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Code for Design of Automatic Fire Alarm System

火灾自动报警系统设计规范

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1 General Provisions

1.0.1 This code is formulated with view to rational design of automatic fire alarm system, prevention and reduction of fire hazards and protection of the personal and property safety.

1.0.2 This code is applicable to design of automatic fire alarm system located in the constructed, renovated and extended building and structure but not applicable to that located at the places for production and storage of gunpowder, explosive, ammunition and explosive device.

1.0.3 Aimed at the features of the protected objects, the design of automatic fire alarm system shall comply with the relevant national guideline and policy and realize the safety and reliability, advanced technology and economic feasibility.

1.0.4 The design of automatic fire alarm system shall not only comply with this code but those in the current relevant standards of the nation.

2 Terms

2.0.1 Automatic fire alarm system

The fire system in use for exploration of early fire feature, sending the fire alarm signal and provision of control and indication for personnel evacuation and prevention of fire spreading and start of self-extinguishing device.

2.0.2 Alarm zone

Unit of warning limit of automatic fire alarm system divided according to fire zone or storey, etc.

2.0.3 Detection zone

Unit of alarm zone divided according to position of detected fire.

2.0.4 Monitoring area

Area of a fire detector where it can detect effectively.

2.0.5 Installation spacing

Horizontal distance between two centers of adjacent fire detectors.

2.0.6 Monitoring radius

Maximum horizontal range of a fire detector where it can detect effectively in a single direction.

2.0.7 Control signal to start & stop an automatic equipment

Signal, sent by the automatic controller for fire protection in use for controlling fire equipment (facilities).

2.0.8 Feedback signal from automatic equipment

Signal indicating the controlled fire equipment (facilities) will send the operation state information to the automatic controller for fire protection.

2.0.9 Signal for logical program

Signal received by the automatic controller for fire protection used for logical decision.

3 Basic Requirement

3.1 General Requirements

3.1.1 The automatic fire alarm system may be used at the places where the persons live or stay frequently and those where the valuable supplies are stored or the serious pollution will be alarmed timely after the burning.

3.1.2 The automatic fire alarm system shall be equipped with automatic and manual trigger gears.

3.1.3 The automatic fire alarm system device shall select the products in conformity with relevant national standards and related to the market-access system.

3.1.4 Compatibility of interfaces among system devices with the communication protocols shall meet the relevant requirements of the current standard GB 22134 "Compatibility Requirements of Automatic Fire Alarm System Components".

3.1.5 The total amount of fire detector, manual fire alarm call point and module connected with any fire alarm control unit and the total addresses shall not exceed 3200 points and the total amount of the connecting devices for each bus circuit should not exceed 200 points and at least an allowance of 10% of rated capacity shall be reserved; the total amount of addresses for any automatic controller for fire protection or total amount of various modules controlled by the (linkage-type) fire alarm control unit shall not exceed 1600 points and the total amount of the connecting device for each linkage bus circuit should not exceed 100 points and at least an allowance of 10% of rated capacity shall be reserved.

3.1.6 The short circuit isolator shall be arranged at the system bus and the total amount of the fire equipment protected by the isolator, like fire detector, manual fire alarm call point and module shall not exceed 32 points; the short circuit isolator shall be arranged at the place where the bus goes through the fire zone where necessary.

3.1.7 In the 100m or over long buildings, the fire detector, manual alarm button, module, etc. which are controlled by each controller shall not cross over the refuge storey other than the controller located in the Fire control center.

3.1.8 Variable frequency startup mode shall not be adopted for the electric fire control unit like pump control cabinet and fan control cabinet.

3.1.9 The automatic fire alarm system located at the subway trains shall send the fire position information to the trains via wireless network, etc.

3.2 Choice and Design of System

3.2.1 Choice of automatic fire alarm system shall meet the following requirements:

1 The local alarm system should be adopted for the protected object with alarm needed but without the necessity to link the automatic fire equipment.

2 The centralized alarm system shall be adopted for the protected objects which need the alarm and automatic fire equipment and on which only one fire alarm control unit and automatic controller for fire protection with centralized control and a Fire control center shall be arranged.

shall be determined according to demand of fume exhaust system or fire extinguishing system and should not exceed 150m.

3 The alarm zones of Class A, B and C liquid tank area shall be composed by one tank area and each 50000m³ or above outer floating roof tank shall be classified into one independent alarm zone.

4 Alarm zone of train shall be divided in accordance with cars and each car shall be classified into one alarm zone.

3.3.2 Division of detection zone shall meet the following requirements:

1 The detection zone shall be divided according to the independent room (suite). The area for one detection zone should not exceed 500m²; the rooms of which the internal can be seen clearly from the main entrance and the area shall not exceed 1000m² may also be classified into one detection zone.

2 The length of detection zone for infrared beam smoke fire detector and cable type linear heat fire detector should not exceed 100m; detection zone length of air pipe temperature difference fire detector should be at 20m~100m.

3.3.3 Independent detection zone shall be divided for the following places:

- 1 Open or enclosed staircase and smoke-proof staircase.
- 2 Smoke-proof staircase front room, fire elevator front room, front room served for fire elevator and smoke-proof staircase, runway and ramp.
- 3 Electrical piping shafts, communication piping shafts and cable tunnel.
- 4 Building loft and interlayer.

3.4 Fire Control Center

3.4.1 Fire control center shall be arranged for the protected object of automatic fire alarm system in possession of automatic functions for fire protection.

3.4.2 The fire equipment located in the fire control center shall cover fire alarm control unit, automatic controller for fire protection, graphic display unit in fire control center, switchboard for special telephone for fire, fire emergency broadcast control device, control device for fire emergency lighting and evacuate indicating system, fire power supply monitor, combination unit in possession of corresponding functions. The graphic display unit in fire control center located in fire control center shall be able to display the dynamic information of all the fire fighting system and relevant equipment within the buildings specified in Appendix B of this code and the fire safety management information specified in Appendix B and the interfaces for the remote monitoring system shall be reserved and the functions of sending relevant information specified in Appendix A and Appendix B to the remote monitoring system shall be provided.

3.4.3 The fire control center shall be equipped with the outside line used for fire alarm.

3.4.4 The fire control center shall be provided with the corresponding completion drawings, each subsystem control logic relationship description, equipment operation instruction, system operation regulations, emergency plan, duty system, maintenance system and documentary data like log.

3.4.5 The fire valve shall be arranged at the place where the supply and return air duct in fire control center passes through the wall.

4 Automatic Control Design

4.1 General Requirements

4.1.1 The automatic controller for fire protection shall send the control signal to start & stop an automatic equipment to each relevant controlled equipment according to the preset control logics and receive the feedback signal from automatic equipment of the relevant equipment.

4.1.2 As for the automatic controller for fire protection, the voltage control output shall adopt dc 24V so that the power supply capacity can meet the requirements to simultaneously starting and keeping the working of controlled fire equipment.

