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**Code for installation and
commissioning of sprinkler systems**

自动喷水灭火系统施工及验收规范

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1 General provisions

1.0.1 This Code is formulated with view to ensuring the construction quality and use function of sprinkler system (hereinafter referred to as system), reducing fire hazard and protecting personal and property safety.

1.0.2 This Code is applicable to the construction, acceptance, maintenance and management of sprinkler system arranged in industrial and civil buildings.

1.0.3 The construction, acceptance, maintenance and management of sprinkler system shall not only meet those specified in this Code, shall also comply with the requirements of relevant national current standards and codes.

3 Basic requirements

3.1 Quality management

3.1.1 The subproject and subunit of sprinkler system shall be classified according to Appendix A.

3.1.2 Construction scheme for system construction shall be prepared according to the design requirements. Necessary technical standard for construction, sound construction quality management system and work quality inspection system shall be provided on construction site, and relevant records shall be filled in according to the requirements of Appendix B.

3.1.3 The following conditions shall be provided prior to sprinkler system construction:

1 The construction drawing shall be examined and approved or recorded before construction. Drawings such as plan drawing, system drawing (axonometric drawing and schematic diagram of development system) and detail drawing for construction as well as technical documents such as instructions, equipment list, material and equipment list shall be complete.

2 The design organization shall make technical disclosure to the construction, development and supervision organizations.

3 The system components and pipe fittings as well as other equipment and materials shall be able to ensure the normal construction.

4 The construction site and the water, electricity and gas used during construction shall meet the construction requirements and shall ensure continuous construction.

3.1.4 The construction of sprinkler system project shall be in accordance with the approved project design documents and technical standard for construction.

3.1.5 The construction process quality control of sprinkler system project shall be carried out in accordance with the following requirements:

1 As for the procedures, quality control shall be carried out according to technical standard for construction. After completion of each procedure, inspection shall be carried out, and the next procedure may be started only after passing such inspection.

2 Handing-over inspection shall be carried out among work types of various

switch, water flow indicator, fire pump and pump adapter shall pass the testing by the National Quality Supervision and Inspection Center of Fire Products; the pressure maintenance pump, automatic exhaust valve, signal valve, multi-function pump control valve, check valve, relief valve, reducing valve, butterfly valve, gate valve, pressure gauge, etc. shall pass the testing of corresponding national product quality supervision and inspection center.

Inspection quantity: 100 % inspection.

Inspection method: inspecting relevant data.

3.2.2 Galvanized steel pipes and pipe fittings shall be subject to site appearance inspection, and shall meet the following requirements:

1 The galvanized steel pipe shall be hot-dip galvanized on both internal and external walls, and the galvanized layer on internal and external surfaces of steel pipe shall be free from phenomena like shedding and corrosion; both inside and outside diameters of steel pipe shall meet the requirements of the current national standard GB/ T 3091 Welded Steel Pipes for Low Pressure Liquid Delivery or GB/T 8163 Seamless Steel Tubes for Liquid Service.

2 The surface shall be free from crack, shrinkage cavity, slag inclusion, fold and double skin.

3 The sealing face of thread shall be complete and free from damage and burr.

4 The non-metallic sealing gasket shall have flexible texture, and be free from aging deterioration or layering, and its surface shall be free from defects like depreciation and wrinkle.

5 The flange sealing face shall be complete, smooth and clean and shall be free from burrs and radial groove; the thread of threaded flange shall be complete without damage.

Inspection quantity: 100 % inspection.

Inspection method: observing and inspecting with ruler.

3.2.3 Stainless steel pipes and pipe fittings shall be subject to site appearance inspection, and shall meet the following requirements:

1 Both the inside and outside diameters of stainless steel pipe shall meet the requirements of the current national standard GB/T 12771 Welded Stainless Steel Pipes for Liquid Delivery or GB/T 19228.2 Stainless Steel Press-fitting Assemblies - Part 2: Light Gauge Stainless Steel Tubes for Press-fittings.

2 The surface shall be free of crack and damage.

5 Pipes and pipe fittings shall be light-tight.

Inspection quantity: 100 % inspection.

Inspection method: observing and inspecting with ruler.

3.2.7 Site inspection of sprinkler must comply with the following requirements:

- 1** Marks such as the trademark, type, nominal operating temperature, response time index (RTI), manufacturer and production date of sprinkler shall be complete.
- 2** Type, specification, etc. of sprinkler shall meet the design requirements.
- 3** The sprinkler appearance shall be free of processing defect and mechanical damage.
- 4** The sealing face of sprinkler thread shall be free from scar, burr, wire shortage or break.
- 5** Close-type sprinkler shall be subject to sealing performance test, and that without leakage and damage shall be regarded as acceptable.

