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SAUDI FACTORY FOR FIRE EQUIPMENT Co.

Empowering
a Safer Future for
the Kingdom

SFFECO
WATER MIST

Fire Extinguishing System
Technical Datasheet

Quality Approvals for Various Products and Services

VER: 00-04/26

Assessed to ISO 9001:2015
Cert. No : 1516

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The Global Standard in Fire Safety

Since 1983, SFFECO has been the trusted name and a recognized global leader in manufacturing top-tier fire-fighting equipment. We don't just offer products; we provide total fire safety solutions like fire doors, fire cabinets, fire pumps, fire extinguishing systems, etc. Our commitment to excellence is certified by multiple international standards, including ISO 9001 (Quality), ISO 14001 (Environmental), and ISO 45001 (Health & Safety). With state-of-the-art facilities in Riyadh and Dubai, we ensure every product meets rigorous international quality standards.

One-Stop-Shop for Fire Protection

SFFECO is your single source for everything in fire protection and fire-fighting. Represented in over 100 countries through a vast network of dealers, our innovative approach and comprehensive, end-to-end product range deliver the full spectrum of solutions you need. We're dedicated to keeping you safe and updated, constantly integrating the latest fire-fighting technology into our knowledge and services. Choose SFFECO and get certified quality, global reach, and pioneering innovation—all in one place.

Quality Services

SFFECO is deeply committed to ensuring superior performance and accuracy in every product it delivers. This dedication is maintained through continuous, close collaboration with a wide array of stakeholders, including key certification bodies, government regulatory agencies, industry partners, and leading technology associations. This concerted effort focuses on the development and delivery of truly innovative and high-quality fire-fighting solutions. The commitment to excellence is rigorously upheld through extensive product testing and evaluation, alongside a strict, ongoing process for continued product quality compliance, guaranteeing that SFFECO's equipment operates with assured reliability when it matters most.

SFFECO is dedicated to providing fire safety products of the highest quality and performance. We achieve this by working closely with certification bodies, government regulatory agencies, industry partners, and technology associations. This collaboration ensures our innovative products are backed by extensive product testing and evaluation, and maintained through continuous quality compliance.

As global leaders since 1983, SFFECO believes in manufacturing quality products and offering exceptional service standards worldwide. Our primary goal is to reward our customers by keeping their investments safe and secure. Our manufacturing plant has steadily grown and is now equipped with modern hi-tech equipment and staffed by highly skilled professionals. With optimal ISO-certified operations, we consistently roll out products that match global standards to serve the needs of the growing fire safety market.

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Water Mist System
General Overview

"Water mist" is relative to the concept of "water spray", the so-called water mist is a water particle produced by a high-pressure water jet using a special nozzle. In the national standard, the definition of water mist is: at the minimum design pressure, the diameter of droplet Dv0.50 is less than 200um, the mist Dv0.99 is less than 400um, that is, the diameter of droplets less than 200um accounted for more than 50% of the total volume, and the diameter of mist less than 400um accounted for more than 99% of the total volume.

The high-pressure water mist achieves the purpose of fire control, fire suppression, and fire extinguishing under the triple effects of cooling, suffocation and thermal isolation, the high-pressure water mist fire extinguishing device has dual functions and advantages of water spray and gas fire extinguishing. It has both the cooling effect of the water spray system and also the suffocation effect of the gas fire extinguishing system. Therefore, the high-pressure water mist is the most effective technology to replaces the traditional fire extinguishing methods such as water spray, medium and low-pressure water mist, gas, aerosol, dry powder, and foam, etc.

System Features

As the small diameter of the high-pressure water mist droplets, the contact surface area of the water with the same volume increases sharply, thereby enhancing the effectiveness of heat exchange and achieving a very good cooling effect. The high- pressure water mist is quickly vaporized after absorbing heat, making the volume expand rapidly, usually reaching more than 1700 times, thus reducing the concentration of oxygen in the air, inhibiting the rate of an oxidation reaction in combustion, and playing a suffocating effect. This shows the fire extinguishing mechanism of the high-pressure water mist: one is the cooling effect, absorbing heat; the other is the suffocation effect, blocking the oxidation reaction. In addition, the high-pressure water mist has a very superior performance in blocking the transfer of heat radiation, and can effectively block strong heat radiation.

Under normal circumstances, the open-type high-pressure water mist open system is in a standby state, the pump unit does not start, and there is no water in the pipe network. It is currently the most widely used type of high-pressure water mist fire extinguishing. It is suitable for large-scale or high-space places such as large spaces, commercial and civil buildings, and it is also suitable for local places.

High-pressure water mist fire extinguishing devices mainly include pump units, control cabinets, section valves, special water mist nozzles, manifold, safety relief valves, pressure sensors, pressure gauges, filters, stainless steel high-pressure ball valves, and fire detector, and other components.

Application classification of high-pressure water mist system

Total flooding application water mist system: The water mist system evenly sprays water mist into the entire enclosure to protect all protected objects in the enclosure.

Local application water mist system: The water mist system directly sprays water mist to the protected objects for the protection of a specific protection object indoor and outdoor or local space.

Local application water mist system: The water mist system protect a predetermined area within the enclosure.

Features

- No pollution and damage to the environment, protection objects, fuel, is the ideal environmentally friendly products.
- Good electrical insulation performance, safe and reliable to fight fires on electric equipment.
- Less firefighting water consumption, less water residue.
- Water mist spray can greatly reduce the smoke content and toxicity of the fire, beneficial to safe evacuation.
- Good fire extinguishing performance, widely used, the fire is fierce, and the fire extinguishing performance is better for the violent and fast-spreading fire.
- Water as a fire extinguishing agent from a wide range of sources, low price.
- Water tank in the standby state for atmospheric pressure, no leakage problems, safe and reliable.

Water Mist System
Application

Water mist is suitable for fire extinguishing, fire suppression, fire control, and temperature control of the following fires:

Class A fires involve solid combustible materials that typically form glowing embers during combustion. These include substances such as wood, rubber (including car tires), paper, and textiles. Extinguishment of Class A fires is primarily achieved through cooling of the burning material, most commonly using water or water-based agents. Certain dry chemical agents may also be used to coat the fuel surface, restrict oxygen supply, and suppress smoldering to prevent re-ignition.

Class B fires involve flammable or combustible liquids, including petrol, oils, grease, ether, and alcohol. These fires burn at the surface where flammable vapors are released and mixed with air. Effective extinguishment is achieved by interrupting the combustion process or by smothering the fire to prevent vapor release. Common extinguishing agents include foam, dry chemical, carbon dioxide, and clean agents, depending on the application and hazard conditions.

Class C fires involve flammable gases burning under pressure, such as propane, butane, methane, acetylene, and town gas. These fires present a high risk of explosion if gas flow is not controlled. The primary objective in fighting Class C fires is to shut off the gas supply whenever it is safe to do so. Extinguishing agents such as dry chemical are used to suppress flames temporarily while isolation of the fuel source is carried out.

Electrical Fires involve energized electrical installations and equipment, including electrical panels, switchgear, motors, transformers, and appliances. The primary hazard is the risk of electric shock; therefore, only electrically non-conductive extinguishing agents such as dry chemical, carbon dioxide, or clean agents shall be used. Once the electrical supply has been isolated, the fire may then be treated according to the underlying fuel class, such as Class A or Class B.

