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GB 50974-2014

**Technical code for fire protection
water supply and hydrant systems**

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**General Administration of Quality Supervision, Inspection
and Quarantine of People's Republic of China**

Foreword

This Code is prepared by the China IPPR International Engineering Corporation and relevant companies based on the requirements of the original *Notice on the Issuance of "Engineering Construction Standards Development and Revision Plan (first) of the Year 2006"* (Construction Standard [2006] No. 77) of the Ministry of Construction.

In the preparation of this Code, the preparation team conducted extensive researches, summed up the fire water and hydrant systems researches of our country as well as the scientific achievements in manufacturing, research and maintenance management and practical experience in engineering, and took advice from the design, construction, research, manufacturing, education, fire supervision departments and organizations, in accordance with the relevant national policies and the fire-fighting policy of "prevention first, prevention and fighting combined" to serve for economic and social development, with reference to foreign advanced standards. The Code is finalized after review.

The Code is divided into 14 chapters and 7 appendices, with main contents including: general provisions, terms and symbols, design parameters, fire water, facilities of water supply, types of fire protection water supply, hydrant systems, pipeline works, fire protection drainage, hydraulic calculation, control and operation, installation, system commissioning and acceptance, maintenance.

The provisions in bold are compulsory and must be strictly enforced in this Code.

The Ministry of Housing and Urban-Rural Development is responsible for the management of the Code and the interpretation of the compulsory provisions, the Ministry of Public Security is responsible for the daily management and China IPPR International Engineering Corporation is responsible for interpreting the specific technical contents. In the implementation of the Code, please sum up experiences, collect information and timely send your advice and information to the *Fire Water and Hydrant System Technical Code* Management Group of China IPPR International Engineering Corporation (Address: No. 5, North Road of West Third Ring Road, Beijing; postal code: 100089) for the reference of future revisions.

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1 General Provisions

1.0.1 This Code is developed to properly design the fire water and fire hydrant system, to ensure construction quality, to standardize inspection and maintenance management, to reduce fire hazards and to protect personal and property safety.

1.0.2 This Code applies to the design, construction, inspection and maintenance management of fire water and fire hydrant systems of the new construction, expansion and renovation of industrial, commercial and municipal construction.

1.0.3 The design, construction, inspection and maintenance of fire water and hydrant systems should follow the relevant national policies, and effective technical measures should be taken combined with engineering features to achieve safety, reliability, advanced technology, low-cost and utility, and environment protection.

1.0.4 The components and equipment of the fire water and hydrant system used in project shall be products complying with the requirements of existing national standards and access system.

1.0.5 The design, construction, inspection and maintenance of the fire water and hydrant system shall not only comply with this Code, but also should be consistent with existing national standards.

2 Terms and Symbols

2.1 Terms

2.1.1 Fire water

Water sources that provide fire water to water fire-extinguishing facilities, vehicle-carried or hand-carried and other mobile fire pumps, fixed fire pumps, including municipal water supply, fire reservoir, gravity fire reservoir and natural water sources.

2.1.2 Constant high-pressure fire protection water supply system

The water supply system that always keeps the working pressure and flow required by the water fire-extinguishing facilities and pressurizes directly without a fire pump in fire.

2.1.3 Temporary high-pressure fire protection water supply system

The water supply system that cannot meet the working pressure and flow required by water fire- extinguishing facilities and automatically starts the fire pump to meet the working pressure and flow required by the fire extinguishing facilities in fire.

2.1.4 Low pressure fire protection water supply system

The water supply system that can meet the working pressure and flow required by the vehicle-carried or hand-carried mobile fire pumps to pump water.

2.1.5 Fire reservoir

The man-built water storage facility for fixed or mobile fire pumps to pump water.

2.1.6 Gravity fire reservoir

The water storage facility set in a high place that directly provides gravity water supply for water fire- extinguishing facilities.

2.1.7 Elevated / gravity fire tank

The water storage facility set in a high place that directly provides gravity water demand in initial fire disaster for water fire-extinguishing facilities.

2.1.8 Hydrant systems/standpipe and hose systems

The system consists of water supply facilities, fire hydrants, water distribution network

3 Design parameters

3.1 General requirements

3.1.1 The outdoor fire water demand of factories, warehouses, storage yards, storage tank area or civil buildings should be determined according to the number of fires at the same time and the outdoor fire water required for extinguishing a fire. The number of fires at the same time should meet the following requirements:

1 For factories, storage yards and storage tank area, etc. with an area less than or equal to 100hm^2 and the population of residential areas less than or equal to 15 000, the number of fires at the same time period should be determined as 1; when the area is less than or equal to 100hm^2 and the population of residential areas is more than 15 000, the number of fires at the same time period should be determined as 2, wherein 1 is in the residential areas and 1 is in the factories, storage yards or storage tank area;

2 For factories, storage yards and storage tank area, etc. with an area more than 100hm^2 , the number of fires at the same time period should be determined as 2, with 1 for each of the two largest buildings (or storage yards, storage tanks) in the factories, storage yards and storage tank area;

3 The number of fires in warehouses and residential buildings at the same time should be determined as 1.

3.1.2 The design flow rates of the fire water required for extinguishing a fire should consist of the design flow rates of the various water fire-extinguishing systems that need to function at the same time, including building outdoor fire hydrant system, indoor fire hydrant system, automatic sprinkler system, foam extinguishing system, water spray system, fixed fire monitor extinguishing system, fixed cooling water system, and should meet the following requirements:

1 Determined according to the sum of the maximum design flow rates of the various water fire-extinguishing systems that need to function at the same time;

2 Determined according to the maximum fire flow rate among the buildings when

- Note: 1 Buildings arranged in groups should be determined according to the sum of the volume of two buildings adjacent with larger fire flow rates of fire hydrant;
- 2 For the transit warehouses of railway stations, docks and airports, the fire flow rates of outdoor fire hydrant should be determined according to the storehouse of articles of grade C with corresponding fire rating;
- 3 The fire flow rates of outdoor fire hydrant for building of the key brick wood and timber structure of national cultural relics protection organization shall be determined according to the fire flow rates of fire hydrant for civil building with fire resistance rating of grade III;
- 4 When the total construction area of a single-seat building is more than 500000m², the fire flow rates of outdoor fire hydrant for building should be the maximum value specified in this table doubled.

3.3.3 The fire flow rates of outdoor fire hydrant for dormitories, apartments and other non-residential residential buildings shall be determined according to the public buildings of Table 3.3.2 in this Code.

3.4 Fire flow rates of outdoor for structures

3.4.1 The fire flow rates of process production equipment with coal, natural gas, petroleum and their products as raw materials should be determined based on the scale, fire risk and other factors, and should be the sum of the fire flow rates of outdoor fire hydrant, the foam fire extinguishing system, the fixed cooling water system and other water fire extinguishing systems, which shall also meet the following requirements:

- 1 The fire flow rates of process production equipment in petrochemical plants shall comply with the relevant provisions of current national standard *Code for Fire Protection Design of Petrochemical Enterprises* GB 50160;
- 2 The fire flow rates of process production equipment for oil and gas projects

4 Fire water

4.1 General requirements

4.1.1 Within the scope of urban and rural planning area, municipal fire water should be planned, designed and implemented synchronously with municipal pipe network.

