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Ordinance for Technical Specifications Pertaining to Detectors and Manual Call Points of Fire Detection and Fire Alarm Systems

(Ordinance of the Ministry of Home Affairs No. 17 of June 20, 1981)

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In accordance with the provision of Article 21-2(2) of the Fire Service Act (Act No. 186 of 1948), the Ordinance for Technical Specifications Pertaining to Detectors and Manual Call Points of Fire Detection and Fire Alarm Systems shall consist of the following parts.

Chapter 1 General Provisions

Purport

Article 1 This Ordinance covers the technical specifications applicable to detectors and manual call points of fire detection and fire alarm systems.

Definitions

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

(i) Detector: A device that automatically identifies occurrence of fire by detecting the heat generated from the fire, the combustion product generated from the fire (hereinafter referred to as "smoke"), or the flame generated from the fire, and transmits a fire detection signal or a fire reference signal to control and indicating equipment, transmitter, or fire-extinguishing systems, etc.

(ii) Spot-type rate of rise heat detector: A device that works where there is a thermal effect in a local area and transmits a fire detection signal when the rate of rise of the ambient temperature becomes equal to or higher than the predetermined threshold.

(iii) Line-type rate of rise heat detector: A device that works where there is a cumulative thermal effect in a wide area and transmits a fire detection signal when the rate of rise of the ambient temperature becomes equal to or higher than the predetermined threshold.

(iv) Line-type fixed temperature heat detector: A device that visually resembles an electrical cable and transmits a fire detection signal when the ambient temperature in a local area becomes equal to or higher than the predetermined threshold.

(v) Spot-type fixed temperature heat detector: A device that does not visually resemble an electrical cable and transmits a fire detection signal when the ambient temperature in a local area becomes equal to or higher than the predetermined threshold.

(v-ii) Spot-type combination detector sensitive to fixed temperature and/or rate of temperature rise: A device that supports features of the spot-type rate of rise heat detector and the spot-type fixed temperature heat detector and transmits one fire detection signal.

(vi) Spot-type multistate detector sensitive to fixed temperature and/or rate of temperature rise: A device that supports features of the spot-type rate of rise heat detector and the spot-type fixed temperature heat detector and transmits two or more fire detection signals.

(vii) Spot-type analog heat detector: A device that does not visually resemble an electrical cable and, when the ambient temperature in a local area reaches any value in the specified range, transmits a fire reference signal that corresponds to the subject temperature.

(viii) Spot-type smoke detector using ionization: A device that works by sensing a change in ionization current due to the existence of smoke in a local area and transmits a fire detection signal when the smoke density in the surrounding atmosphere becomes equal to or higher than the predetermined threshold.

(ix) Spot-type smoke detector using scattered light or transmitted light: A device that works by sensing a change in luminous energy received by a photoelectric element due to the existence of smoke in a local area and transmits a fire detection signal when the smoke density in the surrounding atmosphere becomes equal to or higher than the predetermined threshold.

(x) Line-type smoke detector using a transmitted optical beam: A device that works by sensing a change in luminous energy received by a photoelectric element due to accumulation of smoke in a wide area and transmits a fire detection signal when the smoke density in the surrounding atmosphere becomes equal to or higher than the predetermined threshold.

(xi) Spot-type smoke detector using photoelectric effect and ionization: A device that supports features of the spot-type smoke detector using ionization and the spot-type smoke detector using scattered light or transmitted light.

(xii) Spot-type analog smoke detector using ionization: A device that utilizes a change in ionization current due to existence of smoke in a local area and, when the smoke density in the surrounding atmosphere reaches any value in the specified range, transmits a fire reference signal that corresponds to the subject density.

(xiii) Spot-type analog smoke detector using scattered light or transmitted light: A device that utilizes a change in luminous energy received by a photoelectric element due to existence of smoke in a local area and, when the smoke density in the surrounding atmosphere reaches any value in the specified range, transmits a fire reference signal that corresponds to the subject density.

(xiv) Line-type analog smoke detector using a transmitted optical beam: A device that utilizes a change in luminous energy received by a photoelectric element due to accumulation of smoke in a wide area and, when the smoke density in the surrounding atmosphere reaches any value in the specified range, transmits a fire reference signal that corresponds to the subject density.

(xv) Spot-type combination detector sensitive to heat and smoke: A device that supports features of the spot-type rate of rise heat detector or the spot-type fixed temperature heat detector, and the spot-type smoke detector using ionization or the spot-type smoke detector using scattered light or transmitted light.

(xvi) Spot-type ultra-violet (UV) detector: A device that works by sensing a change in ultra-violet rays received by a photo sensing element in a local area and transmits a fire detection signal when the change in the ultra-violet rays emitted from the flame becomes equal to or higher than the predetermined threshold.

(xvii) Spot-type infrared (IR) detector: A device that works by sensing a change in infrared rays received by a photo sensing element in a local area and sends a fire detection signal when the change in the infrared rays emitted from the flame becomes equal to or higher than the predetermined threshold.

(xviii) Spot-type multiband flame detector: A device that works by sensing a change in ultraviolet and infrared rays received by a photo sensing element in a local area and transmits a fire detection signal when the change in these rays emitted from the flame becomes equal to or higher than the predetermined threshold.

(xix) Spot-type combination detector sensitive to ultra-violet (UV) and infrared (IR): A device that supports features of the spot-type ultra-violet (UV) detector or spot-type and the spot-type infrared (IR) detector.

(xix-ii) Multi-signal detector: A device that transmits two or more different fire detection signals.

(xix-iii) Detector with automatic test functions: A device that supports the automatic test functions prescribed in Article 2(xii) of the Ordinance for Technical Specifications Pertaining to Transmitters (Ordinance of the Ministry of Home Affairs No. 18 of 1981; hereinafter referred to as "Transmitter Specifications Ordinance") and the remote test functions prescribed in Article 2(xiii) of the Ordinance.

(xix-iv) Wireless detector: A device that transmits a fire detection signal or a fire reference signal wirelessly.

(xix-v) Detector with fire alarm function: A device that transmits a fire detection signal when it detects an occurrence of fire, and generates an alarm to notify personnel that a fire has occurred (hereinafter referred to as "fire alarm").

(xix-vi) Detector with interlocked alarm function: A device that transmits a fire detection signal to another detector when it detects an occurrence of fire, and generates a fire alarm when it receives a fire detection signal from the other detector.

(xx) Manual call point: A device that manually transmits a fire detection signal to control and indicating equipment.

(xxi) P-type manual call point: A device that manually transmits a fire detection signal, which is common or specific to each manual call point, to control and indicating equipment, and may not execute signal transmission and communications simultaneously.

(xxii) T-type manual call point: A device that manually sends a fire detection signal, which is common or specific to each manual call point, to control and indicating equipment, and may execute signal transmission and communications simultaneously.

(xxiii) M-type manual call point: A device that manually sends a fire detection signals specific to each manual call point to control and indicating equipment.

(xxiii-ii) Wireless manual call point: A manual call point that wirelessly transmits a fire detection signal.

(xxiv) Transmitter: A device prescribed in Article 2(vi) of the Transmitter Specifications Ordinance.

(xxv) Control and indicating equipment: A device prescribed in Article 2(vii) of the Ordinance for Technical Specifications Pertaining to Control and Indicating Equipment (Ordinance of the Ministry of Home Affairs No. 19 of 1981).

(xxvi) Fire-extinguishing systems, etc.: Fire-extinguishing systems, smoke extraction systems, alarm systems, or other systems similar to these and used for disaster prevention.

(xxvii) Fire detection signal: A signal indicating an occurrence of fire.

(xxviii) Fire reference systems, etc.: A signal containing information on the extent of heat or smoke generated in a fire and other information on the extent of the subject fire.

General structures

Article 3 General structures of detectors and manual call points shall meet the following requirements:

(i) These devices shall certainly transmit fire detection or fire reference signals and feature easy handling, maintenance and inspection, and replacement of accessories.

(ii) These devices shall be sufficiently durable.

(iii) These devices shall not generate functional degradation due to dust or moisture.

(iv) For the portions that may be functionally degraded by corrosion, corrosion preventive measures shall be provided.

(v) Each of these devices shall be contained in an incombustible or flame-resistant housing.

(vi) The electrical wires shall have sufficient capacity and shall allow proper connection.

(vii) Necessary measures shall be provided to prevent erroneous connection, except in the case of non-polar types.

(viii) The components shall be installed in a proper and secure manner to avoid occurrence of functional degradation.

(ix) For the portion in which currents other than those flowing in electrical wires exist, necessary measures shall be provided to prevent imperfect contact if the subject portion suffers poor sliding contact or movable axis contact.

(x) The charging part shall be sufficiently protected against easy external access by personnel.

(xi) For detectors and manual call points whose rated voltage is more than 60 V, a grounding terminal shall be installed on their metallic housings.