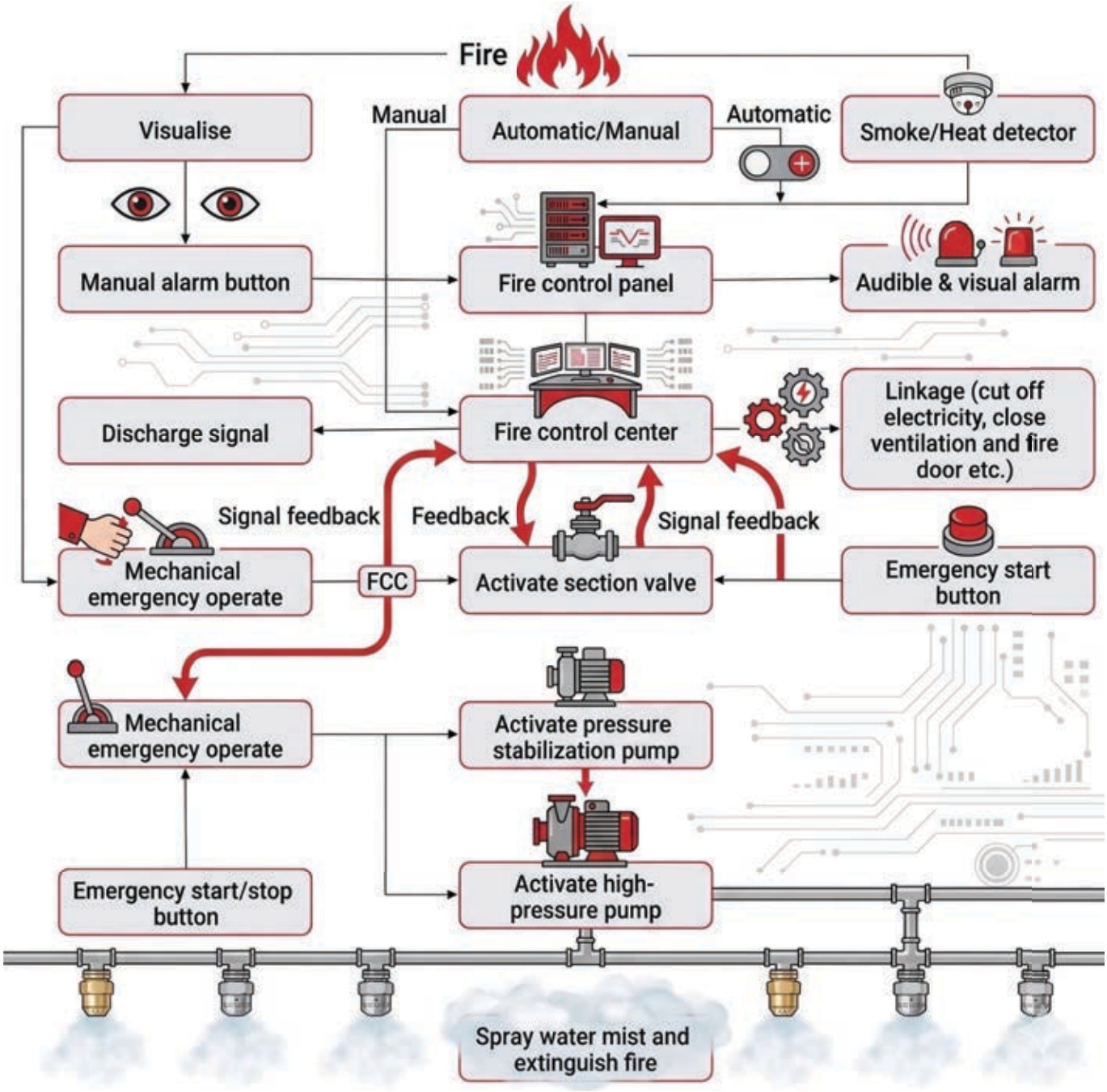
Class K or Class F fires involve cooking appliances and combustible cooking media, including vegetable oils and animal fats such as olive oil, maize oil, lard, and butter. These fires burn at high temperatures and are prone to re-ignition. Specialized wet chemical agents are required to extinguish Class K/F fires by cooling the burning oil and forming a stable layer that prevents oxygen contact and re-ignition, without causing splashing or spread of burning oil.

Other Fires: Fires in engine test rooms, traffic tunnels, locomotive power rooms, electrical rooms, and other places where water mist is suitable for fire extinguishing.

Water mist is not suitable for the following fires:

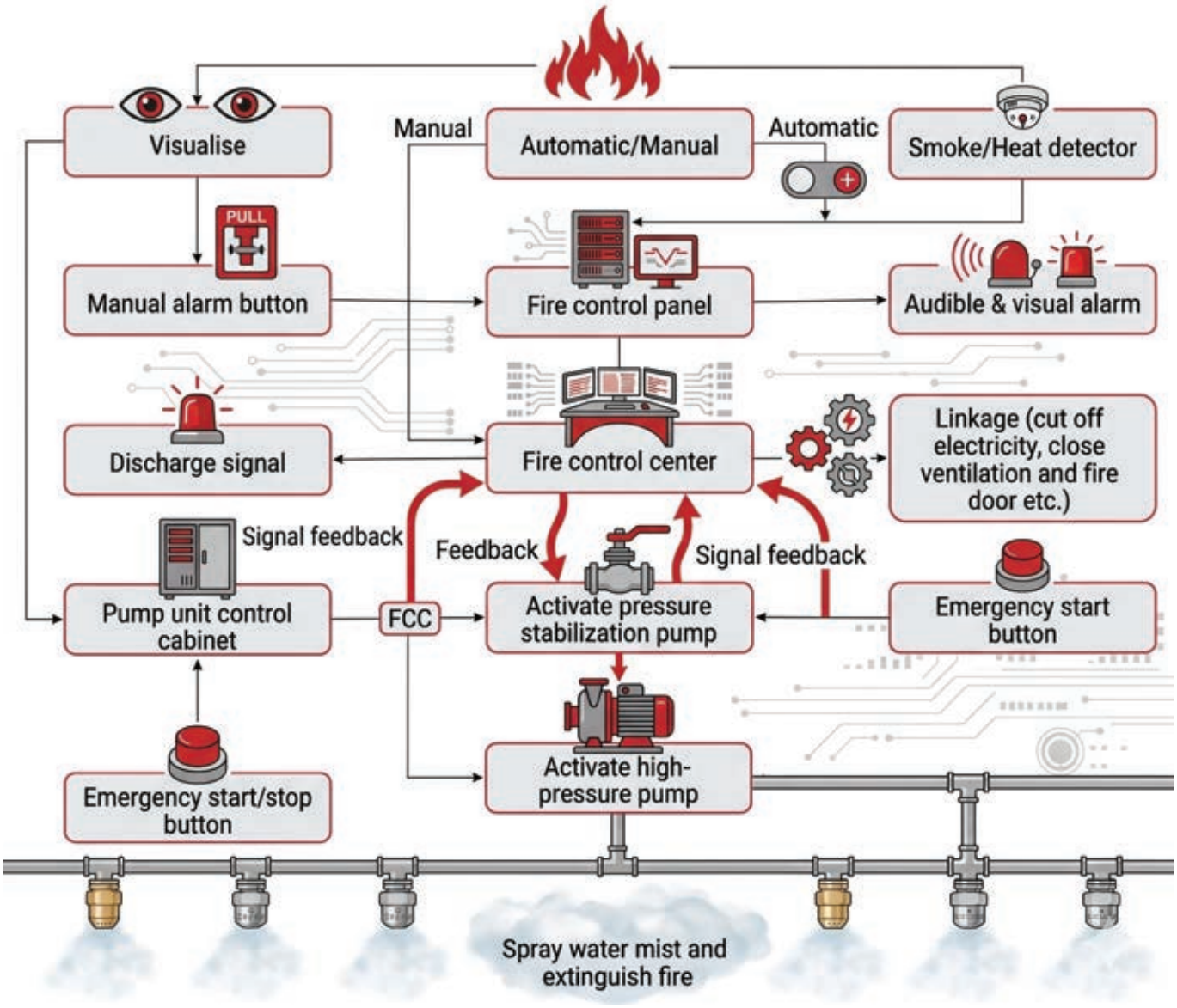
- Substances that can produce combustible gases in contact with water.
- Substances that can react and lead to combustion, explosion, or the production of a large number of harmful substances fire in contact with water.
- Substances that can produce violent boiling overflow combustible liquid fire in contact with water.