Test quantity shall be 1 % from each batch through random sampling, and shall not be less than 5; the test pressure shall be 3.0 MPa, and the pressure holding time shall not be less than 3 min. Where two or more pieces are rejected, sprinklers of this batch cannot be used. Where there is only one piece rejected, 2 % (not less than 10 pieces) shall be randomly taken for sealing performance test; if there are still rejected ones, sprinklers of this batch shall not be used.

Inspection quantity: complying with Item 5 of this clause.

Inspection method: observing and testing on special test device; the main testing equipment includes pressure test pump, pressure gauge and stopwatch.

3.2.8 Site inspection of valve and its accessories shall meet the following requirements:

- 1** The marks like trademark, type and specification of valve shall be complete, and the type and specification of valve shall meet the design requirements.
- 2** The valve and its accessories shall be complete and free from processing defect and mechanical damage.
- 3** In addition to such marks as trademark, type and specification, the alarm valve shall also be provided with permanent mark of flow direction.
- 4** The disc and operating mechanism of alarm valve and control valve shall be

4 Installation and construction of water supply facilities

4.1 General requirements

4.1.1 As for installation of such water supply facilities as fire pump, fire tank, fire reservoir, pressure fire water supply equipment and fire department connection as well as their auxiliary pipelines, the dirt and sundries inside shall be cleaned. In case that the installation is interrupted, the opening shall be sealed.

4.1.2 Safe and reliable protective measures shall be taken for the fire water supply facility, and the installation position shall be convenient for the routine operation, maintenance and management.

4.1.3 Where fire water pipe is directly connected with municipal water supply pipe and domestic water supply pipe, the connection shall be equipped with backflow preventer.

4.1.4 During installation of water supply facility, the ambient temperature shall not be lower than 5 °C; anti-freezing measures shall be taken where the ambient temperature is lower than 5 °C.

4.2 Installation of fire pump

Dominant item

4.2.1 The specification and type of fire pump shall meet the design requirements and shall be provided with product qualification certificate and installation and operation instruction.

Inspection quantity: 100 % inspection.

Inspection method: observing according to drawing.

4.2.2 Installation of fire pump shall meet the requirements of the current national standards GB 50231 General Code for Construction and Acceptance of Mechanical Equipment Installation Engineering and GB 50275 Code for Construction and Acceptance of Computer, Fan and Pump Installation Engineering.

Inspection quantity: 100 % inspection.

Inspection method: inspecting with ruler and observing.

4.2.3 Installation of inlet pipe and its fittings shall meet the following requirements:

Inspection quantity: 100 % inspection.

Inspection method: observing.

4.3 Installation of fire tank and construction of fire reservoir

I Dominant item

4.3.1 Construction and installation of fire reservoir and fire tank shall meet the requirements of the current national standards GB 50141 Code for Construction and Acceptance of Water and Sewerage Structures and GB 50242 Code for Acceptance of Construction Quality of Water Supply Drainage and Heating Works. Arrangement mode and position of water level display device of fire reservoir and elevated fire tank shall meet the requirements of the design document.

Inspection quantity: 100 % inspection.

Inspection method: inspecting with ruler and observing.

4.3.2 Water-proof sleeve shall be arranged on the inlet and outlet pipes of reinforced concrete fire reservoir or fire tank, and flexible joint shall be arranged for pipeline with vibration. The inlet and outlet pipe joints of combined fire reservoir or fire tank should be connected with flange; in case that other connection is adopted, rust-proof treatment shall be carried out.

Inspection quantity: 100 % inspection.

Inspection method: observing.

II General item

4.3.3 The volume and installation position of elevated fire tank and fire reservoir shall meet the design requirements. During installation, the clear distance between the external wall of the reservoir (tank) and the wall surface of building structure or other reservoir wall shall meet the requirements of construction or assembly. The clear distance on the side surface without pipeline should not be less than 0.7 m while that on the side surface with pipeline should not be less than 1.0 m; the width of passage between external wall of pipeline and wall surface of building should not be less than 0.6 m; for the reservoir top with manhole, the clearance between top slab surface and the upper building slab bottom shall not be less than 0.8 m; the distance from assembled elevated fire tank bottom to the floor should not be less than 0.5 m.

Inspection quantity: 100 % inspection.

Inspection method: inspecting with ruler according to drawing.

Inspection quantity: 100 % inspection.

Inspection method: observing according to drawing.