4.1.3 The characteristic parameter of each controlled equipment interfaces shall be matched with the control signal to start & stop an automatic equipment generated from automatic controller for fire protection.

4.1.4 The control equipment of fire pump and smoke control and smoke exhaust fan shall not only adopt automatic control but also set manual direct control device at the fire control center.

4.1.5 Fire equipment with larger starting current should be started up at different time.

4.1.6 As for the fire equipment requiring automatic control of automatic fire alarm system, the signal for logical program shall adopt " and " logical combination of alarm signal of two independent alarm trigger gears.

4.2 Automatic Control Design of the Automatic Sprinkler System

4.2.1 Automatic control design of wet pipe system and dry pipe system shall meet the following requirements:

1 The automatic control method shall use the operation signal of wet alarm valve pressure switch as the triggering signal to directly control and start the sprinkling fire pump and the automatic control shall not be affected by the automatic or manual state of automatic controller for fire protection.

2 In the manual control, the start up and stop button of sprinkling fire pump control box (cabinet) shall be connected directly to the manual control disc of automatic controller for fire protection in fire control center with the dedicated line to manually control the start up and stop of sprinkling fire pump directly.

3 The operation signal of start up and stop of water flow indicator, signal valve, pressure switch and sprinkling fire pump shall be returned to the automatic controller for fire protection.

4.2.2 Automatic control design of precaution system shall meet the following requirements:

1 In the automatic control, the alarm signal of two or more independent smoke fire detector or one smoke fire detector and one manual fire alarm call point as the signal for logical program for opening of pre-action valve set. The automatic controller for fire protection shall control the opening of the pre-action valve set so that the system turns into the wet pipe system; when the system is provided with rapid exhauster, the opening of electric

protection shall make an automatic control over the opening of relevant control valve set of water curtain system.

2 In the manual control, the startup and stop button of water curtain system relevant control valve set and fire pump control box (cabinet) shall be connected directly to the manual control disc of automatic controller for fire protection in fire control center with the dedicated line to manually control the start up and stop of water curtain system relevant control valve set directly.

3 The operation signal of start up and stop of pressure switch, water curtain system relevant control valve set and fire pump shall be returned to the automatic controller for fire protection.

4.3 Automatic Control Design of Fire Hydrant System

4.3.1 In the automatic control, the signal for low voltage pressure switch located on main outlet pipe of fire hydrant system and the flow switch or alarm valve located on outlet pipe of elevated water tanks shall be used as the trigger signal to directly control the opening of fire hydrant pump; the automatic control shall not be affected by the automatic or manual state of automatic controller for fire protection. When the fire hydrant button is provided, the operation signal of fire hydrant button shall be used as the alarm signal and signal for logical program to opening fire hydrant pump and the opening of fire hydrant pump shall be subjected to the automatic control by the automatic controller for fire protection.

4.3.2 In the manual control, the startup and stop button of fire hydrant pump control box (cabinet) shall be connected directly to the manual control disc of automatic controller for fire protection in fire control center with the dedicated line to manually control the startup and stop of fire hydrant pump directly.

4.3.3 Operation signal of fire hydrant pump shall be returned to the automatic controller for fire protection.

4.4 Automatic Control Design of Gases (Bubble) Fire-extinguishing System

4.4.1 The gases (bubble) fire extinguishing system shall be controlled by the specialized gas fire extinguishing controller and bubble fire extinguishing controller respectively.

4.4.2 The automatic control mode of gases (bubble) fire extinguishing system shall meet the following requirements when the gas fire extinguishing controller and bubble fire extinguishing controller are directly connected with the fire detector:

1 The alarm signal of two independent fire detectors within the same protected zone, of one fire detector and one manual fire alarm call point or the emergency starting signal beyond the protected zone are used as the signal for logical program of the system; the detector should adopt the combination of smoke fire detector and heat fire detector and the detectors shall be subjected to the calculation of monitoring area according to 6.2 of this code.

2 After the gas fire extinguishing controller and bubble fire extinguishing controller have received the first signal for logical program to meet the automatic logical relation, the audible and visible fire alarm device in the protected zone shall be started up and the signal for logical program shall be the first alarm signal of smoke fire detector and other types of fire

2 The manual startup and stop button different from the protected zone shall be arranged on the gas fire extinguishing controller and bubble fire extinguishing controller; when the manual startup button is pushed down, the gas fire extinguishing controller and bubble fire extinguishing controller shall carry out the operation in Item 3 and Item 5 in 4.4.2 of this code; when the manual stop button is pushed down, the gas fire extinguishing controller and bubble fire extinguishing controller shall stop the working operation.

4.4.5 The feedback signal for the gas fire extinguishing device and bubble fire extinguishing device and automatic control at different opening and spraying stages and for the system shall be returned to the automatic controller for fire protection. The feedback signal from automatic equipment of the system shall cover the following items:

- 1 Alarm signal of fire detector directly connected with gas fire extinguishing controller and bubble fire extinguishing controller.
- 2 Operation signal of selector valve.
- 3 Operation signal of pressure switch.

4.4.6 As for system arranged with manual and automatic control conversion device at the protected zone, the operation state of manual or automatic control mode shall be displayed on the manual and automatic control status display in and out of the protected zone and the information shall be returned to the automatic controller for fire protection.

4.5 Automatic Control Design of Smoke Exhaust System

4.5.1 Automatic control method of smoke control system shall meet the following requirements:

1 The alarm signal of two independent fire detectors or one fire detector and one manual fire alarm call point at the fire zone where the pressurization air supply outlet is located is used as the signal for logical program for start of air supply outlet and forced draught blower and the automatic controller for fire protection shall make an automatic control over the startup of the pressurization air supply outlet and forced draught blower at the place where the pressurization air supply is needed like front room of relevant floor.

2 The alarm signal of two independent smoke fire detectors at the same smoke zone and nearby the electric ceiling screen shall be used as the signal for logical program for electric ceiling screen falling and the automatic controller for fire protection shall have an automatic control over the falling of electric ceiling screen.

4.5.2 Automatic control of smoke exhaust system shall meet the following requirements:

1 The alarm signal of two independent fire detectors at the same smoke zone shall be used as the signal for logical program for opening of smoke vent, exhaust louver or smoke exhaust damper and the automatic controller for fire protection shall have an automatic control over opening of smoke vent, exhaust louver or smoke exhaust damper and stop of air conditioning system of smoke zone.

2 The operation signal of opening of smoke vent, exhaust louver or smoke exhaust damper shall be used as the signal for logical program of starting up of smoke discharge fan and the automatic controller for fire protection shall have an automatic control over the startup of smoke discharge fan.

2 In the manual control, the manual control at both sides of fire roller shutter shall control the lifting and falling of fire roller shutter and the falling of fire roller shutter shall be manually controlled by automatic controller for fire protection at fire control center.

