



Energy storage fire protection

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Energy storage fire protection Installation is quick and easy

In view of the fire hazards and fire difficulties of the energy storage system, Changyuan Spray has launched a fire nozzle specifically for the energy storage industry on the basis of full research and testing and combined with fire protection standards. Energy storage fire nozzles are mainly used in large-scale and distributed energy storage power stations, mobile energy storage vehicles, backup power storage stations, covering power generation, power transmission and transformation, electricity sales and electricity consumption industry chain and other industries of fire protection systems.

Although the electrochemical energy storage device represented by car battery has various advantages, the metal bond is the most active metal among the known elements (including radioactive elements), and thermal runaway occurs from time to time in the automotive field, which lays a safety hazard for the application of battery storage in energy storage. As the last passive defense system, reasonable design, material selection, layout and construction directly affect energy storage development.



Dongguan Changyuan Spray Technology Co., Ltd. is located in Chang'an Town, Dongguan since its establishment in 2000, has a history of 22 years, the company has more than 200 employees, technology developers account for more than 10%, the company has been rated as a national high-tech enterprise for 12 consecutive years, the company strictly in accordance with the requirements of IATF16949 certification system to establish relevant management systems and processes to meet the delivery quality and cycle of high-end customers, The company has invested more than 50 million yuan for more than ten years to introduce the world's high-end nozzle manufacturing and testing equipment, most of the company's nozzle processing equipment is imported from Japan and Germany, and has established a very advanced particle size and flow test system, the company in the ship desulfurization industry, chemical tank cleaning industry, steel smelting industry nozzles, spray disinfection industry, dry fog dust suppression industry manufacturing has accumulated very rich experience, and has Wärtsilä, Alfa Laval, Tesla, 711 Research Institute, Shanghai Power Construction, Sany, Zoomlion, Customers of world-renowned enterprises such as DJI UAV, Changyuan CYCO nozzle trademark has enjoyed a very high reputation in the field of international industrial nozzles.

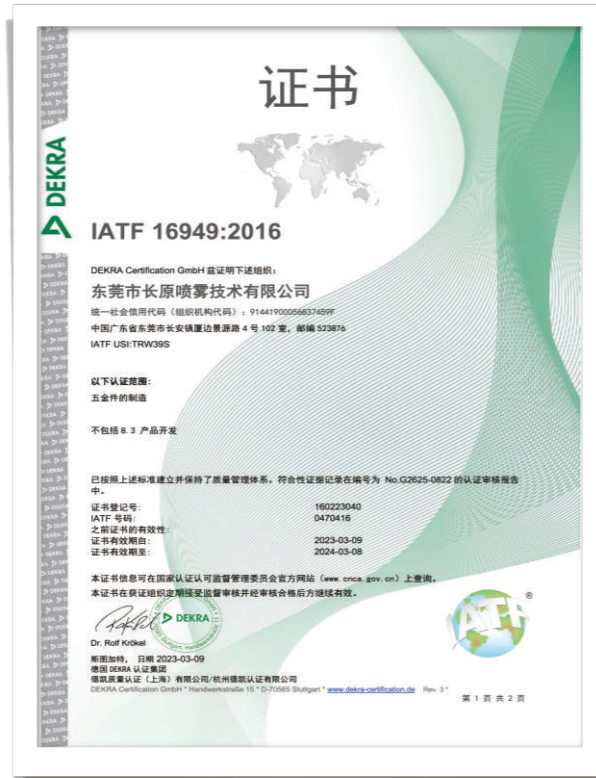
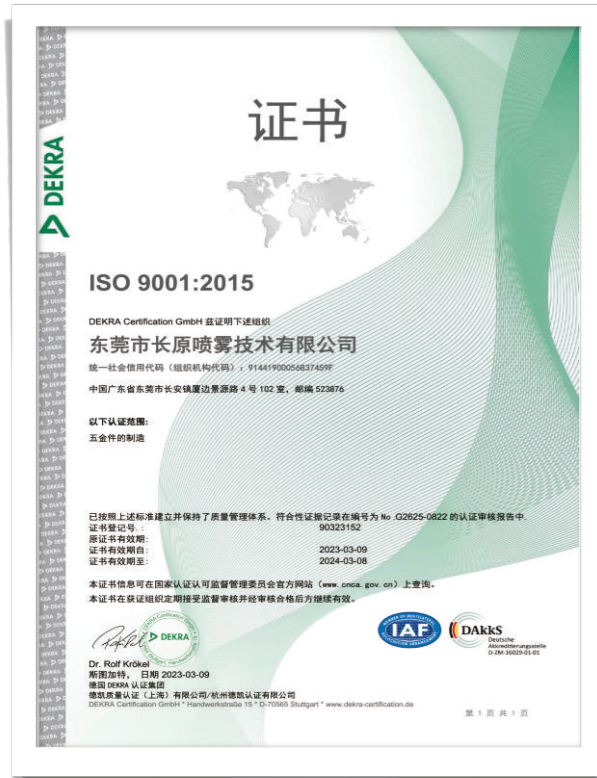
In 2022, the company established a wholly-owned subsidiary Hunan Changyuan Spray Technology Co., Ltd. in Liuyang Environmental Protection Industry Demonstration Park, Hunan Province, and established an advanced production and testing line in the Changyuan factory in Hunan Province, focusing on providing customers with precision spray systems, tank cleaning systems, car cleaning systems, etc., the company will be equipped with advanced equipment and production R & D personnel to provide customers with quality services and create value beyond expectations.