Structures and functions of components

Article 4 When the components listed in the following items are used for detectors and manual call points, they shall have the structures and functions prescribed in the respective items:

(i) Electric lamp: When AC voltage whose level is 130% of the rated voltage of the circuit used is continuously applied to an electric lamp for 20 hours, the components shall be free of wire breakage, extreme luminous flux change, blackening, or extreme current decrease.

(ii) Switch

(a) The switch shall work in a positive and easy manner and shall have a clear cutoff point.

(b) The contact shall be free from risk of corrosion and shall withstand maximum service current.

(c) For the tilt-down cutoff switch, necessary measures shall be provided so that the operator can securely return the switch to its home position.

(iii) Handset: The device shall work properly and shall be sufficiently durable.
(iv) Power transformer: Power transformer shall have the equivalent of or above the performance requirement for the bell transformer as stipulated in the Ministerial Order to Provide Technical Standards for Electrical Appliances and Materials, Order of the Ministry of Economy, Trade and Industry No. 34 of July 1, 2013, and the power transformer capacity shall withstand the continuous incoming of the maximum working current.

Accessories

Article 5 Detectors and manual call points shall be free of any accessories that might have harmful impacts on the functions of these devices.

Power supply voltage fluctuation test

Article 6 Detectors and manual call points shall not generate functional degradation if the power supply voltage varies within a range from 85 to 110% of the rated voltage (or the specified range for detectors and manual call points connected to the control and indicating equipment or transmitter in which the voltage fluctuation range pertaining to power supplied is specified, or those to which power is not supplied from the control and indicating equipment or transmitter).

Test conditions

Article 7 The tests prescribed in Articles 10 to 17-8, 30, 31, 41, and 42 shall be implemented under the conditions listed below:

(i) Temperature: 5 to 35°C
(ii) Relative humidity: 45 to 85%

Chapter 2 Detectors

Structures and functions of detectors

Article 8 The structure and functions of each detector shall meet the following requirements:

(i) Even when the direction of the air stream to the detector is changed, extreme functional fluctuation shall not be observable.
(ii) The contact interval and other adjustable parts shall be fixed so that they will not be changed after adjustment.
(iii) Metallic thin plates used in the components, such as heat sensors and diaphragms, shall not generate any flaw, deformation, corrosion, etc. that might have a harmful impact on the functions of these plates.
(iv) The air tube model of line-type rate of rise heat detector or similar devices shall meet the following requirements:
    (a) Leak resistance and contact water height shall be able to be tested without difficulty.
    (b) Necessary measures shall be provided to enable easy testing for leakage and for clogging of the air tube, and to enable the operator to securely return the test apparatus to the home position after the test.
    (c) The length of one air tube (seamless tube) shall be 20 m or more. The tube shall have uniform bore and wall thickness and shall not generate flaw, crack, deformation, corrosion,

etc. that might have any harmful impact on its functions.

(d) The wall thickness of the air tube shall be not less than 0.3 mm.

(e) The outside diameter of the air tube shall be not less than 1.94 mm.

(v) Thermocouple and thermo semiconductor models of line-type rate of rise heat detectors shall meet the following requirements:

(a) The operating voltage of the sensor shall be able to be easily tested.

(b) Necessary measures shall be provided to enable easy testing for the existence/nonexistence of wire breakage in thermocouples and the resistance of the conductor and allow the operator to securely return the test apparatus to the home position after the test.

(vi) When the base surface is tilted from its specified mount position by 45° for the spot-type detectors (except for those detectors listed in Articles 2(xvi) to 2(xix) (hereinafter referred to as "flame detectors"), 5° for the line-type rate of rise heat detector (only sensor part), and 90° for the line-type smoke detector using a transmitted optical beam, line-type analog smoke detector using a transmitted optical beam, and flame detectors, the detectors shall not generate functional degradation.

(vii) Operation indicators shall be installed on detectors that perform as spot-type smoke detectors using ionization and spot-type analog smoke detectors using ionization. However, this shall not apply to a detector that may be connected to control and indicating equipment that is capable of indicating the fact that the subject detector has transmitted a signal.

(viii) A detector performing as a smoke detector using scattered light or transmitted light, or a detector performing as an analog smoke detector using scattered light or transmitted light shall meet the following requirements:

(a) The semiconductor element shall be used as a light source.

(b) An operation indicator shall be installed. However, this shall not apply to a detector that may be connected to control and indicating equipment capable of indicating the fact that the subject detector has transmitted a signal.

(ix) Necessary measures to prevent entry of insects, such as a screen with a mesh size of 1 mm or less or plate with circular perforation, shall be provided for a detector performing as a spot-type smoke detector using ionization, a detector performing as a spot-type smoke detector using scattered light or transmitted light, a spot-type analog smoke detector using ionization, or a spot-type analog smoke detector using scattered light or transmitted light.

(x) A multi-signal detector shall transmit two or more fire detection signals per performance level, type, nominal operating temperature, or nominal alarm verification time.

(xi) For a detector that utilizes radioactive material, the subject radioactive material shall be defined as a sealed radioactive source and this radioactive source shall not be directly accessed from outside and shall not be easily destroyed during a fire.

(xii) A flame detector shall meet the following requirements:

(a) The photo-sensing element shall be free from sensitivity degradation and fatigue and shall sufficiently withstand long operation.

(b) The sensor shall be easy to clean.

(c) An operation indicator shall be installed. However, this shall not apply to a detector that may be connected to control and indicating equipment capable of indicating the fact that the subject detector has transmitted a fire detection signal.

(d) A detector capable of monitoring staining, if its sensor is stained to an extent that could

possibly impair the detector's function, shall automatically transmit information indicating that fact to the control and indicating equipment.

(xiii) A detector with automatic test functions shall meet the following requirements:

(a) Functions pertaining to automatic testing shall not have the potential to affect the detector's function and shall verify the state of the signal transmission function of the detector.

(b) The time necessary for the verification described in (a) above shall not exceed 30 seconds (30 seconds plus nominal alarm verification time for an alarm-verification type detector).

(xiv) In the event that the power supply is cut, a detector to which power is supplied from a component other than a terminal that transmits a fire detection signal or a fire reference signal (except for a detector powered by batteries; and a detector with interlocked alarm function, which is used in the automatic fire detection and fire alarm system designed for particular small-scale facilities that is prescribed in Article 2(ii) of the Ordinance for Fire-extinguishing Facilities Equipped with Fire Prevention Capability Necessary for Particular Small-scale Facilities (Ordinance of the Ministry of Internal Affairs and Communications No. 156 of 2008) (hereinafter referred to as "automatic fire detection and fire alarm system designed for particular small-scale facilities" and is equipped with a power indicator), cut, shall transmit a signal notifying that fact.

(xv) The fire detection signal or fire reference signal transmitted from the detector shall be properly input to the transmitter, control and indicating equipment, or fire-extinguishing systems, etc.

(xvi) A wireless detector shall meet the following requirements:

(a) The wireless system shall be the wireless system for the small-power security system radio station prescribed in Article 49-17 of the Rule for Radio Equipment (Rule of the Radio Regulatory Commission No. 18 of 1950).

(b) The field intensity of the signal transmitted from the detector shall not be less than the design value at a location 3 m apart from the subject detector.

(c) The reception and transmission of a fire detection signal by a wireless system shall comply with the following.

1. The time required for a wireless system of a detector detecting the occurrence of a fire to transmit a fire detection signal shall be within five seconds of the time of receiving the signal.
2. A wireless system shall transmit a fire detection signal intermittently while receiving the said signal; provided, however, that this requirement shall not apply to wireless systems with the function of verifying the receipt of a fire detection signal from control and indicating equipment or another detector with an interlocked alarm function or similar function.

(d) A device that can easily verify transmission of a fire detection signal shall be installed. However, this shall not apply to a detector that allows the control and indicating equipment to conduct this verification.

(e) A device that can transmit a signal indicating the transmission status of the wireless system to the transmitter or control and indicating equipment at an interval of not more than 168 hours shall be installed. However, this shall not apply to a detector that allows the control and indicating equipment to verify the transmission status of the wireless system or a detector with an interlocked alarm function.

(f) The wireless system shall transmit a signal that enables the system to be differentiated from other equipment.

(g) For a wireless detector capable of receiving electric waves, the reception sensitivity (this parameter refers to the minimum field intensity enabling the wireless detector to receive the signal transmitted from a location 3 m distant from it) shall not be greater than the design value.

(h) A wireless detector powered by batteries (except for a detector with an interlocked alarm function) shall meet the following requirements:

1. Batteries shall be easily replaced with fresh ones.
2. If the battery voltage reaches the lower limit for assurance of effective operation of the detector, the detector shall automatically transmit that fact to the control and indicating equipment.

(xvii) A detector with an alarm function shall meet the following requirements:

(a) The detector shall continue to generate an alarm for no less than 10 minutes.

