



Firenor

A Part of Consilium Group

Helideck Protection Solution



When Safety Matters

Introduction

Superior Helideck protection is essential to the safety of any people working on any installation, onshore, offshore or in marine industries. The safety of the helideck will be not fulfilled if all products and systems perform unsatisfactory all together. This issue is more critical on Normally Unattended Installations (NUIs). Different regulations may apply to the helideck protection and the most common used worldwide is including IALA, ICAO, CAP437, NORMAM-27 and Norsok.

A means of automatically activating the helideck extinguishing system should be through the use of flame detection. Manual intervention of the operator can also activate the helideck extinguishing system. On the other hand, a reliable control system is an essential part of the helideck protection solution. The control system will then activate the helideck extinguishing system and monitor the performance of it. Firenor has designed extensive variations of helideck extinguishing system which can be connected to the fire water ring main or can operate standalone.

Material

Every Firenor system is available in the following materials:

- Galvanized carbon steel
- Super duplex
- Duplex
- 6Mo
- Copper nickel
- Titanium
- SS316
- GRE

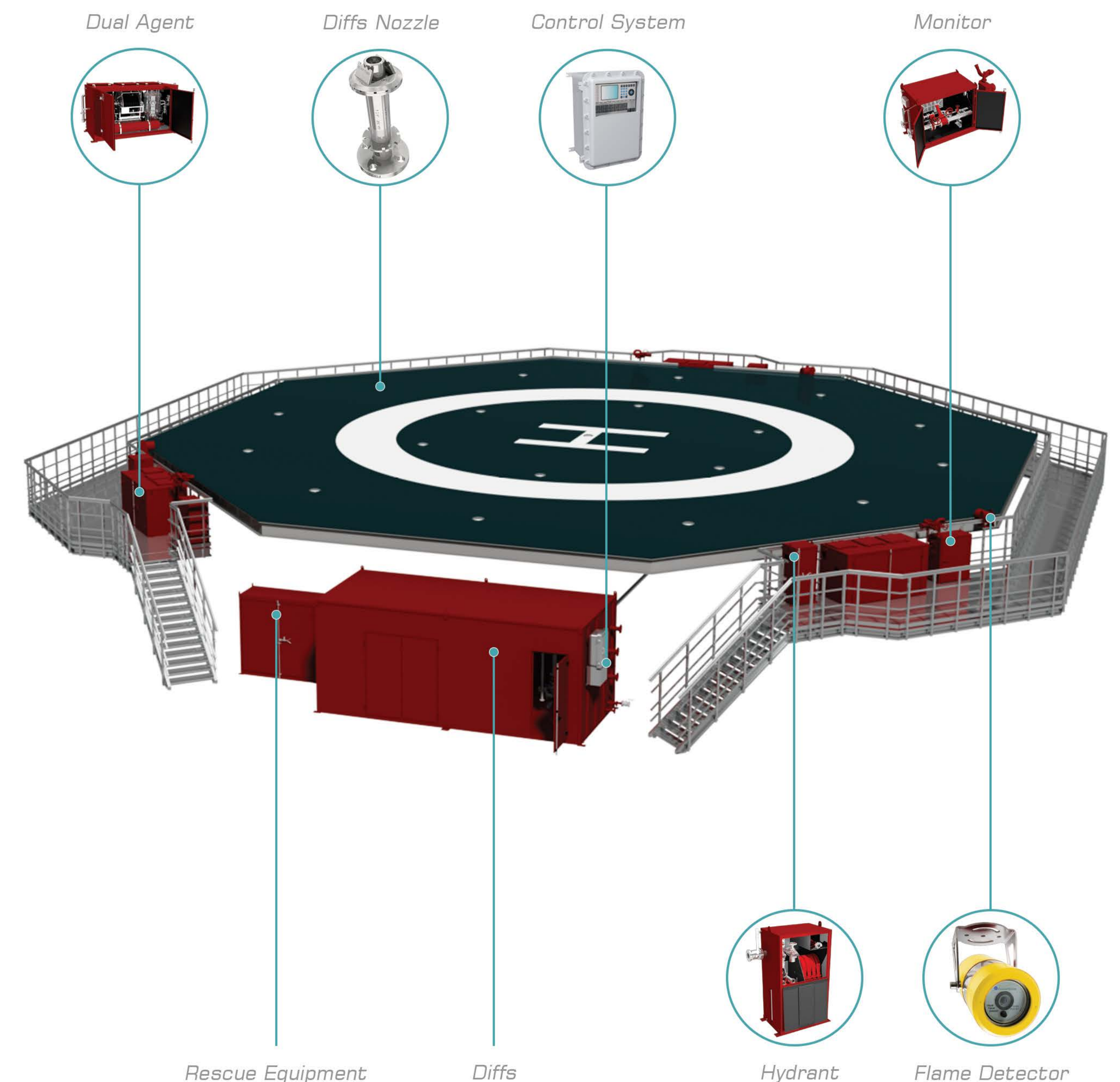
Documentation

The engineering department produces documentation relevant to all phases of the project . Documentation normally includes the following

- Quality Plan
- Calculation
- ITP
- Certificates
- Drawings
- Reports
- Data Sheets
- User Manual
- Indexes
- MRB

Verification

Every system can be customized, upon request, for compliance with applicable rules, regulations and project specific requirements. Full documentation for any tailor-made products are available and include all necessary certifications, third party verifications such as DNV/GL, BV, ABS, etc., and full scale test reports, if required.



Reliability in Detection



Detection

All applications present differing challenges for flame detectors. The important thing is ensuring the detection technology used is suitable for the application. The helideck is no different as it is one of the most challenging applications for flame detectors to operate correctly. A false alarm in this application could be potentially catastrophic or at least a costly clean up exercise. Typical false alarm stimuli and desensitization sources found on the helideck consist of; hot