Water Mist System
Working Principle



Open-type water mist fire extinguishing system

Water Mist System
Working Principle



Close-type water mist fire extinguishing system

Water Mist System
Components

The activated modes of high-pressure water mist system: Automatic activating, Electrical Manual Activating (remote or on-site), Mechanical Emergency Activating:

Automatic control: Select "Auto" as the control mode on the fire alarm controller to put the system in an automatic control state.

Step of open-type: When a fire occurs in the enclosure, the fire detector detects the fire and sends a signal to the fire alarm controller. The fire alarm controller confirms the area where the fire occurred according to the address of the fire detector, then sends a control signal to start the fire suppression system and opens the corresponding section valve. After the section valve is opened, the pressure of the pipeline drops, and the pressure stabilizer pump starts automatically. After more than 10 seconds, because the pressure still cannot reach the predetermined pressure, the high-pressure main pump starts automatically and the water in the system pipeline quickly reaches the working pressure and sprays out through the high-pressure fine water mist nozzle to produce fine water mist to extinguish the fire.

Step of close-type: When a fire occurs in the enclosure, the closed nozzle detects the fire, the glass bubble breaks, and the flow switch operates, sending a signal to the fire alarm controller. Nozzle corresponding to the pipeline pressure drop, the pressure stabilization pump automatically start running for more than 10 seconds because the pressure still cannot reach the predetermined pressure, the high-pressure main pump automatically start, the system pipeline water quickly reaches the working pressure, nozzle normal work to produce fine water mist to put out the fire.

Electrical manual control: Select "Manual" as the control mode on the fire alarm controller to put the system in an electrical manual control state

Remote control: When a person finds a fire, in the case of fire detectors have not yet acted, you can start the corresponding area of the electric valve (or solenoid valve) button through the remote fire control center (open the section valve of the open-type water mist fire extinguishing system; the valve of close-type is normally open), the pump can automatically start and supply water for fire extinguishing.

On-site control (open-type): When a person finds a fire, he/she can also open the section valve cabinet on-site and press the section valve control button to open the section valve to extinguish the fire.

Mechanical emergency control:

In the event of a fire alarm system failure, can manually operate the handle on the section valve to open the section valve to extinguish the fire (open-type).

In the case of fire alarm system failure can be manually damaged the temperature- sensitive glass bubble of the nozzle, and start the water mist system to extinguish the fire (close-type).

System reset

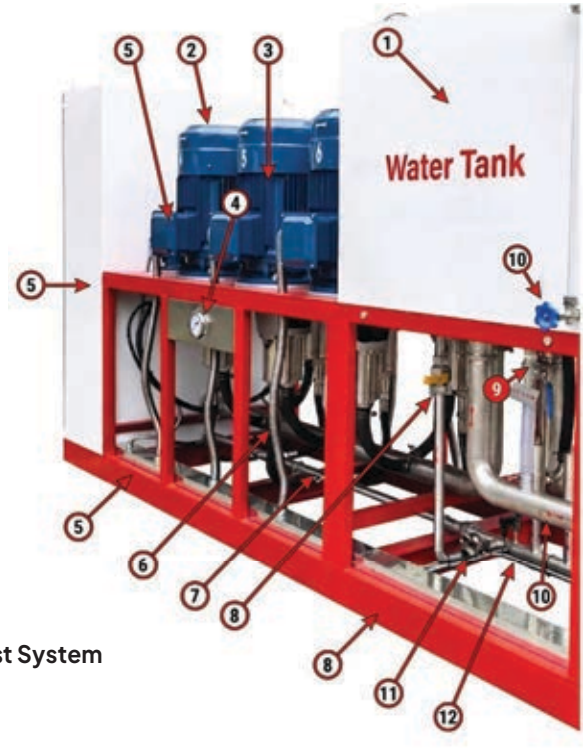
After the fire, stop the main pump by pressing the emergency stop button on the pump control cabinet, and then close the section valve. After stopping the pump to drain the pressurized water in the main pipe, if it's a close-type system, also need to replace the close-type nozzle with the same model specifications.

Close the main valve at the pump unit, disconnect the main pump in the pump control cabinet, and press the reset button on the pump control cabinet, so that the system is in a ready state, the water tank automatically starts to replenish water. After the replenishment is completed, the main pipe is filled with water by a pressure-stabilizing pump until it reaches the normal system working pressure of 1.2MPa. While replenishing the water in the main network, pay attention to the exhaust at the end of the main pipe. After the water replenishment is completed, the system is commissioned and checked according to the commissioning procedure of the system, so that all parts of the system are in working condition.

Water Mist System
Components

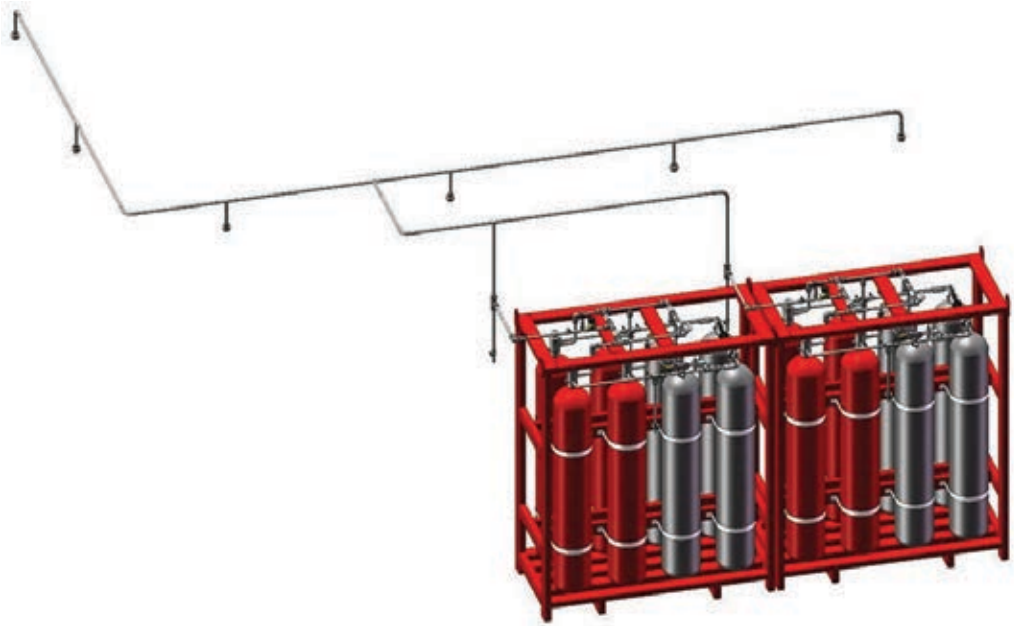
Compositions of open-type water mist system

