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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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**Code of design for water spray extinguishing systems
(English Translation)**

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1 General

1.0.1

This specification is formulated in order to reasonably design the water spray fire extinguishing system (or system for short), ensure its construction quality and use function, reduce fire hazards, and protect personal and property safety.

1.0.2

This code is applicable to the design, construction, acceptance and maintenance management of the water spray fire extinguishing system installed in new construction, expansion and reconstruction projects.

This specification does not apply to mobile water spray fire extinguishing devices or water spray fire extinguishing systems installed in transportation vehicles.

1.0.3

The water spray fire extinguishing system can be used to extinguish solid material fires, Class C liquid fires, beverage fires and electrical fires, and can be used for protective cooling of production, storage devices or loading and unloading facilities of combustible

gases and Class A, B and C liquids.

1.0.4

The water spray fire extinguishing system shall not be used to extinguish fires that can cause combustion and explosion due to chemical reactions when contacted with water, and fires that water mist will cause obvious damage to the protected objects.

1.0.5

The design, construction, acceptance and maintenance management of the water spray fire extinguishing system shall not only comply with the provisions of this specification, but also comply with the provisions of the current relevant national standards.

2.1.1 Water spray fire protection system water spray fire protection system

It is composed of water source, water supply equipment, pipeline, deluge alarm valve (or electric control valve, pneumatic control valve), filter and water mist nozzle, etc., spraying water mist to the protected object for fire extinguishing or protective cooling system.

2.1.2 Transfer pipe

A pipeline that detects fires using closed nozzles and transmits signals using changes in air or water pressure.

2.1.3 Supply intensity application density

The amount of water sprayed by the system to the unit protection area per unit time.

2.1.4 Response time response time

The time from the start of the water supply facilities of the system to the spraying of water mist from the water mist nozzle at the most unfavorable point in the system.

2.1.5 Spray nozzle

Under the action of a certain pressure, the water flow can be decomposed into water droplets with a diameter of less than 1mm in the set area, and the nozzles can be sprayed out according to the designed sprinkling shape.

2.1.6 Effective range effective range

When the nozzle is spraying horizontally, the horizontal distance between the highest point of the water mist and the plane where the nozzle is located is perpendicular to the axis of the nozzle.

2.1.7 Water spray cone water spray cone

The cone formed by the water mist within the effective range of the water mist nozzle.

2.1.8 Deluge alarm valves unit

It is a device composed of deluge alarm valve, solenoid valve, pressure switch, hydraulic alarm bell, pressure gauge and supporting general valves.

2.2 Symbols

B - the distance between the nozzle of the water mist nozzle and the protected object;

Ch--Haichen-William coefficient;

dj - the calculated inner diameter of the pipe;

dg-calculated inner diameter of throttle tube;

g - acceleration of gravity;

H--The head of the fire pump or the supply pressure of the system inlet;

Hk - the head loss of the decompression orifice;

Hg-the head loss of the throttling tube;

hz-the elevation difference between the water mist nozzle at the most unfavorable point and the system pipe entrance or the lowest water level of the fire pool;

sumh--The sum of the head loss along the system pipeline and the local head loss;

i - head loss per unit length of the pipeline;

K--The flow coefficient of the water mist nozzle;

k - safety factor;

L - the length of the throttle tube;

N-the calculated number of water mist nozzles required for the protected object;

n--the number of water mist nozzles sprayed at the same time after the system is started;

P - the working pressure of the water mist nozzle;

P0 - the working pressure of the water mist nozzle at the most unfavorable point;

Q--the flow rate of the deluge alarm valve;

q - the flow rate of the water mist nozzle;

qi - the actual flow rate of the water mist nozzle;

qg--the flow rate of water in the pipeline;

Qj--calculated flow rate of the system;

Qs--design flow rate of the system;

R-the radius of the bottom circle of the water mist cone;

S - the protection area of the protection object;

V - the flow rate of water in the pipeline;

Vk--the average flow velocity of water in the pipeline behind the decompression orifice;

Vg - the average flow velocity of water in the throttle tube;

W--design supply intensity of protected object;

theta --the atomization angle of the water mist nozzle;

xi --local resistance coefficient of decompression orifice;

zeta --The sum of the local resistance coefficients of the reducer and expander in the throttling tube.

3.1 Basic design parameters

3.1.1

The basic design parameters of the system should be determined according to the protection purpose and protection object.

3.1.2

The supply intensity and continuous supply time of the system should not be less than those specified in Table 3.1.2, and the response time should not be greater than those specified in Table 3.1.2.

Table 3.1.2 Supply intensity, continuous supply time and response time of the system

Continued Table 3.1.2 Note. 1 For the system adding water-based fire extinguishing agent, its supply strength shall be determined by tests.

2 Steel single-disc, double-disc and open compartment internal floating roof tanks shall be treated as floating roof tanks. Other internal floating roof tanks shall be treated as fixed roof tanks

3.1.3

The working pressure of the water mist nozzle should not be less than 0.35MPa when it is used for fire extinguishing; it should not be less than 0.2MPa when it is used for protective cooling, but it should not be less than 0.15MPa for Class A, B, B and C liquid storage tanks