4.6.5 The operation signal of falling of fire roller shutter to 1.8m from the floor slab and to the floor slab and the alarm signal of fire roller shutter controller directly connected to the smoke and heat fire detectors shall be returned to the automatic controller for fire protection.

4.7 Automatic Control Design of Elevator

4.7.1 The automatic controller for fire protection shall be able to send out the control signal to start & stop an automatic equipment to make all the elevators stop at the first floor or elevator transfer floor.

4.7.2 The feedback signal of running state information and stopping at the first floor or transfer floor shall be returned to the fire control center display and the special telephone shall be provided in the elevator car to have a conversation with the fire control center directly.

4.8 Automatic Control Design of the Fire Alarm and Signalling Device

4.8.1 The automatic fire alarm system shall be equipped with audible and visible fire alarm device and start up all the audible and visible fire alarm devices in a building after the confirmation.

4.8.2 As for the automatic fire alarm system without automatic controller for fire protection, the audible and visible fire alarm device shall be controlled by the fire alarm control unit; as for the automatic fire alarm system with automatic controller for fire protection, the audible and visible fire alarm device shall be controlled by the fire alarm control unit or automatic controller for fire protection.

4.8.3 The fire sound alarm with the same fire modified tone shall be set at the public places; the fire sound alarm with voice prompt should be selected for the protected object with multiple alarm zones; the alarm bell shall not be used as the fire sound alarm at the place using the electrical bell as daily use like the school and factory.

4.8.4 The voice synchronizer shall be set when the fire sound alarm is provided with the voice prompt function.

4.8.5 The automatic fire alarm system shall start up and stop all the fire sound alarms simultaneously when multiple fire sound alarms are provided at the same building.

4.8.6 The fire sound alarm shall send the fire alarm for 8s~20s each and when the fire sound alarm is used, the fire alarm shall be played alternately with the fire sound alarm.

4.8.7 Fire emergency broadcast shall be arranged for centralized alarm system

4.8.8 Control signal to start & stop an automatic equipment of fire sound alarm system shall be sent out by the automatic controller for fire protection. After the confirmation of fire hazards, the whole building shall be announced simultaneously.

4.8.9 The fire sound alarm should last the voice for 10s~30s each time and shall work alternately with the fire sound alarm at the different time and the circulating and alternate play of one fire sound alarm play and one or two fire sound alarm play may be adopted.

4.8.10 In the fire control center, the manual control or the automatic control according to preset control logic shall be used to select broadcast zone and start up or stop and monitor the fire sound alarm. The sound recording shall be done automatically when the emergency broadcast is conducted by the microphone.

4.8.11 The working state of broadcast zone of fire emergency broadcast shall be shown in the fire control center.

4.8.12 The function of cutting in fire emergency broadcast forcibly shall be provided when fire emergency broadcast is used together with ordinary broadcast or background music broadcast.

4.9 Automatic Control Design of the Fire Emergency Lighting System

4.9.1 Automatic control design of the fire emergency lighting system shall meet the following requirements:

1 The centralized control type fire emergency lighting system shall be realized through the starting of the emergency lighting controller by the fire alarm control unit or automatic fire-fighting controller.

2 The fire emergency lighting system of intensive power supply and non-centralized control type shall be realized by the intensive emergency lighting power supply linked by the automatic fire-fighting controller and emergency lighting electricity distribution device.

3 The fire emergency lighting system of self-contained power supply and non-centralized control type shall be realized by the intensive emergency lighting distribution box linked by the automatic fire-fighting controller.

4.9.2 When the fire is confirmed, the fire emergency lighting system of the exit passageways in the whole building is orderly started up from the alarm zone of the fire, the starting time that the system takes to enter into the emergency state totally shall not be greater than 5s.

4.10 Automatic Control Design of the Related Equipment

4.10.1 The automatic fire-fighting controller shall be provided with the function of cutting the non-fire power in the conflagration area and relevant areas, the normal illumination should be cut down before the action of the automatic spraying system, fire hydrant system if needed.

5 Fire Detector Choice

5.1 General Requirements

5.1.1 The choice of fire detectors shall meet the following requirements:

1 The smoke fire detector shall be selected for the places where there is the smoldering stage in the early stage of the fire and large amount of smoke and small amount of heat and little or no flame radiation may be produced.

2 The one of or a combination of the heat fire detector, smoke fire detector, flame detector may be selected for the places where the fire spreads rapidly and a great deal of heat, smoke and flame radiation may be produced.

3 The flame detector shall be selected for the places where the fire spreads rapidly and with intense flame radiation and little smoke and heat.

4 The carbonic oxide fire detector should be added for the places where there is the smoldering stage in the early stage of the fire and that need early detection.

5 The incombustible gas detector shall be selected for the places where the combustible gas or flammable steam is used and produced.

6 The fire detector shall be selected according to relative analyses of the incendiary material and possible parts to cause fire as well as the type, sensitivity and response time of the fire detector, for the places where the form characteristics of the fire are unpredictable, the fire detector may be selected according to the result of the simulation test.

7 The fire detector and fire alarm control unit with the function of compound judgement towards fire may be selected when multiple fire detectors are set in a detecting area.

5.2 Choice of Point Type Fire Detector

5.2.1 For rooms of different height, the point type fire detector may be selected according to Table 5.2.1.

5.2.5 The places under one of the following conditions should choose point type heat fire detector and shall choose the heat fire detector of proper classification according to the typical application temperature and maximum application temperature of the operating site:

- 1 The relative humidity is often greater than 95%.
- 2 The smokeless fire may happen.
- 3 A great deal of dusts exist.
- 4 The places where the smoke or steam is detained under normal conditions.
- 5 The places where the smoke fire detector should not be installed, such as the kitchen, boiler room, generator room, dryer car etc..
- 6 The inner side of the emergency exit that needs automatic extinction marker light "emergency exit".
- 7 Other places where no one stays and that are unsuitable to install the smoke fire detector but need in-time alarm when the fire happens.

5.2.6 The point type heat fire detector should not be selected for the places where the smoldering fire may happen or heavy losses will be caused if the alarm is not in time when the fire happens; the constant temperature detector should not be selected for the places under 0°C; the detector with differential temperature characteristic should not be selected for the places with large temperature variation.

5.2.7 The places under one of the following conditions should choose point type fire detectors or video image type flame detector:

- 1 There is intense flame radiation during the fire.
- 2 The fire in non-smoldering stage like liquid burning may happen.
- 3 Rapid response needs to be made towards the flame.

5.2.8 The places under one of the following conditions should not choose point type fire detectors or video image type flame detector:

- 1 The dense smoke spreads before the appearance of the flame.
- 2 The lens of the detector are easy to be contaminated.
- 3 The sight of the detector is easy to be sheltered by the oil mist, smog, water fog and ice and snow.