The system is mainly composed of water source, water supply device (pump unit), pressure stabilization pump unit, control cabinet, section valve, open-type nozzle, pipe network and fire alarm system.



Pump Type Water Mist System

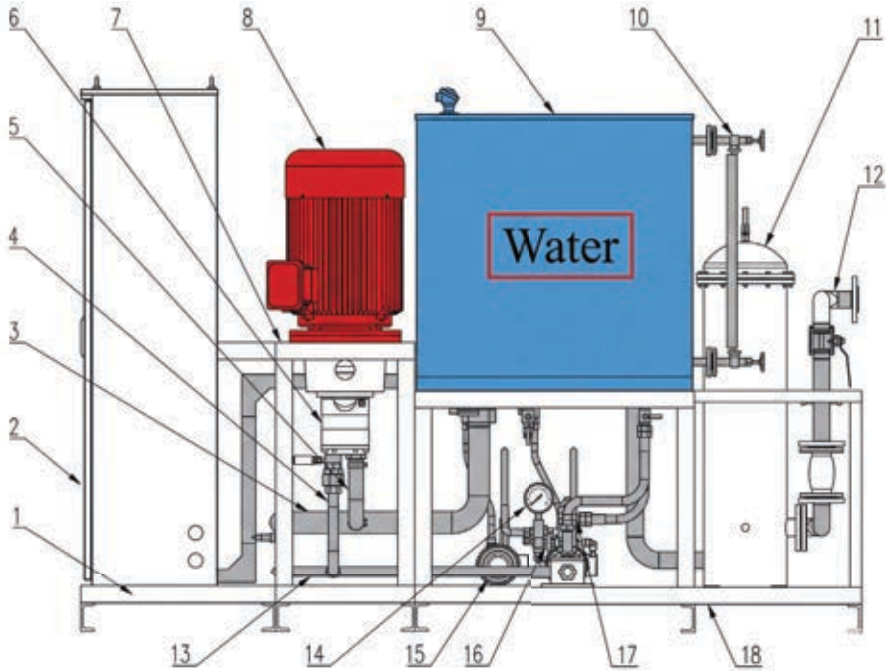
1. Water tank (storage)
2. Main drive motors (prime mover)
3. High-pressure pumps (pressurization)
4. Pressure gauge (monitoring)
5. Control cabinet (logic & electrical)
6. Stainless steel piping (conveyance)
7. High-Pressure discharge manifold (distribution)
8. Suction manifold (supply)
9. Actuation & discharge valve (control)
10. Suction isolation valve (maintenance)
11. Discharge outlet / nozzle point (terminal component)
12. Skid frame (structural)



Cylinder Type Water Mist System

Water Mist System
Components

Compositions of water mist fire extinguishing system

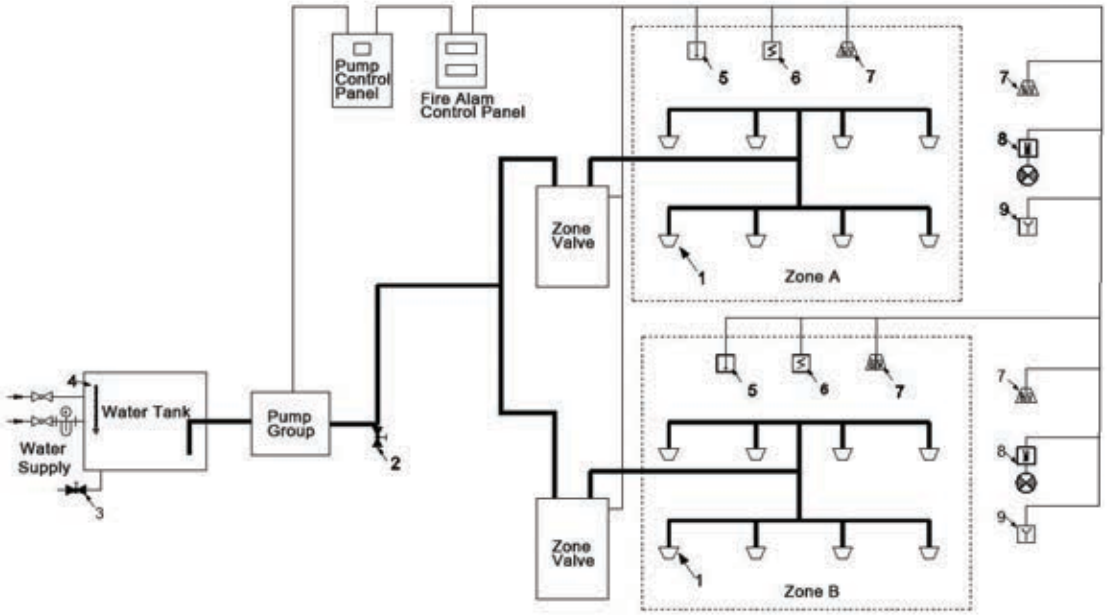


Pump Type Water Mist System

It consists of high-pressure pump, pressure relief regulating valve, safety valve, pressure gauge, water inlet pipeline, high-pressure water outlet pipeline, overflow pipeline, relay tank, stabilized pressure pump, control cabinet, etc., and is used for water supply of high-pressure pump supplied, pressure stabilization of pipeline and control of extinguishing equipment. as shown in the figure.