Type

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Case - Quality Assurance

F10-11



Enterprise strength



Spray production department No.1



Spray production department No.2



Precision machining equipment



Patent display wall



Honor display wall



American particle size detector



American particle size detector

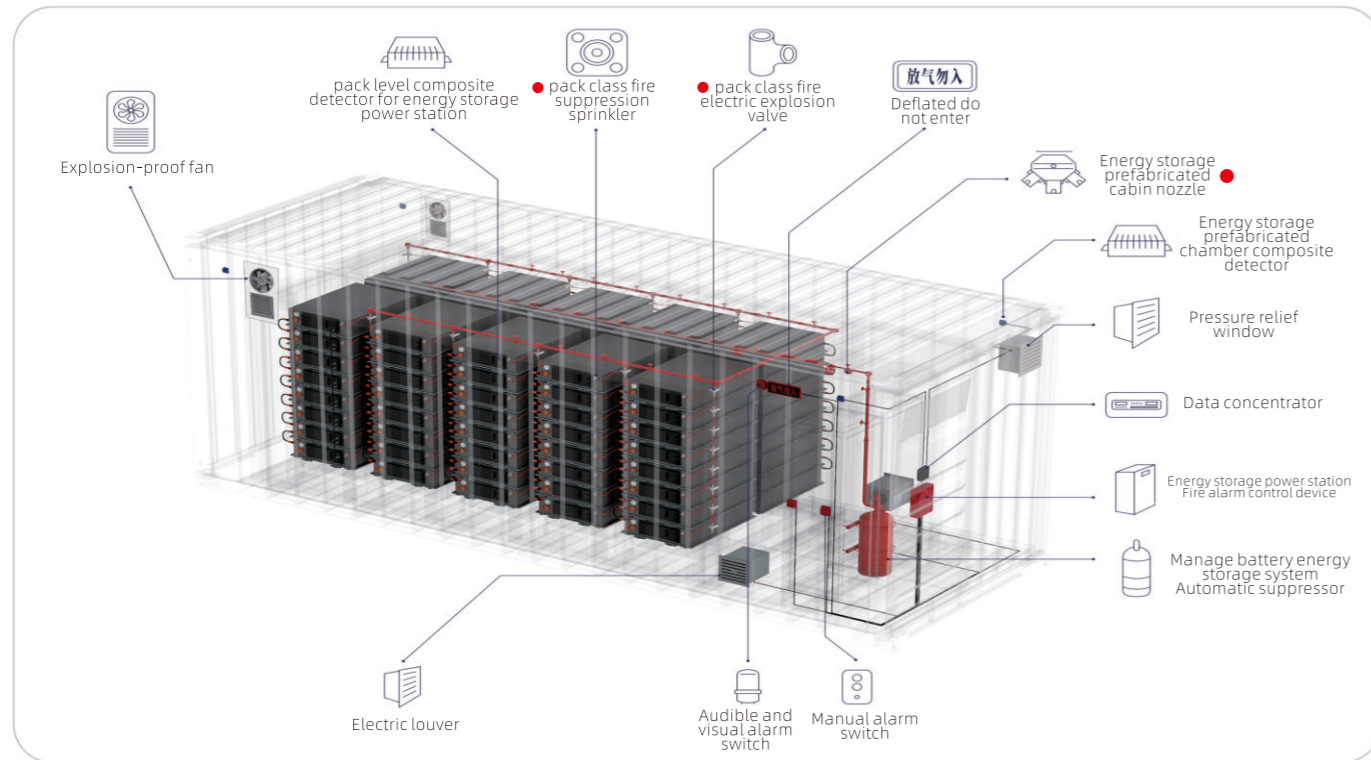


Materials testing laboratory

Some partners



Introduction to energy storage fire protection

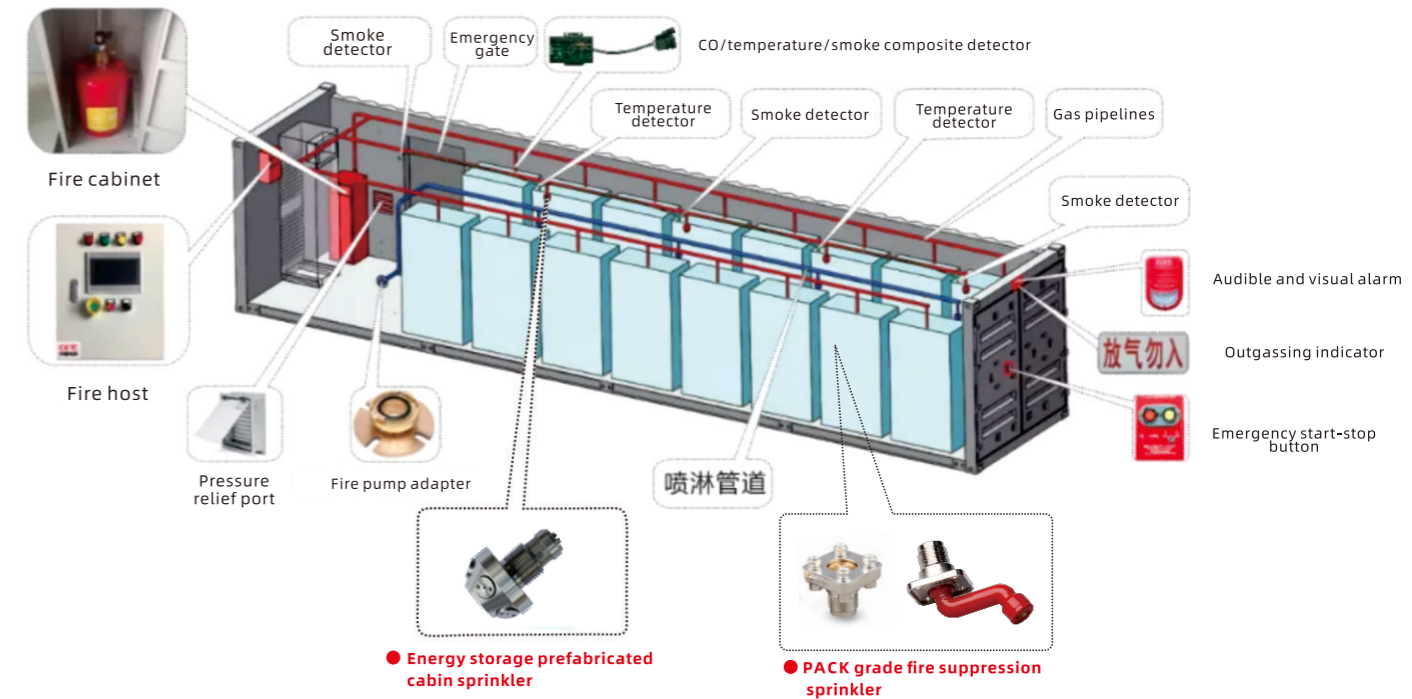


Energy storage fire protection to "prevention first, prevention and elimination combination" as the principle, energy storage safety mainly has two aspects, one is electrical safety, the other is battery safety, in the safety accidents that have occurred, energy storage system fire accounted for a large proportion, the loss caused is also quite heavy. From that point of view, do well Energy storage fire safety is obviously very important.



- Double system, one end connected to perfluorohexanone, one end connected to tap water (about 0.2-0.4MPa)
- Design a variety of detectors, such as temperature; Fumes; combustible gas; Carbon monoxide; Hydrogen and other detectors to sense the fire, through the prefabricated algorithm, start the fire extinguishing device

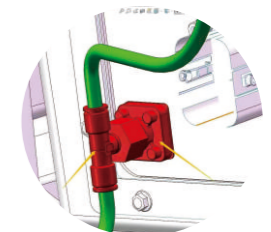
Introduction to energy storage fire protection



Energy storage system refers to a system that stores energy in the form of electrical energy, chemical energy, etc., in case of emergency. Energy storage systems are used in a wide range of applications, including electric vehicles, solar energy, wind energy and other fields. However, the safety of energy storage system has always been the focus of attention, Fuji energy storage power station fire protection system is specially developed for energy storage power station a fire extinguishing system, it is based on the principle of "early detection, accurate fire extinguishing", in the primary stage of thermal runaway early warning and precise suppression treatment, the loss of electrochemical energy storage chamber as much as possible. The energy storage container fire fighting system is composed of fire alarm system + energy storage tank fire extinguishing system, according to the different needs of customers, we customize different fire extinguishing schemes. So what is the composition of the fire protection system of the energy storage power station?