exhaust emissions, modulated blackbody radiation from the body of the helicopter, modulated sunlight from the rotor blades and an environmentally exposed location. Visual flame detection™ (VFD) from Consilium is built to detect flames in the most extreme environments where false alarms are unacceptable. Due to the principle of operation of VFD it is not affected by any of the sources listed and as such is the only technology on the market suitable to detect flames on a helideck.

Visual Flame Detector

The Consilium visual flame detector is an explosion proof device and it processes live video images to detect the characteristic properties of flames visually, by means of its FM and SIL 2 certified flame detection algorithms and on-board digital signal processing. It is the safest and most advanced flame detector on the market today.



Visual Flame Detector

Flame Detection & Live Video

The CD-F-301 has the capability to output a live video signal over standard twisted pair cable. The live video provides instant visual verification of fire eliminating the need to send personnel in to potentially hazardous situations, and reducing the risk of injury. Although the CD-F-301 transmits live video images, it is not necessary to utilize them as the unit will still be a fully functioning flame detector.

On-board SD Card

Each CD-F-301 incorporates an on-board Micro-SD card capable of recording 17 seconds of the alarm video – 8.5 seconds pre-alarm and 8.5 seconds post-alarm. This video recording proves invaluable during incident analysis and more crucially, you will never have an unknown alarm.

Control System

Consilium ConSafe is versatile safety control system which is intended to be used in any fire and gas detection as well as extinguishing systems. ConSafe is certified to be used in SIL2 and SIL3 applications certified by TÜV Rheinland. ConSafe can be configured to have redundant, hot swap and line monitored I/O modules. All mentioned features is reducing the mean time between failure as well as increasing the availability and reliability of the helideck protection solutions.

Versatility

ConSafe-C, a smaller version of ConSafe, can be used on helideck protection solutions to process the signals from the visual flame detectors, perform the desired logic and release the Firefighting system in addition to monitor the performance of it. The control system can also control the LED illuminated Circle-H Helideck Navigation aid as well as manual alarm call points etc.