4.4.2 The installation position as well as the directions of inlet pipe and outlet pipe of pressure fire water supply equipment shall meet the design requirements; check valve shall be installed for outlet pipe with an overhaul passage, which should not be less than 0.7 m in width, arranged around it; the distance from the top of pressure fire water supply equipment to the floor slab or beam bottom should not be less than 0.6 m.

Inspection quantity: 100 % inspection.

Inspection method: inspecting with ruler and observing according to drawing.

II General item

4.4.3 Installation of safety valve, pressure gauge, drain pipe, water level indicator and pressure control instrument etc. on pressure fire water supply equipment shall meet the requirements of product instructions.

Inspection quantity: 100 % inspection.

Inspection method: observing according to drawing.

4.4.4 The specification and type of pressure maintenance pump shall meet the design requirements; product certificate and installation and operation instructions shall be provided.

Inspection quantity: 100 % inspection.

Inspection method: observing according to drawing.

4.4.5 The installation of pressure maintenance pump shall meet the relevant requirements of the current national standards GB 50231 General Code for Construction and Acceptance of Mechanical Equipment Installation Engineering and GB 50275 Code for Construction and Acceptance of Fan, Compressor and Pump Installation.

Inspection quantity: 100 % inspection.

Inspection method: inspecting with ruler and observing.

4.5 Installation of fire department connection

I Dominant item

4.5.1 Assembly-type fire department connection shall be installed in the

5 Installation of pipeline network and system components

5.1 Installation of pipeline network

I Dominant item

5.1.1 Where steel pipes are adopted for pipeline network, the material shall meet the requirements of the current national standards GB/T 8163 Seamless Steel Tubes for Liquid Service and GB/T 3091 Welded Steel Pipes for Low Pressure Liquid Delivery.

Inspection quantity: 100 % inspection.

Inspection method: checking material quality qualification document and performance detection report, inspecting with ruler and observing.

5.1.2 Where stainless steel pipes are adopted for pipeline network, the material shall meet the requirements of the current national standards GB/T 12771 Welded Stainless Steel Pipes for Liquid Delivery and GB/T 19228.2 Light Gauge Stainless Steel Pipes for Stainless Steel Press-fittings.

Inspection quantity: 100 % inspection.

Inspection method: checking material quality qualification document and performance detection report, inspecting with ruler and observing.

5.1.3 Where copper pipelines are adopted for pipeline network, the material shall meet the requirements of the current national standards GB/T 18033 Seamless Copper Tubes for Water and Gas, GB/T 11618.1 Pipe Fittings of Copper and Copper Alloys - Part 1: Fittings of Braze Welding Type and GB/T 11618.2 Pipe Fittings of Copper and Copper Alloys - Part 2: Fittings of Press Type.

Inspection quantity: 100 % inspection.

Inspection method: checking material quality qualification document and performance detection report, inspecting with ruler and observing.

5.1.4 Where coating steel pipes are adopted for pipeline network, the material shall meet the requirements of the current national standard GB 5135.20 Automatic Sprinkler System - Part 20: Coating Steel Pipe.

Inspection method: observing and inspecting with level ruler.

5.1.11 Connection of grooved pipe fittings shall meet the following requirements:

1 The selected grooved pipe fittings shall meet the requirements of the current national standard GB 5135.11 Automatic Sprinkler System - Part 11: Grooved Couplings and Fittings, the material shall be ductile cast iron and shall meet the requirements of the current national standard GB/T 1348 Spheroidal Graphite Iron Castings; the material of rubber sealing ring shall be EPDM (ethylene propylene diene monomer) and meet the requirements of ISO 6182-12 Performance Requirements and Test Methods for Quick Coupling of Metal Pipeline System.

2 During connection of grooved pipe fittings, the groove and opening for pipeline connection shall be processed with special channeling machine and tapping machine, and corrosion-proof treatment shall be conducted; before connection, groove and hole dimension shall be inspected and processing quality shall meet the technical requirements; groove and hole shall be free from any burr, damaging crack and dirt.

Inspection quantity: randomly inspecting 20 % and not less than 5.

Inspection method: observing and inspecting with ruler.

3 Rubber sealing ring shall be free from damage and deformation.

Inspection quantity: randomly inspecting 20 % and not less than 5.

Inspection method: observing.

4 After the convex edge of grooved pipe fitting is clipped into the groove, the bolt shall be fastened, both sides shall be simultaneously fixed; in case of any wrinkled rubber ring, it shall be replaced by a new one.

Inspection quantity: randomly inspecting 20 % and not less than 5.

Inspection method: observing.