(b) The alarm sound pressure, when measured at a front location 1 m from the center of the alarm part in an anechoic chamber, shall be 70 dB or more at 85% of the rated voltage (or the lower limit of the specified range for a detector connected to the control and indicating equipment or transmitter in which the voltage fluctuation range pertaining to the power supplied is specified or a detector to which power is not supplied from the control and indicating equipment or transmitter).

(c) A detector that can stop the fire alarm via operation of a switch shall automatically recover to the appropriate monitoring state within 15 minutes after the fire alarm is switched off.

(xviii) A detector with an interlocked alarm function shall meet the following requirements in addition to those prescribed in preceding Items (a) and (b):

(a) When a fire is detected, the fire detection signal transmitted from the detector with an interlocked alarm function shall be securely input to another detector with an interlocked alarm function.

(b) The detector shall verifiably receive the fire detection signal from another detector with an interlocked alarm function.

(c) The detector, upon receiving the fire detection signal according to the stipulation in (b) above, shall generate a fire alarm, without fail.

(d) A detector powered by batteries shall meet the following requirements:

1. Batteries shall be easily replaced with fresh ones.
2. The detector, by means of blinking or any other appropriate function, shall automatically indicate for no less than 72 hours if the battery voltage has reached the lower limit for assurance of effective operation of the detector. Otherwise, the detector shall notify that fact by means of acoustic sound for no less than 72 hours.

(e) A detector that can stop a fire alarm via operation of a switch shall meet the following requirements:

1. When the fire alarm is switched off, the detector with an interlocked alarm function that has detected occurrence of a fire shall automatically recover to the appropriate monitoring state within 15 minutes, while any other detector with an interlocked alarm function shall automatically recover to the appropriate monitoring state within the shortest period.
2. A detector with an interlocked alarm function that has detected occurrence of a fire shall

not be able to be stopped by operation of the switch of any other detector with an interlocked alarm function.

Contacts of detectors

Article 9 The contact of a detector shall be made of gold-silver-platinum alloy or other material with performance equivalent to or higher than that of such alloy, and its contact surface shall be polished.

(2) The contact of a detector (except for a contact enclosed in an inert gas environment) shall be designed so that the contact pressure is 0.05 N or more when a force twice as large as the contacting force is applied to the component.

(3) The detector shall have a structural design such that its contact and adjustable parts are not exposed.

Air stream testing, stray light testing, etc.

Article 10 A detector performing as a spot-type smoke detector using ionization, when energized and exposed to an air stream of 5 m/s for 5 minutes, shall not transmit a fire detection signal. A spot-type analog smoke detector using ionization, when energized and exposed to an air stream of 5 m/s for 5 minutes, shall not transmit a fire reference signal that represents a density equal to or higher than the lower limit of the nominal detectable density.

(2) A detector performing as a smoke detector using scattered light or transmitted light, when energized and subjected an irradiation test such that a 10-cycle irradiation sequence (one cycle consists of 10-second irradiation of 5,000 lx stray light and 10-second silent mode) is implemented by means of an incandescent lamp, and then 5-minute continuous irradiation is executed, shall not transmit a fire detection signal. A detector performing as an analog smoke detector using scattered light or transmitted light, when energized and subjected to the same irradiation test, shall not transmit a fire reference signal that represents a density equal to or higher than the lower limit of the nominal detectable density.

(3) An indoor type flame detector, when energized and subjected to an irradiation test such that 5,000 lx stray light is irradiated for 5 minutes by means of incandescent and fluorescent lamps, respectively, shall not transmit a fire detection signal.

(4) Outdoor type and road type flame detectors, when energized and irradiated by stray light or magnetic wave under the following conditions, shall not transmit a fire detection signal.

(i) A halogen lamp is used to irradiate 20,000 lx stray light onto these detectors for 5 minutes.

(ii) A rotating lamp equipped with red, yellow, blue, green, and purple filters is used to irradiate 1,000 lx stray light onto these detectors for 5 minutes per color.

(iii) A magnetic wave is irradiated onto these detectors. This magnetic wave has a field strength of 10 V/m, is amplitude-modulated at 80% by means of a 1 kHz sine wave, and is changed at a rate of not more than 0.0015 decade/s in a frequency range from 80 MHz to 1 GHz and a range from 1.4 GHz to 2 GHz, respectively.

(5) When an outdoor type flame detector is unenergized and impulse voltage characterized by a peak value of 6 kV, wave front length of 0.5 to 1.5 μs, and wave tail length of 32 to 48 μs is applied between the charging part and the housing, the device shall not generate functional degradation. In this impulse voltage test, one positive impulse voltage and one negative

impulse voltage are applied, respectively.

(6) A wireless detector, when energized and exposed to the magnetic waves prescribed in Item (iii) of Paragraph (4), shall not transmit a fire detection signal nor generate functional degradation.

Tension testing, etc. of detectors

Article 11 A detector (except for a wireless detector powered by batteries) shall conform to the provisions stipulated in the following items:

(i) One pole shall be equipped with two terminals.

(ii) For a detector in which wires are used instead of terminals (except for a line-type fixed temperature heat detector), one pole shall be equipped with two wires. When a tensile load of 20 N is applied to each wire, the wire shall not break or generate functional degradation.

(2) The line heat sensor of a line-type rate of rise heat detector and a line-type fixed temperature heat detector shall conform to the provisions stipulated provided in the following items:

(i) When a tensile load of 100 N per 25 cm is applied, no wire shall break or generate functional degradation.

(ii) The connecting piece for the line heat sensor shall not cause functional degradation of the sensor when it is used in the connection.

Sensitivity of spot-type rate of rise heat detectors

Article 12 The sensitivity of a spot-type rate of rise heat detector shall pass the following tests per type when values of K, V, N, T, M, k, v, n, t, and m are defined as shown below:

Type	Operation test					Non-operation test				
	Step increase			Linear increase		Step increase			Linear increase	
	K	V	N	T	M	k	v	n	t	m
Type 1	20	70	30	10	4.5	10	50	1	2	15
Type 2	30	85		15		15	60		3	

(i) Operation test

(a) When a vertical air stream of V cm/s at room temperature plus K°C is sent to the detector, the device shall transmit a fire detection signal within N seconds.

(b) When a horizontal air stream whose temperature is increased linearly from room temperature at a rate of T°C per minute is sent to the detector, the device shall transmit a fire detection signal within M minutes.

(ii) Non-operation test

(a) When a vertical air stream of v cm/s at room temperature plus k°C is sent to the detector, the device shall not work within n minutes.

(b) When a horizontal air stream whose temperature is increased linearly from room temperature at a rate of t°C per minute is sent to the detector, the device shall not work within m minutes.

Sensitivity of line-type rate of rise heat detector

Article 13 The sensitivity of an air tube model of a line-type rate of rise heat detector shall pass the following tests when the rates of temperature rise in the air tubes, t_1 and t_2, are defined as shown in the table below per type:

Type	t_1	t_2
Type 1	7.5	1
Type 2	15	2
Type 3	30	4

(i) Operation test: When the temperature of a 20 m portion of an air tube located in the farthest position from the sensor is increased linearly at a rate of t_1°C per minute, the detector shall transmit a fire detection signal within 1 minute.

(ii) Non-operation test: When the temperature of an entire air tube is increased linearly at a rate of t_2°C per minute, the detector shall not work.

(2) Provisions prescribed in preceding paragraph shall apply mutatis mutandis to the sensitivity of other line-type rate of rise heat detectors besides an air tube model.

Nominal operating temperature category and sensitivity of fixed temperature heat detector

Article 14 The nominal operating temperature of a fixed temperature heat detector shall be not less than 60°C and not more than 150°C. The nominal operating temperature shall be determined every 5°C in the range from 60°C to 80°C while it shall be determined every 10°C in the range of more than 80°C.

(2) The sensitivity of a fixed temperature heat detector shall pass the tests prescribed below per type and nominal operating temperature:

(i) Operation test: When a vertical air stream of 1 m/s at 125% of the nominal operating temperature is sent to the detector, the device shall transmit a fire detection signal within the respective times specified in the table below:

Type	Room temperature	
	0°C	Other than 0°C
Special type	40 seconds	The operating time t (in second) at a room temperature of θ_r (°C) is calculated using the following equation: $t = \frac{t_0 \log_{10}\left(1 + \frac{\theta - \theta_r}{\delta}\right)}{\log_{10}\left(1 + \frac{\theta}{\delta}\right)}$
Type 1	120 seconds	
Type 2	300 seconds	

Note: t_0 stands for the operating time (in seconds) at a room temperature of 0°C, θ stands for the nominal operating temperature (°C), and δ stands for the difference between the nominal operating temperature and the operation test temperature.

(ii) Non-operation test: When a vertical air stream of 1 m/s at the nominal operating temperature minus 10°C is sent to the detector, the device shall not work within 10 minutes.