Explosion Proof Version

ConSafe-X is explosion proof control system and it's suitable to be used in Zone 1 or Zone 2 in addition to the safe areas. All data available at the control system can be transferred to control room thanks to various communication modules ConSafe has. e.g. Modbus or OPC.

Video Feed Management

Not only can each Consilium Visual Flame Detector store the video of any alarm but the video feed of each flame detector can be stored on a hard drive and can be accessed through designated video network interfaces.

History Logging

Considering that many different helideck protection systems can be delivered based on the client requirement, each ConSafe system is tailor designed to meet all necessary requirement and functions of the system. It will be then fully tested prior to delivery.



ConSafe-X



Flexibility in Design

Fixed Firefighting

Firenor helideck firefighting systems mix water with foam and discharge it to a series of various nozzles through a network of fixed dry pipework.

Firenor helideck firefighting systems are designed and based on decades of firefighting industry experience to for hassle free operation, maintenance, and testing.

The Firenor helideck firefighting system can all be custom built to meet specific project requirements. Custom built systems will always be compliant with any required safety integrity level and full flow pre-tested before delivery. Customizations include helideck firefighting system piping on open frame or inside cabinet for environmental protection purposes.

Many smaller installations as for example Normally Unattended Installations (NUIs) does not feature a fire water pump. Therefore; having a reliable helideck firefighting system is a key to safety of the people using the helideck when needed. Firenor can design helideck firefighting system in different configurations which are connected to the firewater ring main or operates as a standalone unit for the NUIs.

The fixed firefighting system for a helideck protection can be one of the following systems:

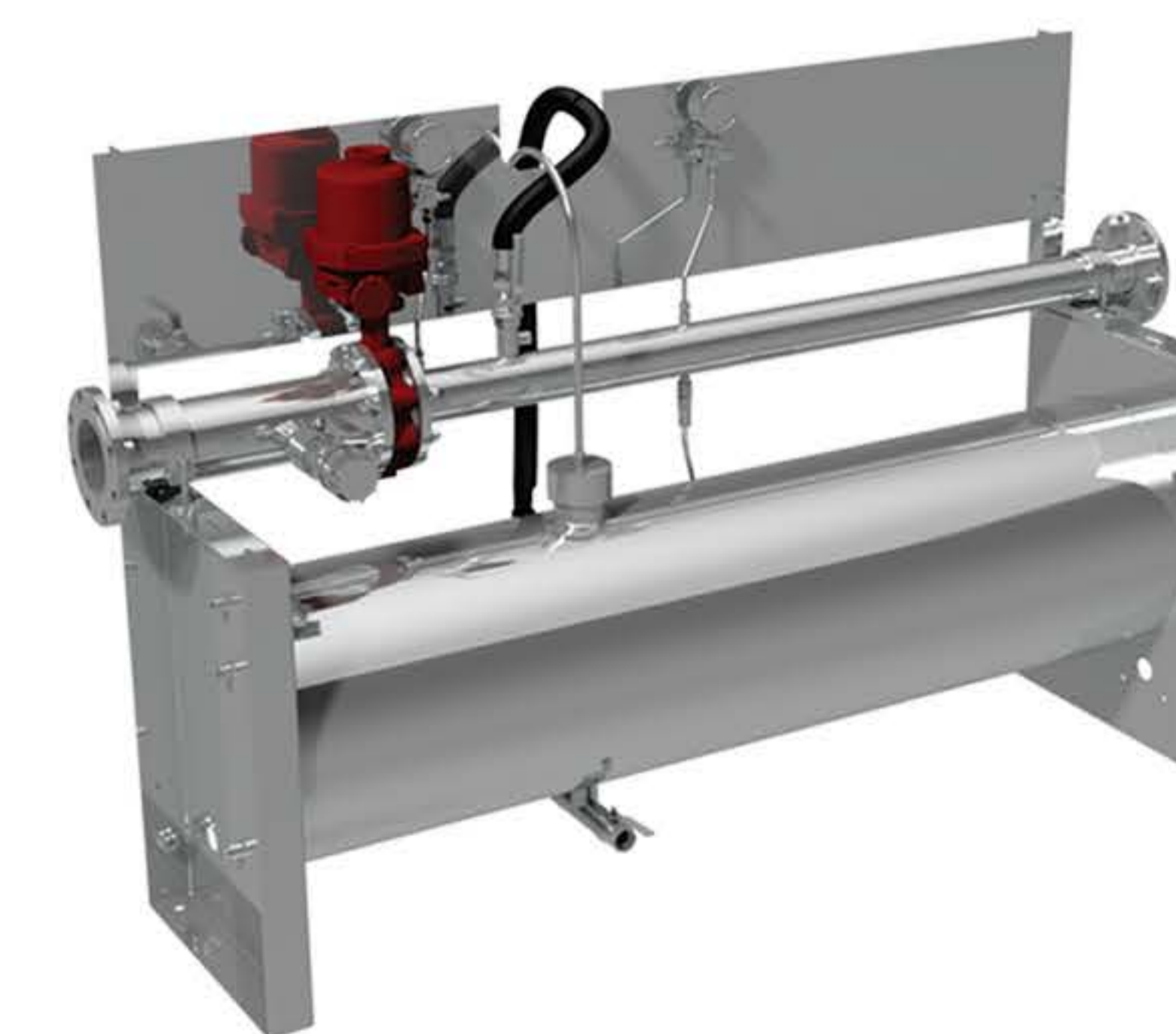
- Deck Integrated Fire Fighting Systems (DIFFS) which the nozzles are integrated to the helideck for an even distribution of water and foam. Our nozzles supply water to deck even if the nozzle is blocked by a helicopter tire or by other means.
- Ring Main System (RMS) which the nozzles are installed around the helideck. This solution does not require to drill hole in the helideck itself, and can be a cost-efficient way to install on either new or existing helidecks.
- Fixed Monitor Systems (FMS) with two or three monitors installed around the helideck. These monitors can be delivered in different variations such as manual operated, self-oscillating in a preset pattern or remote operated from control room, if required.