5.3.2 The places under one of the following conditions should not choose line type light beam smoke fire detector:

- 1 A great deal of dusts or water fogs are detained.
- 2 The steam and oil mist may be caused.
- 3 The smoke is detained under normal conditions.
- 4 The places where the building structure that fixes the detector may cause large bias

due to the vibration etc..

5.3.3 The cable line type heat fire detector should be selected for the following places or parts:

- 1 The cable tunnels, cable shafts, cable interlayers, cable bridges.
- 2 The interlayers, blind ceilings where the point type detector is difficult to install.
- 3 All kinds of belt transmission devices.
- 4 Other places that are in bad conditions and unsuitable for the installation of the point

type detector.

5.3.4 The line type optical fibre heat fire detector should be selected for the following places or parts:

- 1 The storage tank for the petroleum except for the liquefied petroleum gas.
- 2 The inflammable and explosive places needed to be equipped with the line type heat fire detector.

3 The line type optical fibre heat fire detector with the function of real time temperature monitoring should be set in the places like the underground space needed environment temperature monitoring.

4 The highway tunnels, railway tunnels with power cables and urban subway tunnels etc.

5.3.5 The line-style constant temperature fire detector shall be selected to ensure its non-operating temperature in accordance with the requirements of the maximum ambient temperature in the set place.

6 Setting of the Equipment

6.1 Setting of the Fire Alarm Control Unit and Automatic Control Equipment

6.1.1 The fire alarm control unit and automatic control equipment shall be set in the fire control center or rooms and places where someone is on duty.

6.1.2 The arrangement of the fire alarm control unit and automatic control equipment in the fire control center shall meet those specified in Article 3.4.8 in this code.

6.1.3 When the fire alarm control unit and automatic control equipment are installed on the wall, the height of their main display screens should be 1.5 m ~ 1.8 m, the distance from their side faces close to the door pivot to the wall shall not be less than 0.5 m, the front operated distance shall not be less than 1.2 m.

6.1.4 The zone fire alarm control unit in the centralized alarm system and control center warning system may be set in unattended places under the following conditions:

- 1 No automatic fire-fighting equipment needed manual control is in this area.
- 2 All the information of this fire alarm control unit may be displayed on the central fire alarm control unit, this fire alarm control unit can receive the control signal to start & stop an automatic equipment of the fire alarm control unit with centralized control function and automatic startup relevant fire equipment.
- 3 Only the watch keeper may have access to the set place.

6.2 Setting of the Fire Detector

6.2.1 The specific arrangement part of the detector shall be adopted in accordance with Appendix D in this code.

6.2.2 The setting of point type fire detector shall meet the following requirements:

- 1 At least one fire detector shall be set in each room of the detecting area.
- 2 The monitoring area and monitoring radius for the smoke fire detector and the heat fire detector of Type A1, A2, B shall be determined according to those specified in Table 6.2.2; the monitoring area and monitoring radius for the heat fire detector of Type C, D, E, F,

6.2.3 When the point type smoke fire detector, the heat fire detector is set on the beamed ceiling plate, the following requirements shall be met:

1 When the beam is of less than 200mm higher than the ceiling plate, the impact of the beam towards the monitoring area of the detector may not be calculated.

2 When the beam is 200mm ~ 600 mm higher than the ceiling plate, the impact of the beam towards the monitoring area of the detector and the quantity of areas between beams protected by one detector shall be determined in accordance with Appendix F, Appendix G in this code.

3 When the beam is over 600 mm higher than the ceiling plate, at least one detector shall be set in each area divided by the beams.

4 When the area divided by the beam exceeds the monitoring area of one detector, the set quantity of the detectors in the divided areas shall be calculated in accordance with Article 6.2.2 Item 4 in this code.

5 The impact of the beam towards the monitoring area of the detector may not be calculated when the clear distance between the beams is less than 1m.

6.2.4 The point type detector should be arranged in the middle when being set on the inner walkway ceiling with its width being less than 3m. The installation spacing for the heat fire detector shall not be greater than 10m; the installation spacing for the smoke fire detector shall not be greater than 15m; the distance from the detector to the end wall shall not be greater than 1/2 of the installation spacing for the detectors.

6.2.5 The horizontal distance from the point type detector to the wall shall not be less than 0.5 m.

6.2.6 No shelter shall be within 0.5 m around the point type detector.

6.2.7 When the room is divided by the bookshelf, equipment or partition etc. and the distance from its top to the ceiling plate or the beam is less than 5% of the stud, at least one point type detector shall be installed for each divided part.

6.2.8 The horizontal distance from the point type detector to the air supply outlet of the air conditioner shall not be less than 1.5 m and the point type detector should be installed near

4 The single range fire detectors shall not be set in the places directly or indirectly exposed by light sources such as the sunshine, filament lamp etc. at ordinary times.

6.2.15 The setting of line type optical light beam smoke detector shall meet the following requirements:

1 The vertical distance from the axial line of detector light beam to the ceiling plate should be 0.3 m ~ 1.0 m, the height from the ground for the axial line of the detector light beam should not exceed 20 m.

2 The horizontal distance between two adjacent sets of detectors shall not be greater than 14 m, the horizontal distance from the detector to sidewall shall not be greater than 7 m and shall not be less than 0.5 m, the distance between the launcher and receiver of the detector should not exceed 100 m.

3 The detector shall be set on the fixed structure.

4 The setting of the detector shall ensure its receiving end away from the direct radiation of the daylight and artificial light source.

5 The detector shall be ensured to response correctly when being selected and when the simulation test is conducted in any part between the baffle board and the detector.

6.2.16 The setting of line type heat fire detector shall meet the following requirements:

1 The contact-type arrangement shall be adopted for the detector to protect the protected objects like cable, stacking etc.; the detector should be arranged nearby the heat spot of the device when being set on all kinds of belt transmission device.

2 The distance from the line type heat fire detector under the ceiling plate to the ceiling plate should be 0.1 m. The monitoring radius for the detector shall meet the requirements of the monitoring radius for the point type heat fire detector, and the distance from the detector to the wall should be 1 m ~ 1.5 m.

3 The monitoring area and monitoring radius for each grating of the optical grating fibre heat fire detector shall meet the requirements of monitoring area and monitoring radius for the point type heat fire detector.

4 When there are linkage requirements for places equipped with line type heat fire detector, a combination of alarm signal of two different fire detectors should be adopted.

5 If the ratio of the hollow-out area to total area is 30%~70% at places such as subway platform affected by the piston wind, the detector should be arranged at the upper & lower part of the suspended ceiling.

6.2.19 The setting of other fire detectors not concerned in this code shall be arranged in accordance with design manuals or operating instructions provided by enterprise and the setting conditions of the detectors may be verified through simulating the fire scene of monitoring objects where necessary.