4.1.2 The fire water quality should meet the functional requirements of water extinguishing facilities.

4.1.3 Fire water should meet the following requirements:

1 The municipal water supply, fire reservoirs and natural water source can be used as fire water, and the municipal water supply is preferably;

2 Rainwater clean-water tanks, reclaimed water clean-water tanks, water features and swimming pools can be used as alternate fire water.

4.1.4 The pH value of water usually charged into the fire water pipe should be 6.0~9.0.

4.1.5 The fire reservoirs, water towers and gravity fire reservoirs in frost, cold places and places freezing in winter shall be provided with anti-freezing measures.

4.1.6 If rainwater clean-water tanks, reclaimed water clean-water tanks, water features and swimming pools must be used as fire water, there should be technical measures guaranteed in any case to meet the quantity and quality of the fire water system.

4.2 Municipal water supply

4.2.1 When the municipal water supply network provides continuous water, the municipal water supply network may be used to supply water directly for the fire water supply system.

4.2.2 The municipal water supply network used as two fire water should meet the following requirements:

1 The municipal waterworks should have at least two water mains to supply water

supply for the deep well pumps of each well shall be provided with primary power load.

4.4.3 The guaranteed rate of the design low flow of rivers, lakes, seas, reservoirs and other natural water sources should be determined based on the urban and rural size, importance of industrial projects, fire risks and economically rationality and other factors, appropriate 90% to 97%. However, the guaranteed rate of the design low flow of the outdoor fire water for villages can be appropriately reduced according to the local water source.

4.4.4 If the outdoor fire water is natural water, technical measures should be taken to prevent ice, float, suspended solids and other substances from clogging the fire pump and to ensure the safety of taking water.

4.4.5 If natural water is used as the fire water, it should meet the following requirements:

1 If surface water is used as outdoor fire water, technical measures should be taken to ensure fire truck, fixed and mobile fire pump to take water at low water level; when the fire truck is taking water, the maximum suction height should not exceed 6.0m;

2 If a well is used as fire water, a water level test device shall be set to detect the water level of the well.

4.4.6 The position of the intake and facilities for the fire truck of natural water should comply with the requirements for surface water intake specified in the current national standard *Outdoor Water Supply Design Specifications GB 50013*, and the intake head should be set with grille, with space between bars appropriately not less than 50mm; filter pipes can also be used.

4.4.7 The natural water with fire truck intake shall be provided with a fire road for the fire truck to reach the water intake and fire truck turnaround or turning lane.

each 300m increase of the altitude, the lowest submerged depth of the deep-well pump should be increased by 0.30m at least;

2 When the axial flow deep-well pump is installed on the fire water and other fire sources, the bottom of the first pump impeller should be lower than the minimum effective water level of the fire reservoir and the submerged depth should be determined by calculation based on hydraulic conditions, which shall also meet the requirements that the effective water storage capacity or effective level of the fire reservoirs and other fire water can all be utilized; when the pump design flow rate is greater than 125L/s, the submerged depth should be determined based on pump performance and should meet the pump NPSH requirements;

3 The connection between axial flow deep-well pump outlet pipe and fire water supply network shall be in accordance Paragraph 3 of Article 5.1.13 of this Code;

4 The valve of axial flow deep-well pump outlet pipe should be set consistent with the provisions of paragraph 5, 6 of Article 5.1.13 of this Code;

5 When the lowest water level of fire reservoir is below the outlet centerline of the centrifugal pump or the water level cannot ensure the suction of centrifugal pump, an axial flow deep-well pump can be used, which should be mounted on fire reservoirs and other fire water in the way of wet pit;

6 When the motor of axial flow deep-well pump is set outdoor, it should be equipped with rain-proof function;

7 Others should be consistent with the relevant provisions of current national standard *Outdoor Water Supply Design Specifications GB 50013*.

5.1.10 The fire pumps should be provided with standby pumps, with performance consistent with that of the work pump, except for the following construction:

1 Residence with building height less than 54m and buildings with the design flow of outdoor fire water less or equal to 25L/s;

1 The design pressure of makeup pump should meet the requirements of system automatic start and pipe full of water;

2 The design pressure of makeup pump should ensure that the pressure at the pressure set point for system automatic start of pump in preparing working state is greater than the pressure set by the system for automatic start of pump, and the value of increase is appropriately 0.07MPa~0.10MPa;

3 The design pressure of makeup pump should ensure that the static pressure of water fire extinguishing facilities at the most unfavorable point in preparing working state should be greater than 0.15MPa.

5.3.4 The temporary high-pressure fire protection water supply system of makeup pump should be provided with technical measures to prevent the makeup pump starting and stopping frequently; if gas pressure tank is used, the adjustable volume should be determined based on calculation according to the frequency of makeup pump start no more than 15 times/h, but the effective storage volume of water shall not be less than 150L.

5.3.5 The suction pipe of makeup pump should be provided with a clear bar gate valve, and the outlet pipe should be provided with a muffler check valve and clear bar gate valve.

5.3.6 The makeup pump should be provided with a standby pump.

5.4 Fire department connection

5.4.1 The fire water system of indoor fire hydrant in the following places should be provided with fire department connection:

1 High-rise civil buildings;

2 Residences provided with fire water and other multi-storey civil buildings with more than five storeys;

3 Underground or semi-underground buildings (rooms) with more than two storeys or construction area of more than 10000m², peacetime and wartime civil

wall; in the installation of underground fire department connection, the distance between the inlet and bottom surface of manhole cover shall be no more than 0.40m and should not be less than the radius of the cover.

5.4.9 A permanent mark nameplate should be set at the fire department connection, indicating the water supply system, water supply range and rated pressure.

5.5 Fire pump room

5.5.1 The fire pump room should be provided with lifting facilities and shall meet the following requirements:

1 If the weight of fire pump is less than 0.5t, a fixed hook or mobile hanger should be set;

2 If the weight of fire pump is 0.5t ~ 3t, it is desirable to set manual lifting equipment;

3 If the weight of fire pump is greater than 3t, electric lifting equipment should be set. .

5.5.2 The arrangement of fire water pump unit shall meet the following requirements:

1 For the clear distance of two adjacent units and from the unit to the wall, if the motor capacity is less than 22kW, it should not be less than 0.60m; if the motor capacity is not less than 22kW and not more than 55kW, it should not be less than 0.8m; if the motor capacity is more than 55kW and less than 255kW, it should not be less than 1.2m; if the motor capacity is more than 255kW, it should not be less than 1.5m;

2 When the fire pump is under inspection on the spot, a channel 0.5m wider than the fire pump unit should be set on the side of each unit at least, and it should be ensured that the fire pump shaft and the motor rotor can be disassembled in maintenance;

3 The main channel of fire pump room shall not be less than 1.2m in width.

5.5.3 When a diesel fire pump is used, the clear distance between units should be

6.1.4 The outdoor fire water of process unit areas, storage tank areas, storage yards and other structures should meet the following requirements:

1 The process unit areas, storage tank areas and other places should be provided with high-pressure or temporary high-pressure fire protection water supply system, but if there is no foam fire extinguishing system, fixed cooling water system and fire monitor, the fire flow rates of outdoor fire water shall not be greater than 30L/s and low-pressure fire protection water supply system may be used within the protection scope of town fire protection station;

2 Storage yards and other places should be provided with low-pressure fire protection water system, but the high-pressure or temporary high-pressure fire protection water supply system should be used in case of large-scale combustible yard, tall stacking, easy on fire and great difficulty in firefighting.