Any of the above mentioned systems needs reliable water and foam source. This requirement can be met by using a centralized Fire water and foam supply system or from a local standalone system. The various main supply systems are listed as per next page:

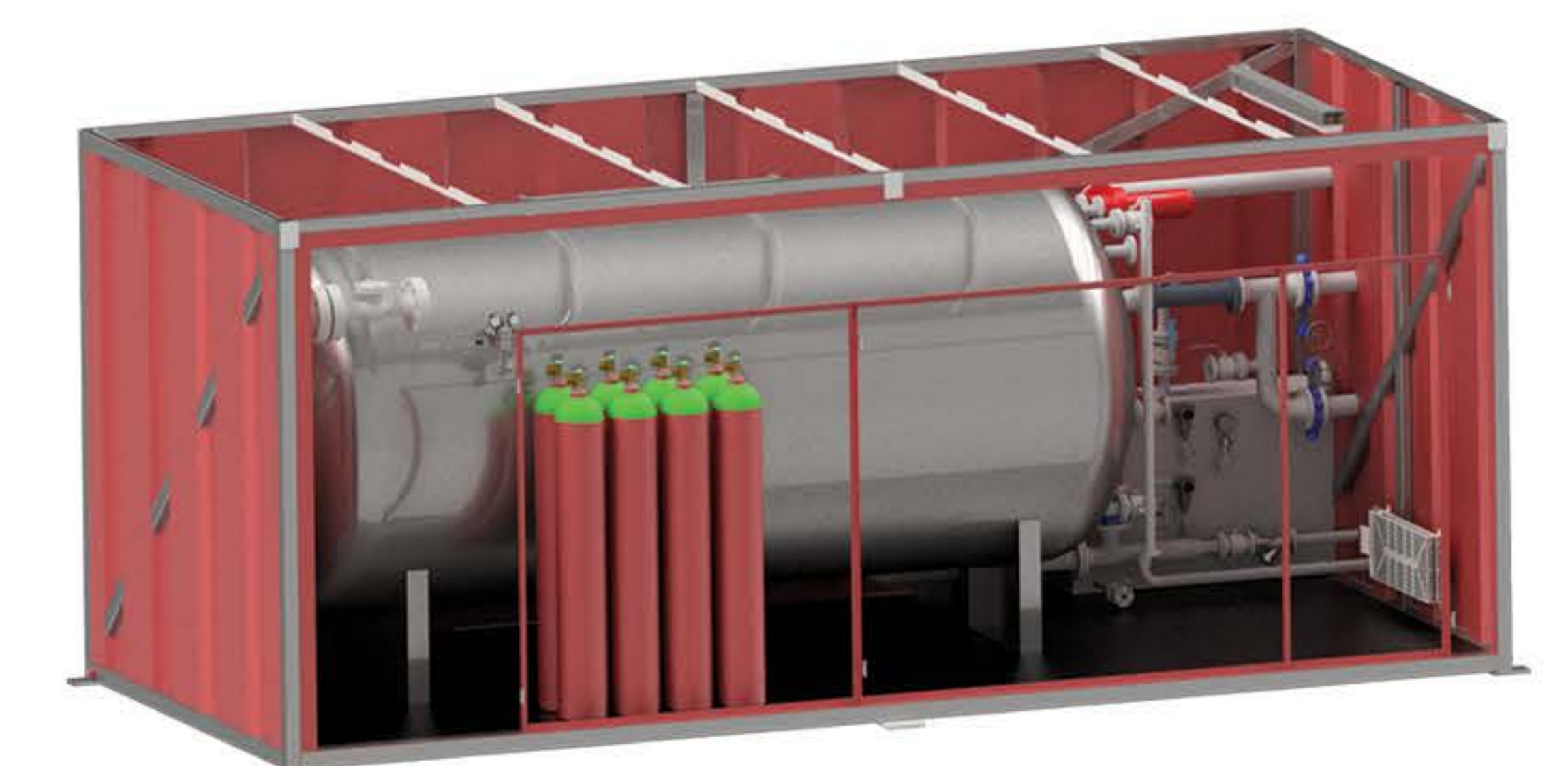
- System with connection to fire water pumps and centralized foam system. The system mix and control water and foam supplied from water pumps and a centralized foam system for distribution to different consumers.
- System with connection to fire water pump and local foam reservoir. The system control water supplied from water pumps and mix foam into the water form an integrated foam tank.
- System with electrical driven pumps can be supplied if reliable and sufficient emergency power is available. This solution is flexible in design allowing installation in areas with many design limitations.
- System with air driven pumps instead of emergency power which the pump can be driven by compressed air instead of electricity.

- System with pressurized water vessel and local foam supply. Water are stored inside a pressure approved vessel. When water is needed, the vessel will be pressurized and water will be driven out by compressed air stored in high pressure cylinders. The cylinders can be recharged without be replaced as an option.

All systems can be delivered with on-off valve normally control the water flowing through the pipes when the system is needed, though Firenor can install a pressure regulating deluge valve if the water supply requires one. Firenor will provide the foam mixing system most suitable for the specific project and provide necessary instrumentation and valves for monitoring and maintenance the system.