6.3 Setting of the Manual Call Point

6.3.1 A manual call point (at least) shall be arranged in each fire zone. The walking distance between any position and the nearest manual call point in each fire zone shall not be greater than 30m. The manual call point should be arranged at the evacuation route or entrance/exit. The manual call point set on the trains shall be at the entrance/exit of and in middle of each carriage.

6.3.2 The manual call point shall be arranged in visible positions and positions for the convenience of operation. If the manual call point is installed by hanging, the height from its bottom edge to the ground should be 1.3m~1.5m. The manual call point shall be provided with visible marks.

6.4 Setting of the Fire Display Panel

6.4.1 A fire display panel shall be arranged in each alarm zone; a fire display panel shall be arranged in each alarm zone of such place as hotel and restaurant etc.. If there are many floors in an alarm zone, a fire display panel shall be arranged in each floor, which can only display the alarm information of this floor.

6.4.2 The fire display panel shall be arranged in visible positions and positions for the convenience of operation such as entrance/exit. If the fire display panel is installed by hanging, the height from its bottom edge to the ground should be 1.3m~1.5m.

6.5 Setting of the Fire Alarm Singalling Device

6.5.1 The fire alarm singalling device shall be arranged in the visible positions such as stair port of the each floor, front room of the fire elevator and internal corners of buildings etc., and it should not be arranged on the same wall together with the mandatory sign light fixture of the emergency exit.

6.5.2 The fire alarm singalling device shall be uniformly arranged in each alarm zone and its sound pressure level shall not be less than 60dB; its sound pressure level shall be 15dB greater than that of the background noise in the places where the ambient noise is greater than 60dB.

6.5.3 If the fire alarm singalling device is installed by hanging, the height between the bottom edge and the ground shall be greater than 2.2m.

6.6 Setting of the Sounder Equipment for Fire Emergency Purposes

6.8.1 The module in each alarm zone should be arranged in the metal module case in this alarm zone in a relative concentrated manner.

6.8.2 It is strictly forbidden to arrange the module in the power distribution (control) cabinet (box).

6.8.3 The module in this alarm zone shall not control the equipment in other alarm zone.

6.8.4 The modules which are not set intensively shall be provided with marks with the dimension not less than 100mm×100mm.

6.9 Setting of the Graph Indicator in Fire Control Center

6.9.1 The graph indicator in fire control center shall be arranged in the fire protection control room and shall meet the requirements for installation and setting of the fire alarm control unit.

6.9.2 Dedicated lines shall be adopted for connection between fire protection equipment such as the graph indicator in fire control center, fire alarm control unit, automatic controller for fire protection, alarm and control unit for electric fire protection and combustible gas control unit etc..

6.10 Setting of the Routing Equipment

6.10.1 The transmission equipment of fire alarm or the transmission device of the user information shall be arranged in the fire protection control room and they shall be arranged nearby the visible position of the fire alarm control unit once the fire protection control room is not arranged.

6.10.2 The dedicated lines shall be adopted for connection between fire protection equipment such as the graph indicator in fire control center, fire alarm control unit, automatic controller for fire protection and combustible gas control unit etc..

6.10.3 The setting of the routing equipment shall ensure the sufficient operation and overhauling distance.

6.10.4 The manual alarm device of the routing equipment shall be arranged in the visible position for the convenience of operation.

6.11 Setting of the Indicator and Control Unit for Fire Doors

6.11.1 If the indicator and control unit for fire doors shall be arranged in the fire protection control room, which is not arranged, the indicator and control unit for fire doors shall be arranged at the place attended by someone.

6.11.2 The manual control point of the electric door opener shall be arranged on the sidewall of the fire door, the distance between the point and the door should not exceed 0.5m, the height between the bottom edge and the ground should be 0.9m~1.3m.

6.11.3 The indicator and control unit for fire doors shall be set according to the requirements for installation and setting of the fire alarm control unit.

1 The fire detector for household set in households shall be connected with the fire alarm control unit for household directly.

2 The fire alarm control unit for household shall be able to start up the fire alarm signalling device set in public positions.

3 In the Category B system, the fire alarm control unit for household set in each dwelling shall be connected with the monitoring equipment of OCC (Operating Control Center) and the monitoring equipment of OCC (Operating Control Center) shall be able to display the households at which the fire happens.

7.2.3 The design of the Category D system shall meet the following requirements:

1 If there are many living rooms in one household, the independent fire detector & alarm devices connected with each other should be adopted.

2 The independent fire detector & alarm device of which the battery life is not less than 3 years should be selected.

7.2.4 The independent fire detector & alarm devices are adopted to form the system in wireless manner and the system design shall meet one of the requirements for design of Category A, Category B and Category C systems.

7.3 Setting of the Fire Detector

7.3.1 A smoke fire detector (at least) shall be arranged in each bedroom or living room.

7.3.2 The combustible gas detector arranged in the kitchen shall meet the following requirements:

1 The methane detector shall be selected for the user who uses the natural gas, the propane detector shall be selected for the user who uses the liquefied gas and the carbon monoxide detector shall be selected for the user who uses the coal gas.

2 If the hose and connector are in the cabinet to connect the gas cooking appliances, the detector should be arranged in the cabinet.

3 The methane detector shall be arranged at the top of the kitchen, the propane detector shall be arranged at the lower part of the kitchen and the carbon monoxide detector may be arranged at the lower part of kitchen or may also be arranged in other parts.

4 The combustible gas detector should not be arranged over the cooking appliance.

5 The combustible gas detector which can automatically shut down the shut off value of the gas should be adopted.

6 The shut off value of gas for the automatic detector should be those which can be reset by the users themselves and shall be able to protect the rubber pipes from shedding off.

7.4 Setting of the Fire Alarm Control Unit for Household

7.4.1 The fire alarm control unit for household shall be independently arranged in each household and shall be arranged in the visible position and positions where the operation is convenient. If the unit is installed by hanging, the height from its bottom edge to the ground should be 1.3m~1.5m.

7.4.2 The fire alarm control unit for household provided with graphic talkback function should be arranged nearby the household door.

8 Combustible Gas Detection and Alarm System

8.1 General Requirement

8.1.1 The combustible gas detection and alarm system shall be composed of combustible gas control unit, combustible gas detector and audible and visible fire alarm device etc.

8.1.2 The combustible gas detection and alarm system shall consist independently, the combustible gas detector shall not be connected with the detector loop of the fire alarm control unit; if the alarm signal of the combustible gas needs connecting with the automatic fire alarm system, the connection may start from the combustible gas control unit.

8.1.3 The combustible gas detector which is in related to the process control in the petrochemical industry, shall be set in accordance with the requirements of the current national standard "Specification for Design of Combustible Gas and Toxic Gas Detection and Alarm for Petrochemical Industry" (GB 50493), but, its alarm signal shall be connected with the fire control center.

8.1.4 The alarm information and fault information of the combustible gas control unit shall display on the graph indicator in fire control center or fire alarm control unit with the function of centralized control; however, this kind of information shall be different from the fire alarm information.

