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Ordinance for Technical Specifications pertaining to Water Flow Detecting Devices
(Ordinance of the Ministry of Home Affairs No. 2 of January 18, 1983)

Latest update: Ordinance of the Ministry of Home Affairs No. 44 of September 14, 2000

In accordance with the provision of Article 21-2(2) of the Fire Service Act (Act No. 186 of 1948), the Ordinance for Complete Revision of Technical Specifications pertaining to Water Flow Detecting Devices (Ordinance of the Ministry of Home Affairs No. 18 of 1975) shall be specified as follows.

Purport

Article 1 This Ordinance covers the technical specifications applicable to water flow detecting devices for use in sprinkler systems, water spray extinguishing systems, or foam extinguishing systems (hereinafter referred to as “water flow detecting devices”).

Definitions

Article 2 In this Ordinance, the meanings of the terms listed in the following items shall be as prescribed respectively in those items.

(i) Water flow detecting device: The wet, dry, and pre-action water flow detecting devices that automatically detect the water flow in the devices to generate signals or alarms.

(ii) Wet water flow detecting device: The device where the primary system (refers to the inflow side up to the valve body of the device; the same shall apply hereinafter) and the secondary system (refers to the outflow side from the valve body of the device; the same shall apply hereinafter) are filled with pressurized water or pressurized foam solution (hereinafter referred to as “pressurized water, etc.”) and, when the automatic closed sprinkler head or deluge valve (referred to as “automatic closed sprinkler head, etc.” in the next item) is opened, opens the valve body as a result of pressure drop in the secondary system so that pressurized water, etc. will be discharged to the secondary system.

(iii) Dry water flow detecting device: The device where the primary system is filled with pressurized water and the secondary system is filled with pressurized air and, when the automatic closed sprinkler head, etc. is opened, opens the valve body as a result of pressure drop in the secondary system so that pressurized water, etc. will be discharged to the secondary system.

(iv) Pre-action water flow detecting device: The device where the primary system is filled with pressurized water and the secondary system is filled with air and, when the detector, fire detection head, or other fire detecting equipment of the fire detection and fire alarm system (hereinafter referred to as “detection unit”) is operated, opens the valve body so that pressurized water, etc. will be discharged to the secondary system.

(v) Service pressure range: The primary system’s pressure range within which the water flow detecting device does not generate functional degradation.

(vi) Design pressure: The secondary system pressure setting provided within the service pressure range to keep the balance with the primary system pressure on the water flow detecting device that requires the pressure setting in the secondary system.

Structure

Article 3 The wet water flow detecting device shall meet the following structural requirements.

(i) The wet water flow detecting device that actuates the water supply system shall have the same structural design as the check valve.

(ii) The wet water flow detecting device shall not generate functional degradation due to deposits.

(iii) The pipe joint shall be designed to permit easy connection with piping.

(iv) The portion where pressurized water, etc. flows shall be finished smoothly.

(v) The body and components of the device shall permit easy maintenance, inspection, and replacement.

(vi) The valve seat surface shall be free from harmful imperfections that will cause functional degradation.

(vii) Effective drip-proof measures shall be arranged for switches.

(viii) The sensitivity adjustment device shall not be exposed to the external environment.

(2) The dry water flow detecting device shall meet the following structural requirements in addition to those prescribed in the items in the preceding paragraph (except for Item (i)).

(i) The dry water flow detecting device shall be equipped with the unit that protects the valve body once opened from reclosing due to water hammer, back flow, or other unpreferable phenomena except for the case that the operation pressure ratio (refers to the value calculated by dividing the primary system pressure, which is observed on the valve body immediately before the opening action, by the secondary system pressure) is not more than 1.5.

(ii) The dry water flow detecting device shall be capable of replenishing the pressurized air to the secondary system.

(iii) The dry water flow detecting device shall be equipped with the unit capable of checking signal or alarm generation function without opening the valve body.

(iv) The dry water flow detecting device that has an intermediate chamber separating the primary system from the secondary systems shall be equipped with the unit that automatically drains water collected in the chamber to the external environment.

(v) The dry water flow detecting device that requires standby water in the secondary system shall be equipped with the unit that ensures the necessary level of the standby water.

(vi) The dry water flow detecting device that does not require standby water in the secondary system shall be equipped with the unit that drains water collected in that system to the external environment.

(3) The pre-action water flow detecting device shall meet the structural requirements prescribed in the items in Paragraph (1) (except for Item (i)) and Paragraph 2 (except for Item (ii)). In addition, the water flow detecting device that requires the pressure setting in the secondary system shall be capable of replenishing the pressurized air.

Material

Article 4 The water flow detecting device shall meet the following material requirements.