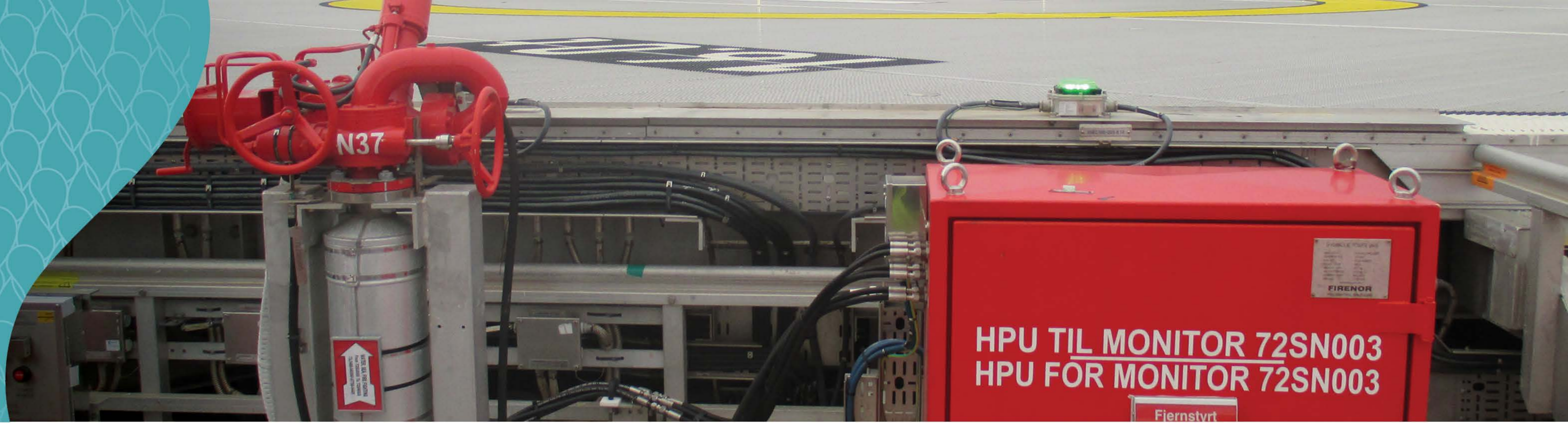


System with Connection to Fire Water Pump



System with Pressurized Water Vessel

Confidence in Quality



Manual Firefighting

DAHR Systems

The Firenor Dual Agent Hose Reel (DAHR) is a high quality supplemental fire extinguishing device intended for manual use against smaller fires on and in the vicinity of helicopter decks, as well as areas with high risk of hydrocarbon fires where the primary fixed firefighting system may have limited reach. The DAHR unit combines a foam solution with compatible dry chemicals to produce a mixture that is highly efficient at extinguishing fires involving flammable liquids and offers excellent re-ignition control. When this mixture is deployed, the dry powder rapidly knocks out the fire while the foam solution secures the hazard and contributes to the cooling of the fuel.

Hydrant Systems

Generally installed in open deck areas, walkways, and escape routes, a Firenor firewater hydrant is the ultimate piece

of firefighting equipment for manually extinguishing large and devastating fires. In addition to releasing water from a traditional water supply, a high quality Firenor firewater hydrant also have a foam connection, allowing it efficiently deliver water mixed with foam. When used this way, the hydrant creates a blanket that extinguishes the fire by cutting off the oxygen supply to the fire, a tactic which is particularly effective against oil and fuel fires.

Extinguishers

Firenor can provide all necessary extinguishers needed as powder, foam and CO2. The extinguishers are available in various sizes and larger sizes will be wheel mounted.

Firenor can provide heated or unheated cabinets for storage of one or more extinguishers when required.

Nozzles

To ensure a quick extinguishing of a fire on a helicopter deck it is important to distribute water and foam to the entire helideck area. Entire area shall have the correct flow regardless of location of the helicopter or wind conditions. This can be performed by the following three main nozzle types.

DIFFS

Deck Integrated Fire Fighting Systems which the nozzles are integrated to the helideck for an even distribution of water and foam in all water conditions. The nozzles supply water to deck even if a nozzle is blocked by a helicopter tire or by other means. The Fireproducts DIFFS pop-up nozzle can be installed with a pressure test cover. The cover seals the nozzle, and pressure test can be performed on both pipework and nozzle installations.

RMS

Ring Main System nozzles are installed around the helideck. This solution does not require to drill holes in the helideck itself, and can be a cost-efficient way to install at new and existing helidecks. The Fireproducts RMS pop-up nozzle can be installed with a pressure test cover. With the cover fitted, test can be performed on both pipework and nozzle installations.