1. Control cabinet mounting rack
2. Control cabinet
3. Main water inlet pipe of pump supplied
4. Water outlet hose of pump supplied
5. Water inlet hose of pump supplied
6. High-pressure pump
7. Pump supplied mounting bracket
8. Motor
9. Relay water tank
10. Liquidometer
11. High precision filter
12. Water tank inlet pipe group
13. Header
14. Stabilized pressure pump
15. Safety valve
17. Pressure relief regulating valve

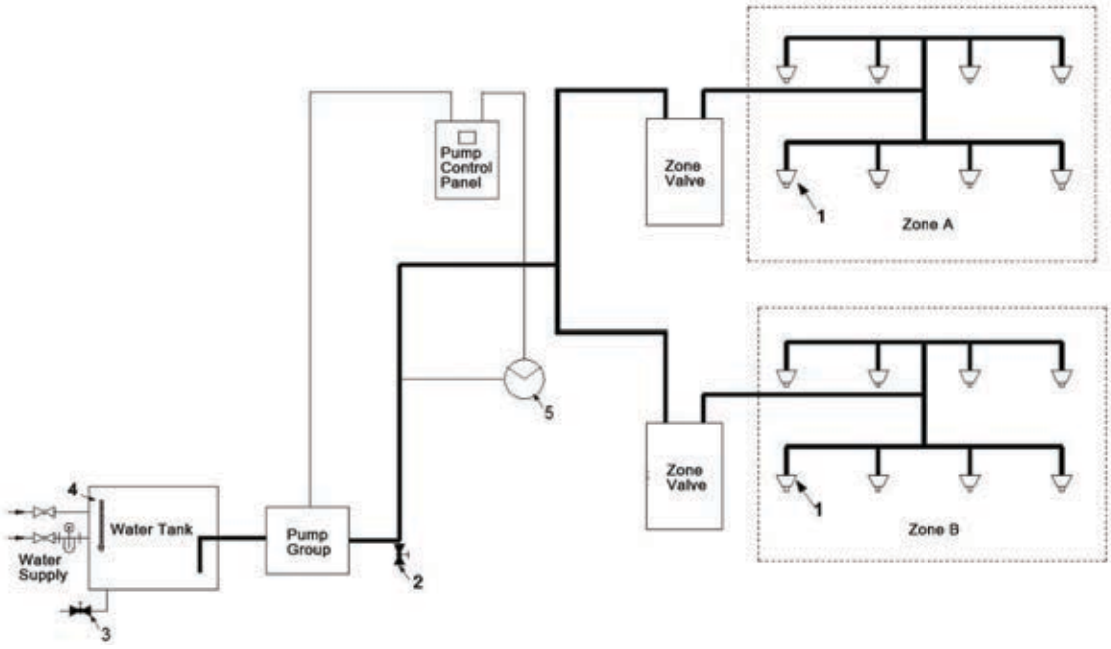
Water Mist System
Components



1. Open-type water mist nozzle
2. Water drain valve
3. Drain valve
4. Liquid meter
5. Heat detector
6. Smoke detector
7. Audible and visual alarms
8. Discharge signal
9. Manual alarm button

Compositions of close-type water mist system

The system is mainly composed of water source, water supply device(pump unit), pressure stabilization pump unit, control cabinet, section valve, close-type nozzle, pipe network and fire alarm system.



1. Close-type water mist nozzle
2. Water drain valve
3. Drain valve
4. Liquid meter
5. Flow switch

Water Mist System
Components

Closed high pressure water mist nozzle

Closed nozzles are suitable for:

- Closed wet water mist fire extinguishing system
- Closed pre-action water mist fire extinguishing system

Overview

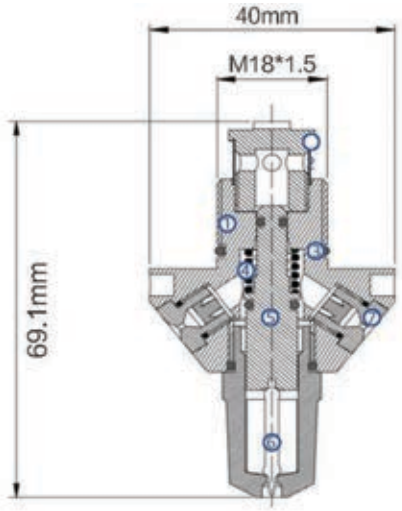
The closed water mist nozzle is made of austenitic stainless steel and consists of a shell, a nozzle, a temperature-sensitive glass ball, etc. Its core component is a plurality of centrifugal nozzles installed on the conical surface of the shell. The atomization mechanism is to utilize the rotating liquid produced by the swirling parts in the nozzle to accelerate and eject the hollow diffusion cone-shaped liquid film through the outlet channel, and use the speed difference between the liquid and the outside air to break up and atomize.

Water mist system with closed nozzles

While in standby mode, our system maintains a pipe pressure of approximately 12 bar. Once the temperature surpasses 57°C, the heat-sensitive glass bulbs integrated into the nozzle heads will begin to melt. As a result, the high-pressure pump will be automatically activated, forcing water through high-pressure nozzles (60 or 100 bar, depending on nozzle type) to produce a fine mist. Only those nozzles with melted bulbs will activate, ensuring that only the affected area is actively sprayed.

Product Structure

- Austenitic Stainless Steel Body
- Water Inlet and Filter Screen
- Sealant
- Austenitic Stainless Steel Body
- Nozzle Thimble
- Imported Thermosensitive Glass Bulb
- High-pressure Orifice



Specification

Open Type Nozzle	Flow Parameters(K)	Working Pressure(Mpa)	Working Flow(L/min)
SF-T1.0/10-57°C φ2	1.0	10.0-14.0	10.0-11.8
SF-T1.2/10-57°C φ2	1.2	10.0-14.0	12.0-14.2
SF-T1.5/10-57°C φ2	1.5	10.0-14.0	15.0-17.7
SF-T1.7/10-57°C φ2	1.7	10.0-14.0	17.0-20.1
SF-T2.0/10-57°C φ2	2.0	10.0-14.0	20.0-23.7
SF-T2.5/10-57°C φ2	2.5	5.0-10.0	12.5-29.6

Water Mist System
Components

Open high pressure water mist nozzle

Open nozzles are suitable for:

- Open wet water mist fire extinguishing systems

Overview

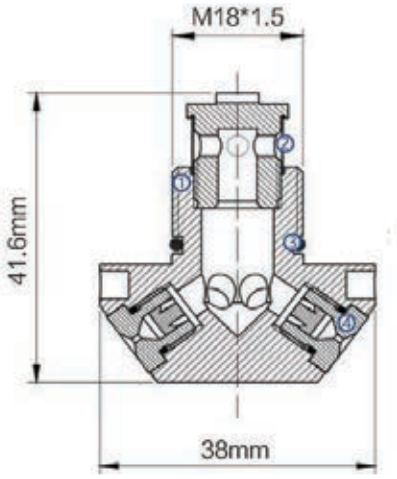
The open water mist nozzle is made of austenitic stainless steel and consists of a shell, a nozzle, etc. Its core component is a plurality of centrifugal nozzles installed on the conical surface of the shell. The atomization mechanism is to utilize the rotating liquid produced by the swirling parts in the nozzle to accelerate and eject the hollow diffusion cone-shaped liquid film through the outlet channel, and use the speed diference between the liquid and the outside air to break up and atomize.

Water mist system with open nozzles

While on stand-by, our system boasts dry piping for maximum efficiency. Activation can be achieved manually or through the sensors that detect heat, smoke, or flames - tailored to your specific needs. Our nozzles are thoughtfully grouped in sections, so upon activation, all nozzles within the selected section will be released for optimal fire suppression.

