



Firenor

Company Profile



When Safety Matters

ABOUT US

Firenor AS is a dynamic and flexible company that designs, produces, assembles, tests, installs and does commissioning on an enormous variety of high quality active firefighting equipment.

In addition to providing high quality products, we also provide the best possible service to our customers by offering experienced and knowledgeable consultation services for fire protection on land, ships, and offshore industry.

Turnkey Supplier

From conceptual design work to on-time delivery of pre-tested equipment, Firenor is a turnkey supplier of active firefighting equipment. Firenor also ensures the integrity of firefighting equipment by performing full flow testing, maintenance, and supplying spare parts as needed.

Long History

The knowledgeable staff at Firenor is incredibly experienced, with some employees having worked in the active fire protection industry for over 30 years.

Management

Operations at Firenor are carried out according to the rigorously defined guidelines of our quality management system. The quality management system flexibly adapts to any customer's business model and is regularly assessed by

management to ensure that it is providing the expected high level of quality.

Our business strategy is to design, produce, and manufacture valuable products that can be efficiently used for the firefighting industry in any country, industry, or location, including marine, offshore and, onshore locations.

We are experts at advising our clients to use the proper equipment in the right locations. Our policies are designed to ensure that our clients are always compliant with the laws and regulations that control workplace conditions.

Furthermore, our policies are all grounded in a set of fundamental principles and values that are critical to our company and direct all the actions and decisions our company make:

- High ethical standards
- Clear quality requirements
- Good internal and external information
- Active participation
- Strong respect for confidential information
- Taking responsibility for goals and results
- High employee expertise supported by targeted skills development
- Strong motivational tools and recognition of employee efforts
- Maintaining an environment that enforces responsibilities and allows creative freedom

Turnkey Supplier and Environment Policy

HSE GOALS

The following are our HSE goals:

- At Firenor, we never compromise on safety issues.
- Health, environment and safety concerns are always given top priority for parties potentially affected by our products, including employees, customers or sub suppliers.

EMPLOYEE PERSPECTIVE

Firenor motivates and supports employees by creating an environment that maintains their excitement for their profession through the integration of management policies that encourage them to further their interests through their everyday work. In return, Firenor expects all employees to always treat safety and protecting the environment as their highest priorities.

CUSTOMER AND SUB SUPPLIER PERSPECTIVE

We wish for our customers and sub suppliers to recognize Firenor as the most environmentally conscious, safety conscious, and versatile provider of quality firefighting equipment.

OWNER PERSPECTIVE

We wish for our shareholders to see

Firenor as an efficient and progressive organization that limits risks and costs while offering attractive returns on investment, including benefits from HSE focused work.

Certification

Firenor holds various internationally recognized certifications:

- ISO 9001:2008: QUALITY MANAGEMENT SYSTEM
- ISO 14001: 2004: ENVIRONMENTAL MANAGEMENT SYSTEM
- ACHILLES JOINT QUALIFICATION SYSTEM
- ACHILLES FIRST POINT ASSESSMENT (FPAL)