FMS

Fixed Monitor Systems which two or three monitors will be installed around the helideck. This monitors can be delivered in variants for manual operated, osculating in a pre-set pattern or remote operated from control room if required. For maximum safety, this solution can also be combined with DIFFS to ensure always have a system available for helideck protection



DAHR With Cabinet



Hydrant with Foam Tank



DIFFS Nozzle



RMS Nozzle

Precision in Engineering



Foam Mixing Equipment

The foam supply for this system can be provided by a separate tank outside or inside the skid, or from a central foam system, depending on the exact project specifications. The foam can be mixed with a variety of solutions listed below:

- Turbine foam proportioner
- Balanced pressure foam proportioner
- Foam inductor
- Constant flow orifice

Inductor

The Incendium Line Inductor (LI) is a foam concentrate proportioner intended for a fixed flow in fixed installation. The LI is installed between the discharge side of the fire water pump and the foam making unit. The water flow and pressure creates a vacuum inside the inductor that induces foam concentrate into the water line. The inductor is made to handle high counter pressure giving the possibility to operate at long distances between inductor and the foam making unit.



Inductor

Proportioner

The Incendium IPP is a foam proportioner designed for use with foam pumps and induces foam concentrate into the main water line. The proportioner has a very good proportioning accuracy combined with a low pressure drop. It is available with proportioning from %1 up to %6. Suitable for use with fresh or sea water and any type of foam concentrate. The IPP comes in sizes from DN50 up to DN250, and flow ranges of 110 to 24000 lpm. As standard equipped with balancing valve. The IPP balanced pressure proportioner is designed for mounting between flanges, DIN or ANSI. Foam pump pressure to be minimum 1 bar over water pressure to enable accurate proportioning. The proportioner body is marked with flow direction.



Proportioner

Other Systems

Rescue Equipment

In case of an accident it is important to have necessary rescue equipment. Following rescue equipment should be stored in clearly marked and secure watertight cabinets or chests close to the helideck as minimum.

- Adjustable wrench
- Rescue axe
- Cutters, bolt
- Crowbar, large
- Hook, grab or salving
- Hacksaw (heavy duty) and six spare blades
- Blanket, fire resistant
- Ladder (two-piece)
- Life line (5 cm circumference x 15 m in length) plus rescue harness
- Pliers, side cutting (tin snips)
- Set of assorted screwdrivers
- Harness knife and sheath
- Gloves, fire resistant
- Power cutting tool

Fireman's Equipment Cabinet

The firefighters need necessary personal protecting equipment and supporting tools, all this equipment is recommended to be stored inside a protective cabinet at a suitable location allowing firefighters to gear up.

- Fireman's Suit (jacket/trouser)
- Fireman's helmet w/visor
- Rubber Firefighter Boots
- Firefighter Gloves
- Electricians Gloves
- Rescue Belts
- Breathing Apparatus
- Air Cylinders
- Torches with Chargers
- Boiler Suits
- Rescue Masks (15 minutes)
- Safety lines (30m)

Helideck Lighting Systems

The most important task is to prevent an accident to happened at all.

An important and efficient way to reduce the risk during landing and takeoff is to ensure proper lighting system for the helicopter deck. As part of helideck protection solution, Firenor can provide various helideck lighting products including but not limited to:

- Status Light
- Perimeter Light
- Illuminated Windsock
- Circle-H Lighting
- Flood Light

The products focus on low maintenance and high reliability and all necessary control functions can be done through the ConSafe Control panel.

CONSILIUM GROUP

Consilium is a global niche company that develops, manufactures and markets products and systems that are used to protect people, material values and the environment. Consilium conducts its operations in two business areas – Marine & Safety and Fire safety & Automation.

Consilium's entire offering is based on delivering high-quality applications to customers who need to protect large and complex environments with high material values or large numbers of people. With a global market organization, Consilium can offer its customers local service and support wherever in the world they are. The vision is for customers to make Consilium their choice when safety matters.

Consilium has more than 900 employees in 25 countries worldwide. Consilium AB (publ) is the ultimate holding company, listed on the Nasdaq Stockholm stock exchange.



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