Nominal operating temperature category and sensitivity of spot-type multistate detector sensitive to fixed temperature and/or rate of temperature rise

Article 15 The provision prescribed in Article 14(1) shall apply mutatis mutandis to spot-type multistate detectors sensitive to fixed temperature and/or rate of temperature rise.

(2) The sensitivity of a spot-type multistate detector sensitive to fixed temperature and/or rate of temperature rise shall pass the tests prescribed in Article 12 and Article 14(2) per performance, type, and nominal operating temperature.

Nominal isothermal point category and sensitivity of spot-type combination detector sensitive to fixed temperature and/or rate of temperature rise

Article 15-2 The provision prescribed in Article 14(1) shall apply mutatis mutandis to the nominal operating temperature of the nominal isothermal point category of spot-type combination detectors sensitive to fixed temperature and/or rate of temperature rise.

(2) The sensitivity of the spot-type combination detector sensitive to fixed temperature and/or rate of temperature rise shall pass the following tests per type and nominal isothermal point when values of K, V, N, T, M, k, v, n, t, and m are defined as shown in the table below:

Type	Operation test					Non-operation test				
	Step increase			Linear increase		Step increase			Linear increase	
	K	V	N	T	M	k	v	n	t	m
Type 1	20	70	30	10	4.5	10	50	1	2	10
Type 2	30	85		15		15	60		3	

(i) Operation test

(a) When a vertical air stream of V cm/s at room temperature plus K°C is sent to the detector, the device shall transmit a fire detection signal within N seconds.

(b) When a horizontal air stream whose temperature is increased linearly from room temperature at a rate of T°C per minute is sent to the detector, the device shall transmit a fire detection signal within M minutes.

(c) When a horizontal air stream whose temperature is increased linearly from room temperature at a rate of 1°C per minute is sent to the detector, the device shall transmit a fire detection signal at or above the nominal isothermal point minus 10°C and at or below the nominal isothermal point plus 10°C.

(ii) Non-operation test

(a) When a vertical air stream of v cm/s at room temperature plus k°C is sent to the detector, the device shall not work within n minutes.

(b) When a horizontal air stream whose temperature is increased linearly from room temperature at a rate of t°C per minute is sent to the detector, the device shall not work within m minutes as long as the temperature does not reach the nominal isothermal point

minus 10°C.

Nominal detectable temperature range, continuous response, and sensitivity of spot-type analog heat detector

Article 15-3 For the nominal detectable temperature range of a spot-type analog heat detector, the upper limit shall be not less than 60°C and not more than 165°C and the lower limit shall be not less than 10°C and not more than the upper limit minus 10°C. The nominal detectable temperature shall be determined every 1°C.

(2) When a horizontal air stream whose temperature is increased linearly at a constant rate of 2°C per minute or less from the lower limit to the upper limit of the nominal detectable temperature range is sent to a spot-type analog heat detector, the device shall transmit a fire reference signal that corresponds to the air stream temperature at that time.

(3) The sensitivity of the spot-type analog heat detector shall pass tests conforming to the operation tests designed for the special type prescribed in Article 14(2)(i), at any temperature in the nominal detectable temperature range.

Nominal alarm verification time category and sensitivity of spot-type smoke detector using ionization

Article 16 The alarm verification time (refers to the time between when the detector finds that the smoke density in the surrounding atmosphere has become equal to or higher than the predetermined threshold and when the detector continues the operation and resultantly transmits a fire detection signal; the same shall apply hereinafter) of a spot-type smoke detector using ionization shall be more than 5 seconds and not more than 60 seconds. The nominal alarm verification time of the device shall be not less than 10 seconds and not more than 60 seconds and shall be determined every 10 seconds.

(2) The sensitivity of a spot-type smoke detector using ionization shall pass the following tests per type and nominal alarm verification time when values of K, V, T, and t are defined as shown in the following table:

Type	K	V	T	t
Type 1	0.19	20 to 40	30	5
Type 2	0.24			
Type 3	0.28			

Note: K is the nominal operating ionization current change rate. This parameter shows the rate of ionization current change induced by smoke when 20 VDC is applied between parallel-placed plate electrodes (the distance between the electrodes is 2 cm and Americium 241 of 8.2 μCi is attached to one electrode, which is a round metallic plate with a diameter of 5 cm).

(i) Operation test: When a horizontal air stream containing smoke whose density brings about an ionization current change rate of 1.35K is sent to the detector at v cm/s, the alarm-nonverification type detector shall transmit a fire detection signal within T seconds while an

alarm-verification type detector shall sense the air stream within T seconds and then transmit a fire detection signal within the period from the nominal alarm verification time minus 5 seconds to the nominal alarm verification time plus 5 seconds.

(ii) Non-operation test: When a horizontal air stream containing smoke whose density brings about an ionization current change rate of 0.65K is sent to the detector at V cm/s, the device shall not work within t minutes.

Nominal alarm verification time category and sensitivity of spot-type smoke detector using scattered light or transmitted light

Article 17 The provision prescribed in Article 16(1) shall apply mutatis mutandis to the alarm verification times and nominal alarm verification times of spot-type smoke detectors using scattered light or transmitted light.

(2) The sensitivity of a spot-type smoke detector using scattered light or transmitted light shall pass the following tests per type and nominal alarm verification time when values of K, V, T, and t are defined as shown in the following table:

Type	K	V	T	t
Type 1	5	20 to 40	30	5
Type 2	10			
Type 3	15			

Note: K is the nominal operating density and is expressed as absorbance index. In this case, the absorbance index is measured using an incandescent lamp with a color temperature of 2,800 K as a light source, under the assumption that the luminosity factor of the light sensor is similar to the actual value.

(i) Operation test: When a horizontal air stream containing smoke whose density generates an absorbance index of 1.5 K per meter is sent to the detector at V cm/s, an alarm-nonverification type detector shall transmit a fire detection signal within T seconds while an alarm-verification type detector shall sense the air stream within T seconds and then transmit a fire detection signal within the period from the nominal alarm verification time minus 5 seconds to the nominal alarm verification time plus 5 seconds.

(ii) Non-operation test: When a horizontal air stream containing smoke whose density generates an absorbance index of 0.5 K per meter is sent to the detector at V cm/s, the device shall not work within t minutes.

Nominal alarm verification time category, nominal monitoring distance, and sensitivity of line-type smoke detector using a transmitted optical beam

Article 17-2 The provision prescribed in Article 16(1) shall apply mutatis mutandis to the alarm verification time and nominal alarm verification time of line-type smoke detectors using a transmitted optical beam.

(2) The nominal monitoring distance of a line-type smoke detector using a transmitted optical beam shall be not less than 5 m and not more than 100 m and shall be determined every 5 m.

(3) The sensitivity of a line-type smoke detector using a transmitted optical beam shall pass the following tests per type, nominal alarm verification time, and nominal monitoring distance when values of K_1, K_2, T, and t are defined as shown in the following table:

Type	L_1	K_1	K_2	T	t
Type 1	Less than 45 m	$0.8 \times L_1 + 29$	$0.3 \times L_2$	30	2
	45 m or more	65			
Type 2	Less than 45 m	$L_1 + 40$			
	45 m or more	85			

Note: (i) L_1 is the minimum nominal monitoring distance while L_2 is the maximum nominal monitoring distance.

(ii) K_1 and K_2 respectively represent neutral density filter performance that corresponds to smoke density and are expressed as absorbance index. The absorbance index is measured using a light-emitting diode with a peak wavelength of 940 nm as a light source, under the assumption that the light sensor has peak sensitivity in the near infrared zone.

(i) Operation test: When a neutral density filter having performance K_1 that corresponds to L_1 is installed between the light emitter and the light sensor, an alarm-nonverification type detector shall transmit a fire detection signal within T seconds while an alarm-verification type detector shall sense the light within T seconds and then transmit a fire detection signal within the period from the nominal alarm verification time minus 5 seconds to the nominal alarm verification time plus 5 seconds.

(ii) Non-operation test: When a neutral density filter having performance K_2 that corresponds to L_2 is installed between the light emitter and the light sensor, the detector shall not work within tminutes.

Nominal alarm verification time category and sensitivity of spot-type smoke detectors using photoelectric effect and ionization

Article 17-3 The provision prescribed in Article 16(1) shall apply mutatis mutandis to the alarm verification time and the nominal alarm verification time of spot-type smoke detectors using photoelectric effect and ionization.

(2) The sensitivity of a spot-type smoke detector using photoelectric effect and ionization shall pass the tests prescribed in Article 16(2) and Article 17(2), respectively, per performance, type, and nominal alarm verification time.