6.1.5 When municipal fire hydrants or fire trucks draw water from the fire reservoirs and provide outdoor fire water to buildings, the following requirements should be met:

Each intake of the outdoor fire reservoir for fire trucks suction should be calculated as one outdoor fire hydrant and its protection radius shall not be more than 150m.

The municipal building fire hydrants 5m~150m from the outer edge of buildings can be included in the number of building outdoor fire hydrant, but in case of water supply for fire pump department connection, municipal building fire hydrants 5m~40m from the outer edge of buildings can be included in the number of building outdoor fire hydrant.

When the municipal water supply network is a cyclic, the outflow of outdoor fire hydrants in line with the provisions above of this article should be included in the fire flow rates of outdoor fire hydrant for building; but if the municipal water supply network is branched, the fire flow rates of outdoor fire hydrant included in building should not be more than the outflow of one municipal fire hydrant.

6.1.6 The outdoor high-pressure or temporary high-pressure fire protection water supply system used should be applied combined with indoor fire water system.

and pressure and the fire flow rates should be within the valid segment of the valve flow pressure characteristic curve; meanwhile, if checked at 150% of the fire flow rates, the dynamic pressure at the pressure reducing valve outlet should not be less than 65% of the fire flow rates;

3 Each water supply zone should be provided at least two pressure reducing valve groups and each group should be equipped with an alternate pressure reducing valve;

4 The pressure reducing valve should be provided only on the one-way water pipe and should not be set on the double-flow water pipe;

5 The pressure reducing valve should be proportional type, and pilot-operated type pressure reducing valve should be used in case of more than 1.20MPa;

6 The pressure ratio between valve front and back should not be greater than 3: 1; if one-stage pressure reducing valve cannot meet the requirements, pressure reducing valves can be used in series for pressure reduction, but the series pressure should not exceed two-stage; the second stage pressure reducing valve should be pilot-operated type, and the pressure differential between valve front and back should not exceed 0.40MPa;

7 A safety valve should be set at the back of pressure reducing valve, and the opening pressure of safety valve should be able to ensure the system security, and should not affect the safety of the water supply system.

6.2.5 If reduced pressure tank is used for vertical zone of water supply, the following requirements should be met:

1 The effective volume, outlet, drainage, water level and installation location of pressure reduced tanks shall meet the provisions in Article 4.3.8, 4.3.9, 5.2.5 and Paragraph 2 of Article 5.2.6 of this Code;

2 The arrangement, air pipes and snorkels of the pressure reduced tanks should be consistent with Paragraph 3~ 11 of Article 5.2.6 of this Code;

3 The effective volume of the pressure reduced tank shall not be less than 18m³, and the tank should be divided into two cells;

7 Hydrant systems

7.1 Types of system

7.1.1 The municipal hydrants and building outdoor hydrants should be wet fire hydrant system.

7.1.2 A wet hydrant system should be used in places with indoor environment temperature not below 4 °C and not above 70 °C.

7.1.3 A dry hydrant system should be used in places with indoor temperature below 4 °C or above 70 °C.

7.1.4 If it is really difficult to set indoor wet hydrant system for multi-storey residential buildings not higher than 27m, a dry fire standpipe may be set.

7.1.5 For the hydrant systems for city tunnels and other structures in frost, cold places and places frozen in winter, anti-freezing measures should be taken, and it is preferably to adopt a dry hydrant system and dry outdoor hydrants.

7.1.6 The water filling time of dry hydrant system should not exceed 5min, and shall meet the following requirements:

1 There should set dry alarm valves, deluge valve or solenoid valves, electric valves and other quick on-off devices on the water mains; if an electric valve is used, the start time should not exceed 30s;

2 If the deluge valve, solenoid valve and electric valve are used, there should set manual buttons on the fire hydrant box to directly enable the quick on-off device;

3 There should set a quick exhaust valve at the highest point of the system pipeline.

7.2 Municipal hydrant

7.2.1 Municipal hydrants should be outdoor ground fire hydrant; in frost, cold places and places frozen in winter should be provided with dry outdoor fire hydrants and severe cold areas should be additionally provided with fire water cranes. If underground outdoor hydrant is used, the diameter of underground hydrant well shall

7.3.6 The outdoor hydrants of tank area for class A, B, C liquid, liquefied hydrocarbon tank area and other structures should be located outside the fire dike or protective wall, the number should be based on calculation according to the design flow of each tank, but the tanks within 15m from the tank wall should not be counted in the number to be used by the tank.

7.3.7 For process equipment area or places with high-pressure and temporary high-pressure fire protection water supply system, outdoor hydrants should be set up around, with number to be determined based on the design flow and the spacing not greater than 60.0m. If the process equipment area is wider than 120.0m, outdoor hydrants should set on the roadside of equipment area.

7.3.8 If the process equipment area, tank area, stacking yards, flammable gases and liquids terminals and other structures are large in area or height, which cannot be covered by the full water column of outdoor hydrants, outdoor fixed fire monitors should set in proper position.

7.3.9 If the process equipment area, tank area, stacking yards and other structures are provided with high-pressure or temporary high-pressure fire protection water supply system, the settings of fire hydrants should meet the following requirements:

1 Outdoor hydrants should be equipped with fire hose and fire water guns;

2 The seating platform for process equipment and other places requiring hydrants should be provided with indoor hydrants, and shall comply with the relevant provisions of Article 7.4 of this Code.

7.3.10 If the introducing pipe of outdoor fire water is provided with a backflow preventer and the outdoor hydrants cannot meet the requirements of Article 7.2.8 of this Code because of its head loss in fire, an outdoor fire hydrant should be set in front of the backflow preventer.

7.4 Indoor hydrant

7.4.1 The type of indoor hydrant should be determined according to the user, fire risk,

7.4.7 The arrangement of building indoor hydrants should meet the requirements of firefighting and shall meet the following requirements:

1 The indoor hydrants shall be set in the stairwell and the rest platform as well as the front room, corridor and other locations obviously readily accessible and easy for firefighting;

2 Residential indoor hydrants should be set in the stairwell and rest platform;

3 The hydrants set in car library should not affect the traffic and car parking, and should ensure the opening of hydrant;

4 The hydrants set in the same stair and different layers nearby, the flat position should be the same;

5 The hydrants of cold storage should be set in the hallway or stairwell at room temperature.

7.4.8 The installation height of the mouth of building indoor hydrant should be easy to connect and use a fire hose, and its height from the ground should be 1.1m; the outflow direction should facilitate the laying of a fire hose, which should be 90° angulated with the wall of hydrant or downward.

7.4.9 Buildings provided with indoor hydrant should be equipped with test hydrants with pressure gauge and the location should meet the following requirements:

1 Multi-storey and high-rise buildings should be set in its roof, and frost, cold places and other places frozen in winter may be set at the exit of the top or in the cells of tank and other positions for easy operation and anti-freezing;

2 Single-storey buildings should be set at the position with the most unfavorable hydraulic power and should be near the entrance.

7.4.10 The arrangement distance of indoor hydrant should be calculated by straight line distance and shall comply with the following provisions:

1 For buildings with hydrants arranged by two full water columns of two fire water guns, the arrangement distance of hydrant should not exceed 30.0m;

2 For buildings with hydrants arranged by one full water columns of one fire water

the following provisions:

1. It shall be ensured that the standpipe does not exceed one in the stop of the indoor fire hydrant in repairing the pipe. When the number of standpipe exceeds four, two non-adjacent standpipes can be shut down;

2. The connection between each standpipe and water supply horizontal trunk should be equipped with a valve.

8.1.7 The water supply pipe network of indoor fire hydrant system shall be arranged separately with automatic water sprinkler fire extinguishing system and other fire extinguishing systems; when the firefighting pump is used at the same time, the water supply pipeline shall be arranged separately before the alarm valve along with the flow direction.