- 1. Fire host:**
As the main fire control system in the station, the fire control host has the functions of collecting detector data, starting the fire extinguisher, sound and light alarm control, and linkage communication of the host in the station. The installation size is different according to the function of the host, and the installation methods are vertical, wall-mounted, and in-cabinet rail mounting. The fire host interacts with the station communication host through the bus. Communication protocols are customized according to customer needs.
- 2. The energy storage cabin fire extinguishing device:**
The use of perfluorohexanone and water as the fire extinguishing medium, through the high-pressure water mist spray, the early spray of perfluorohexanone can improve the post-disaster utilization rate of the energy storage cabin, reduce economic losses, and the later stage can spray fine water mist for continuous cooling and fire extinguishing.
- 3. Detector:**
The composite detector integrates smoke, temperature, hydrogen (H₂), carbon monoxide (CO), and electrolyte gas to detect fire. The detector is installed on the top of the battery cabinet and on top in the container space of the energy storage station.
- 4. Sound and light alarm inside the station/outside the station:**
The sound and light alarm inside and outside the station is installed inside and outside the container, and the sound and light alarm outside the station is an explosion-proof sound and light alarm, which is installed outside the container and at the evacuation channel for fire warning.
- 5. Emergency stop switch:**
set automatic manual, forced start, emergency stop, fire indicator light in one, installed at the entrance of the evacuation passage (outside the container).

The above components are indispensable to ensure the efficient and reliable operation of the energy storage fire protection system, meet the actual needs of fire fighting equipment and maintain the safety and stability of the system. In order to ensure the safe operation of the energy storage power station, Changyuan Spray suggests that the configuration of the fire protection system should be fully considered when designing the energy storage power station.



The importance of energy storage fire protection

PACK class fire suppression nozzle Energy storage fire nozzles



Fire cases of energy storage containers and causes of fires

The safety of energy storage power station is not limited to lithium batteries, if any link of the energy storage system fails, it may cause fire safety accidents, among which, safety risk and safe disposal is the core of energy storage power station safety issues, safety risks mainly cover the electrical safety, chemical safety and fire and explosion safety of energy storage systems and components; Safe disposal includes the design of Fire cases of energy storage containers and causes of fires, the design of product standards and the design of emergency treatment.

(一) Fire cases

Case 1: On the afternoon of May 31, 2016, an explosion occurred in the lithium-ion battery storage warehouse of Jiangsu Qidong enterprise, which was caused by the heating of the battery short circuit.

Case 2: Wuhan Fute caught fire and the waste lithium battery container burned for 2 hours, and a fire occurred in the production workshop of Wuhan Fute Electronic Technology Co., Ltd., and hundreds of square meters of production workshop were burned. As expected, the fire plant has not been completely repaired, and on October 15, a container of the company collecting waste lithium batteries recently exploded and caught fire again, and the fire lasted for 2 hours before being extinguished.

Case 3: In August 2018, a fire occurred in a user-side energy storage project in Yangzhong City, Jiangsu Province, which caused the lithium iron phosphate battery container to burn down, causing adverse effects on the energy storage industry.



The cause of the fire

1. The quality of the battery itself

Some battery production process defects, such as pole piece folding, poor cutting, poor coating of active materials and other manufacturing defects. In long-term battery operation, the battery charge and discharge amplitude is large, and when it is still continuously charged after full charge, the possibility of fire due to internal short circuit of the battery will become higher.

2. Lack of battery protection system

Due to the electrical shock caused by external grounding or short circuit, the DC contactor in the battery rack protection device explodes, resulting in a secondary short circuit accident in the bus bar in the battery protection device and the battery protection device shell, and a fire may occur in the battery.

3. The installation of the energy storage system is not careful

As an emerging industry, some energy storage systems have defective designs, inattentive installation, poor battery storage, incorrect wiring and other installation negligence will cause fire.

