

Case story | SEM-SAFE® high-pressure water mist system

INS Vikrant

The largest warship and first aircraft carrier to be built in India, protected with a SEM-SAFE® high-pressure water mist system

Danfoss Fire Safety A/S



Cochin Shipyard Limited in India is building an aircraft carrier for the Indian Navy. The vessel named "INS Vikrant" formerly known as Project 71 Air Defence Ship (ADS) or Indigenous Aircraft Carrier (IAC) is scheduled for delivery in 2018.

The aircraft carrier displaces about 40,000 metric tons, is 262 metres long and has a tailored air group of up to thirty aircraft. It is powered by four gas turbines on two shafts, generating over 80MW of power. INS Vikrant will have capacity for a crew of 1,600 people. Upon completion, INS Vikrant will be the biggest warship ever built by Cochin Shipyard Limited. It has two take-off runways and a landing strip with three arrestor wires, capable of operating STOVAR aircrafts including the indigenous LCA, as well as a range of helicopters.

The engine rooms of INS Vikrant are protected by the SEM-SAFE® high-pressure water mist system for fire fighting from Danfoss combined with a bilge foam protection system.



SEM-SAFE® high-pressure water mist system

SEM-SAFE® high-pressure water mist is the optimum solution for the fire protection of engine rooms on INS Vikrant. The machinery space is protected by a dry pipework system with manual activation.

SEM-SAFE® is a high-pressure water mist based fire fighting system that utilizes micro-droplets released through nozzles in protected areas. It comprises a high-pressure modular pump unit, section valves to operate designated areas, piping and water mist nozzles.

Benefits of SEM-SAFE®

As soon as a fire is detected, the SEM-SAFE® system is activated. In comparison with traditional gaseous systems, the SEM-SAFE® system does not require crew evacuation prior to release. High-pressure water mist has excellent fire suppression properties against the range of fuels that can be found in machinery spaces. It cools the fire and simultaneously starves the fire from oxygen. Fire is prevented from spreading, making the system reliable and efficient. There is close to no water damage, making the post clean-up fast.

But most important, it keeps the navy vessel running as there is no downtime. In case of discharge, the SEM-SAFE® system does not require stopping operations on the ship in order to recharge the system. SEM-SAFE® is ready for re-use immediately after the first release. 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 INS Vikrant against fire, with reliability, low maintenance cost and crew safety in mind.

For protection of the bilge area, the customer has selected an AFFF (Aqueous Film-Forming Foam) system, also supplied by Danfoss.

Approvals and tests

The frame of the system is made of special reinforced material in order to resist shocks and vibrations.

The control panel of the SEM-SAFE® system complies with the standards for electromagnetic compatibility (EMC) and electromagnetic interference (EMI).

The SEM-SAFE® high-pressure water mist system has been designed in accordance with MIL-S-901D for Shock, MIL-STD-461F for EMI/EMC, MIL-STD-167/1A for Mechanical Vibrations, MIL-F-24385(F) for AFFF, IMO MSC/Circ. 1385 and IMO MSC/Circ. 1165 for E/R protection.

With the specially designed unit, Danfoss has performed multiple CFD simulations, where the unit had to perform in various scenarios. All criteria were successfully met.



SEM-SAFE®

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