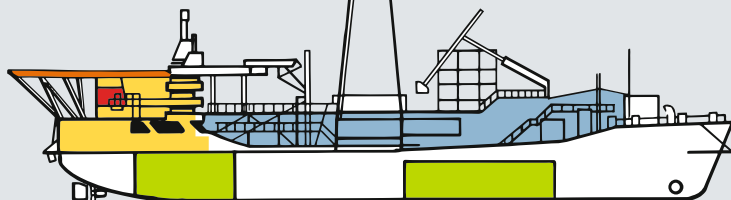
SUPPLY



OFFSHORE



YACHTS



SPECIALS

<b>CONTAINER &amp; BULK CARRIERS</b>	<ul style="list-style-type: none"><li>■ <b>ENGINE ROOM:</b> HP + LP CO<sub>2</sub>, local application water mist system</li><li>■ <b>CARGO HOLDS:</b> HP + LP CO<sub>2</sub>, smoke detection system</li><li>■ <b>GALLEY:</b> HP CO<sub>2</sub> duct, deep fat fryer K5 system</li></ul>
<b>TANKERS</b>	<ul style="list-style-type: none"><li>■ <b>ENGINE ROOM:</b> HP + LP CO<sub>2</sub>, local application water mist system</li><li>■ <b>CARGO DECKS:</b> Foam, dry chemical system</li><li>■ <b>GALLEY:</b> HP CO<sub>2</sub> duct, deep fat fryer K5 system</li></ul>
<b>RO-RO &amp; PCTC</b>	<ul style="list-style-type: none"><li>■ <b>ENGINE ROOM:</b> LP CO<sub>2</sub>, local application water mist system</li><li>■ <b>CARGO DECKS:</b> LP CO<sub>2</sub>, drencher system</li><li>■ <b>GALLEY:</b> HP CO<sub>2</sub> duct, deep fat fryer K5 system</li></ul>
<b>PASSENGER &amp; CRUISE</b>	<ul style="list-style-type: none"><li>■ <b>ENGINE ROOM:</b> HP water mist system, HP CO<sub>2</sub>, local application water mist system</li><li>■ <b>ACCOMMODATION:</b> HP water mist system</li><li>■ <b>ACCOMMODATION AND CAR DECKS:</b> Drencher system</li><li>■ <b>GALLEY:</b> HP CO<sub>2</sub> duct, deep fat fryer K5 system</li></ul>
<b>NAVY &amp; PATROL</b>	<ul style="list-style-type: none"><li>■ <b>ENGINE ROOM:</b> Argonite, HP CO<sub>2</sub>, HP water mist system</li><li>■ <b>ACCOMMODATION:</b> HP water mist system</li><li>■ <b>TECH. ROOMS:</b> HP water mist system</li><li>■ <b>HELIDECK:</b> Foam system</li><li>■ <b>GALLEY:</b> HP CO<sub>2</sub> duct, deep fat fryer K5 system</li><li>■ <b>AMMUNITION STORE:</b> Drencher system</li></ul>
<b>SUPPLY</b>	<ul style="list-style-type: none"><li>■ <b>ENGINE ROOM:</b> HP CO<sub>2</sub>, HP water mist system</li><li>■ <b>DECK:</b> Foam monitors, drencher for chemical tanks</li><li>■ <b>HELIDECK:</b> Foam system</li><li>■ <b>GALLEY:</b> HP CO<sub>2</sub> duct, deep fat fryer K5 system</li></ul>
<b>OFFSHORE</b>	<ul style="list-style-type: none"><li>■ <b>HELIDECK:</b> Foam System, Dual Agent System</li><li>■ <b>ACCOMMODATION &amp; GALLEY:</b> HP Water Mist system, Argonite System, deep fat fryer K5 System</li><li>■ <b>LIFE BOATS:</b> Deluge System</li><li>■ <b>CANTILEVER:</b> HP Water Mist system, Deluge System, Foam System</li><li>■ <b>HULL (INCL ENGINE ROOM):</b> HP Water Mist system, Deluge System, Argonite System</li></ul>
<b>YACHTS</b>	<ul style="list-style-type: none"><li>■ <b>ENGINE ROOM:</b> HP water mist system, HP CO<sub>2</sub>, local application water mist system</li><li>■ <b>ACCOMMODATION:</b> HP water mist system</li><li>■ <b>GALLEY:</b> HP CO<sub>2</sub> duct, deep fat fryer K5 system</li><li>■ <b>TENDER GARAGE:</b> HP water mist system, drencher</li></ul>
<b>SPECIALS</b>	<ul style="list-style-type: none"><li>■ <b>ENGINE ROOM:</b> HP CO<sub>2</sub>, HP water mist system</li><li>■ <b>ACCOMMODATION:</b> HP water mist system</li><li>■ <b>DECK:</b> Foam monitors, drencher for chemical tanks</li><li>■ <b>HELIDECK:</b> Foam system</li><li>■ <b>GALLEY:</b> HP CO<sub>2</sub> duct, deep fat fryer K5 system</li></ul>