Nominal detectable density range, continuous response, and sensitivity of spot-type analog smoke detectors using ionization

Article 17-4 The nominal detectable density of a spot-type analog smoke detector using ionization, when converted into absorbance index per meter (as prescribed in Table Note of Article 17(2); the same shall apply to this and following articles), shall range from the upper limit to the lower limit;

where the upper limit is not less than 15% and not more than 25% and the lower limit is not less than 1.2% and not more than the upper limit minus 7.5%. The nominal detectable density shall be determined every 0.1%.

(2) When an air stream of not less than 20 cm/s and not more than 40 cm/s is generated and smoke, whose density (expressed as ionization current change rate, which is the change rate of ionization current prescribed in Table Note of Article 16(2); the same shall apply in this Article 17-4), increases linearly at a constant rate of not more than 0.12 per minute from the rate at the lower limit of the nominal detectable density range to the rate at the upper limit of the range, is added to this air stream and the resulting mixture is sent to a spot-type analog smoke detector using ionization, the device shall transmit a fire reference signal that corresponds to the subject smoke density at that time.

(3) The sensitivity of a spot-type analog smoke detector using ionization shall pass a test conforming to the operation test designed for alarm-nonverification detectors, which is prescribed in Article 16(2)(i), at any density in the nominal detectable density range.

Nominal detectable density range, continuous response, and sensitivity of spot-type analog smoke detectors using scattered light or transmitted light

Article 17-5 The nominal detectable density of a spot-type analog smoke detector using scattered light or transmitted light, when converted into absorbance index per meter, shall range from the upper limit to the lower limit: where the upper limit is not less than 15% and not more than 25% and the lower limit is not less than 1.2 % and not more than the upper limit minus 7.5 %. The nominal detectable density shall be determined every 0.1 %.

(2) When an air stream of not less than 20 cm/s and not more than 40 cm/s is generated and smoke, whose density (expressed as absorbance index) increases linearly at a constant rate of not more than 2.5% per minute from the index at the lower limit of the nominal detectable density range to the index at the upper limit of the range, is added to this air stream and the resulting mixture is sent to a spot-type analog smoke detector using scattered light or transmitted light, the device shall transmit a fire reference signal that corresponds to the subject smoke density at that time.

(3) The sensitivity of a spot-type analog smoke detector using scattered light or transmitted light shall pass a test conforming to the operation test designed for an alarm-nonverification detector, which is prescribed in Article 17(2)(i), at any density in the nominal detectable density range.

Nominal monitoring distance category, nominal detectable density range, continuous response, and sensitivity of line-type analog smoke detectors using a transmitted optical beam

Article 17-6 The provision prescribed in Article 17-2(2) shall apply mutatis mutandis to the nominal monitoring distance of line-type analog smoke detectors using a transmitted optical beam.

(2) The nominal detectable density of the line-type analog smoke detector using a transmitted optical beam, when the absorbance index (as prescribed in Table Note of Article 17-2(3); the same shall apply in this Article 17-6) is used as a measure, shall range from the upper limit to the lower limit defined in the table below (the nominal detectable density shall be determined every 0.1%):

Category	Nominal detectable density range	
	Upper limit	Lower limit
L_1: Less than 45 m	$(0.8 \times L_1 + 29)$% to $1.1 \times (L_1 + 40)$%	$(0.15 \times L_2)$% to upper limit less $(0.2 \times L_2 + 11)$%
L_1: 45 m or more	65 to 94%	$(0.15 \times L_2)$% to upper limit less 20 %

Note: L_1 is the minimum nominal monitoring distance while L_2 is the maximum nominal monitoring distance.

(3) When a neutral density filter is installed between the light emitter and the light sensor, and the filter value is changed linearly at a constant per-minute rate of not more than 30% of maximum nominal monitoring range from the absorbance index corresponding to the lower limit of the nominal detectable density range to the index corresponding to the upper limit of the range, a line-type analog smoke detector using a transmitted optical beam shall transmit a fire reference signal that corresponds to the changed filter value at that time.

(4) The sensitivity of a line-type analog smoke detector using a transmitted optical beam shall pass a test conforming to the operation test designed for the alarm-nonverification detectors, which is prescribed in Article 17-2(3)(i), at any density in the nominal detectable density range.

Nominal operating temperature category, nominal alarm verification time category, and sensitivity of spot-type combination detectors sensitive to heat and smoke

Article 17-7 Provisions in Article 14(1) and Article 16(1) shall respectively apply mutatis mutandis to the nominal operating temperature, alarm verification time, and nominal alarm verification time of spot-type combination detectors sensitive to heat and smoke,

(2) The sensitivity of a spot-type combination detector sensitive to heat and smoke shall pass the tests prescribed in Article 12 or Article 14(2) and Article 16(2) or Article 17(2) per performance, type, and nominal operating temperature and nominal alarm verification time.

Nominal monitoring distance category, sensitivity, and viewing angle of flame detectors

Article 17-8 The nominal monitoring distance of a flame detector shall be determined every 5° of viewing angle. This parameter shall be determined every 1 m over a distance of less than 20 m and every 5 m over a distance of 20 m or more.

(2) The flame detector shall pass the following tests:

(i) Operation test: When L and d are defined as shown in the table below according to the category of flame detector and the viewing angle dependent nominal monitoring distance, and n-heptane is burned on a d×d cm square combustion plate at a location L meters distant from the detector in the horizontal direction, the device shall transmit a fire detection signal within 30 seconds.

Category	L	d
Indoor type	1.2 × nominal monitoring distance	33
Outdoor type or road type	1.4 × nominal monitoring distance	70

(ii) Non-operation test: When the luminous energies of the ultra-violet and infrared rays are a quarter of those used in the operation test described above, the flame detector shall not work within 1 minute.

(3) For road type flame detectors, the maximum viewing angle shall be not less than 180°.

Sensitivity test conditions

Article 18 The tests prescribed in Articles 12 to 17-8 shall be implemented after the detector is subjected to forced ventilation air of room temperature for 30 minutes.

Ambient temperature test

Article 19 The detector types as listed in the following items shall not generate functional degradation in the respective ambient temperature ranges specified in those items:

(i) Detectors performing as fixed temperature heat detectors: -10°C to nominal operating temperature (the lowest value for a device having two or more nominal operating temperatures; the same shall apply in the following Article) minus 20°C or nominal isothermal point minus 20°C

(ii) Spot-type analog heat detectors: -10°C to upper limit of nominal detectable temperature range minus 20°C

(iii) Outdoor type and road type flame detectors: -20°C to 50°C

(iv) Detectors other than those listed in the preceding three items: -10°C to 50°C

Aging test

Article 20 When detectors listed in Article 19(i) are energized and placed in an atmosphere whose temperature is lower than the nominal operating temperature or nominal isothermal point by 20°C for 30 days, the devices shall not generate structural or functional degradation. When detectors listed in Article 19(ii) are energized and placed in an atmosphere whose temperature is lower than the upper limit of the nominal detectable temperature range by 20°C for 30 days, the devices shall not generate structural or functional degradation. When detectors listed in Article 19(iii) and (iv) are energized and placed in an atmosphere of 50°C for 30 days, the devices shall not generate structural or functional degradation.

Waterproof test

Article 21 Waterproof detectors, when subjected to a 2-cycle immersion test (one test cycle consists of two steps: detectors are immersed in fresh water of 65°C for 15 minutes and then immersed in saturated sodium chloride aqueous solution for 15 minutes), shall not generate functional degradation.

Drop test

Article 21-2 When detectors (except for waterproof detectors, battery-powered wireless detectors without terminals or electrical wires (only when wires are used instead of terminals), and detectors with interlocked alarm functions that are used for automatic fire detection, and fire alarm systems designed for particular small-scale facilities and not classified as detectors with automatic test functions) are energized and subjected to a drop test wherein fresh water is dropped onto the base surface of each detector at a rate of 5 cm^3 per minute, the devices shall not generate functional degradation.

Water spray test

Article 21-3 When outdoor type and road type flame detectors (except for waterproof models) are installed under normal service conditions and subjected to a water spray test wherein fresh water is uniformly sprayed onto each detector at a rate of 3 mm per minute from the upper front side at an angle of 45° for 60 minutes, the devices shall not collect water internally or generate functional degradation.

Corrosion test

Article 22 Detectors (except for those detectors with interlocked alarm functions that are used for automatic fire detection, and fire alarm systems designed for particular small-scale facilities and not classified as detectors with automatic test functions) shall not generate functional degradation when normal models are tested according to Item (i), acid-resistant models are tested according to Items (ii) and (iii), and alkali-resistant models are tested according to Items (ii) and (iv). In all tests, the test temperature shall be 45°C. For air tube models, the tube shall be closely wound 10 times around a round bar with a diameter of 10 mm. For thermocouple models, thermocouples shall be closely wound 10 times around a round bar with a diameter of 100 mm. For line sensor models, sensing lines shall be closely wound 10 times around a round bar with a diameter of 100 mm.