(i) Major portions of the water flow detecting device shall be made of the material conforming to JIS (refers to the Japanese Industrial Standards prescribed in Article 17(1) of the Industrial Standardization Law (Act No. 185 of 1949); hereinafter the same shall apply in this item) G 5501, G 5151, H 5120, or H 5121, or the material having the mechanical strength and corrosion resistance equal to or higher than those of these JIS materials.

- (ii) For the portions sensitive to rust, an effective rust preventive treatment shall be provided.
- (iii) Rubbers, synthetic resins, and other sensitive components used in the water flow detecting device shall endure property alteration prolongedly.

Maximum service pressure range

Article 5 The maximum service pressure range of the water flow detecting device shall stay within the range prescribed in the following table in accordance with the nominal designation specified in that table.

Nominal designation /// Pressure, MPa

10K /// 1.0 to 1.4

16K /// 1.6 to 2.2

Withstanding pressure

Article 6 When the pressure prescribed in the following table and determined in accordance with the nominal designation specified in that table is applied to the wet water flow detecting device for 2 min, its valve box shall not generate water leak, deformation, damage, or rupture.

Nominal designation /// Pressure, MPa

10K /// 2.0

16K /// 3.2

(2) When the design pressure (equal to the maximum service pressure) multiplied by 3 or the pressure shown in the table of the preceding paragraph and determined in accordance with the nominal designation specified in that table, whichever is larger, is applied to the dry and pre-action water flow detecting devices for 2 min, the valve bodies of these devices shall not generate water leak, deformation, damage, or rupture.

(3) When the secondary system design pressure associated with the primary system service pressure is applied to the secondary system and the primary system service pressure multiplied by 1.1 is applied to the primary system for 2 min, the valve seats of the dry and pre-action water flow detecting devices shall not generate water leak.

Function

Article 7 Wet water flow detecting devices shall meet the following functional requirements.

(i) Depending on the pressure within the service pressure range and the detection flow constant (refers to the flow detected as water flow phenomenon to control the generation of signals or alarms; the same shall apply hereinafter), the wet water flow detecting device shall continuously generate signals or alarms within 1 min from the initiation of water flow at the rate specified below and stop these signals or alarms when water is no longer delivered.

(a) When the detection flow constant is 80 and 50, the flow rate shall be obtained from the following equation. If the pressure is 0.5 MPa or less, the flow rate shall be 80 L/min for the detection flow constant of 80 and 50 L/min for the constant of 50.

$$Q = 0.75 \times K\sqrt{10P}$$

where,

Q: Flow rate, L/min

K: Detection flow constant

P: Pressure, MPa

(b) When the detection flow constant is 60, the flow rate shall be 60 L/min at the pressure within the service pressure range.

(ii) When pressurized water, etc. is delivered at 4.5 m/s, the wet water flow detecting device shall continuously generate signals or alarms. The device shall stop these signals or alarms when water is no longer delivered.

(iii) Even when the water flow is initiated at the no-operation flow rate at the minimum service pressure (refers to the predetermined maximum flow rate that is observed in the wet water flow detecting device and will not generate signals or alarms; the same shall apply hereinafter), the device shall not generate signals or alarms.

(iv) When an instantaneous pressure fluctuation occurs in the primary system, the wet water flow detecting device shall not continuously generate signals or alarms.

(2) The dry water flow detecting device shall meet the following functional requirements in addition to those prescribed in Paragraph (1)(iv).

(i) When the pressurized air is released from the automatic closed sprinkler head characterized by the nominal designation of 15, the valve body of the dry water flow detecting device shall be opened within 30 s under the secondary system pipe volume prescribed in the following table and determined in accordance with the inside diameter specified in that table, and the device shall continuously generate signals or alarms within 1 min.

Inside diameter, mm /// Secondary system pipe volume, L

50 /// 70

65 /// 200

80 /// 400

100 /// 750

125 /// 1200

150 /// 2800

200 /// 2800

(ii) When pressurized water, etc. is delivered at 4.5 m/s, the dry water flow detecting device shall continuously generate signals or alarms.

(3) The pre-action water flow detecting device shall meet the following functional requirements in addition to those prescribed in Paragraphs (1)(iv) and (2)(ii).

(i) When the detection unit is operated, the valve body of the pre-action water flow detecting device shall be opened within 30 s under the secondary system pipe volume prescribed in the table of Paragraph (2)(i) and determined in accordance with the inside diameter specified in that table, and the device shall continuously generate signals or alarms within 1 min.

(ii) The pre-action water flow detecting device that recloses the valve body upon shutdown of the detection

unit shall stop signals or alarms when this unit no longer works.

Durability

Article 8 When pressurized water, etc. is delivered at 4.5 m/s for 30 min, the water flow detecting device shall not generate functional degradation.