8.1.8 The design flow rate of the fire water supply pipeline shall not be larger than 2.5m / s. The design flow rate of the automatic fire extinguishing pipeline shall comply with relevant provisions of the current national standard GB 50084 Code of design for sprinkler systems, GB 50151 Code for design of foam extinguishing systems, GB 50219 Code of design for water spray extinguishing systems and GB 50338 Code for design for fixed fire monitor extinguishing systems, but the flow rate of water supply of any firefighting pipe shall not be larger than 7m/s.

8.2 Pipeline design

8.2.1 The working pressure rating of the equipment, tools, pipefittings, valves and accessories and system components used in fire water supply system shall be larger than the system working pressure of the fire water supply system and the system shall be ensured to be able to run safely and reliably at the possible maximum operation pressure.

8.2.2 The system working pressure of the low-pressure fire water supply system shall be determined according to the system working pressure of municipal water supply pipe network and other water supply pipe network and it shall not be less than

to 1.20MPa, it is suitable to use hot-dip zinc-galvanized steel pipe; when the system working pressure of it is larger than 1.20MPa, it is suitable to use hot-dip zinc-coated thicken steel pipe or hot-dip zinc-coated seamless steel pipe; when the system working pressure of it is larger than 1.60MPa, it is suitable to use hot-dip zinc-coated seamless steel pipe.

8.2.9 The connection of overhead pipes shall be done through groove connections (clamp), thread, flange, compression, etc. and it shall not be done though welding. When the diameter of the pipe is less than or equal to DN50, it is suitable to use thread and compression to connect; when it is larger than DN50, it is suitable to use groove connections or flange connections to connect; when the connection space is small, it is suitable to use groove connections to connect.

8.2.10 The overhead water-filled pipes shall be arranged in the area with ambient temperature being not less than 5°C. When the ambient temperature is less than 5°C, anti-freezing measures shall be taken; when the temperature change of the outdoor overhead pipes is large, the expansion and contraction of the pipeline system shall be verified, and corresponding technical measures shall be taken.

8.2.11 The requirements for the foundation, base, , bedding, backfill compaction density and others of buried pipes shall be implemented according to the nature of rigid or flexible pipes and the specified condition at the buried location of the pipe and in accordance with relevant provisions of the current national standard GB 50268 *Code for construction and acceptance of water and sewerage pipeline works* and GB 50332 *Structural design code for pipelines of water supply and waste water engineering*. When the diameter of the buried pipe is not less than DN100, reinforced concrete buttress shall be arranged at pipe bends, tees and plugs and other locations.

8.2.12 The fire water supply pipeline shall not pass through the building foundation. When it needs to pass through it, protective measures like protective casting shall be taken.

8.2.13 The anti-corrosion measures to external wall of the pipe to buried steel pipe

1. The pressure reducing valve shall be arranged at the front of the entrance of the alarm valves. When it connects with two or more than two alarm valves, the standby pressure reducing valve shall be arranged.

2. The inlet of the pressure reducing valve shall be arranged with a filter. The pore diameter of the filter shall not be less than 4 mesh/ cm²~5 mesh/ cm². The flow area shall not be less than 4 times of the pipe cross-sectional area;

3. The area before and behind the filter and pressure reducing valve shall be equipped with pressure gauges. The dial diameter of the pressure gauge shall not be less than 100mm and the maximum range of it shall be two times of the design pressure.

4. The area before and behind the filter and pressure reducing valve shall be equipped with control valves.

5. . The area before and behind the filter and pressure reducing valve shall be equipped with pressure test drainage valve.

6. The pressure educing valve shall be equipped with test interface of flow detection or flowmeter;

7. The flow direction of the vertically mounted valve shall be down;

8. The proportional pressure reducing valve should be installed vertically and the adjustable pressure reducing valve should be installed horizontally;

9. The pressure reducing valve and control valve gate shall be equipped with equipment used to protect or lock adjustable accessories.

10. The pipe section of pressure reducing valve shall not be locked or stopped by gas.

8.3.5 When the water of the indoor fire water supply system is supplied by life or production water supply system network, the location of the introduction pipe shall be equipped with backflow prevention device. When the fire water supply system uses backflow prevention device separated by air, the backflow prevention device shall be arranged at hygienic places and technical measures shall be taken at the outfall to

10.2.1 The protection radius of the indoor fire hydrant can be calculated according to the following equation:

$$R_0 = k_3 L_d + L_s \quad (10.2.1)$$

Where: R_0 - The protection radius of the fire hydrant (m);

K_3 - Bending reduction factor of fire hose and it shall be 0.8-0.9 according to the bend amount of the fire hose.

L_d -The length of the fire hose (m);

L_s - The projection length of the length of the gun enrich the water column on the plane and it shall be $0.71S_k$ calculated when the inclination angle of the gun is 45° .

S_k - The length of the nozzle enriches the water column and the value of it shall be taken according to the article 2 of item 7.4.12 and article 2 of item 7.4.16 of this specification (m).

10.3 Pressure reduction

10.3.1 The pressure relief orifice shall comply with the following provisions:

1. It shall be arranged at the horizontal pipe section with diameter being not less than 50 mm and the length between the pipe section before and after shall not be less than the 5 times of the diameter of this pipe section;
2. The orifice diameter shall not be less than 30% of the diameter of this pipe section and it shall not be less than 20 mm;
- 3 It shall be made from stainless steel plates.

10.3.2 The throttling pipe shall comply with the following provisions:

1. The diameter shall be determined according to $1/2$ of the diameter of the upstream pipe section;
2. Its length shall not be less than 1 m;
3. The average velocity of the water within the throttling pipe shall not be more than 20m/s.

10.3.3 The water head loss of the pressure relief orifice shall be calculated according

11 Control and operation

11.0.1 The fire pump control pump shall be set at the fire pump room or the dedicated fire pump control room and it shall comply with the following requirements:

1. The fire pump control room shall make the fire pump be in automatically activation status at ordinary times.

2. When the automatic fire extinguishing system is open-type system and it is difficult to set automatic start, the fire pump can be set at manual start state and it shall be ensured that there is a person in duty for it for 24 hours after verification.

11.0.2 The fire pump shall not be equipped with the control function of automatically stopping the pump and the pump stop shall be determined by the worker with administrative privileges according to firefighting and rescue situation.

11.0.3 The automatic start time from receiving signal to starting the pump shall be endured to be not longer than 2 minutes for fire pumps.

11.0.4 The pressure switch set on the main water pipe of the fire pump, the flow switch at the water pipe of elevated fire tank or the pressure switch of the alarm valve and other switches and signals on the fire pump can directly and automatically start the fire pump. The pressure switch in the fire pump room shall be led to the fire pump control cabinet.

11.0.5 The fire pump shall be able to manually start and stop and automatically start.

11.0.6 The stabilized pressure pump shall be controlled by the fire water supply pipe network or the pressure switch for automatically start and stop the pump of the stabilized pressure pump set on the gas pressure water tank or pressure transmitter.