# Your total solution provider

Danfoss Semco has the experience and technological knowledge to provide you with fire fighting solutions designed in accordance with IMO/SOLAS regulations and many classification societies and national authorities. Our team specialises in meeting your specifications, no matter how specific, to supply precisely the system you need.



## **SEM-SAFE® water mist system**

Water is forced through nozzles at very high pressure to create a water mist with the most effective fire fighting drop size distribution. The extinguishing effects give optimum protection by cooling, due to heat absorption, and inerting due to the expansion of water by approximately 1,700 times when it evaporates.

The SEM-SAFE® water mist system provides better protection for personnel and surroundings and minimises potential water damage, as the majority of the water mist evaporates. The SEM-SAFE® water mist system is available for accommodation, total flooding and local application.



## **High- and low-pressure CO<sub>2</sub> systems**

CO<sub>2</sub> systems are used as total flooding systems in engine rooms, machinery spaces and cargo holds. The high-pressure system consists of a number of CO<sub>2</sub> cylinders, whose outlets are connected to a common manifold. From there, the CO<sub>2</sub> is directed, via selector valves, into the various protected spaces. If the protected space is large, a high number of cylinders are required. These can be replaced by a single CO<sub>2</sub> tank, saving approximately 50% in weight and installation costs. The tank contains CO<sub>2</sub> cooled to -18 °C. The tank, refrigerators, distribution valves, controls, etc., are supplied pre-wired and ready assembled on a steel frame.



## **Foam fire fighting system**

Foam used in fire fighting is an aggregate of air-filled bubbles formed from aqueous solutions, and is of lower density than the lightest flammable liquids. It is mainly used to form a coherent floating blanket on flammable and combustible liquids to prevent or extinguish fires by excluding air and cooling the fuel. It then prevents re-ignition by suppressing the formation of flammable vapours, and also adheres to surfaces, providing a degree of exposure protection from adjacent fires. Foam can be used as a fire prevention, control or extinguishing agent for flammable liquid in tanks or processing areas.



## **Dry chemical powder fire fighting system**

When introduced directly to a fire, dry chemical powder extinguishes flames almost immediately. Dry chemical powder is intended for use in extinguishing fires involving bulk chemical agents and liquefied gases. Our dry chemical powder systems are developed to meet the increasing demand for large capacity systems for the protection of ships carrying LNG/LPG and certain chemicals or agents in bulk.



# Your total solution provider

Danfoss Semco has the experience and technological knowledge to provide you with the optimal fire fighting solution for any given project. We develop both our products and expertise as new requirements arise, founded on knowledge acquired through many decades of experience in the business.

Danfoss Semco has specialised expertise in the integration of equipment and processes. We possess a unique ability to understand and identify the needs and requirements of our customers. Our priority is to create long-term customer relationships in the global market, based on our outstanding ability to supply – complete solutions and innovative designs.

Our flexible approach allows us to respond appropriately in each case and appoint the system most suitable for each application.

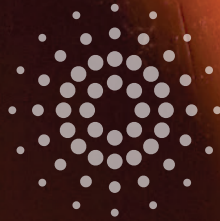
When working on a ship building project, we aim to get involved from the very beginning. Based on a thorough evaluation of various solutions in close cooperation with naval architects, marine authorities and ship designers, we recommend the most appropriate fire fighting solution for each specific project.

## **From beginning to end, Danfoss Semco offers you a total solution including:**

- Fire risk analysis
- System evaluation: i.e., which technologies are best suited to the project
- System design and dimensioning
- Layout and installation drawings
- Installation, commissioning, start-up and service
- Worldwide support







SEM-SAFE® WATER MIST SYSTEM



HIGH- & LOW-PRESSURE CO<sub>2</sub> SYSTEMS



FOAM FIRE EXTINGUISHING SYSTEM



DRY CHEMICAL POWDER FIRE EXTINGUISHING SYSTEM

# Unique worldwide service

Danfoss Semco is a service provider approved by several classification societies and provides valuable and cost-saving overviews at multiple levels. We track ships due for annual service, so clients do not need to use their own resources. We highly recommend leaving periodical check-ups to our own technical supervisors.