(i) Test sequence: Pour 500 ml of aqueous sodium thiosulfate solution with a density of 40 g/l into a 5-liter beaker. Dilute sulfuric acid with distilled water by controlling the ratio of sulfuric acid to distilled water to 1:35 in volume percent, prepare 156 ml of this solution and add it to 1,000 ml of water. Add 10 ml of the aqueous sulfuric acid solution to the aqueous sodium thiosulfate solution twice a day to generate sulfur dioxide. Place the energized detector in this sulfur dioxide atmosphere for 4 days.

(ii) Test sequence: Pour 500 ml of aqueous sodium thiosulfate solution with a density of 40 g/l into a 5-liter beaker. Dilute sulfuric acid with distilled water by controlling the ratio of sulfuric acid to distilled water to 1:35 in volume percent, prepare 156 ml of this solution and add it to 1,000 ml of water. Add 10 ml of the aqueous sulfuric acid solution to the aqueous sodium thiosulfate solution twice a day to generate sulfur dioxide. Place the energized detector in this sulfur dioxide atmosphere for 8 days. Then, repeat this test over another 8 days.

(iii) Test sequence: Place the energized detector in a hydrochloric acid atmosphere with a density of 1 mg/l for 16 days.

(iv) Test sequence: Place the energized detector in gaseous ammonium with a density of 10 mg/l for 16 days.

(2) Outdoor type and road type flame detectors, when 3% aqueous sodium chloride solution is sprayed onto each detector once a day for 30 seconds in such manner that the amount of solution will range from 1 to 3 ml per horizontal area of 9 cm in diameter and this spray test is continued for 3 days, and then the device is left in air of 40°C and 95% RH for 15 days, shall not generate heavy rust or functional degradation.

Cyclic operation test

Article 23 When the operations prescribed in the following items are repeated over 1,000 cycles for the following detector types (except for non-resettable detectors) to which rated voltage that permits generation of rated current is applied, the detectors shall not generate structural or functional degradation:

(i) Detectors performing as rate of rise heat detectors or fixed temperature heat detectors: For detectors performing as rate of rise heat detectors (except for spot-type combination detectors sensitive to fixed temperature and/or rate of temperature rise), the operation is characterized as follows: The devices are exposed to an air stream at higher than room temperature until generation of a fire detection signal and then are cooled in forced ventilation air of room temperature to regain their original condition. For detectors performing as fixed temperature heat detectors (except for spot-type combination detectors sensitive to fixed temperature and/or rate of temperature rise; the same shall apply in Article 29), the operation is characterized as follows: The devices are exposed to an air stream having a higher temperature than the nominal operating temperature (the highest value for devices having two or more nominal operating temperatures) until generation of a fire detection signal and then are cooled in forced ventilation air of room temperature to regain their original condition. For spot-type combination detectors sensitive to fixed temperature and/or rate of temperature rise, the operation is characterized as follows: The devices are exposed to an air stream having a higher temperature than the nominal isothermal point plus 30°C for special type and type 1, the nominal isothermal point plus 40°C for type 2, and the nominal isothermal point plus 60°C for type 3 (the highest temperature for devices having two or more performance levels or types) until generation of a fire detection signal and then are cooled in forced ventilation air of room temperature to regain their original condition.

(ii) Spot-type analog heat detectors: The operation is characterized as follows: The devices are exposed to an air stream having a higher temperature than the upper limit of the nominal detectable temperature range by 30°C until generation of a fire reference signal pertaining to the upper limit of this range and then are cooled in forced ventilation air at room temperature to regain their original condition.

(iii) Detectors performing as spot-type smoke detectors using ionization: The operation is characterized as follows: Voltage or any other physical quantity is applied to the detectors to generate a fire detection signal and then the devices are treated to restore them to their original condition.

(iv) Detectors performing as smoke detectors using scattered light or transmitted light or flame detectors: The operation is characterized as follows: Luminous energy or any other physical quantity is applied to the detectors to generate a fire detection signal and then the devices are treated to restore them to their original condition.

(v) Spot-type analog smoke detectors using ionization: The operation is characterized as follows: Voltage or any other physical quantity is applied to the detectors to generate a fire reference signal pertaining to the upper limit of the nominal detectable density range and then the devices are treated to restore them to their original condition.

(vi) Detectors performing as analog smoke detectors using scattered light or transmitted light: The operation is characterized as follows: Luminous energy or any other physical quantity is applied to the detectors to generate a fire reference signal pertaining to the upper limit of the nominal detectable density range and then the devices are treated to restore them to their original condition.

Vibration test

Article 24 When vibration characterized by double amplitude of 1 mm and 1,000 cycles per minute is continuously applied to a detector in an arbitrary direction for 10 minutes, the device shall maintain an appropriate monitoring state.

(2) When vibration characterized by double amplitude of 4 mm and 1,000 cycles per minute is continuously applied to an unenergized detector in any direction for 60 minutes, the device shall not generate structural or functional degradation.

Impact test

Article 25 When maximum impact of 50 G is applied to a detector five times in an arbitrary direction, the device shall not generate functional degradation.

Dust test

Article 26 When an energized detector is exposed to air containing Class 5 dust as prescribed in Article 17(1) of the Industrial Standardization Act (Act No. 185 of 1949), conforms to JIS Z 8901, and features a density of 20% per 30 cm (the value is expressed as absorbance index) for 15 minutes, the device shall not generate functional degradation. This test shall be implemented under the following conditions: 20°C and 40% RH.

Impulse voltage test

Article 27 When detectors (except for wireless detectors) are energized and subjected to the following tests for 15 seconds, the devices shall not generate functional degradation:

(i) Voltage of 500 V is applied to each detector from a power supply having an internal resistance of 50 Ω under the following conditions: pulse width of 1 μs and inter-pulse period of 100 Hz.

(ii) Voltage of 500 V is applied to each detector from a power supply having an internal resistance of 50 Ω under the following conditions: pulse width of 0.1 μs and inter-pulse period of 100 Hz.

Moisture test

Article 28 A detector, when energized and placed in air of 40°C and 95% RH for 4 days, shall maintain the appropriate monitoring state.

Resettability test

Article 29 Resettable detectors performing as fixed temperature heat detectors or resettable spot-type analog heat detectors, when exposed to an air stream of 1 m/s at 150°C for 2 minutes, shall not generate structural or functional degradation. Other resettable detectors, when exposed to the same air stream for 30 seconds, shall not generate structural or functional degradation.

Insulation resistance test

Article 30 When the insulation resistance of each detector is measured with a 500-VDC insulation tester at a point between insulated terminals and a point between the charging part and the metallic housing, this physical quantity shall be not less than 50 MΩ (not less than 1,000 MΩ per meter between lines for line-type fixed temperature heat detectors).

Dielectric strength test

Article 31 When 500-Vrms AC voltage whose characteristics are similar to a 50 Hz or 60 Hz sine wave is applied between the charging part and the metallic housing of a detector (1,000 VAC for a detector whose rated voltage is more than 60 VAC and not more than 150 V or 1,000 V plus rated voltage multiplied by 2 for a detector whose rated voltage is more than 150 V), the device shall maintain such dielectric strength as can withstand the input voltage for 1 minute.

Chapter 3 Manual Call Points

Structures and functions of P-type manual call points

Article 32 The structures and functions of P-type class 1 manual call points shall meet the requirements prescribed in Items (i) to (viii) below and those of P-type class 2 manual call points shall meet the requirements prescribed in Items (i) to (v) and (viii):

(i) A fire detection signal shall be transmitted when the push-button switch is pressed.

(ii) For manual call points whose structures do not allow the push-button switch to automatically return to the home position, necessary measures shall be provided so that the operator may securely return the switch to its home position.

(iii) The push-button switch shall be equipped with a frangible element at the front so that the operator may easily access and press the switch by breaking the element or executing a push-and-away procedure for the element.

(iv) The frangible element shall be made of transparent organic glass.

(v) The non-resettable or resettable frangible element, when a static load of 20 N is applied to its center area of 20 mm in diameter, shall not be broken or removed or generate such deformation as to allow the element to contact the switch. In addition, the non-resettable or resettable frangible element shall be broken or removed when a static load of 80 N is applied to it uniformly.

(vi) Each manual call point shall be equipped with a device that can confirm that the control and indicating equipment has received the fire detection signal transmitted from the manual call point.

(vii) Each manual call point shall be equipped with a device that can establish telephone communication between the manual call point and the control and indicating equipment without disturbing transmission of a fire detection signal.

(viii) The housing color shall be red.

Structures and functions of M-type manual call points

Article 33 The structures and functions of M-type manual call points shall meet the requirements prescribed in Items (i) to (iii) below and Article 32(i) to (iii) and (vi) to (viii):

(i) The frangible element shall be made of transparent inorganic glass (limited to glass with a thickness of not less than 1 mm and not more than 2 mm) or organic glass. In this case, the provision of Article 32(v) shall be applied to the organic-glass non-resettable or resettable frangible element.