11.0.7 The fire control room or duty room shall be equipped with the following control and display functions:

1. The fire control cabinet or control panel shall be set with button for directly and manually starting the pump connected by dedicated lines;

2. The fire control cabinet or control panel shall be able to display the running state of the fire pump and the stabilized pressure pump;

3. The fire control cabinet or control panel shall be able to clearly display the alarm signal of high water level, low water level and the normal water level of fire

current nation standard GB 8181 *Fire nozzles*.

5. The trademark, manufactory and other signs of the fire hydrant, fire hose and fire nozzle shall be complete;

6. The models, specifications and other technical parameters of the fire hydrant, fire hose and fire nozzle shall comply with the design requirements.

7. The surface of the fire hydrant shall have no processing defects and mechanical damage; the casting surface shall have no scarring, burrs, cracks and craters and other defects; the external body of the cast iron valve shall be coated with red paint and the inner surface of it shall be painted with anti-rust paint. The hand wheel shall be painted with black paint; the external paint should be smooth and flat with consistent color and it shall have no bubbles, flow marks, wrinkles and other defects and there shall be no significant touch, stroke and so on;

8. The sealing surface of the hydrant thread shall have no scars, glitches, lack of wire or yarn breakage.

9. The water outlet of fire hydrant thread and the quick connect buckle shall have no defects and mechanical damage and it shall be able to meet the requirements for use function.

10. The lifting and drop or the start of the fire hydrant shall be smooth and flexible and there shall be no unsmooth blockage and loose.

11. The internal structure of the rotary hydrant shall be reasonable, and the rotating parts shall be copper or stainless steel. It shall be ensured that the rotation is reliable and there is no unsmooth blockage or water leakage.

12. The reduced and constant voltage fire hydrant shall be ensured to be reliable and have no clog.

13. The moving parts shall be flexible in rotation and the material should be corrosion resistant and it shall be no unsmooth blockage or releasing.

14. Sealing performance test shall be done to hydrant fixed interface and it is qualified when there is no leakage and no damage. The test number of it shall be 1%

current national standard *Pressure Test of General Valve* GB/T 13927, *Automatic Sprinkler System Part 6: General Valve* GB 5135.6, *Performance Test Specification of Pressure Relief Device* GB/T 12242, *Performance Test Method of Pressure Reducing Valve* GB/T 12245, *General Requirements of Safety Valve* GB/T 12241, *Inspection and Test of Valve* JB/T9092;

7. The valve should have the permanent sign of the clear nameplate, safe operation instruction mark, production manual and flowing direction.

Inspection quantity: full inspection.

Inspection method: visual inspection and test on the special test device, and the main test devices include the pressure testing pump, pressure gauge and stopwatch.

12.2.7 The inspection of control cabinet of fire pump should meet the following requirements:

1. The control function of control cabinet of fire pump should meet the requirements of Chapter 11 of this specification and design requirements, and should be the qualified product after the testing by the quality supervision and inspection center approved by the state;
2. The control cabinet should be correct, the surface should be flat, the coating color should be uniform and consistent, it should not have the glare, it should meet the relevant provisions of current national standard *Basic Dimension Series of Panel, Framework and Cabinet with Height System of 20 mm* GB/T 3047.1, and the outside surface of control cabinet should not have the obvious bump scars and deformation, paint falling off;
3. The control cabinet panel should be equipped with the power supply voltage, current, pump (start) stop conditions, routing inspection conditions, fire alarm and sound and light alarm of fault and other displays;
4. The color of cable of control cabinet should meet the relevant provisions of current national standard of *Cable Color of Electrical Complete Set of Equipment* GB/T 2681;
5. The button, switch and indicator on panel should be easy to be operating and

Switchgear and Control Equipment Part 1: Type Test and Part of Type Test Complete Set of Equipment GB/1 7251.1, and the detection result should not have the fault to affect the normal operating;

12. The charged clearance and creepage distance between the control circuit in control cabinet should be implemented the test detection according to the relevant provisions of current national standard of Performance Requirements and Test Method of Fixed Fire Water Supply Equipment Part 2: *Fire Automatic Constant Pressure Water Supply Equipment* GA 30.2, and the detection result should not have the fault to affect the normal operating;

13. The metal cabinet should have the grounding point, and its sign, line number sign, line route should be detected the insulation resistance according to the relevant provisions of current national standard of Performance Requirements and Test Method of Fixed Fire Water Supply Equipment Part 2: *Fire Automatic Constant Pressure Water Supply Equipment* GA 30.2, and the detection result should not have the fault to affect the normal operating; the insulation resistance between the charged terminal and housing in cabinet should be more than 20MΩ, and the insulation resistance between the power supply terminal and ground should be more than 50 MΩ;

14. The dielectric strength test of control cabinet should be implemented the dielectric strength test according to the relevant provisions of current national standard Electrical Control Equipment GB/T 3797, and the test result should be free of breakdown and flashover;

15. Set the sign and control schematic diagram, etc. on the obvious position of control cabinet;

16. The equipment model, specification, quantity, sign, wire map and manual, list of equipment, list of materials and other technical files should be complete, and meet the design requirements.

Inspection quantity: full inspection.

the flange to connect, when use other connections, make the rust prevention treatment.

6. The overflow pipe and drainage pipe of fire pool and fire water tank should not be connected with the drainage system of production or domestic water directly, and should use the indirect drainage way.

Inspection quantity: full inspection.

Inspection method: verify the design diagram, visual inspection.

12.3.4 The installation of air pressure tank should meet the following requirements:

1. The effective volume, air pressure, water level and design pressure of air pressure tank should meet the design requirements;
2. The installation position and clearance of air pressure tank, direction of inlet pipe and outlet pipe should meet the design requirements; the outlet pipe should be equipped with the check valve;
3. The air pressure tank should be equipped with the indicator of effective water volume.

Inspection quantity: full inspection.

Inspection method: verify the design diagram, verify the performance inspection report of product, visual inspection.

12.3.5 The installation of regulator pump should meet the following requirements:

1. The specification, model, flow and travel should meet the design requirements, and it should have the product certificate and installation manual;
2. The installation of regulator pump should meet the relevant provisions of current national standard *Construction and Acceptance General Specification of Installation Project of Mechanical Equipment* GB 50231 and *Construction and Acceptance Specification of Installation Project of Fan, Compressor and Pump* GB 50275.

Inspection quantity: full inspection.

Inspection method: tape measurement and visual inspection.

12.3.6 The installation of fire pump combiner should meet the following provisions:

1. The installation of fire pump combiner should be implemented according to the interface, body, connection pipe, check valve, safe valve, discharge pipe and control valve, the installation direction of check valve should make the fire water flow in the system from the fire pump combiner, and the installation of overall fire pump combiner should be implemented according to the installation manual;
2. The set position of fire pump combiner should meet the design requirements;
3. The permanent fixed sign of fire pump combiner should identify the corresponding fire water supply system or water extinguishing system, when there is the distinguishing requirement, distinguish the signs;
4. The underground fire pump combiner should use the cast iron well cover with the sign of "fire pump combiner", and set the permanent fixed sign to indicate its position near it;
5. The installation of wall fire pump combiner should meet the design requirements. When there are no design requirements, its installation height should be 0.7m away from the ground; the net distance from the door, window, hole and opening on wall should not be less than 2.0m, and it should not be installed under the glass curtain;
6. The installation of underground fire pump combiner should make the distance from the inlet and bottom of well cover no more than 0.4m, and no less than the radius of well cover;
7. Do not set the obstacles to obstruct the pressurization and water supply of firefighting truck between the fire hydrant pump combiner and fire channel;
8. The masonry of underground fire pump combiner should be equipped with the water proof and drainage measures.