5 Where mechanical tee connection is adopted, the clearance between mechanical tee and hole shall be inspected; each part shall be uniform and fixed to the right position; the hole spacing of mechanical tee shall not be less than 500 mm and that of mechanical cross shall not be less than 1000 mm; where mechanical tee and cross are connected, the aperture of branch pipe shall meet those specified in Table 5.1.11.

Table 5.1.11 -- Maximum permissible diameter of branch pipe used for connection (mechanical tee and mechanical cross) (mm)

2 It shall not be supported on joint.

Inspection quantity: randomly inspecting 20 % and not less than 5.

Inspection method: inspecting with ruler.

2 The type, material, processing dimension and welding quality of pipeline support, hanger and restraining rack shall meet the design requirements and the requirements of relevant current national standard.

3 The installation positions of pipeline support and hanger shall not interfere with the sprinkling effect of sprinkler; the distance between pipeline support/hanger and sprinkler should not be less than 300 mm and that between pipeline support/hanger and end sprinkler should not be greater than 750 mm.

Inspection quantity: randomly inspecting 20 % and not less than 5.

Inspection method: inspecting with ruler.

4 The quantity of hanger set on each straight pipe section of distributing branch and pipe section between two adjacent sprinklers should not be less than 1, and the spacing between hangers should not be greater than 3.6 m.

Inspection quantity: randomly inspecting 20 % and not less than 5.

Inspection method: observing and inspecting with ruler.

5 Where the nominal diameter of pipeline is greater than or equal to 50 mm, the quantity of restraining racks set on each section of distributing main and distributing pipe shall not be less than 1 and the spacing between restraining racks should not be greater than 15 m; where the direction of pipeline changes, restraining rack shall be added.

Inspection quantity: 100 % inspection.

Inspection method: observing and inspecting with ruler.

6 As for distributing main installed vertically, it shall be fixed with pipe clamp at the center, restraining racks shall be arranged at its initial and terminal ends or its initial and terminal ends shall be fixed with pipe clamp; the distance from installation position to the ground or the floor should be 1.5 ~ 1.8 m.

Inspection quantity: 100 % inspection.

Inspection method: observing and inspecting with ruler.

5.1.16 Anti-deformation measures shall be taken if pipeline passes through the deformation joint of building. Where the pipeline passes through wall or floor

steel pipe and copper pipe and chlorinated polyvinyl chloride (PVC-C) pipe.

5.1.21 Installation of stainless steel pipe shall meet the following relevant requirements:

1 Where thin-walled stainless steel pipe is connected with other pipes, pipe fittings and accessories, measures shall be taken to avoid electrochemical corrosion.

2 Where the thin-wall stainless steel pipeline with nominal diameter of DN25 ~ 50 is connected with other pipelines, special thread switching connector (such as GTHY or entrapment stainless steel pipe) shall be adopted for connection.

3 Where the thin-wall stainless steel pipeline with nominal diameter of DN65 ~ 100 is connected with other pipelines, special flange switching connector should be adopted for connection.

4 Where the thin-wall stainless steel pipeline with nominal diameter DN greater than or equal to 125 is connected with other pipelines, grooved pipe fitting connection or flange connection should be adopted.

5.1.22 Installation of copper pipe shall meet the following relevant requirements:

1 Braze welding may be used for connection between copper pipe and pipe fittings in various specifications; as for the copper pipe with diameter not greater than DN50 and required to be dismantled, ferrule connection may be adopted; as for the copper pipe with diameter not greater than DN50, entrapment connection may be adopted; as for the copper pipe with diameter not less than DN50, grooved connection may be adopted.

2 Copper alloy products should be adopted for pipeline supporting elements. Where steel support is adopted, soft isolation pad shall be arranged between pipeline and support which shall not generate corrosion on pipeline.

3 Where groove connector is non-copper material, necessary corrosion-proof measures shall be taken for its contact surface.

5.1.23 Installation of chlorinated polyvinyl chloride (PVC-C) pipeline shall meet the following relevant requirements:

1 Socket and spigot type bonding connection shall be adopted between chlorinated polyvinyl chloride (PVC-C) pipes and pipe fittings; butt connection of chlorinated polyvinyl chloride (PVC-C) flange and flange of other material shall be adopted among chlorinated polyvinyl chloride (PVC-C) pipes and flanged pipeline, valve and pipe fittings; threaded connection of injection molding pipe fittings of thread coupling shall be adopted among chlorinated polyvinyl chloride (PVC-C) pipes and threaded pipeline, valve and pipe fittings;

decorative coating for the decoration cover plate of sprinkler and concealed sprinkler.

Inspection quantity: 100 % inspection.