4. The environmental impact and maintenance of energy storage operation are not thorough

The electric energy storage industry is generally in a relatively harsh environment, the temperature difference between day and night is too large, it is easy to suffer from natural threats such as lightning strikes and wildfires, and dust is adsorbed in the operating environment of the battery module, causing insulation damage to the grounding part between the battery and the module shell, which will cause fire hazards.

5. Lack of integrated protection management system

Energy storage power stations lack comprehensive system design and protection, manufacturing entities fail to operate organically with other EMS, PMS, BMS and system integration enterprises, and the information sharing system is incomplete. If the PCS fault is repaired, the battery is not confirmed to be abnormal, and the system is started again; O&M personnel do not have strong security awareness, low skill level, and inadequate O&M management. Fire protection is currently one of the biggest problems facing the energy storage industry, which has a huge impact on the sustainable development of the industry, especially after the Beijing 416 incident, the industry has carried out in-depth thinking on safety issues inside and outside. Energy storage fire is different from the previous fire nature, and its fire emergency treatment measures are not perfect, and the domestic energy storage fire safety standards are relatively missing or lagging behind.

Energy storage container fire protection system

The commonly used product of the storage container energy storage power station fire protection system is heptafluoropropane fire extinguishing system, and the optional forms are cabinet heptafluoropropane, suspended heptafluoropropane, pipe network heptafluoropropane. The whole set of fire fighting system is composed of gas fire extinguishing agent bottle group, pipeline, nozzle, signal feedback part, fire detector and controller, emergency start/stop button, sound and light alarm, deflation indicator, etc., so as to realize the automatic detection, alarm and fire extinguishing protection function of the protection area. When sensing changes in smoke and temperature, the sound and light alarm will respond immediately to extinguish the fire in the early stage of the fire to ensure the safety of the containerized energy storage power station.



Product Name: Energy Storage Fire Fighting Nozzle

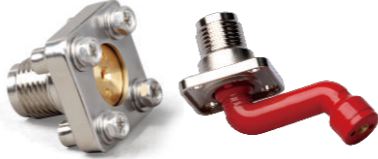
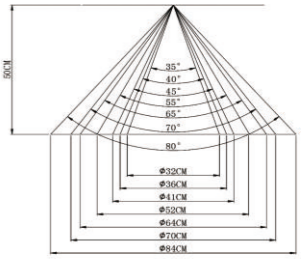
Spray angle: 35°-80°

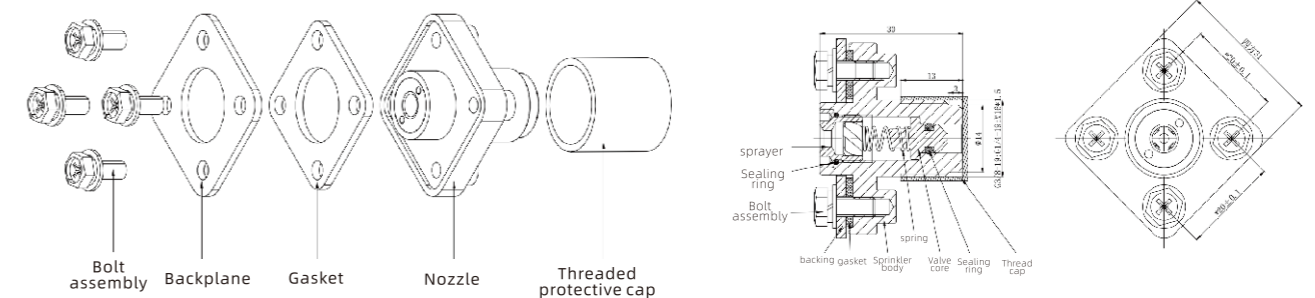
Working pressure: 10-100bar

Working temperature: Different materials correspond to different temperatures

Material: stainless steel

Features: In view of the fire hazards and fire difficulties of the energy storage system, Changyuan Spray has launched a fire nozzle specifically for the energy storage industry on the basis of full research experiments and fire protection standards.

products	aperture	Pressure(kg)	Flowrate (L/min)	angle	Coverage
 <p>Elbow model CYCO fire energy storage nozzle</p>	Φ3.4mm	10	6.32	80	
		20	8.94	70	
		30	10.95	65	
		40	12.65	55	
		50	14.5	45	
		60	16.2	40	
		70	17.5	40	
		80	18.6	40	
		90	19.8	35	
		100	20.6	35	