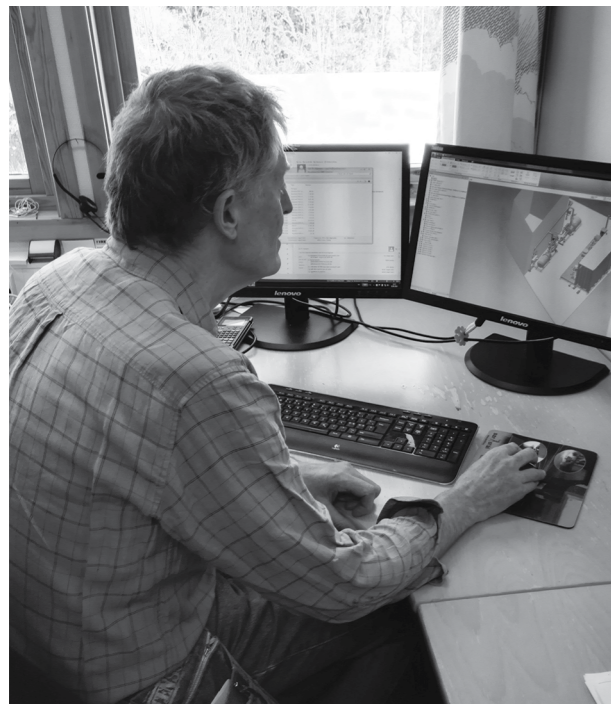
Experience in Heart



Credit: Harald Pettersen / Statoil

Experience

With a constantly growing worldwide client list, Firenor provides services and firefighting equipment deliveries to several of the largest oil companies, shipyards, and EPC contractors around the world. Our industry experience with national and government regulations of countries all around the world offers an advantage to ensuring customer compliance with those regulations. Customers can rely on our years of experience for all their needs, including delivery of complete firefighting systems for brand new platforms, replacement of worn out systems with compatible modern systems, and upgrading of older equipment, for both marine and industrial use, in addition to offshore industries on land, ships, and offshore industry.



Major References

- Aibel
- Aker Solutions
- Apply Leirvik
- Bayards
- British Petroleum
- CB&I
- Conoco Phillips
- Cosco
- Daewoo Shipbuilding & Marine Engineering
- DETNORSKE
- Eni
- Exxon Mobil
- Framo
- Hertel
- Hyundai Heavy Industries
- KVÆRNER
- Lundin
- Maersk Oil
- National Oilwell Varco
- NEAL
- Samsung Heavy Industries
- Sembcorp Marine
- Statoil
- Sulzer
- Technip
- Teekay
- Total
- Tyco
- Wood Group Mustang
- Worley Parsons
- Yara International

SERVICES

Project Management

Top quality project management is a vital key to the successful delivery of the large catalogue of products provided by Firenor. At Firenor, we ensure that project management is performed by individuals that fully understand every aspect of project management processes. Firenor's project management office (PMO) defines and maintains high quality standards for project management within the organization. We focus on standardizing and following project management policies, processes, and methods. The Firenor methodology is derived from guidelines presented in "A Guide to the Project Management Body of Knowledge" (PMBOK® Guide).

Engineering

Firenor gives individual attention and care to every project. For each project, Firenor's engineering team produces tailor made documents and drawings in order to comply with the precise requirements of the specific project. Since the design and delivery of firefighting package is a multi-discipline process, Firenor has developed in-house capacities in different area such as:

- Electrical
- Instrumentation
- Material
- Mechanical
- Piping and layout
- Process
- Safety (HSE)
- Safety and automation systems (SAS)
- Structural

Firenor is also capable of providing all of the above engineering services independently without having to purchase a specific product.

Production

The exceptional quality of our equipment is driven by highly skilled people who have many years of experience in this field, employing rigorous work procedures that are used for all Firenor equipment. Each of our employees has been trained in a variety of production phases such as welding, painting, mechanical, instrumentation and electrical assembly. The production team is also capable of carrying out this phase of the process at the customer's location, if the circumstances require on-site production.

Confidence in Quality



Testing

As part of our quality assurance procedures, Firenor carries out a variety of tests during production of the equipment and prior to the delivery. Some of the tests are listed below, however Firenor can adopt its test procedure to any project specification:

- Positive Material Identification
- Welding Non Destructive Tests
- Pull Test
- Painting Qualification Tests
- Painting Destructive Tests
- Insulation Resistance and Loop Test
- Pressure Test
- Assembly Leak Test
- Function Test
- Full Scale Test
- Noise Test

All the full scale test equipment for water, foam, or powder is containerized and can be easily transported to any site location.

Installation and Commissioning

Firenor can provide personnel resources who were involved in the project life cycle to assist during installation and commissioning. These highly knowledgeable and skilled resources are able to satisfy customer needs, no matter where in the world the customer is located. In order

to provide more efficient support, this team has access to all necessary tools, special tools, or test equipment needed for the project.

Maintenance

Firefighting equipment is never in continuous use, and while designed for high reliability, it may not be subject to the same monitoring as other systems. Fault and defects are therefore more likely to appear without being noticed by operators. An undetected fault can cause a catastrophic result. To ensure that the equipment will remain functional and available in the event of an emergency situation, maintenance inspections must be carried out at regular intervals.

Additionally, Firenor offers a wide selection of well stocked spare parts, scheduled periodic inspections and services, upgrades, replacement services, and general repair services that optimize uptime and reduce the lifecycle cost of equipment.