Inspection method: observing.

5.2.3 For installation of sprinklers, special spanner shall be adopted, and the frame of sprinkler is strictly forbidden for tightening; in case of any deformation of sprinkler frame and splash box or damage of relief element, the sprinkler shall be replaced by another one of the same specifications and type.

Inspection quantity: 100 % inspection.

Inspection method: observing.

5.2.4 The sprinkler installed in the place prone to mechanical damage, sprinkler guards and shields shall be arranged.

Inspection quantity: 100 % inspection.

Inspection method: observing.

5.2.5 In installation of sprinklers, the distance from splash box to ceiling, door, window, opening or obstacle shall meet the design requirements.

Inspection quantity: randomly inspecting 20 % and not less than 5.

Inspection method: inspecting with ruler according to drawing.

5.2.6 Before installation, the type, specification and operating site of sprinkler shall be inspected and meet the design requirements. Where concealed sprinkler is adopted for the system, the elevation of distributing branch and opening dimension of ceiling shall be exactly controlled.

Inspection quantity: 100 % inspection.

Inspection method: observing according to drawing.

II General item

5.2.7 Where nominal diameter of sprinkler is less than 10 mm, filter shall be installed on distributing mains or distributing pipes.

Inspection quantity: 100 % inspection.

Inspection method: observing.

with alarm valve set shall be provided with a drainage facility, of which drainage capacity shall meet the requirements of alarm valve commissioning, acceptance and emptying system pipeline by water test valve.

Inspection quantity: 100 % inspection.

Inspection method: inspecting records of system pressure testing and flush washing, observing and inspecting with ruler.

5.3.2 Installation of alarm valve set accessories shall meet the following requirements:

1 Pressure gage shall be installed in the position on alarm valve convenient for observation.

Inspection quantity: 100 % inspection.

Inspection method: observing.

2 Drainage pipe and test valve shall be installed in the position convenient for operation.

Inspection quantity: 100 % inspection.

Inspection method: observing.

3 Water supply control valve shall be installed to be convenient for operation, and shall be provided with visible opening/closing mark and reliable locking facilities.

Inspection quantity: 100 % inspection.

Inspection method: observing.

5.3.3 Installation of wet alarm valve set shall meet the following requirements:

1 Pipelines in front of and behind the alarm valve shall be filled with water smoothly; in case of pressure fluctuation, water powered alarm shall be free from false alarm.

Inspection quantity: 100 % inspection.

Inspection method: observing and opening valves for water release at the flow rate less than a sprinkler.

2 Filter on alarm flow path shall be installed in the position in front of retarder convenient for slagging operation.

(3) Accelerator.

Inspection quantity: 100 % inspection.

Inspection method: observing.

9 Inflation pressure of pipeline network shall meet the design requirements.

5.3.5 Installation of deluge valve set shall meet the following requirements:

1 Deluge valve set may be opened electrically, or manually or by transfer pipe, and installation of opening control device shall be safe and reliable. Installation of water transfer pipe shall meet the relevant requirements of wet pipe system.

2 If pipelines behind deluge valve set of pre-action system require air inflation, their installation shall meet the relevant requirements of dry alarm valve set.

3 Installation position of observation instrument and operation valve of deluge valve set shall meet the design requirements, and shall be convenient for observation and operation.

Inspection quantity: 100 % inspection.

Inspection method: observing.

4 Installation position of manual opening device for the deluge valve set shall meet the design requirements and the device shall be able to be opened safely and convenient for operation in case of fire.

Inspection quantity: 100 % inspection.

Inspection method: observing according to drawing and inspecting by opening valves.

5 Pressure gauge shall be installed on one side of water supply for the deluge valve.

Inspection quantity: 100 % inspection.

Inspection method: observing.

5.4 Installation of other system components

I Dominant item

5.4.1 Installation of water flow indicator shall meet the following requirements:

1 The water flow indicator shall be installed after the pipeline pressure testing

alarm.

5.4.5 Installation position of inspector's test connection and water test valve shall be convenient for inspection and test, and drainage facilities with corresponding drainage capacity shall be provided.

Inspection quantity: 100 % inspection.

Inspection method: observing

II General item

5.4.6 Signal valve shall be installed on the pipeline in front of the water flow indicator, and distance between it and water flow indicator should not be less than 300 mm.

Inspection quantity: 100 % inspection.

Inspection method: observing and inspecting with ruler.

5.4.7 Exhaust valve shall be installed after system pipeline network pressure testing and flush washing are acceptable; exhaust valve shall be installed at the top of distributing main or end of distributing pipe, and it shall be free from leakage.