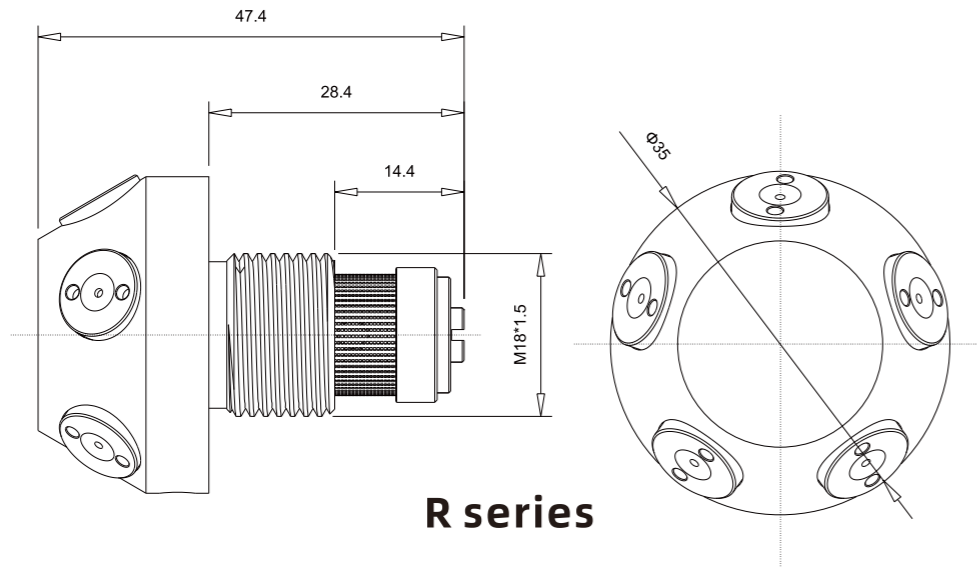
Energy storage prefabricated cabin nozzle High pressure water mist closed nozzle



Design features

- ◆ All stainless steel material, corrosion resistant.
- ◆ Produce fine water droplets with average particles less than 100µm, strong jet momentum, strong penetration to flame, and high fire extinguishing efficiency
- ◆ Long suspension in the air
- ◆ A variety of eddy current technologies for a variety of environments and locations
- ◆ Stainless steel filter screen is adopted to make the nozzle not easy to block

Product size



R series

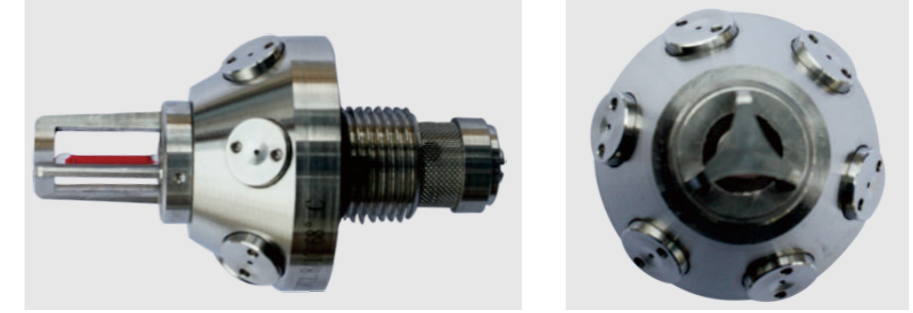
Performance parameters

serial number	Model number	Flow coefficient (K)	Work pressure (MPa)	Total nozzle flow (L/min)	Maximum installation spacing (m)	Maximum installation height (m)
1	XSWT0.5/10	0.5	10	5.0	2.5	3
2	XSWT0.7/10	0.7	10	7.0	2.5	3
3	XSWT0.9/10	0.9	10	9.0	3	3
4	XSWT1.0/10	1.0	10	10.0	3	3
5	XSWT1.2/10	1.2	10	12.0	3	4
6	XSWT1.5/10	1.5	10	15.0	3.5	4
7	XSWT1.7/10	1.7	10	17.0	4	4
8	XSWT2.0/10	2.0	10	20.0	4	5

Ordering information

XSWT1.0/10
1.0 - Flow coefficient (K)
10- Minimum working pressure
please contact our sales engineer for details