Danfoss Semco's highly skilled and trained engineers provide you with detailed reports that present the complete status of the fire fighting system for each vessel area. We provide unique, comprehensive documentation accessible at any given moment.

Danfoss Semco offers you professional services on board vessels anywhere in the world.

We always perform our services in accordance with SOLAS, class, flag and our own manufacturing regulations. All service interventions are thoroughly documented to facilitate the controlling task for the superintendent.

By relying on Danfoss Semco's service department, you also benefit from direct access to original spare parts. Moreover, our training facility can provide training for ship crews in the use of our fire fighting systems.



# Tested and approved



Danfoss Semco continues to invest heavily in new approvals, as a consequence of new nozzles development as well as the need for adapting to new standards.

As a major supplier of water mist, Danfoss Semco has been a member and board member of the International Water Mist Association (IWMA) for many years.

Danfoss Semco's fire fighting systems are recognized by all leading classification societies and national maritime authorities, including ABS, BV, DNV, FM, GL, KRS, LRS, NK, PRS, CC S, RMRS, RINA and others.

Besides having external approvals, Danfoss Semco also use internal test facilities accepted by DNV, LR, and BV for the component testing of nozzles covering tests that include: leak, hydrostatic, vibration, thermal shock, water hammer, vacuum, stress corrosion and coating test.

Danfoss Semco has experience in the design, engineering and delivery of thousands of marine fire fighting systems all over the world, in accordance with SOLAS/IMO regulations, and approved for each ship by the relevant classification society and national authority.

Our on-going internal training programs make our employees, sales engineers, project managers, service engineers, and all support staff fully qualified to handle all our fire fighting systems for the marine industry.

In addition to external approvals, Danfoss Semco also internally operates a EHS&Q system in accordance with DS/EN ISO 9001:2008, DS/EN 14001:2004, and DS/OHSAS 18001:2008.

# Danfoss Semco A/S

## History

Danfoss Semco A/S is a global leader in the sale, development, production and service/commissioning of certified fixed fire fighting systems. In 2006, two leading firms in the field, Danfoss A/S and Semco Maritime A/S, joined forces to form the present company, with Semco Maritime boasting over half a century of expertise in designing and installing fixed fire fighting systems. All the while, Danfoss has developed and delivered key components for the high-tech systems.

Today Danfoss Semco is an integral part of the Danfoss Group, Denmark's largest industrial manufacturing company with a daily output of more than 250,000 finished components. With more than 24,000 employees worldwide, Danfoss is truly a global company.

## Business areas

Our company is located in Odense, Denmark, and operates three main business areas.

Our water mist division comprises two business areas: the marine division and the industrial and commercial division. The former has pushed the boundaries for development and design to offer a wide range of solutions for numerous application areas on almost any type of vessel.

Within the industrial and commercial area, Danfoss Semco has a successful track record with different applications, ranging from complex fire fighting systems for museums and heritage sites to industrial applications, office buildings and universities.

Our gas and foam division is one of the world's largest low-pressure CO<sub>2</sub> based fire fighting systems supplier for the marine industry. This division supplies gas, foam and dry chemical powder systems worldwide.

## In-house manufacturing of key components

Danfoss Semco operates in-house research, development and manufacturing facilities of all critical components to ensure uncompromising performance and cost-effective systems. This puts us in a unique position to maintain our technological leadership in the future.

## Proven experience

Danfoss Semco has supplied fire fighting systems to more than 1,500 vessels, including world class ships, such as:

- *Allure of the Seas* and *Oasis of the Seas*, the world's largest cruise liners when built
- *Mærsk Mc-Kinney Møller*, the world's largest container ship when built
- *INS Vikrant*, the largest and first aircraft carrier built in India for the Indian navy
- *Seven Viking*, ship of the year 2013
- *The Atlantic Mercy*, Mercy Ships' newest hospital ship for delivering free healthcare



"Far Solitaire" – ship of the year in 2012 – is fully protected with Danfoss Semco's SEM-SAFE® high-pressure water mist system.