Inspection quantity: 100 % inspection.

Inspection method: observing and inspecting record of pipeline pressure testing and flush washing.

5.4.8 Installation of throttle pipe and pressure-reducing orifice plate shall meet the design requirements.

Inspection quantity: 100 % inspection.

Inspection method: observing according to drawing and inspecting with ruler.

5.4.9 Outgoing lines of pressure switch, signal valve, and water flow indicator shall be locked by waterproof casing.

Inspection quantity: 100 % inspection.

Inspection method: observing.

5.4.10 Installation of reducing valve shall meet the following requirements:

1 The reducing valve shall be installed after the pressure testing and flush washing of water supply pipeline network are acceptable.

Inspection method: observing.

5.4.11 Installation of multi-function water pump control valve shall meet the following requirements:

1 It shall be installed after the pressure testing and flush washing of water supply pipeline network are acceptable.

Inspection quantity: 100 % inspection.

Inspection method: inspecting records of pipeline pressure testing and flush washing.

2 Before installation, inspect its specification/model and make sure they meet the design requirements; components of the main valve shall be intact; fasteners shall be complete without looseness; each connecting pipeline shall be intact and joint shall be firm; the appearance shall be free from mechanical damage, and the foreign matters in the valve shall be removed.

Inspection quantity: 100 % inspection.

Inspection method: observing according to drawing and inspecting with wrench.

3 Flow direction shall be consistent with that of water supply pipeline network.

Inspection quantity: 100 % inspection.

Inspection method: observing.

4 When other control valves are installed at the exit, a certain spacing shall be kept for the convenience of maintenance and management.

Inspection quantity: 100 % inspection.

Inspection method: observing.

5 It should be horizontally installed and the bonnet shall be upward.

Inspection quantity: 100 % inspection.

Inspection method: observing.

6 Where multi-function water pump control valve without pressure gage is installed, pressure gauge shall be installed at adjacent parts in front of and behind it.

Inspection quantity: 100 % inspection.

6 System pressure testing and flush washing

6.1 General requirements

6.1.1 After the pipeline network is installed, it shall be subject to strength testing, tightness testing and flush washing.

Inspection quantity: 100 % inspection.

Inspection method: inspecting records on strength testing, tightness testing and flush washing.

6.1.2 The strength testing and tightness testing should be carried out with water. Dry sprinkler system and pre-action sprinkler system shall be subject to water pressure testing and gas pressure testing.

Inspection quantity: 100 % inspection.

Inspection method: inspecting records on water pressure testing and gas pressure testing.

6.1.3 After the system pressure testing is completed, all temporary blind plates and pipelines used in the testing shall be timely removed and shall be the same with the record; the record shall be filled in according to the format of Table C.0.2 in Appendix C.

Inspection quantity: 100 % inspection.

Inspection method: observing.

6.1.4 The flush washing for pipeline network shall be carried out by sections after the pressure testing is acceptable. The flush washing shall be carried out in such a sequence that the exterior is flushed before the interior and the underground is before the over-ground; as for the flush washing of the interior, it shall be carried out for distributing mains, distributing pipes and distributing branches successively.

Inspection quantity: 100 % inspection.

Inspection method: observing.

6.1.5 Before system pressure testing, the following conditions shall be provided:

1 After re-inspection, the position of buried pipeline, pipeline foundation, buttress etc. shall meet the design requirements.

6.1.10 During the flush washing of the pipeline with diameter greater than 100 mm, the dead corner and bottom shall be knocked without damaging the pipeline.

6.1.11 After the pipeline network flush washing is acceptable, the record shall be filled in according to the requirements of Table C.0.3 in Appendix C.

6.1.12 The water pressure testing and flush washing should be conducted with domestic water rather than seawater or the water containing corrosive chemical substances.

Inspection quantity: 100 % inspection.

Inspection method: observing.

6.2 Water pressure testing

I Dominant item

6.2.1 Where the design working pressure of the system is less than or equal to 1.0 MPa, the pressure of water pressure strength testing shall be 1.5 times of the design working pressure and shall not be less than 1.4 MPa; where the design working pressure is greater than 1.0 MPa, the pressure of water pressure strength testing shall be the design working pressure plus 0.4 MPa.

Inspection quantity: 100 % inspection.

Inspection method: observing.

6.2.2 The testing point for the water pressure strength testing shall be located at the lowest point of the system pipeline network. During water injection into pipeline network, eliminate the air in pipeline network, slowly increase the pressure until reaching the testing pressure, maintain for 30 min, and the pipeline network shall be free from leakage and deformation and shall not have a pressure drop greater than 0.05 MPa.