Inspection quantity: full inspection.

Inspection method: verify the design diagram, verify the product performance inspection report, and visual inspection.

12.3.7 The installation of municipal and outdoor fire hydrant should meet the following provisions:

of Forged Steel Threaded Pipe Fittings GB/T 14626;

2. When use the thread to connect, the thread should meet the relevant provisions of current national standard of *55° Sealing Pipe Thread Part 2: Taper Internal Thread and Taper External Thread* GB 7306.2, and should have the sealing tape as the sealing of thread interface, and the sealing tape should be used for the male thread;

3. When use the flange to connect, the type and pressure rate of sealing surface should be consistent with the technical requirements of fire water supply system; the type of flange should use the welded flange, butt welding flange and thread flange and so on according to the connection type, and the selection of flange should meet the relevant provisions of current national standard of *Type and Parameters of Steel Pipe Flange* GB 9112, *Overall Steel Pipe Flange* GB/T 9113, *Steel Butt Welding Seamless Pipe Fittings* GB/T 12459 and *PTFE-coated Pad used for Pipe Fittings* GB/T 13404;

4. When the hot-dip galvanized steel pipe uses the flange to connect, select the thread flange, when must use the welding to connect, the flange welding should meet the relevant provisions of current national standard *Construction Specification of Site Equipment, Industrial pipe Welding Project* GB 50236 and *Construction Specification of Industrial Metal Pipe Project* GB 50235;

5. When the ductile iron pipe is connected by the socket, it should meet the relevant provisions of current national standard of *Construction and Acceptance Specification of Water Supply and Drainage Pipe Project* GB 50268;

6. When construct and install the steel wire skeleton plastic composite pipe, in addition to meeting the relevant provision of this specification, it also meets the relevant provisions of current national standard *Technical Procedures of Buried Polyethylene Water Supply Pipe Project* CJJ101.

7. The pipe with the diameter no more than DN50 should not use the thread loose joint, and reducing diameter of pipeline should use the single reducing joint.

Inspection quantity: sample 30% according to the quantity, and it should not be less than 10 pieces.

electric smelting saddle connection; the mechanical connection should use the locking or non-locking socket connection, flange connection and steel plastic transition connection;

3. The connection between the water supply pipe of steel wire skeleton plastic composite pipe and metal pipe or metal pipe accessories should use the flange or steel plastic transition joint, and the connection with the galvanized pipe or lined galvanized pipe with the diameter less than or equal to DN50 should use the locking socket type;

4. The various connections of pipe should use the corresponding dedicated connection tool;

5. When the connection between the steel wire skeleton plastic composite pipe, pipe fittings and metal pipe, pipe accessories should use the steel spray or ductile cast iron transition pipe fittings, the pressure rate of transition pipe fittings should not be less than the nominal pressure of pipe;

6. When implement the hot smelting or electric smelting connection operation under the ambient condition less than -5°C or heavy wind, take the protection measures, or adjust the process parameters of connection machines;

7. When the temperature difference between the pipe, pipe fittings and pipe accessories are large, you should place the steel wire skeleton plastic composite pipe, pipe fittings and pipe accessories on the site for a period of time, and make the temperature of pipe be equivalent with the pipe accessories;

8. When connect the pipe, the cutting of pipe should use the special cutter or pipe cutting tool, the cutting cross-section should be flat, smooth, free of burrs, and it should be vertical with the pipe axis;

9. The pipe closing connection time should be the annual average temperature, and it should be at AM 8:00 – 10:00 of the next day.

10. After connecting the pipe, check the appearance quality of joint timely.

Inspection quantity: sample 30% according to the quantity, and it should not be less

1. The connection between the steel wire skeleton plastic composite pipe end and polyethylene pipe of steel plastic transition connector should meet the provisions of hot smelting connection or electrical smelting connection;
2. The connection between the steel plastic transition connector steel pipe end and metal pipe should meet the provisions of corresponding steel pipe welding, flange connection or mechanical connection;
3. The connection between the steel plastic transition connector steel pipe end and steel pipe should use the flange connection, and do not use the welding connection, when must weld it, take the measures to reduce the temperature;
4. When the steel wire skeleton plastic composite pipe with the outer diameter is more than or equal to dn110 connects with the metal pipe with the pipe diameter more than or equal to DN100, use the herringbone flexible interface accessories, and the sealing rubber ring at both ends of accessory should be matched with the polyethylene pipe and metal pipe;
5. When the steel wire skeleton plastic composite pipe connects with the metal pipe and valve, the specification and dimensions should be matched mutually.

Inspection quantity: sample 30% according to the quantity, and it should not be less than 10 pieces.

Inspection method: visual inspection.

12.3.17 The connection way and foundation buttress of buried pipe should meet the following requirements:

1. When the seismic intensity is Grade 7 and above Grade 7, it is suitable to use the metal pipe or steel wire skeleton plastic composite pipe with flexible connection;
2. When use the ductile cast iron, it is suitable use the socket connection;
3. When use the welding steel pipe, it is suitable to use the flange and groove connector to connect;
4. When use the steel wire skeleton plastic composite pipe, it is suitable to use the electrical smelting connection;

through the outer wall of underground, wall of building, roof and so on, set the waterproof casing;

4. When the fire water supply pipe passing through the load-bearing wall or foundation, the height of opening should ensure that the net space on the top of pipe is not less than the settlement of building, and not less than 0.1m, and fill the impervious elastic materials;

5. When the fire water supply pipe passing through the wall or floor, set the casing, the length of casing should not be less than the thickness of wall, or should be 50mm more than the floor or ground; the clearance between the casing and pipe should use the noncombustible materials to fill, and the pipe interface should not be in the casing;

6. When the fire water supply pipe passing through the expansion joint and settlement joint, use the bellows and compensator and other technical measures;

7. When the fire water supply may be frozen, take the anti-freezing technical measures;

8. When pass through and layout the room with the corrosive gas, the outer wall of pipe should be coated with the preservative paint or wind the preservative materials.

Inspection quantity: full inspection.

Inspection method: tape measurement inspection.

12.3.20 The hanger of overhead pipe should meet the following provisions:

1. The installation of bracket, hanger, anti-shaking or fixed bracket should be fixed firmly, and its type, materials and construction should meet the design requirements;

2. The design hanger can withstand 5 times of weight of pipe with the water at each support point of pipe, and the support point of pipe system should support the whole fire water supply system;

3. The support point of pipe bracket should be set on the structure of building, and its structure should withstand the weight of pipe with water plus the valve, flange and connector and other loads of 114kg on the hanging point of pipe, and the reference weight of pipe with water may be selected according to Table 12.3.20-1;

of groove connector to protect the safety and reliability of system;

2. Use the bracket to fix the pipe on the building firmly;
3. The pipe should be composed of fixed part and active part;
4. When the system pipe passes through the seismic fracture of part of buildings above the ground, regardless of pipe diameter, set the pipe seismic protection device with the flexible accessories;
5. All pipes passing through the wall, floor, platform and foundation include the water drainage pipe, water pump adapter connection pipe and other auxiliary pipes, and they should reserve the clearance around the pipes.
6. The clearance around the pipe with diameter of DN25 – DN80 should not be less than 25mm, and the pipe with diameter of DN100 and above should not be less than 50mm; the fill the putty and other fire protection flexible materials in the clearance;
7. The vertical support should meet the following provisions:
 - 1) The system pipe should have the support to withstand the horizontal and vertical level load;
 - 2) The vertical support should be firmly and concentric, and all supporting parts and accessories should be on the same line;
 - 3) For the water supply main pipe, the spacing between vertical supports should not be more than 24m;
 - 4) The top of vertical pipe should use supports in four directors to fix;
 - 5) The spacing between the horizontal fixed brackets on the water supply pipe should not be more than 12m.