8.1.5 If the combustible gas control unit sends out the alarm signal, it shall be able to start up the audible and visible fire alarm device in the monitoring zone.

8.1.6 If the automatic and alarm requirements are needed in the monitoring zone of the combustible gas detection and alarm system, the combustible gas control unit or automatic controller for fire protection shall be linked for that.

8.1.7 If the combustible gas detection and alarm system is arranged in the places where the explosion-proof requirements are needed, it shall also meet the relevant explosion-proof requirements.

8.2 Setting of the Combustible Gas Detector

8.2.1 As for the combustible gas detector, it shall be arranged at the top of the monitoring space once the detecting gas density is less than the air density, shall be arranged at the lower part of the monitoring space once detecting gas density is greater than the air density and may be arranged in the middle of or at the top of the monitoring space once the detecting gas density is equal to the air density.

8.2.2 The combustible gas detector should be arranged nearby the place where the combustible gas may be generated.

8.2.3 The monitoring radius of point-type combustible gas detectors shall meet the relevant requirements of the current national standard "Specification for Design of Combustible Gas and Toxic Gas Detection and Alarm for Petrochemical Industry" (GB 50493).

8.2.4 The length of the monitoring zone for the line type combustible gas detector should not be greater than 60m.

9 Alarm and Monitoring System for Electric Fire Protection

9.1 General Requirement

9.1.1 The alarm and monitoring for electric fire protection may be used to places where the potential electric fire may occur.

9.1.2 The alarm and monitoring for electric fire protection shall be composed of the partial or whole equipment below:

- 1 Alarm and control unit for electric fire protection.
- 2 Leakage current detector for electric fire prevention,
- 3 Heat detector for electric fire prevention.

9.1.3 The alarm and monitoring for electric fire protection shall be arranged in accordance with the building characteristic and electric fire hazard and the form and installation position of the detector for electric fire prevention shall be determined in accordance with the specific conditions of electric circuit laying and power equipment. If the fire control center is not arranged and setting number of detectors for electric fire prevention is less than or equal to 8, the independent detector for electric fire prevention may be adopted.

9.1.4 The non-independent detector for electric fire prevention shall not be connected with the detector loop in the fire alarm control unit.

9.1.5 Where the fire control center is arranged, the alarm information and fault information of the alarm and control unit for electric fire protection shall display on the graph indicator in fire control center or fire alarm control unit with the function of centralized control; however, this kind of information shall be different from the fire alarm information.

9.1.6 The setting of alarm and monitoring for electric fire protection shall not have an effect on the normal operation of the power supply system and the power supply should not be shut down automatically.

9.1.7 If the line type heat fire detectors are applicable to electric fire monitoring, the alarm and control unit for electric fire protection may be connected directly.

9.2 Setting of the Leakage Current Detector for Electric Fire Prevention

9.2.1 The basic principle is that the leakage current detector for electric fire prevention shall be arranged at the head end of the low-voltage distribution system; the detector should be arranged at the outlet end of the first grade distribution cabinet (box). The detector should be arranged in the next grade distribution cabinet (box), if the leakage current of the power supply circuit is greater than 500mA.

9.2.2 The leakage current detector for electric fire prevention should not arranged in the distribution lines and fire protection distribution lines in the IT system.

9.2.3 If the leakage current detector for electric fire prevention is selected, the effect caused by the natural leakage current of power supply system shall be counted and the detectors with the suitable parameters shall be selected; the alarm value of detectors should be 300mA~500mA.

9.2.4 As for detectors for electric fire prevention which can detect the line fault electric arc, the length of their protective circuit should not be greater than 100m.

9.3 Setting of the Heat Detector for Electric Fire Prevention

9.3.1 The heat detector for electric fire prevention shall be arranged at positions such as cable joint, terminal and important heating components etc..

9.3.2 The monitoring objects are distribution lines of 1000V or below and the contact-type layout shall be adopted for the heat detector for electric fire prevention.

9.3.3 The monitoring objects are power supply circuits of 1000V, and the grating optical fiber or infrared heat detectors for electric fire prevention should be selected for as heat detectors for electric fire prevention; the grating optical fiber heat detector for electric fire prevention shall be directly arranged on the surface of monitoring objects.

9.4 Setting of the Independent Detector for Electric Fire Prevention

9.4.1 Setting of the independent detector for electric fire prevention shall meet those specified in 9.2 and 9.3 of this code.

9.4.2 If the automatic fire alarm system is arranged, the alarm information and fault information of the independent detector for electric fire prevention shall display on the graph indicator in fire control center or central fire alarm control unit; however, this kind of information shall be different from the fire alarm information.

9.4.3 If the automatic fire alarm system is not arranged, the independent detector for electric fire prevention shall transmit the alarm signal at the place attended by someone.

9.5 Setting of the Alarm and Control Unit for Electric Fire Protection

9.5.1 If the fire control center is set, the alarm and control unit for electric fire protection shall be arranged in the fire control center or nearby the monitoring zone; if the unit is arranged nearby the monitoring zone, the alarm information and fault information shall be introduced into the fire control center.

9.5.2 If the fire control center is not arranged, the alarm and control unit for electric fire protection shall be arranged at the place attended by someone.

10 Power Supply

10.1 General Requirement

10.1.1 The alternating current power supply and standby power supply for storage batteries shall be arranged for the automatic fire alarm system.

10.1.2 The fire power supply shall be adopted for the alternating current power supply of the automatic fire alarm system; and the battery power or the emergency power supply for fire fighting equipment accompanied in the fire alarm control unit and automatic controller for fire protection may be adopted for the standby power supply. If the emergency power supply for fire fighting equipment is adopted as the standby power supply, the separate power supply loop shall be adopted for the fire alarm control unit and automatic controller for fire protection and shall have no influence on the normal operation of them, if the system is in maximum load status.

10.1.3 UPS power supply device or emergency power supply for fire fighting equipment shall serve as the power supply for graph indicator in fire control center and fire protection communication equipment etc..

10.1.4 Residual current operated protection and overload protection devices shall not be arranged for the main power supply of the automatic fire alarm system.

10.1.5 The output power of the emergency power supply for fire fighting equipment shall be greater than 120% of the full load power for the automatic fire alarm & automatic control system, the capacity of storage battery shall ensure that the automatic fire alarm & automatic control system can continuous work for 3 hours more in fire hazard and under the working load condition.

10.1.6 The specialized power supply loop shall be adopted for the fire protection power equipment and its power distribution equipment shall be equipped with visible marks. Its distribution lines and control loops should be classified in accordance with fire zone.

10.2 Ground Connection

10.2.1 The ground resistance value of grounding devices in the automatic fire alarm system shall meet the following requirements:

1 If adopting the common grounding devices, the grounding resistance value shall not be greater than 1Ω.

2 If adopting the specialized grounding device, the grounding resistance value shall not be greater than 4 Ω.

10.2.2 The equipotential bonding shall be adopted for metal outer casing cabinet, rack, metal pipes and grooves of electrical and electronic equipment in the fire control room.