Inspection quantity: 100 % inspection.

Inspection method: observing.

6.2.3 The water pressure tightness testing shall be conducted after the water pressure strength testing and pipeline network flush washing are acceptable. The testing pressure shall be the design working pressure of the system, it shall be free from leakage during maintaining this pressure for 24 h.

Inspection quantity: 100 % inspection.

Inspection method: observing.

Inspection quantity: 100 % inspection.

Inspection method: inspecting with flowmeter and observing.

6.4.2 The flow direction of pipeline network in flush washing shall be consistent with that in fire extinguishing.

Inspection quantity: 100 % inspection.

Inspection method: observing.

6.4.3 The pipeline network shall be flushed continuously. Where the color and transparency of water at outlet are basically consistent with those at inlet, the flush washing may be finished.

Inspection quantity: 100 % inspection.

Inspection method: observing.

II General item

6.4.4 Special temporary drainage pipeline should be arranged for the flush washing of pipeline network, of which the discharge shall be unimpeded and safe. The sectional area of drainage pipeline shall not be less than 60 % that of the flush washing pipeline.

Inspection quantity: 100 % inspection.

Inspection method: observing and measuring with ruler, and inspecting with water testing.

6.4.5 Before connecting the over-ground and underground pipelines of pipeline network, a plug shall be set at the bottom of distributing mains to flush the underground pipeline.

Inspection quantity: 100 % inspection.

Inspection method: observing.

6.4.6 After pipeline network flush washing, the water in the pipeline network shall be discharged sufficiently and compressed air drying may be adopted where necessary.

Inspection quantity: 100 % inspection.

Inspection method: observing.

requirements; technical measures preventing fire water storage of shared water reservoir and tank from being used for other purpose shall be taken.

Inspection quantity: 100 % inspection.

Inspection method: observing according to drawing and inspecting with ruler.

2 The quantity and water supply capability of fire department connection shall be verified according to the design requirements and verified through water supply testing with a movable fire pump.

Inspection quantity: 100 % inspection.

Inspection method: observing and water testing.

7.2.3 Fire pump commissioning shall meet the following requirements:

1 Where fire pump is started automatically or manually, it shall be put into normal operation within 55 s.

Inspection quantity: 100 % inspection.

Inspection method: inspecting with stopwatch.

2 Where fire pump is started through switching standby power supply or standby pump, the fire pump shall be put into normal operation within 1 min or 2 min.

Inspection quantity: 100 % inspection.

Inspection method: inspect with stopwatch.

7.2.4 The pressure maintenance pump shall be commissioned according to the design requirements. The pressure maintenance pump shall be started immediately when the designed starting conditions are reached; the pressure maintenance pump shall stop automatically when reaching the design pressure of system; the operation of the pressure maintenance pump shall be stopped when the main fire pump is started.

Inspection quantity: 100 % inspection.

Inspection method: observing.

7.2.5 Alarm valve commissioning shall meet the following requirements:

1 When wet alarm valve is commissioned, release water in end device; where the water pressure at inlet is greater than 0.14 MPa and the water release flow rate is greater than 1 L/s, the alarm valve shall be timely started; the water

8 System acceptance

8.0.1 Project acceptance must be carried out upon system completion; if the acceptance is rejected, the system shall not be put into service.

8.0.2 The project acceptance of sprinkler system shall be filled in according to the requirements in Appendix E.

8.0.3 During system acceptance, the construction organization shall provide the following information:

1 Completion acceptance application report, design change notice and completion drawing.

2 Project quality accident handling report.

3 Construction site quality management inspection records.

4 Quality management inspection records for sprinkler system installation process.

5 Quality control inspection information of sprinkler system.

6 System pressure testing and flush washing records.

7 System commissioning record.

8.0.4 The inspection and acceptance of system water supply shall meet the following requirements:

1 The diameter and water supply capability of inlet pipe for outdoor water supply pipeline network shall be inspected and the capacities of elevated fire tank and fire reservoir shall also be inspected and shall meet the design requirements.

2 Where natural water supply is adopted as the system water supply, the water amount and water quality shall meet the design requirements and technical measures ensuring fire water at the lowest water level in dry season shall be inspected.

3 As for the water level display device of fire reservoir, the minimum water level device shall meet the design requirements.

Inspection quantity: 100 % inspection.

Inspection method: observing according to design information.

the fire pump is started under main power supply, the fire pump shall be started normally; when the main power supply is turned off, the main and standby power supplies shall be switched normally. During switching to standby power supply, the fire pump shall be put into normal operation within 1 min or 2 min. Where the fire pump is started automatically or manually, the fire pump shall be put into normal operation within 55 s.