Inspection quantity: sample 30% according to the quantity, and it should not be less than 10 pieces.

Inspection method: visual inspection.

12.3.24 Coat the red paint or coat the red ring symbol outside of overhead, and indicate the pipe name and flowing direction. The width of red ring sign should not be less than 20mm, the interval should not be more than 4m, and the number of rings in

Inspection quantity: full inspection.

Inspection method: verify the design diagram, check the production performance inspection report, visual inspection.

12.3.27 The installation of control cabinet should meet the following requirements:

1. The level error of base of control cabinet should not be more than $\pm 2\text{mm}$, and take the preservative treatment and water proof measures;
2. Use the bolts of no less than $\phi 12\text{mm}$ to fix the control cabinet and base, and each cabinet should not be less than 4 bolts;
3. When make the upper and lower inlet and outlet hole of control cabinet, do not damage the protection grade of control cabinet.

Inspection quantity: full inspection.

Inspection method: visual inspection.

12.4 Pressure test and flushing

12.4.1 The pressure test and flushing of fire water supply and fire hydrant system should meet the following requirements:

1. After completion of installation of pipe network, perform the strength test, flushing and tightness for it;
2. Use the water to perform the strength test and tightness. The dry fire hydrant system should implement the hydrostatic test and air pressure test;
3. After completion of pressure test of system, remove all temporary blind plates and pipes for test, and check with the records, and fill out the record in the form of Table C.0.2 in this specification;
4. The flushing of pipe network should be implemented after qualification of pressure test. The flushing order should be outdoor and then indoor; underground firstly and then on ground; the indoor flushing should be implemented in the order of water supply trunk pipe, level pipe and vertical pipe;
5. The system should have the following conditions before pressure test:

Inspection quantity: full inspection.

Inspection method: observe and check the hydraulic strength test and hydraulic tightness test records.

12.4.7 The media of air pressure tightness test should use the air or nitrogen, the test pressure should be 0.28MPa, after regulating the pressure for 24h, the pressure reduction should not be more than 0.01MPa.

Inspection quantity: full inspection.

Inspection method: visual inspection.

12.4.8 The flowing rate, flow of pipe network flushing should not be less than the designed flowing rate, flow of system; the pipe network should be implemented by section and area; when flush the level pipe network, the position of drainage pipe should be lower than the flushing pipe network.

Inspection quantity: full inspection.

Inspection method: use the flow meter or visual inspection.

12.4.9 The flowing direction of flushing pipe network should be consistent with the flowing direction of pipe network in fire extinguishing.

Inspection quantity: full inspection.

Inspection method: visual inspection.

12.4.10 The flushing of pipe network should be implemented continuously. When the color, transparency of water at the outlet and the color, transparency of water at the inlet are consistent, the flushing may be end.

Inspection quantity: full inspection.

Inspection method: visual inspection.

12.4.11 Set the temporary special drainage pipe for flushing pipe network, and its drainage should be smooth and safe. The cross-sectional area of drainage pipe should not be less than 60% of cross-sectional area of flushing pipe.

Inspection quantity: full inspection.

Inspection method: visual inspection, and water test inspection.

4. The pressure in the case of zero flow of fire pump should not exceed 140% of designed operating pressure; when the outlet flow is 150% of designed operating flow, its outlet pressure should not be less than 65% of designed operating pressure.

Inspection quantity: full inspection.

Inspection method: inspection by stopwatch.

13.1.5 The regulating pump should be debugging according to the design requirements, and meet the following regulations:

1. When it reaches the designed start pressure, the regulating pump will be started immediately; when it reaches the system pump stop pressure, the regulating pump will stop automatically; the starting and stop of regulating pump should reach the design pressure requirements;
2. It can meet the requirements of system automatic starting, and when the fire main pump is started, the regulating pump shall stop operating;
3. When the regulating is operating normally, the times of starting and top per hour should meet the design requirements, and it should not be more than 15 times/h;
4. When start and stop the regulating pump, the system pressure should be stable, and the regulating pump should not be started and stopped frequently.

Inspection quantity: full inspection.

Inspection method: visual inspection.

13.1.6 The debugging of quick starting and stop of dry fire hydrant should meet the following requirements:

1. When the dry fire hydrant system is debugging, start the system test valve or press the fire hydrant button, the starting time of quick starting and stop system of dry fire hydrant system, system starting pressure, required time of flowing to the outlet of device should meet the design requirements;
2. The pipe volume after starting and stopping the device should meet the design requirements, and meet the requirements of time for filling with the water fully;
3. When the inflation pressure of dry alarm valve is reduced to the setting value, it can

4. Debug the automatic routing inspection function, and detect and verify the routing inspection action, time, period, frequency and speed and so on of each pump;

5. Test the functions of various forced started pumps of fire pumps.

Inspection quantity: full inspection.

Inspection method: use the pressure gauge, ammeter, stopwatch and other instruments to inspect and visual inspection.

13.1.11 The interlocking test should meet the following requirements, and record according to the requirements of Table C.0.4 in this specification:

1. For the interlocking test of dry fire hydrant system, when open 1 fire hydrant or simulate 1 fire hydrant displacement, the dry alarm valve (electric valve/electromagnetic valve) should be started timely, and the pressure switch should issue the signal or starts the fire pump by interlocking, and the action of hydraulic alarm should issue the mechanical alarm signal;

2. In the case of discharge of water of test pipe of fire water supply system, the pressure of pipe network should be reduced continuously, and the pressure switch on the fire pump outlet pipe should start the fire pump automatically; when the test pipe of fire water supply system discharges the water or the drainage pipe of high fire tank discharges the water, the flow switch on outlet pipe of high fire tank should act, and can start the fire pump automatically;

3. The automatic starting time should meet the relevant provisions of Article 11.0.3 of this specification and design requirements.

Inspection quantity: full inspection.

Inspection method: visual inspection.

13.2 System acceptance

13.2.1 After completion of system, must implement the project acceptance, the construction organization should organize the quality inspection, design, construction and supervisor to participate in it, if the acceptance is not qualified, it should not be put

into use.

13.2.2 The acceptance of fire water supply and fire hydrant should be filled according to the requirements of Annex E of this specification.

13.2.3 In acceptance of system, the construction organization should provide the following information:

1. Completion acceptance application report, design documents, and completion information;
2. Debugging report of fire water supply and fire hydrant system;
3. Project quality accident treatment report;
4. Construction site quality management inspection records;
5. Quality management inspection records of fire water supply and fire hydrant system during construction process;
6. Quality control inspection information of fire water supply and fire hydrant system.