(2) When the dry and pre-action water flow detecting devices are operated at the maximum service pressure under the secondary system pipe volume prescribed in the table of Article 7(2)(i) and determined in accordance with the inside diameter specified in that table, and then the primary system is controlled to the atmospheric pressure, the devices shall not generate functional degradation.

Functions of components

Article 9 When the pressure switch is subjected the 2000-cycle test, it shall not generate functional degradation. One cycle consists of the pressure fluctuation where the pressure is changed between 0 MPa and maximum service pressure (if the highest pressure applied to the switch is lower than the maximum service pressure, that highest pressure shall be used) at the rated voltage and current with 1 s of energization time.

(2) The water motor gong shall meet the following requirements.

(i) When the gong is continuously operated for 3 h, it shall not generate functional degradation.

(ii) The gong shall be capable of keeping the sound volume of not less than 90 dB at the place 3 m apart from it.

Pressure loss

Article 10 When water is delivered at the rate prescribed in the following table and determined in accordance with the inside diameter specified in that table, the pressure loss of the wet water flow detecting device shall not exceed 0.05 MPa.

Inside diameter, mm /// Flow rate, L/min

25 /// 130

32 /// 200

40 /// 350

50 /// 550

65 /// 900

80 /// 1350

100 /// 2100

125 /// 3300

150 /// 4800

200 /// 8500

Indication

Article 11 The information specified in the following items shall be indicated on all water flow detecting devices at easily observable place in such the manner that the subject information may not be readily erased.

- (i) Classification of the device: Wet, dry, or pre-action
- (ii) Type and model code
- (iii) Manufacturer's name or trademark
- (iv) Year of manufacture
- (v) Manufacturing number
- (vi) Inside diameter, nominal designation, and service pressure range
- (vii) Pressure loss expressed in equivalent straight pipe length
- (viii) Design pressure for the water flow detecting device that requires the pressure setting in the secondary system
- (ix) No-operation flow rate at the minimum service pressure for the wet water flow detecting device
- (x) Arrow mark indicating the direction of flow
- (xi) Direction of installation
- (xii) Combination of components
- (xiii) Term "50" for the water flow detecting device having detection the flow constant of 50 or "60" for the device having the flow constant of 60

Exemption from standards

Article 12 When the Minister of Internal Affairs and Communications recognizes that water flow detecting devices newly created as a result of technology development activities have the performance equivalent to or higher than those conforming to the provisions prescribed in this Ordinance, judging from their profiles, structures, materials, and performance, the technical standards specified by the Minister of Internal Affairs and Communications shall apply to these new developments notwithstanding the provisions of this Ordinance.

Supplementary Provisions

- (1) This Ordinance shall come into effect as of April 1, 1983.
- (2) For tests pertaining to water flow detecting devices whose application for test has been already made to have the fire extinguishing equipment apparatus tested by the Japan Fire Equipment Inspection Institute at the time of enforcement of this Ordinance, the provisions then in force shall remain applicable.

Supplementary Provisions (Ordinance of the Ministry of Home Affairs No. 7 of March 18, 1987)

This Ordinance shall come into effect as of the day of promulgation.

Supplementary Provisions (Ordinance of the Ministry of Home Affairs No. 30 of September 13, 1995)

- (1) This Ordinance shall come into effect as of October 1, 1995.
- (2) For water flow detecting devices that have already got model approvals at the time of enforcement of this Ordinance, their model approvals shall be deemed as those provided in accordance with the standards prescribed in the amended Ordinance for Technical Specifications pertaining to Water Flow Detecting Devices.

Supplementary Provisions (Ordinance of the Ministry of Home Affairs No. 37 of September 28, 1998)-Excerpt

Effective date

Article 1 This Ordinance shall come into effect as of October 1, 1999.

Transitional measures

Article 2 For tests pertaining to fire extinguishers, fire extinguishing agents, automatic closed sprinkler heads, fire hoses, deluge valves, foam concentrates, detectors and manual call points, water flow detecting devices, plug-in couplings, and screw couplings whose application for test has been already made to have the target equipment tested by the Japan Fire Equipment Inspection Institute at the time of enforcement of this Ordinance, the provisions then in force shall remain applicable.

(2) For fire extinguishers that have already got model approvals and fire extinguishers that have got model approvals based on the results from the tests identified by the prescription “provisions then in force shall remain applicable” as described in the preceding paragraph at the time of enforcement of this Ordinance, their model approvals shall be deemed as those provided in accordance with the standards prescribed in the Ordinance for Technical Specifications pertaining to Fire Extinguishers amended according to the provisions of Article 1.