Product Structure

- Austenitic Stainless Steel Boc
- Water Inlet and Filter Screen
- Sealant
- High-pressure Orifice



Specification

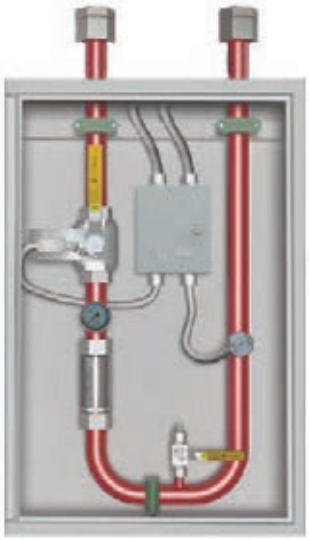
Open type Nozzle	Flow Parameters(K)	Working Pressure(Mpa)	Working flow(L/min)
SF-T0.3/10-PRI	0.3	10.0-14.0	3.0-3.5
SF-T0.5/10-PRI	0.5	10.0-14.0	5.0-5.9
SF-T0.7/10-PRI	0.7	10.0-14.0	7.0-8.3
SF-T0.9/10-PRI	0.9	10.0-14.0	9.0-10.6
SF-T1.0/10-PRI	1.0	10.0-14.0	10.0-11.8
SF-T1.2/10-PRI	1.2	10.0-14.0	12.0-14.2
SF-T1.5/10-PRI	1.5	10.0-14.0	15.0-17.7
SF-T1.7/10-PRI	1.7	10.0-14.0	17.0-20.1
SF-T2.0/10-PRI	2.0	10.0-14.0	20.0-23.7
SF-T2.5/10-PRI	2.5	5.0-10.0	12.5-29.6
SF-T3.0/10-PRI	3.0	5.0-10.0	15.0-35.5
SF-T3.5/10-PRI	3.5	5.0-10.0	17.5-41.4
SF-T4.0/10-PRI	4.0	3.5-10.0	14.0-47.3
SF-T4.5/10-PRI	4.5	3.5-10.0	15.8-53.2
SF-T5.0/10-PRI	5.0	3.5-10.0	17.5-59.2
SF-T5.5/10-PRI	5.5	3.5-10.0	19.3-65.1

Water Mist System
Components

Section Valve

In a water mist fire suppression system, valves play a crucial role in controlling the flow of water or water mist. These systems typically include various types of valves, such as:

- Deluge Valve: A deluge valve is a key component in a water mist system. It remains open and allows water to flow into the piping network when a fire detection system is activated. Deluge valves are often used in high-hazard areas.
- Control Valve: Control valves are used to regulate the flow of water or water mist in specific sections of the system. They can be manually or automatically operated based on the system design.
- Isolation Valve: Isolation valves are strategically placed in the system to isolate specific sections or zones. This allows for maintenance or repairs without affecting the entire system.
- Pre-action Valve: In some water mist systems, pre-action valves are used. These valves are kept closed until a fire is detected. Once activated, they open to allow water flow into the piping system.



Type A

It consists of pressure switch, high-pressure manual ball valve, high-pressure electric stop valve, junction box, pressure gauge and box. The working power supply is DC24V, 0.15A, and the rated working pressure is 160 Bar.

It starts automatically when receiving the linkage signal from the fire alarm controller and the feedback valve opening signal is sent to the fire alarm controller, then the high-pressure pump supplied starts to release water mist to the enclosure for fire extinguishing, the pressure switch sends a spraying feedback signal to the fire alarm controller, as shown in the figure.

TypeB

It consists of pressure switch, high-pressure electric stop valve, junction box and box. The working power supply is DC24V, 0.15A, and the rated working pressure is 160 Bar.

It starts automatically when receiving the linkage signal from the fire alarm controller and the feedback valve opening signal is sent to the fire alarm controller, then the high-pressure pump supplied starts to release water mist to the enclosure for fire extinguishing, the pressure switch sends a spraying feedback signal to the fire alarm controller, as shown in the figure.

Water Mist System
Components

High-pressure plunger pumps

The high-pressure plunger pump is the key part to produce high-pressure water, is one of the core components of a high-pressure water mist system, our high-pressure plunger pump adopts foreign advanced technology, with the advantages of long use cycle and stable performance.

Pump model	Max. pressure	Max. flow	Supporting motor power
112.140	14	112	30
134.160	16	134	37

Electric motor of water pumps

Our high-pressure water mist system adopts a three-phase asynchronous motor.

Star buck start is used, and after 5 seconds of the start, it is transformed into a triangle start to achieve the purpose of reducing the start current at the moment of start and to make the motor reach the rated power. The rated speed of the motor selected for the high-pressure water mist system should be consistent with the speed requirements of the pump. Motor voltage: 380V, power: 30KW.

Pressure stabilization pump

The pressure stabilizing pump stabilizes the pressure in the pipeline. After the section valve is opened, the pipeline pressure drops, and the pressure stabilizing pump automatically starts. After running for more than 10 seconds, if the pressure still does not reach 1.2MPa, the high-pressure main pump will automatically start. The stabilized pump is made of stainless steel

Pump control cabinet

The control cabinet of the high-pressure water mist pump unit is composed of star- delta controller, programmable controller, sensor, control circuit, and cabinet.

- Voltage: AC 380V
- Digital display screen can show pressure of pump outlet and liquid level of water tank
- The working status indicator light can display the working status of each pump, main and backup power supply, etc;
- Adopting PLC control, stable and reliable, with strong anti-interference ability;
- Equipped with a dual power switch, which can be connected to two power sources to ensure reliable system use;
- There are manual start and stop buttons on the control cabinet panel of the pump unit, which can perform on-site start and stop operations on the pump unit;
- The pump control cabinet is equipped with emergency start and emergency stop buttons, which can complete pump operation with one click.

Water Mist System
Components

Section valve

The open-type water mist system section valve consists of section control valve, high- pressure ball valve, pressure gauge, pressure transmitter, etc. The main material of the valve cabinet is stainless steel corrosion-resistant materials, its main feature is with compact structure, centralized control, reliable performance, easy maintenance. Close- type has a manual high-pressure ball valve, pressure gauge, flow transmitter, and other components.

Open-type high-pressure section valve has automatic, manual, and mechanical emergency control methods.

Open-type section control valve

Close-type section control valve (ball valve)

Main specification of open-type section valve:

Model	Diameter	Rated Working Pressure (MPa)	Working Voltage (V)	Rated Power Consumption (W)
SF-FZ 15/10 RG	DN15	16	DC24	20
SF-FZ 20/10 RG	DN20	16	DC24	20
SF-FZ 25/10 RG	DN25	16	DC24	20
SF-FZ 32/10 RG	DN32	16	DC24	40
SF-FZ 40/10 RG	DN40	16	DC24	40
SF-FZ 50/10 RG	DN50	16	DC24	50

Safety valve/Pressure regulator valve

Also known as safety relief valve, is an automatic pressure relief device driven by the medium pressure. The safety valve/regulator relief valve is made of stainless steel.