SYSTEMS

Firenor has an extensive product portfolio and can deliver any of the following equipment in a variety of configurations and materials, and with any required certifications. We can customize equipment according to precise customer specifications or provide a system that will best fit the needs of a customer based on our industry experience. Our main products are as follow:

- Deluge systems
- Deck integrated firefighting systems
- Monitor systems
- Sprinkler systems
- Dual agent hose reel
- Hose reels
- Hydrants
- Foam systems
- Water mist systems
- Gaseous systems
- Hydrophore systems
- Active pressure pulse compensator systems
- Rim seal systems
- Safety equipment
- Utility stations

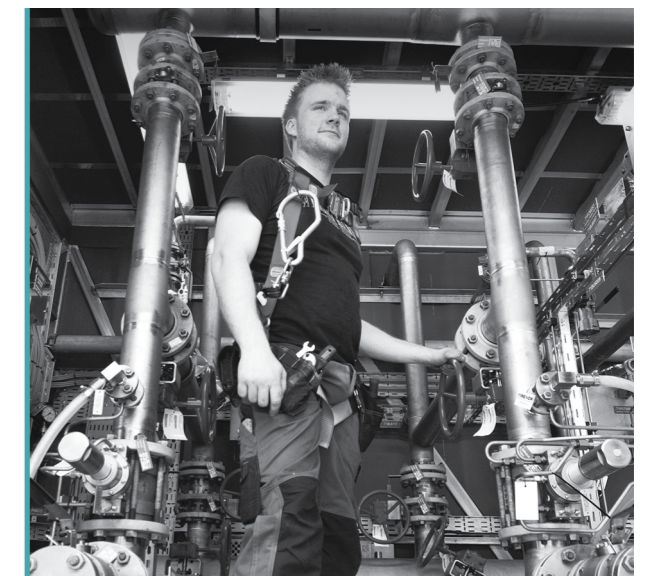
Verification

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.

Material

Firenor systems are available in the following materials:

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

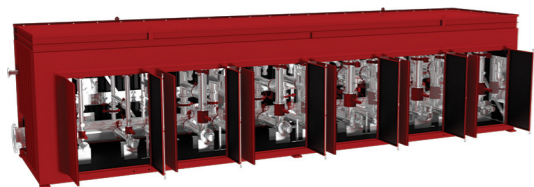




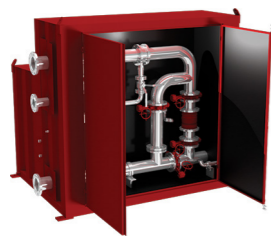
Variety in Products

Deluge Systems

The Firenor deluge skid system offers exceptional fire protection for high risk areas where rapid fire spread is a potential scenario, by allowing quick discharge of water with or without foam in case of emergency. While this system is designed for high risk fire suppression, it is also excellent for cooling purposes, general area protection, and protection of high risk objects during a fire. Additionally, the design of this system can be customized to protect against pool fires by mixing foam into water at a precise flow.



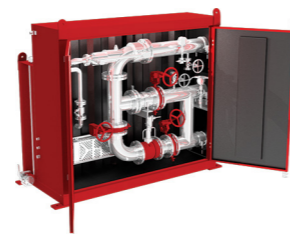
Deluge, Multi Zone



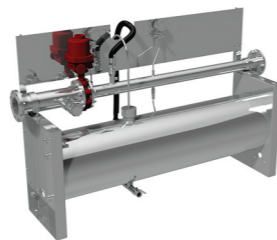
Deluge, Single Zone

DIFF Systems

A Deck Integrated Fire Fighting (DIFF) system is an effective fire suppression system that is normally the primary firefighting system on a helideck. The compact design of the system also allows it to be easily installed in storage areas and hangars used for aircrafts and helicopters. This versatile system can also extinguish a pool fire by mixing foam in the water at a specified flow, should the need arise.



DIFF with Cabinet



DIFF on Frame

Monitor Systems

A monitor system is a fast acting fire protection system used primarily to protect against rapid fire spread in high risk areas. Due to their specialized nature and compact size, monitor systems typically replace deluge systems in high risk areas or areas with limited space for pipework, though both systems can work together as well. Monitor systems may also be used for helicopter deck protection and in other large areas to increase fire protection of those areas.