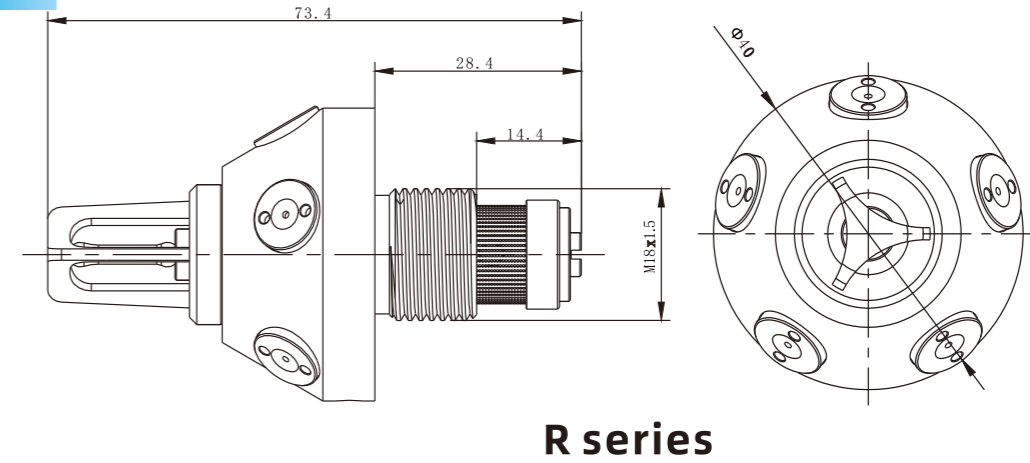
Energy storage prefabricated cabin nozzle High pressure water mist closed nozzle



Design features

- ◆ All stainless steel material, corrosion resistant.
- ◆ Produce fine water droplets with average particles less than 100µm, the droplets are densely and uniformly distributed in space, and the suspension residence time in the air is long.
- ◆ The unique vortex nozzle technology overcomes the influence of extremely fine droplets by air resistance.
- ◆ Different spray angles and models, 120 degree angle covering nozzles and finer vapor mist tumbling nozzles are adopted to make the system better adapt to different fire extinguishing environments and protection objects.
- ◆ A variety of flow coefficient options, suitable for a variety of different environments and places.
- ◆ 304 stainless steel filter screen is adopted, so that the nozzle is not easy to block.
- ◆ Highly responsive glass ball, in the event of a fire, can quickly sense the ambient temperature
- ◆ All German JOB glass balls are used

Product size



R series

Performance parameters

serial number	Model number	Flow coefficient (K)	Work pressure (MPa)	Total nozzle flow (L/min)	Maximum installation spacing (m)	Maximum installation height (m)
1	XSWT0.5/10-68°C	0.5	10	5.0	2.5	3
2	XSWT0.7/10-68°C	0.7	10	7.0	2.5	3
3	XSWT0.9/10-68°C	0.9	10	9.0	3	3
4	XSWT1.0/10-68°C	1.0	10	10.0	3	3
5	XSWT1.2/10-68°C	1.2	10	12.0	3	4
6	XSWT1.5/10-68°C	1.5	10	15.0	3.5	4
7	XSWT1.7/10-68°C	1.7	10	17.0	4	4
8	XSWT2.0/10-68°C	2.0	10	20.0	4	5

Ordering information

XSWT 1.0/10-68°C
1.0 - Flow coefficient (K)
10- Minimum working pressure
10MPa
68°C - For nozzles with a nominal operating temperature of 68°C
please contact our sales engineer for details

General application

- ◆ Tunnels
- ◆ Medicine
- ◆ Archives
- ◆ Library
- ◆ Petrochemical industry
- ◆ Aerospace
- ◆ Military equipmen
- ◆ Fire brigade, forest police, etc
- ◆ Electricity
- ◆ Subway
- ◆ Coal industry
- ◆ Surface vessels
- ◆ Electronics industry
- ◆ Food processing industry
- ◆ Commercial and civil buildings
- ◆ Large traffic vehicles