10.2.3 The copper-cored insulated wire with the core section area not less than 4mm² shall be selected for the specialized grounding wire led from the grounding plate in the fire control center to the fire-protection electronic equipment.

flame-retardant or flame-retardant & fire resisting electric wires and cables shall be used for the alarm bus line and transmission lines for signalling device system and fire telephone etc.

11.2.3 If the line is laid in a concealed way, protection shall be made with metal tubes, flexible (metal) electric conduits or rigid plastic pipes (Class B1 or above) inside the structural layer of non-combustible components, and the thickness of protection layer should not be less than 30mm. If the line is laid in an open way, protection shall be provided with metal tubes, flexible (metal) electric conduits or metal enclosed cable trays. The incombustible cables with mineral insulation may be laid in an exposed way.

11.2.4 The cable shafts for automatic fire alarm system should be set separately from those for the electrical or illuminating low-voltage distribution lines. If they must serve for both the said system and lines, the cables for the system and those for the lines shall be arranged respectively on two sides of the shaft.

11.2.5 Cables with different voltage classes shall not be threaded into a same protecting pipe; if they have to, partitions shall be provided inside the cable tray.

11.2.6 If the horizontal laying is carried out in the manner of pipe penetration, except for the alarm bus line, lines for different fire compartments shall not be treaded into a same pipe.

11.2.7 All the lines from the junction box or cable tray to the detector base, control gear box and speaker enclosure shall be protected with metal tubes.

11.2.8 The transmission line of fire detector should consist of insulated wires or cables of different color. The wire or cable fir positive pole "+" shall be red, and those for negative pole "-" shall be blue or black. The conductors for a same purpose and same project shall be in the same color, and the wiring terminals shall be marked with numbers.

12 Automatic Fire Alarm System for Typical Place

12.1 The Traffic Tunnel

12.1.1 Urban traffic tunnels, super-long highway tunnels and subaqueous tunnels in road shall be provided with both line-type optical fibre heat fire detector and point-type infrared flame detector (or video image fire detector); other highway tunnel shall be provided with either of them.

12.1.2 Line-type optical fibre heat fire detector shall be set over the lane and 100mm ~ 200mm below the ceiling. The grating spacing of line-type optical grating fiber heat fire detector shall not be greater than 10m; each distributed line-type optical fibre heat fire detector or line-type optical grating fiber heat fire detector shall not monitor more than 2 lanes. The point-type infrared flame detector or video image fire detector shall be set on the side wall of lanes at the height over the lane surface for 2.7m~3.5m, and it shall be made sure there is no detection gap; while being set by both sides of the lane, the detectors shall be arranged in a staggered way.

12.1.3 If the automatic fire alarm system has to be linked with the fire protection facilities, its alarm zone should not be longer than 150m.

12.1.4 Alarm reporting telephones shall be set for every other 200m in the tunnel and at tunnel portals. Manual fire-alarm buttons and audible and visible fire alarm devices with red flash light shall be set every other 50m in the tunnel. Audible and visible alarm devices shall be arranged within 50m~250m ahead of the tunnel portal to indicate fires inside the tunnel.

12.1.5 Line-type heat detectors should be provided for cable channels in tunnel, and detectors for electric fire prevention shall be provided for distribution lines in rooms for major equipment.

12.1.6 The automatic fire alarm system in tunnel should be linked to the video monitoring system inside the tunnel to confirm fires.

12.1.7 The Automatic fire alarm system shall send fire alarm signals to the central control & management equipment of the tunnel.

detection length shall be guaranteed at heating parts such as the cable joints and terminals.

Line-type heat detectors set in the tunnel may be connected to the electrical fire monitor.

12.3.2 Line-type heat detectors shall be arranged on the upper surface of cable layer in cable tunnel without external ignition source, and on both the upper surface of cable layer and the top of tunnel for that with possible external fire source.

12.3.3 If the line-type heat detectors are arranged in "S" shape, or, if it is in the cable tunnel with possible external ignition source, the detectors shall be capable of responding to flames not greater than 100mm.

12.3.4 Line-type heat detectors shall monitor all the power cable inside the tunnel in the contact laying manner; cable type line heat fire detectors shall be arranged in the "S" shape on the upper surface of each electric cable layer. One optical cable of a line-type optical fibre heat fire detector shall monitor one power cable, and the temperature-sensitive cables shall be laid along the power cable.

12.3.5 If distributed line-type optical fibre heat fire detectors are laid at the heating parts such as cable joints and terminals, the extension length of its temperature-sensitive optical cable shall not be shorter than 1.5 times the detection unit length; if line-type optical grating fiber heat fire detectors are laid, temperature-sensitive gratings shall be laid at such heating parts.

12.3.6 If power cables are laid in other tunnels, the detectors shall be set according to the requirements of this code, except that the line-type heat detectors at the tunnel top are not necessary.

12.4 The Large Space Places Where Higher than 12m

12.4.1 The large space places where higher than 12m should be equipped with fire detectors of two or more types of fire parameters.

12.4.2 As for places where large amount of fume would be generated at the initial stage of fire line-type optical light beam smoke detectors, air sampling-type smoke detectors, or video image type smoke detectors.

12.4.3 Line-type optical light beam smoke detectors shall be arranged according to the following requirements:

- 1 The detectors shall be set up on the tops of buildings.
- 2 The detectors should be set with the detection method hierarchical networking.
- 3 If the building is not higher than 16m, an additional layer of detectors should be set at the heights of 6m~7m.
- 4 If the building is taller than 16m but shorter than 26m, two layers of detectors should be set respectively at the heights of 6m~7m and 11m~12m.
- 5 If the building has a tropospheric layer formed by open windows or ventilation air conditioners at 7m~13m, the additional detector layer may be set 1m below such tropospheric layer.
- 6 The monitoring area of detectors set in layers may be calculated as the usual area, and detectors on a higher layer should be staggered with those below.

12.4.4 The air sampling-type smoke detectors for pipelines shall be set according to the following requirements.

- 1 The sampling pipes of detectors should be arranged vertically and horizontally; at least two sampling holes shall be guaranteed below 16m, and 2 should be set 1m below the tropospheric layer formed by open windows and ventilation air-conditioners.
- 2 Additional alarm sampling holes may be arranged at the return air inlet.

12.4.5 As for the places with small amount of smoke and obvious flames generated in the initial stage of fire, the point-type infrared flame detectors with Grade 1 sensitivity or video image type flame detectors shall be adopted, and they shall be set at a lower height.

12.4.6 Detectors for electric fire prevention shall be provided for electrical lines, and detector for electric fire prevention with the failure electric arc detection function shall be provided for illuminating lines.