Monitor with Cabinet



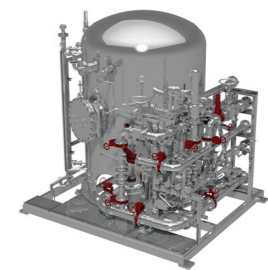
Monitor on Frame

Sprinkler Systems

A sprinkler system offers optimal fire protection in areas where there is little to no risk of rapid fire spread. Because the nozzles of a sprinkler system automatically open if the temperature increases beyond a designated threshold, sprinkler systems provide a quick response during any fire emergency. Sprinkler systems typically provide optimal coverage and protection in areas where personnel are usually present, like commercial buildings, offices, living quarters, workshops, and similar areas.



Sprinkler



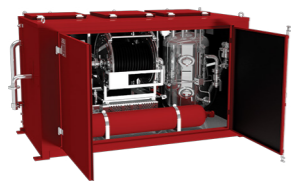
Sprinkler with Water Vessel

Flexibility in Design

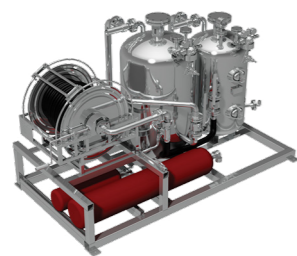


DAHR Systems

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. A 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.



DAHR with Cabinet



DAHR on Frame

Hose Reels

The Firenor firewater hose reel is a high quality quick-response piece of equipment ideal for manual fighting of small fires and for protection of personnel during evacuation. In order to ensure optimal protection of personnel, this equipment is typically used in locations like utility areas, open deck areas, living quarters and other low risk areas where personnel are likely to be present. Built for versatility of mounting, the Firenor hose reel can be mounted on the floor, wall or can be recessed mounted.



Hose Reel, Deck Mounted



Hose Reel, Recessed Mounted

Hydrants

Generally installed in open deck areas, walkways, and escape routes, the Firenor firewater hydrant is the ultimate piece of firefighting equipment for manually extinguishing large, devastating fires. In addition to releasing water from a traditional water supply, a high quality Firenor firewater hydrant can 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.



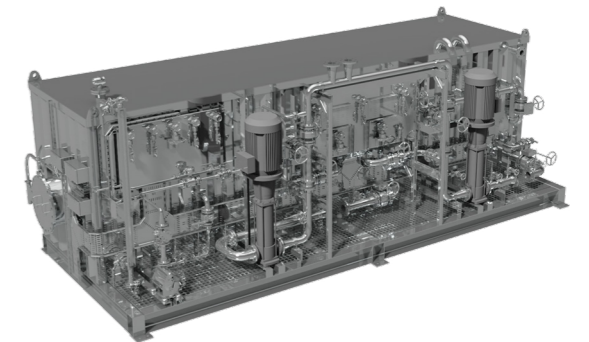
Hydrant with foam tank



Hydrant on Standpipe

Foam Systems

Foams role is to preventing burning liquid to contact with oxygen and resulting in suppression of the combustion. The Firenor foam system is connected to the foam ring main which efficiently supplies foam to all foam consuming equipment at the installation in the same way that firewater is supplied from the firewater pumps. The Firenor foam system uses a redundant foam pumps to feed pressurized foam liquid from a foam tank to a distribution system. This distribution system efficiently supplies foam to all foam consumers on site, like deluge skids, monitor skids, hydrants, hose reels, etc.



Centralized Foam System



Precision in Engineering

Water Mist Systems

A water mist system sprays droplets of water mist that rapidly evaporate, creating massive amounts of steam. Because this process is highly energy demanding, it reduces the temperature of the fire rapidly. Furthermore, the rapidly expanding steam fills up 1700 times more space than the water droplets, displacing air from the fire, further reducing the oxygen the fire needs to burn. A water mist system combines the strength of deluge and gaseous systems. Water mist systems are primarily used for fire protection in enclosed areas such as emergency generator rooms, turbine enclosures, and machine enclosures.



Water Mist, Standalone



Water Mist, Pump Unit

Gaseous Systems

The main extinguishing principle for this system is that gas, when applied to an area where fire is present, displaces air around the fire, removing the oxygen that the fire requires to continue burning. Some gaseous system with chemical or synthetic characteristics is extinguishing fire by interrupting fire chain reaction. A gaseous system can be designed to release a variety of gasses, including Argonite, Inergen, CO₂, FM200, Novec, or an equivalent gas. Each type of gas offers specific benefits and disadvantages when fighting specific types of fires. Gaseous systems are primarily installed in enclosed areas with controlled ventilation. These systems are used as a total flooding system for a wide range of hazards.