Energy storage prefabricated cabin nozzle

Medium pressure fine water mist open nozzle

Nozzles & Accessories

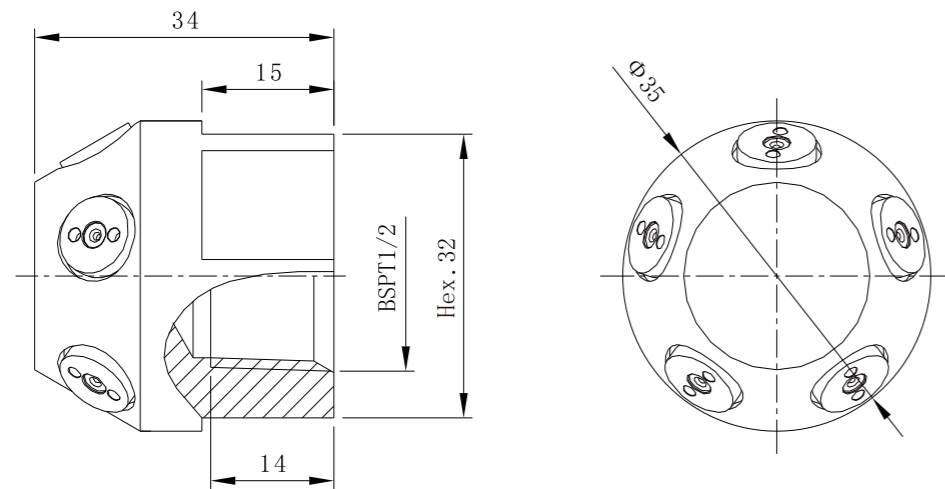
Design features

- Working pressure 0.8MPa-1.4MPa.
- Produces a fine water mist with an average particle of less than 200 μm, with strong jet momentum, Strong penetration of flame and high fire extinguishing efficiency.
- Unique eddy current technology and structural design to ensure the best fire extinguishing effect
- can be processed with brass (electroplated) stainless steel.
- The stainless steel filter screen is adopted to make the nozzle not easy to block.

General application

- Tunnels
- Medicine
- Archives
- Library
- Petrochemical industry
- Aerospace
- Military equipmen
- Fire brigade, forest police, etc
- Electricity
- Subway
- Coal industry
- Surface vessels
- Electronics industry
- Food processing industry
- Commercial and civil buildings
- Large traffic vehicles

Product size



R series

Performance parameters

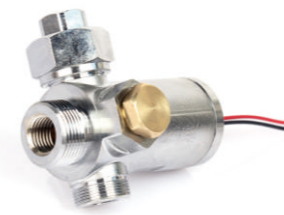
serial number	Model number	Flow coefficient (K)	Work pressure (MPa)	Total nozzle flow (L/min)	Maximum installation spacing (m)	Maximum installation height (m)
1	XSWT2.5/1.2	2.5	1.2	8.7	3	3
2	XSWT3.0/1.2	3.0	1.2	10.4	3	3
3	XSWT3.5/1.2	3.5	1.2	12.1	3	3
4	XSWT4.0/1.2	4.0	1.2	12.9	3	3
3	XSWT4.5/1.2	4.5	1.2	15.6	3	3
4	XSWT5.0/1.2	5.0	1.2	17.3	3	3

Ordering information

XSWT 2.4/1.2
 2.4 - Flow coefficient (K)
 1.2 - Minimum working pressure
 1.2MPa
 please contact our sales engineer for details



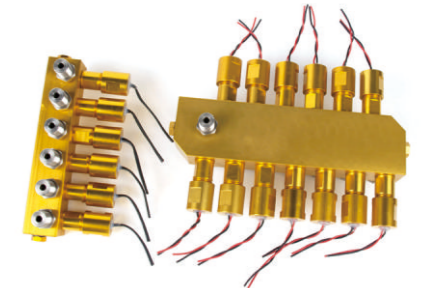
PACK class fire suppression nozzle



Puncture vessel valve



3-way valve



Exhaust valve



different kinds of push-in connectors



Puncture valve



different kinds of nozzle



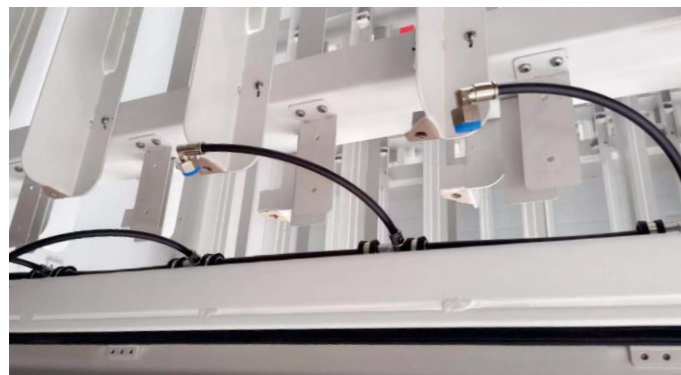
sensor



Hose clamp



TPU yarn tube



Salt spray tester

For testing the corrosion performance of raw materials



Material analysis

For each batch of raw materials, we perform material spectral analysis



Two-dimensional measuring instrument

It is used for precision dimensional inspection such as small holes



Three-dimensional image measuring instrument

Ensure the dimensional accuracy, positioning accuracy, geometric accuracy and contour accuracy of the product