Inspection quantity: 100 % inspection.

Inspection method: observing.

5 Where fire pump is stopped, the pressure behind the water-hammer arrester shall not exceed 1.3 ~ 1.5 times of the rated pressure at pump outlet.

Inspection quantity: 100 % inspection.

Inspection method: inspecting with pressure gauge at valve outlet.

6 As for pressure fire water supply equipment, when the system air pressure drops to the minimum design pressure, the pressure maintenance pump shall be capable of being started through the pressure variation signal.

Inspection quantity: 100 % inspection.

Inspection method: inspecting with pressure gauge and observing.

7 Fire pump start control shall be placed at auto-start mode and fire pump shall be mutual standby.

Inspection quantity: 100 % inspection.

Inspection method: observing.

8.0.7 The acceptance of alarm valve set shall meet the following requirements:

1 Each component of alarm valve set shall meet product standard requirements.

Inspection quantity: 100 % inspection.

Inspection method: observing.

2 Where water release valve of system flow rate pressure detection device is opened, the tested flow rate and pressure shall meet the design requirements.

Inspection quantity: 100 % inspection.

Inspection method: observing with flowmeter and pressure gauge

Inspection quantity: 100 % inspection for alarm valve set, pressure switch, check valve, reducing valve, relief valve and solenoid valve, and the acceptance rate shall be 100 %; 30 % inspection of design quantity through random inspection for gate valve, signal valve, water flow indicator, pressure-reducing orifice plate, throttle pipe, flexible joint and exhaust valve, with the quantity of each kind of them not less than 5, and the acceptance rate shall be 100 %.

Inspection method: observing according to drawing.

5 For the dry pipe system and the pre-action system whose pre-action device is started by pressure switch arranged on automatic fire alarm system and air-charging pipeline, the water filling time of distributing pipelines should not be greater than 1 min; for deluge system and pre-action system whose pre-action device is started only by linkage of automatic fire alarm system, the water filling time of distributing pipelines should not be greater than 2 min.

Inspection quantity: 100 % inspection.

Inspection method: inspecting with stopwatch in water testing.

8.0.9 The acceptance of sprinkler shall meet the following requirements:

1 Arrangement site, specification, type, nominal action temperature and response time index (RTI) of sprinkler shall meet the design requirements.

Inspection quantity: 10 % of design sprinkler quantity through random inspection, the total quantity shall not be less than 40, and the acceptance rate shall be 100 %.

Inspection method: inspecting with ruler according to drawing.

2 The sprinkler installation spacing and the distance from sprinkler to obstacles like floor slab, wall and beam shall meet the design requirements.

Inspection quantity: 5 % of design sprinkler quantity through random inspection and the total quantity shall not be less than 20, with distance deviation of ± 15 mm, and it's deemed as acceptable if the acceptance rate is not less than 95 %.

Inspection method: inspecting with ruler according to drawing.

3 For the sprinklers installed in the environment with corrosive gas and places with freezing hazards, protective measures shall be taken.

Inspection quantity: 100 % inspection.

Inspection method: observing.

4 Sprinklers installed at places with risk of collision shall be provided with guards and shields.

Inspection quantity: 100 % inspection.

Inspection method: observing.

5 A certain quantity of standbys shall be provided for different specifications of sprinklers, with the quantity not be less than 1 % of the total installed quantity and at least 10 pieces for each kind of them.

8.0.10 The quantity of fire department connections and positions of inlet pipes shall meet the design requirements; water filling testing shall be conducted for the fire department connection and the pressure and flow rate at the most unfavorable point of the system shall meet the design requirements.

Inspection quantity: 100 % inspection.

Inspection method: inspecting with flowmeter, pressure gauge and observing.

8.0.11 The acceptance of system flow rate and pressure shall be carried out through water release testing by using the detection device for system flow rate and pressure, and the system flow rate and pressure shall meet the design requirements.

Inspection quantity: 100 % inspection.

Inspection method: observing.

8.0.12 Fire extinguishing function simulation testing of system shall be carried out and shall meet the following requirements:

1 Where alarm valve acts, water powered alarm shall make sound.

Inspection quantity: 100 % inspection.

Inspection method: observing.

2 Where water flow indicator acts, feedback signal shall be displayed.

Inspection quantity: 100 % inspection.

Inspection method: observing.

3 Where pressure switch acts, fire pump and relevant equipment linked with it shall be started and feedback signal shall be displayed.

Inspection quantity: 100 % inspection.

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