Gaseous System with Cabinet



Gaseous System on Rack

Hydrophore Systems

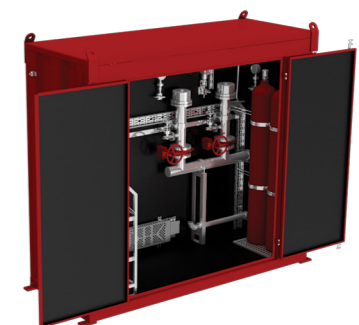
The Firenor hydrophore system is a system designed to prevent pressure surges in the firewater distribution piping. When a high flow firewater demanding system like a deluge skid starts before the firewater pumps, water is drained from the highest points of the ring main. This drain results in a vacuum in the upper levels of the piping. To prevent this dangerous situation from occurring, a hydrophore system will automatically discharge water into the firewater ring main from the hydrophore Water Vessel as soon as the pressure controlling valve senses a drop in firewater ring main pressure.



Hydrophore Water Vessel

APPC Systems

The Firenor Active Pressure Pulse Compensator system (APPC) is a system designed to prevent pressure surges in the firewater distribution piping. When a high flow firewater demanding system like a deluge skid starts before the firewater pumps, water is drained from the highest points of the ring main. This drain results in a vacuum in the upper levels of the piping. To prevent this dangerous situation from occurring, an APPC system will automatically fill air into the highest point of the ring main to avoid vacuum. This will also make an air pillow at the high point to dampen the water from the firewater pump after startup.



APPC

Efficiency in Production



Safety Equipment

The Firenor safety equipment gives protection when used by workers to avoid injuries and life threatening situations for a range of applications in non-hazardous and hazardous environments. Different types of safety equipment to be used upon the nature of risk involved in the work. Firenor can provide a wide range of safety equipment listed below:



Eye Wash with Cabinet



Fire Extinguisher

- Bolt cutters
- Breathing air compressors
- Breathing air cylinders
- Breathing apparatus
- Chemical resistant coveralls
- Chemical resistant gloves
- CO2 refilling machine for extinguishers
- Emergency escape breathing apparatus
- Extinguishers, CO2
- Extinguishers, Foam
- Extinguishers, Powder
- Eyewash stations
- Fire blanket
- Fireman's gloves
- Fireman's helmet
- Fireman's safety boots
- Fireman's suits
- First aid kits
- Harnesses
- Head protection
- Hearing protection
- Ladders
- Life jackets
- Life rafts
- Lifelines
- Portable toxic and explosive gas detectors
- Raincoat and trousers
- Safety Ax
- Safety glasses - goggles
- Safety showers
- Safety signs and tape
- Safety Torch
- Storage cabinets

Rim Seal Systems

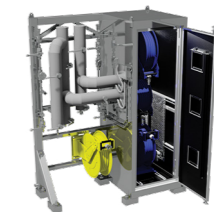
The Firenor rim seal system offers fire protection to storage tanks with floating roofs. Each unit is a fully standalone containing enough water and suitable foam to extinguish a fire on the rim seal of the storage tank. The integrated release system is designed for quick release in case of an accident to protect the seal. The unit can be automatic or remote manual released for one section of the tank roof seal or released for the entire seal diameter for maximum protection and reduce the risk for fire spreading.



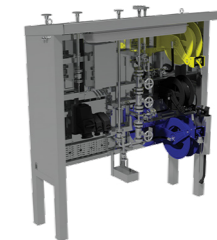
Rim seal skid

Utility Stations

The Firenor utility stations are generally installed in areas where specific utility services are required during operation and maintenance. A utility station is quite flexible, capable of being designed for a wide variety of utility services, including fresh water, hot water, nitrogen, air, diesel and electricity. Furthermore, an individual station can deploy multiple services and every station can be customized to supply different combinations. In addition to providing rapid and easy deployment of utility services with minimal preparation time required, utility stations also require minimal clean time and effort after use.



Utility Station with Cabinet



Utility Station on Frame

Firenor International

Firenor is a Norwegian based company with international presence mitigating risks by delivering high end engineered fire safety systems since 2001. Firenor designs, engineers and supplies fire safety solutions to the international projects in energy, oil & gas and renewable sectors. Firenor is managed from its head office in Kristiansand, Norway and with operational hubs in the Middle East, India, and China.



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