Water Mist System
Components

Specification of open-type nozzle:

Nozzle model	K factor	Nozzle orifice diameter (mm)	Working pressure (MPa)	Installation of total flooding application Spacing*Height (m)	Installation of local application Spacing*Height (m)
SF-T0.5/10RG	0.5	0.39	10 ~ 14	3*3*5	-
SF-T0.7/10RG	0.7	0.48	10 ~ 14	3*3*8	3*3*3
SF-T1.0/10 RG	1.0	0.61	10 ~ 14	3*3*8	3*3*3
SF-T1.2/10RG	1.2	0.71	10 ~ 14	3*3*8	3*3*3.5
SF-T1.7/10 RG	1.7	0.84	10 ~ 14	3.5*3.5*8	3*3*4
SF-T2.0/10RG	2.0	0.90	10 ~ 14	3.5*3.5*8	3*3*4

Specification of close-type nozzle:

Nozzle model	K factor	Nozzle orifice diameter (mm)	Working pressure (MPa)	Installation of total flooding application Spacing*Height (m)
SF-T1.2/10-57°C 62RG	1.2	0.71	10 ~ 14	3*3*5
SF-T1.5/10-57°C 6 2RG	1.5	0.76	10 ~ 14	3*3*5
SF-T2.0/10-57C 6 2RG	2.0	0.90	10 ~ 14	3*3*5

Remote wireless monitoring system (optional)

Fine water mist fire extinguishing can be selected remote wireless monitoring system, set up a processor inside the control cabinet, the processor is embedded with a wireless communication module, wireless communication module and remote monitoring terminal for communication, for the processor to send the signal received by the remote monitoring terminal, but also with portable intelligent devices for communication. The parameters of each monitoring point of the device acquired by the current processor are sent to the remote monitoring terminal (e.g., cell phone), and the back-end software compares the parameters with the set values and analyzes them, and issues the corresponding response mechanism. The remote wireless monitoring system has the following features.

A remote wireless monitoring system can be used for water mist fire extinguishing system. To install a processor with wireless communication module in the control cabinet, the wireless communication module communicates with the remote monitoring terminal to send the signal received by the processor to the remote monitoring. The terminal can also communicate with portable smart devices.

The parameters of each monitoring point of the device acquired by the current processor are sent to a remote monitoring terminal (such as a mobile phone, etc.), the parameters and the set values are compared and analyzed through the background software, and the corresponding response mechanism is issued. The remote wireless monitoring system has the following features.

1. Small volume, light weight, easy to install, debug and use.
2. Modular design, easy to install and maintain, safe and reliable.
3. GPRS remote wireless communication, can monitor each product everywhere.

Water Mist System
System Design

The following factors should be consider when design the system:

- The type of fire that may exist;
- Fire performance target;
- The geometric dimensions of the protective space;
- Ambient wind speed or ventilation conditions;
- Type of fire detection system;
- How to activate the water mist fire extinguishing system;
- The distribution of pipes and sprinklers;
- The highest or lowest ambient temperature.

The design of water mist system shall contain the following the following basic parameters:

The flow coefficient of the nozzle, the maximum and minimum working pressure of the nozzle.

The maximum and minimum working pressure of the system.

The maximum distribution of the nozzle spacing and maximum and minimum installation height.

The spraying time of the system.

For total flooding application system, shall meet the following requirements.

Should install audible and visual alarms, emergency lighting and evacuation signs at the enclosure;

Should install discharge signal, audible and visual alarms at the entrance of enclosure.

The evacuation door of the enclosure shall be opened in the direction of evacuation.

System Selection

The type selection of the water mist system should be based on the protected objects in the enclosure, the type of fire and the nature of the use of the enclosure, and geometry and environmental conditions.

Telecommunications rooms, electronic computer rooms, and other electronic equipment rooms and other needs to reduce water damage and smoke loss of the site, should use a high-pressure open-type water mist system.

Archives, libraries, important data banks, and other places and the existence of multiple elevation differences between the protection area of the place, should use a high-pressure water mist system.

For flammable liquid fires, an open-type water mist system should be selected.

When a closed space needs full protection, a total flooding system should be used. When the space is large and only a part of the space needs to be protected, the local application system should be adopted. When only a specific facility in the space needs to be protected, a local application system should be selected.

The maximum volume of the protective area protected by a total flooding water mist system should not be larger than 3000m3; When it exceeds this volume, dividing to multiple enclosures should be considered.

The self-contained high-pressure water mist system should be equipped with a standby pump, and the water supply capacity of the standby pump should not be less than the water supply capacity of the largest working pump.

The working temperature of the high-pressure water mist system should be 4°C -50°C.

The pressure of the nozzle at the most disadvantageous part of the high- pressure water mist system should not be less than 10MPa.

Nozzle distribution.

The distribution of the nozzles should be determined per the protection object and the characteristics of the nozzles. In addition to the local application system, the nozzles should be installed in a rectangular shape and it is appropriate to a square arrangement.

The distance between the nozzles and the wall or horizontal obstacles should not be more than half of the distance between the nozzles.

Spraying time

The spraying time of the high-pressure water mist system should follow the below table:

Water Mist System
Specification

Spraying time of a high-pressure water mist system:

Enclosures	The min. design spraying time (min)
Electronic information system room, power distribution room and other electronic and electrical equipment rooms, library, database, archives, cultural relics, cable tunnel, cable mezzanine, etc.	30
Oil-immersed transformer room, turbine room, diesel generator room, hydraulic station, ubricating oil station, oil-fired boiler room and other mechanical equipment rooms that contain liquid	20

Selection of min. Spray intensity

For closed type system, see below chart of min. Spray intensity nozzle mounting distance and height

Application	Install height of nozzle (m)	Mix. spray intensity of the system (L/min.m2)	Max. mounting distance of nozzles (m)
Image library, database, and file library stored in non dense cabinets	>3.0 and ≤5.0	3.0	>2.0 and ≤3.0
	≤3.0	2.0	

For open type system, see below chart of min. Spray intensity nozzle mounting distance and height

Application	Working pressure of nozzle (MPa)	Install height of nozzle (m)	Mix. spray intensity of the system (L/min.m2)	Max. mounting distance of nozzles (m)
Oil immersed transformer room	≥10	≤7.5	1.2	3.0
Hydraulic station, diesel generator room, oil boiler room		≤5.2	1.0	
Cable tunnel, cable interlayer		>3.0 and ≤5.0	2.0	
		≤3.0	1.0	
Cultural Relics Warehouse, Dense Cabinet Storage Library, Database, Archive Room		>3.0 and ≤5.0	2.0	
		≤3.0	1.0	
Electronic information, host workspace, system room, floor mezzanine		≤3.0	0.7	
		≤0.5	0.3	

Water Mist System
Installation and Debugging

The installation of pump unit should comply with following requirements:

The type, specification of the fire pump, shall comply with the design requirements.

The installation of the high-pressure pump shall conform to the standard GB50265 <Compressor, fan, pump installation engineering construction, and acceptance specification>. The type and installation of the coupling between the high-pressure water pump and the prime mover should meet the requirements.

Filter and valve should be set on the suction pipe of the high-pressure water pump, and there should be no airbag and air leakage in the horizontal section, and the reducer should be connected with a small and large head.

The installation of the valve group shall comply with the following requirements.

The installation position of valve group observation instrumentation and operating valve should be in line with the design requirements and should be easy to observe and operate.

Section valves should be installed after the pipeline pressure test and flushing test is passed, the installation height should be 1.2m ~ 1.6m, and the distance between the operating panel and wall or other equipment should not be less than 0.8m.

The valve control device of the section valve should be set outside the enclosure for easy operation, inspection, and maintenance, and should be close to the enclosure, and in the event of fire should be able to safely open and easy to operate. The installation of the water drive pipe should comply with the relevant requirements of the wet system. If the pipeline behind the section valve needs to be inflated, its installation should be carried out according to the relevant requirements of the dry- type alarm valve set.