Appendix B

Fire Safety Management Information Table

Table B Fire Safety Management Information

SN	Name		Contents
1	Basic information		The name, number, category, address, telephone, number and post code, fire control center telephone number of the organization, the number of employees, the foundation time, the name of its managing (or) administrative organization, the floor area, total building area, and general layout (including fire lanes and adjacent buildings) drawings; the names, ID numbers and telephone of its legal representative, fire safety principal, fire safety manager and full-time and part-time fire-fighting managers.
2	Information for major buildings and structures etc.	Buildings and structures	The structure/building's name, number, service purpose, fire resistance rating, structure type, building height, over ground floors and building area, underground floors and building area, tunnel height and length, built date, names and quantity of primary storages, maximum capacity of the building, and elevation and fire-fighting device layout plan of buildings; the location of fire control center, and the number, locations and forms (such as emergency staircase) of escape exits; the service purpose, structure type, building height and space to this building of the adjacent buildings.
		Stock yard	The stockyard's name, names of main bulk-load, total storage, maximum stock height, stockyard plan (including fire lanes and fire breaks)
		Storage tank	The tank area's name, tank types (overground, underground, vertical, horizontal, floating roof or fixed roof etc.), total volume, maximum single tank volume and height, name, nature and form of stored material, and tank area plan (including fire lanes and fire breaks)
		Process plant	The process plant area's name, coverage, maximum height, designed daily output, major raw materials, main products, and process plant area plan (including fire lanes and fire breaks)
3	Information of key fire safety positions inside the organization (place)		The key position's name, location, service purpose, building area, fire resistance rating, fire-fighting device provision, and the name, ID number and telephone number of its principal
4	Information of interior and exterior fire-fighting devices	Automatic fire alarm system	The established position, system form, name of maintenance and protection organization, and telephone; the types, models, quantities and manufacturers of controllers (for fire alarm, fire automatic control, flammable gas alarm and electrical fire monitoring etc.), detectors (for fire, flammable gas or electrical fire etc.), manual fire alarm call points, and electric fire control units etc.
		Fire water source	The form (annular or branch) and pipe diameter of municipal water supply network, the number and pipe diameters of water inlet pipes of building and structure water supply by municipal pipe network, the locations and service discharge of fire cistern, the locations and capacities of attic tanks, the forms and service discharges of other sources, the locations of fire pump rooms and number of pumps, and the layout plan of fire water supply system

Appendix C

Classification for the Point Type Heat Detectors

Table C Classification for the Point Type Heat Detectors

Detector category	Application temperature of the type (□)	Maximum application temperature (□)	Lower limit of operating temperature(°C)	Upper limit of operating temperature (□)
A1	25	50	54	65
A2	25	50	54	70
B	40	65	69	85
C	55	80	84	100
D	70	95	99	115
E	85	110	114	130
F	100	125	129	145
G	115	140	144	160

Appendix D

Specific Setting of the Detectors

D.0.1 Fire detectors may be set at the following positions:

- 1 Offices, business halls and bill vaults of commercial and financial buildings.
- 2 Machine rooms and offices of telecommunication and postal buildings
- 3 Business halls of commercial or commercial and residential buildings, exhibition halls of exhibition complexes
- 4 Guest rooms and public activities rooms of hotels.
- 5 Microwave machine rooms, computer rooms, control machine rooms, power machine rooms and offices of power dispatching buildings and disaster-preventing commanding & deployment buildings.
- 6 Television studios, broadcasting studios, recording studios, offices, program transmission technical rooms and prop & setting rooms of broadcast television buildings.
- 7 Repositories, reading rooms and offices of libraries.
- 8 File stores, reading rooms and offices of archive buildings.
- 9 Offices, conference rooms and filing rooms of office buildings.
- 10 Wards, offices, medical facility rooms, medical records %filing rooms and chemical storages of ward buildings.
- 11 Offices, reference rooms, expensive equipment rooms, and laboratories with many combustible materials or greater fire hazards of scientific research buildings.
- 12 Electrization classrooms, physics and chemistry demonstration rooms and laboratories, and expensive equipment and instrument rooms of teaching buildings.
- 13 Bedrooms, study rooms, living rooms (ante hall) and kitchens of apartments (lodging house or residential buildings)
- 14 Category A and B production buildings and their control rooms.
- 15 Storage rooms for Class A, B, C articles.

16 Production shops and storage rooms for Class C and D articles which are built underground.

17 Stockyards, piles and oil tanks etc.

18 Subway station halls, pedestrian passageways, equipment rooms and wagons of subways.

19 The stages, dressing rooms, property rooms, projection rooms, auditorium, waiting rooms and all auxiliary recreation areas of gymnasiums, cinemas and theaters, assembly halls, and auditorium

20 Public activity rooms such as showrooms, exhibition rooms, business halls, commercial restaurant, and auditoriums etc.

21 Fore-chambers and shared front rooms of fire elevators and smoke prevention staircases, walkways, halls and stairways.

22 Combustible article storerooms, air conditioning rooms, power distribution rooms, transformer rooms, house generator rooms and elevator machine rooms.

23 Technical interlayer with clear height over 2.6m and many combustible materials.

24 Cable shafts, cable interlayer, cable tunnels and cabling trays for cables laid with fire-spreading insulated layers and outer protection layers.

25 Rooms for expensive equipment or with greater fire hazard.

26 Main computer rooms, control rooms, paper warehouses, optical or magnetic recording material vaults.

27 Basements people stays a lot or with many combustible materials.

28 Rooms people stays a lot or with many combustible materials in the places for singing, dancing or entertainment.

29 High-rise garages, Category I garages, Categories I and II underground garages, mechanical stereo garages, duplex garages, and garages with escalators as vehicle evacuation exits (open garages may not be provided with such detectors).

30 Fore-chambers of dirty clothes chutes and waste& rubbish chutes, blind ceilings with clear height over 0.8m and combustible materials, and commercial or common kitchens.

31 The common kitchens and gas meter rooms of commercial organizations, enterprises and institutions which use the combustible gases as fuel.

32 Other places where people stay a lot, with many combustible materials or significant pollution will be caused after fire.

33 Other places where fire detectors are needed.

Explanation of Wording in This Code

- 1 The explanation of wording for different degrees of strictness of provisions in this code is provided as follows for the convenience of making difference and implementation:
 - 1) Words representing very strict and compulsory requirements:

“Must” is used for affirmation, and "must not" for negation;
 - 2) Words representing strict requirements which shall be complied with under normal conditions:

"Shall" is used for affirmation, and "Shall not" for negation.
 - 3) Words indicating slight alternations and requirements which shall be preferred if conditions permit:

“Should” is used for affirmation, and “should not” for negation;
 - 4) The word indicating alternations and the requirements which can be complied with under certain conditions is "may".
- 2 Expressions indicating the compliance to other relevant standards are "shall meet the requirements of ..." and "shall be in accordance with...".

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