(ii) The punching record type manual call points may consecutively transmit the identical fire detection signal twice or more. The signal shall consist of not more than 5 digits, with each digit composed of not more than 6 punched holes.

(iii) Each outdoor type manual call point shall be equipped with 3-ampere capacity protector that works in the voltage range from 100 to 300 V.

(Structure and function of T-type manual call points)

Article 34 The structure and function of T-type manual call points shall meet the requirements prescribed in Items (i) to (iii) below and Article 32(ii) and (viii).

(i) The fire detection signal shall be transmitted when the operator picks up the handset.

(ii) The handset shall feature easy handling.

(iii) Each manual call point shall be equipped with the device that may establish simultaneous communications between the manual call point and the control and indicating equipment.

(Structure and function of wireless manual call points)

Article 34-2 The structural design arrangement to be used shall be such that the antenna of the manual call point is not exposed to the external environment.

(2) Provisions prescribed in Article 8(xvi)(a) to (c) and (e) to (h) and Article 10(6) shall apply mutatis mutandis to the structures and functions of wireless manual call points. In this case, the term “detector” in Article 8(xvi)(b) shall be deemed to have been replaced with “manual call point”; the term “control and indicating equipment or other detector with interlocked alarm function” in Article 8(xvi)(c) shall be deemed to have been replaced with “control and indicating equipment”; the term “that allows the control and indicating equipment to verify the transmission status of the wireless system or the detector with interlocked alarm function” in Article 8(xvi)(e) shall be deemed to have been replaced with “that allows the control and indicating equipment to verify the transmission status of the wireless system”; the term “wireless detector” in Article 8(xvi)(g) shall be deemed to have been replaced with “wireless manual call point”; the term “powered by batteries (except for detectors with an interlocked alarm function)” in Article 8(xvi)(h) shall be deemed to have been replaced with “powered by batteries”; the term “detector” in Article 8(xvi)(h).2 shall be deemed to have been replaced with “manual call point”; and the term “wireless detector” in Article 10(6) shall be deemed to have been replaced with “wireless manual call point.”

Ambient temperature test

Article 35 Manual call points classified as shown in the following items shall not generate functional degradation in the respective ambient temperature ranges prescribed in those items:

(i) Outdoor type manual call points: -20°C to 70°C

(ii) Indoor type manual call points: -10°C to 50°C

Cyclic operation test

Article 36 When rated current is supplied to manual call points at a rated voltage and transmission of a fire detection signal is repeated 1,000 times, the devices shall not generate structural or functional degradation.

Corrosion test

Article 37 Outdoor type manual call points, when 3% aqueous sodium chloride solution is sprayed onto each call point once a day for 30 seconds in such a manner that the amount of solution will range from 1 ml to 3 ml per horizontal area of 9 cm in diameter and this spray test is continued for 3 days, and then the device is left in air of 40°C and 95% RH for 15 days, shall not generate heavy rust or functional degradation.

Water spray test

Article 38 When outdoor type manual call points are installed under normal service conditions and subjected to a water spray test wherein fresh water is uniformly sprayed onto each call point at a rate of 3 mm per minute from the upper front side at an angle of 45° for 60 minutes, the devices shall not collect water internally or generate functional degradation.

Vibration test

Article 39 When vibration characterized by double amplitude of 4 mm and 1,000 cycles per minute is continuously applied to the manual call points in an arbitrary direction for 60 minutes, the devices shall maintain the appropriate monitoring state and shall not generate structural or functional degradation.

(Impact test)

Article 40 When maximum impact of 100 G is applied to manual call points five times in an arbitrary direction, the devices shall not generate functional degradation.

(Insulation resistance test)

Article 41 When the insulation resistance of each manual call point is measured with a 500-VDC insulation tester at a point between the insulated terminals, a point between the charging part and the metallic housing and a point between the charging part and the head of push-button switch, this physical quantity shall be not less than 20 MΩ.

Dielectric strength test

Article 42 When 500-Vrms AC voltage whose characteristics are similar to 50 Hz or 60 Hz sine

wave is applied between the charging part and the metallic housing of a manual call point (1,000 VAC for the manual call point whose rated voltage is more than 60 V and not more than 150 V or 1,000 VAC plus doubled rated voltage for the manual call point whose rated voltage is more than 150 V), the devices shall maintain such dielectric strength as can withstand the input voltage for 1 minute.

Chapter 4 Miscellaneous Provisions

Indications

Article 43 In accordance with the categories of detectors and manual call points listed below, the information specified in the following items shall be indicated on all of these devices in easily observable locations in such a manner that the subject information may not be readily erased.

(i) Detector: The following information shall be indicated:

(a) Type of device: Spot-type rate of rise heat detector, line-type rate of rise heat detector, line-type fixed temperature heat detector, spot-type fixed temperature heat detector, spot-type combination detector sensitive to fixed temperature and/or rate of temperature rise, spot-type multistate detector sensitive to fixed temperature and/or rate of temperature rise, spot-type analog heat detector, spot-type smoke detector using ionization, spot-type smoke detector using scattered light or transmitted light, line-type smoke detector using a transmitted optical beam, spot-type smoke detector using photoelectric effect and ionization, spot-type analog smoke detector using ionization, spot-type analog smoke detector using scattered light or transmitted light, line-type analog smoke detector using a transmitted optical beam, spot-type combination detector sensitive to heat and smoke, spot-type ultra-violet (UV) detector, spot-type infrared (IR) detector, spot-type multiband flame detector, or spot-type combination detector sensitive to ultra-violet (UV) and infrared (IR), and Term “Detector”

(b) Applicable design: Waterproof, acid-resistant, alkali-resistant, non-resettable, or alarm-verification

(c) For a detector that has type classification, the relevant type shall be indicated (both performance and type shall be indicated for spot-type multistate detectors sensitive to fixed temperature and/or rate of temperature rise, spot-type smoke detectors using photoelectric effect and ionization, and spot-type combination detectors sensitive to heat and smoke).

(d) For detectors performing as fixed temperature heat detectors, the nominal operating temperature shall be indicated; for spot-type combination detectors sensitive to fixed temperature and/or rate of temperature rise, the nominal isothermal point shall be indicated; for spot-type analog heat detectors, the nominal detectable temperature range shall be indicated; for detectors performing as spot-type smoke detectors using ionization or alarm-verification type detectors performing as smoke detectors using scattered light or transmitted light, the nominal alarm verification time shall be indicated; for line-type smoke detectors using a transmitted optical beam, the nominal monitoring distance shall be indicated per applicable type; for spot-type analog smoke detectors using ionization or spot-type analog smoke detectors using scattered light or transmitted light, the nominal detectable density range shall be indicated; for line-type analog smoke detectors using a

transmitted optical beam, the nominal monitoring distance and nominal detectable density range shall be indicated; and for flame detectors, the nominal monitoring distance per viewing angle shall be indicated.

(e) For multi-signal detectors, the number of transmittable fire detection signals shall be indicated.

(f) Model and model code

(g) Year of manufacture

(h) Name/designation of manufacturer

(i) Outline of handling method

(j) Line-type rate of rise heat detectors, detectors performing as spot-type smoke detectors using ionization, detectors performing as smoke detectors using scattered light or transmitted light, spot-type analog smoke detectors using ionization, detectors performing as analog smoke detectors using scattered light or transmitted light, or flame detectors: Manufacturing number

(k) Air tube models of line-type rate of rise heat detectors: Maximum length of air tube Other models of line-type rate of rise heat detectors: Maximum number of heat sensors, resistance of conductor, and working voltage

(l) Flame detectors: Applicable design (indoor type, outdoor type, or roadtype) Stain monitoring type flame detectors: Function (i.e., stain monitoring)

(m) Detectors with automatic test functions: Term "with automatic test function", and type and model code of connectable control and indicating equipment or transmitter

(n) Wireless detectors: According to indications listed below:

1. Term "Wireless"
2. Model code of communicatable transmitter or control and indicating equipment

(o) Detector with fire alarm function (except for a detector with an interlocked alarm function): Term of "with fire alarm function"

(p) Detector with interlocked alarm function: Term "with interlocked alarm function"

(q) Detector that may not be used in the automatic fire detection and fire alarm system, except for the automatic fire detection and fire alarm system designed for particular small-scale facilities, in accordance with the provision provided in Article 23(4)(vii-vi) of the Ordinance for Enforcement of Fire Service Act (Ordinance of the Ministry of Home Affairs No. 6 of 1961): The fact showing that a detector may not be used in an automatic fire detection and fire alarm system, except for the automatic fire detection and fire alarm system designed for particular small-scale facilities

(r) Detector powered by batteries: Type and voltage of batteries

(ii) Manual call point: The information described in the preceding items (f) to (i), as well as the information listed below:

(a) Term "P-type class 1", "P-type class 2", "T-type", or "M-type", as well as term "Manual call point"

(b) Indication of "Fire detection and fire alarm system"

(c) Wireless manual call point: According to indications listed below:

1. Term "Wireless"
2. Model code of communicatable transmitter or control and indicating equipment
3. Manual call point powered by batteries: Types and voltages of batteries

(2) For terminal boards used in detectors (except for non-polar type) and manual call points, the terminal symbol shall be indicated in an easily observable location in such a manner that the subject symbol may not be readily erased.