13.2.4 The inspection and acceptance of water source should meet the following requirements:

1. Check whether the pipe diameter and water supply capacity of inlet pipe of outdoor water supply pipe network, and check the effective volume of high fire tank, high fire pool and fire pool, etc. and the water level measurement device meet the design requirements;
2. When use the natural water source on ground surface as the fire water source, its water level, water volume, water quality, etc. should meet the design requirements;
3. Check the minimum water level, normal water level and flood water level of natural water source in the dry season according to the effective hydrological data to ensure that the fire water meet the design requirements;
4. Determine the normal water level, minimum water level, water yield and water level measurement device and other technical parameters according to the underground well pumping test information and the equipment should meet the design requirements.

5. The effective volume and adjustable volume of the auto pneumatic cylinder should conform to the design requirements and meet the start-stop requirements of the makeup pump;

Checking amount: exhaustive test

Checking method: visual inspection

13.2.8 The acceptance of reducing valve should conform to the following requirements:

1. The version, specification, design pressure and design flow of reducing valve should conform to the design requirements;

2. It should have a filter before the valve of the reducing valve, the filter area and aperture of the filter should conform to the design requirements and the provisions of article 8.3.4(2) in this regulation;

3. The dynamic and static pressure before the valve and after the valve of the reducing valve should conform to the design requirements;

4. At the place of the reducing valve, it should have the experiment to drainage with the pressure.

5. The reducing valve should not appear these conditions that the noises increase obviously or the pipeline surge at the situation of small flow or the design flow and the 1.5 times of the design flow.

6. The head loss of the reducing valve should be smaller than the difference between static pressure and dynamic pressure after the design valve.

Checking amount: exhaustive test

Checking method: pressure gage, flowmeter and visual inspection.

13.2.9 The acceptance of fire reservoir, elevated fire reservoir and elevated fire tank should conform to the design requirements:

1. The setting position should conform to the design requirements;

2. The effective volume, water level, alarming water level etc. of the fire reservoir, elevated fire reservoir and elevated fire tank should conform to the design requirements;

3. The water pipe for ingress and egress, overflow pipe and the drain pipe should conform to the design requirement, moreover, the overflow pipe should adopt the indirect drain;

4. Pipe, valve and float valve should be convenient to repair, the location of manhole and the ladder should be reasonable;

5. The setting location of the absorbing well and the bell mouth of water absorption (outlet) tube of the fire reservoir should conform to the design requirements;

Checking amount: exhaustive test

Checking method: visual inspection.

13.2.10 the acceptance of the auto pneumatic cylinder should conform to the following requirements:

1. The effective volume, adjustable volume of the auto pneumatic cylinder and the pump frequency of makeup pump should conform to the design requirements;

2. The pressure of the auto pneumatic cylinder should conform to the design requirements;

Checking amount: exhaustive test

Checking method: visual inspection.

13.2.11 the acceptance of alarming valve system of dry fire hydrant system should conform to the following requirements:

1. The components of the alarming valve system should conform to requirements of the product standard;

2. Open the drain valve and check the flow pressure of the system and the measured flow and pressure should conform to the design requirements;

3. The setting position of the water motor alarm should be correct. During the test, pressure in the nozzle of the water motor alarm should be no less than 0.05MPa, the

water filling test, the pressure and flow of the worst point for water supplying should conform to the design requirements; The largest height of water-supplying of the firefighting truck and the reasonability of the setting location of the boost pump should be determined during the partitioned water supply.

Checking amount: exhaustive test

Checking method: pressure gage, flowmeter and visual inspection.

13.2.15 the acceptance of flow and pressure of the water supply of fire protection should conduct the dewatering test through the systematic flow, pressure detector and the ZSPM, the systematic flow, pressure and the enriched water column of fire hydrant should conform to the design requirements.

Checking amount: exhaustive test

Checking method: visual inspection

13.2.16 The acceptance of control cabinet should conform to the following requirements:

1. The specification, version and quantity of the control cabinet should conform to the requirements for design;

2. The drawing of the control cabinet should be sealed with plastic package and then be pasted on the inner side of the cabinet door.

3. The action of the control cabinet should conform to the requirements for design and the relevant provisions in chapter11 in this regulation;

4. The quality of the control cabinet should conform to the standard of the product and the requirements stated in article12.2.7 of this regulation.

5. The set of the devices used for the automatic switch between main power source and stand-by power source should conform to the requirements for design;

Checking amount: exhaustive test

Checking method: visual inspection

13.2.17 The systematic simulated experiment on the function of extinguishment should be conducted and conform to the following requirements:

14 Maintenance and Management

14.0.1 The fire water supply and the fire hydrant system should have the operation instruction for the management, examination and maintenance; it should also be guaranteed that the system is in the working state. The maintenance and management should be conducted based on the appendix G in this regulation;

14.0.2 The staff worked for the maintenance and management should master and get familiar with the principle, performance and operation procedure of the fire water supply system.

14.0.3 The maintenance and management of the water source should conform to the following regulations:

1. The pressure and capability of supplying water of the municipal water supply net should be monitored every quarter.

2. The surface water in the natural river and lake, etc. for fire water supplying should be tested every year, the testing items include ordinary water level, low water level, flood level and the flow or storage of the low water level, etc.

3. The underground water of the well, etc. for fire water supplying should be tested every year, the testing items include ordinary water level, lowest water level, highest water level and water yield etc.

4. The water level of the facilities of fire water supply, such as the fire reservoir, elevated fire reservoir, elevated fire tank etc., should be tested every month; The angle valves at the two terminals of the glass water gauge of the fire reservoir(tank) should be turned off when don't need to observe the water level.

5. In winter, the indoor temperature and water temperature should be tested every day for the fire storage facilities, If the water freezes or the indoor temperature is under 5 centigrade, some measures should be taken to ensure that the water will not freeze and the indoor temperature will not be under 5 centigrade.

14.0.4 The maintenance and management of the water facilities, including fire pump

2. Check the performance of the power-supply and start-stop of the electric valve and solenoid valve every month;

3. All of the control valve in the system should be fixed in the state of start or the regulated state through adopting the lead sealing or being fixed by chains, the lead sealing and chains should be checked every month, if being damaged or broken, the lead sealing and chains should be repaired or replaced in time;

4. The control valve on the water inlet of the outdoor valve well should be checked once a quarter and be verified that it is in the state of full start;

5. Conduct the visual inspection on the valve for controlling water and the alarming valve and ensure that the system is in the unfaulty conditions;

6. Conduct the dewatering test of the dewatering test valve on all of the valves for ZSPM and the alarming valves in the system every quarter, and then check whether the start of the system, the function of alarming and the water condition are normal.

7. When the valve of the municipal water supply is in the state of full start, the differential pressure of backflow preventer should be checked every month and should conform to the current national standard and relevant provisions in *Backflow Preventer for Reducing Pressure* GB/T25178, *Backflow Preventer with Low Resistance* JB/T11151, *Backflow Preventer with Double Check Valve* CJ/T160.

14.0.7 Check appearance and the condition of leakage of the fire pump every quarter and change the abnormal fire pump in time upon finding it.

14.0.8 Check the connector and attachment of the fire pump once a quarter and ensure that the connector is in good condition, have no situation of leakage and its cap is complete.

14.0.9 Conduct desludging for the filter of the system once a year and check whether the filter is in good condition, when the filter is blocked or broken, it should be overhauled in time

14.0.10 Check every year whether the construction material of the storing facilities of water, such as fire reservoir, fire tank etc. is in good condition and deal with the

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