(3) For fire extinguishing agents that have already got model approvals and fire extinguishing agents that have got model approvals based on the results from the tests identified by the prescription “provisions then in force shall remain applicable” as described in Paragraph (1) at the time of enforcement of this Ordinance, their model approvals shall be deemed as those provided in accordance with the standards prescribed in the Ordinance for Technical Specifications pertaining to Fire Extinguishing Agents amended according to the provisions of Article 2.

(4) For automatic closed sprinkler heads that have already got model approvals and automatic closed sprinkler heads that have got model approvals based on the results from the tests identified by the prescription “provisions then in force shall remain applicable” as described in Paragraph (1) at the time of enforcement of this Ordinance, their model approvals shall be deemed as those provided in accordance with the standards prescribed in the Ordinance for Technical Specifications pertaining to Automatic Closed Sprinkler Heads amended according to the provisions of Article 3.

(5) For fire hoses that have already got model approvals and fire hoses that have got model approvals based on the results from the tests identified by the prescription “provisions then in force shall remain applicable” as described in Paragraph (1) at the time of enforcement of this Ordinance, their model approvals shall be deemed as those provided in accordance with the standards prescribed in the Ordinance for Technical Specifications pertaining to Fire Hoses amended according to the provisions of Article 4.

(6) For deluge valves that have already got model approvals and deluge valves that have got model approvals based on the results from the tests identified by the prescription “provisions then in force shall remain applicable” as described in Paragraph (1) at the time of enforcement of this Ordinance, their model approvals shall be deemed as those provided in accordance with the standards prescribed in the Ordinance for Technical Specifications pertaining to Deluge Valves amended according to the provisions of Article 5.

(7) For foam concentrates that have already got model approvals and foam concentrates that have got model approvals based on the results from the tests identified by the prescription “provisions then in force shall remain applicable” as described in Paragraph (1) at the time of enforcement of this Ordinance, their model approvals shall be deemed as those provided in accordance with the standards prescribed in the

Ordinance for Technical Specifications pertaining to Foam Concentrates amended according to the provisions of Article 6.

(8) For detectors and manual call points that have already got model approvals and detectors and manual call points that have got model approvals based on the results from the tests identified by the prescription “provisions then in force shall remain applicable” as described in Paragraph (1) at the time of enforcement of this Ordinance, their model approvals shall be deemed as those provided in accordance with the standards prescribed in the Ordinance for Technical Specifications pertaining to Detectors and Manual Call Points of Fire Detection and Fire Alarm Systems amended according to the provisions of Article 7.

(9) For water flow detecting devices that have already got model approvals and water flow detecting devices that have got model approvals based on the results from the tests identified by the prescription “provisions then in force shall remain applicable” as described in Paragraph (1) at the time of enforcement of this Ordinance, their model approvals shall be deemed as those provided in accordance with the standards prescribed in the Ordinance for Technical Specifications pertaining to Water Flow Detecting Devices amended according to the provisions of Article 8.

(10) For plug-in couplings that have already got model approvals and plug-in couplings that have got model approvals based on the results from the tests identified by the prescription “provisions then in force shall remain applicable” as described in Paragraph (1) at the time of enforcement of this Ordinance, their model approvals shall be deemed as those provided in accordance with the standards prescribed in the Ordinance for Technical Specifications pertaining to Plug-in Couplings used for Fire Hoses amended according to the provisions of Article 11.

(11) For screw couplings that have already got model approvals and screw couplings that have got model approvals based on the results from the tests identified by the prescription “provisions then in force shall remain applicable” as described in Paragraph (1) at the time of enforcement of this Ordinance, their model approvals shall be deemed as those provided in accordance with the standards prescribed in the Ordinance for Technical Specifications pertaining to Screw Couplings used for Fire Hoses or Fire Suction Hoses amended according to the provisions of Article 12.

(12) For power driven fire pumps that were notified to the Minister of Home Affairs in accordance with the provision of Article 21-16-4(1) of the Fire Service Act (Act No. 186 of 1948) before the enforcement of this Ordinance, they shall be deemed as those that conform to the standards prescribed in the Ordinance for Technical Specifications pertaining to Power Driven Fire Pumps amended according to the provisions of Article 9.

(13) For fire suction hoses that were notified to the Minister of Home Affairs in accordance with the provision of Article 21-16-4(1) of the Fire Service Act before the enforcement of this Ordinance, they shall be deemed as those that conform to the standards prescribed in the Ordinance for Technical Specifications pertaining to Fire Suction Hoses amended according to the provisions of Article 10.

Supplementary Provisions (Ordinance of the Ministry of Home Affairs No. 44 of September 14, 2000)

This Ordinance shall come into effect as of the effective date (January 6, 2001) of the Act for Partial Revision of Cabinet Law (Act No. 88 of 1999).