Exemption from standards

Article 44 When the Minister of Internal Affairs and Communications recognizes that detectors and manual call points newly created as a result of technology development activities have 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 July 1, 1981.
(2) The Ordinance for Technical Specifications Pertaining to Fire Detection and Fire Alarm Systems (Ordinance of the Ministry of Home Affairs No. 4 of 1969; hereinafter referred to as "former Rule") shall be abolished.
(3) For tests pertaining to detectors and manual call points for which application has been already made to have the fire 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.
(4) For detectors and manual call points that have already received model approvals according to the standards prescribed in the former Rule, and detectors and manual call points that have received model approvals based on the results of 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 to have been provided in accordance with the standards of this Ordinance.

Supplementary Provisions (Ordinance of the Ministry of Home Affairs No. 18 of July 20, 1984)

(1) This Ordinance shall come into effect as of October 1, 1984.
(2) For tests pertaining to detectors whose application for test has been already made to have the fire 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.

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. 18 of May 7, 1991)

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

Supplementary Provisions (Ordinance of the Ministry of Home Affairs No. 3 of January 29, 1993)

(1) This Ordinance shall come into effect as of February 1, 1993.
(2) For detectors and manual call points that are installed in fire detection and fire alarm systems

and have already got model approvals at the time of enforcement of this Ordinance, their model approvals shall be deemed to have been provided in accordance with the standards prescribed in the amended Ordinance for Technical Specifications Pertaining to Detectors and Manual Call Points of Fire Detection and Fire Alarm Systems.

Supplementary Provisions (Ordinance of the Ministry of Home Affairs No. 27 of September 13, 1995)

(1) This Ordinance shall come into effect as of October 1, 1995.

(2) For tests pertaining to detectors and manual call points of fire detection and fire alarm systems for which application 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.

(3) For detectors and manual call points that have already received model approvals, and detectors and manual call points that have received model approvals based on the results of 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 to have been provided in accordance with the standards prescribed in the amended Ordinance for Technical Specifications Pertaining to Detectors and Manual Call Points of Fire Detection and Fire Alarm Systems.

Supplementary Provisions (Ordinance of the Ministry of Home Affairs No. 38 of September 29, 1997)

This Ordinance shall come into effect as of October 1, 1997.

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 measure

Article 2 For tests pertaining to fire extinguishers, fire-extinguishing chemicals, enclosed sprinkler heads, fire hoses, deluge valves, fire-extinguishing foams, detectors and manual call points, flowing water detectors, plug-in couplers, and screw couplers for which application has already been 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 received model approvals and fire extinguishers that have received model approvals based on the results of 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 to have been provided in accordance with the standards prescribed in the Ordinance for Technical Specifications Pertaining to Fire Extinguishers as amended per provisions of Article 1.

(3) For fire-extinguishing chemicals that have already received model approvals and fire-

extinguishing chemicals that have received model approvals based on the results of 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 to have been provided in accordance with the standards prescribed in the Ordinance for Technical Specifications Pertaining to Fire-extinguishing Chemicals as amended per provisions of Article 2.

(4) For enclosed sprinkler heads that have already got model approvals and enclosed sprinkler heads that have received model approvals based on the results of 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 to have been provided in accordance with the standards prescribed in the Ordinance for Technical Specifications Pertaining to Enclosed Sprinkler Heads as amended per provisions of Article 3.

(5) For fire hoses that have already received model approvals and fire hoses that have received model approvals based on the results of 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 to have been provided in accordance with the standards prescribed in the Ordinance for Technical Specifications Pertaining to Fire Hoses as amended per provisions of Article 4.

(6) For deluge valves that have already received model approvals and deluge valves that have received model approvals based on the results of 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 to have been provided in accordance with the standards prescribed in the Ordinance for Technical Specifications Pertaining to Deluge Valves as amended per provisions of Article 5.

(7) For fire-extinguishing foams that have already received model approvals and fire-extinguishing foams that have received model approvals based on the results of 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 to have been provided in accordance with the standards prescribed in the Ordinance for Technical Specifications Pertaining to Fire-extinguishing Foams as amended per provisions of Article 6.

(8) For detectors and manual call points that have already received model approvals, and detectors and manual call points that have received model approvals based on the results of 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 to have been provided in accordance with the standards prescribed in the standards prescribed in the Ordinance for Technical Specifications Pertaining to Detectors And Manual Call Points of Fire Detection and Fire Alarm Systems as amended per provisions of Article 7.

(9) For flowing water detectors that have already received model approvals and flowing water detectors that have received model approvals based on the results of 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 to have been provided in accordance with the standards prescribed in the Ordinance for Technical

Specifications Pertaining to Flowing Water Detectors as amended per provisions of Article 8.

(10) For plug-in couplers that have already received model approvals and plug-in couplers that have received model approvals based on the results of 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 to have been provided in accordance with the standards prescribed in the Ordinance for Technical Specifications Pertaining to Plug-in Couplers used for Fire Hoses as amended per provisions of Article 11.

(11) For screw couplers that have already received model approvals and screw couplers that have received model approvals based on the results of 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 to have been provided in accordance with the standards prescribed in the Ordinance for Technical Specifications Pertaining to Screw Couplers used for Fire Hoses and Fire Suction Hoses as amended per provisions of Article 12.

(12) For power 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) immediately before the enforcement of this Ordinance, they shall be deemed to conform to the standards prescribed in the Ordinance for Technical Specifications Pertaining to Power Fire Pumps as amended per 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 immediately before the enforcement of this Ordinance, they shall be deemed to conform to the standards prescribed in the Ordinance for Technical Specifications Pertaining to Fire Suction Hoses as amended per 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 Act (Act No. 88 of 1999).

Supplementary Provisions (Ordinance of the Ministry of Internal Affairs and Communications No. 30 of March 26, 2007)

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

(2) For tests pertaining to detectors and manual call points of fire detection and fire alarm systems for which application 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.

(3) For detectors and manual call points that have already received model approvals, and detectors and manual call points that have received model approvals based on the results of 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 to have been provided in accordance with the standards prescribed in the amended Ordinance for Technical Specifications Pertaining to Detectors and

Manual Call Points of Fire Detection and Fire Alarm Systems.

Supplementary Provisions (Ordinance of the Ministry of Internal Affairs and Communications No. 158 of December 26, 2008)

Effective date
Article 1 This Ordinance shall come into effect as of the day of promulgation.

Transitional measure
Article 2 For detectors and manual call points that have already received model approvals at the time of enforcement of this Ordinance, their model approvals shall be deemed to have been provided in accordance with the standards prescribed in the amended Ordinance for Technical Specifications Pertaining to Detectors and Manual Call Points of Fire Detection and Fire Alarm Systems.

Supplementary Provisions (Ordinance of the Ministry of Internal Affairs and Communications No. 16 of March 9, 2009) – Excerpt

Effective date
(1) This Ordinance shall come into effect as of the day of promulgation.

Transitional measure
(2) For detectors and manual call points that have already received model approvals at the time of enforcement of this Ordinance, their model approvals shall be deemed to have been provided in accordance with the standards prescribed in the amended Ordinance for Technical Specifications Pertaining to Detectors and Manual Call Points of Fire Detection and Fire Alarm Systems.

Supplementary Provisions
Summary of Order of the Ministry of Internal Affairs and Communications, No. 25 of March 27, 2013

Effective date
Article 1 This Ordinance shall come into effect as of April 1, 2014.

Transition measures
Article 3 Test for fire alarm facility detectors, manual call points, and relay equipment for which the application for machine and equipment certification, implemented by corporate entities as stipulated by the Japan Fire Equipment Inspection Institute, or in Paragraph 1, Article 21-3 of the Fire Service Act, which are registered with the Minister of Internal Affairs and Communications, was actually submitted at the time of enforcement of this ministerial ordinance, shall follow the stipulations in the previous regulations.

(2) The model certification for detectors and manual call points that were actually received at the time of enforcement of this ministerial ordinance, as well as the model certification for detectors and manual call points that were certified based on the results of the test in compliance with previous regulations in accordance with the stipulations in the previous paragraph, shall be deemed as model certification that complies with the post-revision ministerial ordinance that stipulates technical standard concerning detectors and manual call points in fire alarm facility, in compliance with the stipulations in Article 2.

Supplementary Provisions
Ordinance of the Ministry of Internal Affairs and Communications, No. 26 of March 31, 2014)
This Ordinance shall come into effect as of the day of promulgation.