The installation location of the end water test device and water test valve should be easy to check, test, and have the drainage facilities of corresponding drainage capacity.

The installation of the pipe should comply with the following requirements:

Recommended size for stainless steel seamless pipe: (from GB/T 17395<Seamless steel pipe size, shape, weight and allowable deviation>)

Nominal diameter	DN15	DN20	DN25	DN32	DN40	DN50
Outer diameter of pipe	24	27	32	40	48	60
Thickness of pipe	2.5	3	3	4	4	5

The pipeline of the system should be made of stainless steel or copper, and the pipeline of the high-pressure system should be connected by welding, flange, or special joint, and the system pipeline should be fixed by metal support and hanger. The support, hanger should be anti-corrosion treated and should avoid electrochemical corrosion with the system pipeline.

Pipe supports and hangers should be fixed on the building components. The maximum distance of piping support and hanger of high pressure system shall not be greater than that specified in the following table.

The max. distance of the piping support and hanger:

Outer diameter of pipe (mm)	<16	20	24	28	32	40–48	-60	>76
Max. Distance (m)	1.5	1.8	2	2.2	2.5	2.8	3.2	3.8

System pipe support, hanger should be able to withstand the weight of the pipe when full of water. The high-pressure water mist system pipeline should take anti- shaking measures.

Pipeline construction process should ensure that the internal cleanliness of the pipeline, there shall be no welding slag, weld tumor, oxide skin, mechanical impurities, or other foreign matter.

The spacing between the flanges of the pipes in the same row should be convenient for dis-assembly and should not be less than 100mm.

Water Mist System
Installation and Debugging

Spraying time of a high-pressure water mist system:

Casing should be installed at the position of pipe through the wall, floor. The length of the casing through the wall should not be less than the thickness of the wall, and its joint position from the wall should be greater than 0.8m. The length of the casing through the floor should be 50mm above the ground, and the gap between the pipe and the casing should be filled with flexible non-combustible material.

Pipeline welding bevel form, processing methods, and size standards, etc., should be in line with the current national standards GB/T985 <Gas welding, manual arc welding, and gas shielded welding seam bevel of the basic type and size>, GB/T986 <Submerged arc welding seam bevel of the basic form and size> of the relevant provisions; pipe and pipeline, pipe and pipe joint welding should be used to butt welding.

The system pipeline should be flushed after installation, and should comply with the following requirements:

It is appropriate to use water that meets the water quality requirements of the system water source for pipe flushing.

Flushing shall be carried out continuously and the flow rate shall not be less than 1.05 times the design flow rate.

Protective measures should be taken for the instrumentation of the system before flushing, and pipe supports and hangers should be inspected, and reinforcement measures should be taken if necessary.

Hydraulic test should be conducted after pipeline flushing, and shall comply with the following requirements:

Test water should meet the requirements of water quality.

The ambient temperature during the test shall not be lower than 5°C; when the ambient temperature is lower than 5°C, anti -freezing measures shall be taken

test pressure shall be 1.5 times the working pressure of the system.

The test point of the test should be located at the lowest point of the system network, and the equipment, instruments, valves and accessories that cannot be involved in the test pressure should be isolated or removed.

Test method: pipeline filled with water, purge air, increase the pressure slowly by test pressure device, when the pressure rises to the test pressure, steady pressure for 5min, no damage or deformation to the pipeline, and then lower the test pressure to the design pressure, steady pressure for 120min, should ensure that the pressure does not drop, no leakage, no visual deformation.

When hydraulic test conditions are not available in cold areas, air or nitrogen can be used for testing.

After passing the hydraulic strength test and tightness test, the system pipeline should be purged with compressed air or nitrogen. The purge pressure should not exceed the design pressure of the pipeline, and the flow rate should not be less than 20m/s. Install a wooden rake board with a white cloth or white paint at the end of the pipe. There should be no rust, dust, water stains, and other debris on the rake board within 5 minutes.

The installation of the nozzle shall comply with the following requirements:

Installation of the nozzle should be carried out after the pipe hydraulic test passed and after purge;

When installing the nozzles, should check the model, specification, and direction of the spray hole of every nozzle according to the design documents, do not disassemble or modify the nozzle;

Nozzle installation should use a special wrench;

The connections pipe threads of the nozzles without the decorative cover should not be exposed to the ceiling; The installation of the nozzles with the decorative cover should be close to the ceiling; The installation of nozzles with an external filter should ensure the filter not extend into the branch pipe.

Nozzle installation should not use PTFE, hemp wire, binder, and other sealing materials, it is appropriate to use end seals or O-ring seals.

Micro-water droplets full coverage of the protection, in the top plane of the protection, the fog cone should have a minimum of 0.1 m cross;

Ensure the nozzle effective spray distance is at least 0.8–1.0 m;

When arrange the nozzles, the space pipeline, beams, moving vehicles, racks and other obstacles to the micro-water droplets of the shade shall be considered;

The arrangement of the nozzle is arranged in a square or a rectangular arrangement with a smaller length and width. For the length of the longer size, can reduce the width for arrangement, but the maximum length should not exceed 3 meters; nozzle distance from the wall is less than half of the same direction of spacing.

Attention

The water in the firefighting water tank and firefighting pneumatic water supply equipment should be replaced from time to time according to the local environment and climate conditions, and measures should be taken to ensure that no part of the firefighting water storage equipment will freeze in winter.

When changing the use of buildings and structures or the location and height of storage of goods will affect the reliable operation of the system, the system should be verified or redesigned.

The system should do regular inspection and maintenance

The annual inspection of the system shall conform to the followings:

The water supply capacity of the water source of the system shall be measured regularly;

A comprehensive inspection of the fire-fighting water storage equipment should be carried out, and the defects should be repaired and repainted.

The quarterly inspection of the system shall meet the followings:

A water discharge test for the end test valves and water discharge test valve next to the section valve should be conducted, to check whether the system start-up, alarm function and water discharge conditions are normal;

Check whether the control valve on the water inlet pipe is in a fully open state.

The monthly inspection of the system shall meet the followings:

The fire-fighting water pump or the fire-fighting water pump driven by the internal combustion engine should be started and operated once. When the fire water pump is automatically controlled to start, it should simulate the automatic control conditions to start and run once;

The solenoid valve should be checked once and a start-up test should be performed and should be replaced in time when the action is abnormal

Check whether the lead seal or chain on each control valve of the system is intact and whether the valve is in the correct position

The appearance of the firewater tank and the fire air pressure water supply equipment, the fire reserve water level, and the air pressure of the fire air pressure water supply equipment shall be checked once, and the measures to ensure that the firewater is not used for other purposes shall be checked whether the measures are intact;

Check the appearance and spare quantity of the nozzles once. If any abnormal nozzles are found, they should be replaced in time; the foreign matter on the nozzles should be removed in time. Special wrenches should be used to replace or install nozzles.

The daily inspection of the system shall meet the followings:

Visual inspection of various valves and control valves on the water pipeline should be carried out, and the system should be ensured to be in normal operation;

The temperature of the room where the water storage equipment is installed should be checked, and it should not be lower than 5°C.

Maintenance, inspection, maintenance and testing must be recorded in detail.

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