

**PART I**  
**GENERAL**

**1.1 Title**

This Code of Practice shall be titled "Minimum Fire Service Installations and Equipment" hereinafter referred to as "The Code".

**1.2 Definitions****"Building" means**

As defined in Buildings Ordinance Cap. 123.

**"Cubical Extent" means**

The space contained within the external surfaces of its walls and roof and the upper surface of the floor of its lowest storey but excluding any space within any enclosure on the roof of the building used exclusively for accommodating a water tank or lift gear or any like apparatus and where a building on one or more of its sides is not enclosed by a wall or walls the building where unenclosed shall be deemed to be extending downwards from the outer edge of the roof.

**"Fire Compartment" means**

An enclosed space in a building that is separated from all other parts of the building by enclosing construction providing a fire separation that may be required to have a fire-resisting rating.

**"Fire Load" means**

The theoretical amount of heat that may be released during the burning of combustibles in the building under fire conditions and is computed by the formula:

$$\frac{\text{Calorific value of contents in MJ/kg} \times \text{weight of contents in kg}}{\text{Floor area in square metres}}$$

**"Fire Service Installations or Equipment" means**

Any equipment or installation manufactured, used or designed to be used for the purpose of:

- (a) extinguishing, attacking, preventing or limiting a fire;
- (b) giving warning of a fire;
- (c) providing access to any premises or place for the purpose of extinguishing, attacking, preventing or limiting a fire.

**"Natural Venting of Staircases" means**

As an alternative to pressurisation of staircase by provision of venting of smoke from staircase in accordance with Section 2 of BS 5588: Part 5: 1991 in particular paras. 8.4(a), (b) and (h) and the latest version of the Standard.

**"Place" means**

Any area, lot or site on which buildings are located.

**"Premises" means**

Any building works or structure which is subject to the formal approval or consent of Government for its construction, alteration, change of use or demolition.

**"Protected Means of Escape" means**

Protected corridors, protected lobbies (including lobbies protecting fireman's lifts) and protected staircases as defined in the Code of Practice for Means of Escape published by the Buildings & Lands Department.

**"Sleeping Risk" means**

Increased life risk during hours of darkness when the occupants, in addition to being in a natural resting state with their consciousness nearly suspended, required additional assistance in the event of a fire either due to:

- their physical conditions, such as the old, the infirm and the children, or
- their transient presence in a strange building, and are unable to identify the means of escape.

Definitions of systems and classification of premises are at Parts II & III respectively.

### **1.3 Discretionary powers of the Director of Fire Services**

For the avoidance of doubt, the Director of Fire Services may, in the case of any particular building, vary any of the requirements of the Code (whether by requiring the provision of any fire service installations or equipment not indicated in the Code either in addition to or in substitution for any fire service installations or equipment so indicated or by relaxing any of the requirements in the Code or otherwise) where, in his opinion, such a variation is required in order to ensure the provision of all such fire service installations and equipment, as, having regard to the purpose for which the building is intended to be put, comprise the minimum fire service installations and equipment necessary for that building/premises, or as the case may be, where such a variation is not inconsistent with the provision for the building of all such fire service installations and equipment as aforesaid.

### **1.4 Approval of plans for building works**

The Building Authority may, under Section 16(1)(b) of the Buildings Ordinance, refuse to give his approval of any plans of building works where:

“the plans are not endorsed with or accompanied by a certificate from the Director of Fire Services certifying either:

- (i) that, having regard to the purpose to which the building is intended to be put (which purpose shall be stated in the certificate), no fire service installation or equipment is necessary in connection with the building that will result from the carrying out of the building works shown on the plans; or
- (ii) that the plans have been examined and are approved by him as showing all such fire service installations and equipment as in his opinion, having regard to the purpose to which the building is intended to be put (which purpose shall be stated in the certificate), comprise the minimum fire service installations and equipment necessary for the building in accordance with the Code of Practice published from time to time by the Director of Fire Services”.

### **1.5 Design of fireman's lift**

Whilst the requirements for fireman's lift are included in this Code, it should be pointed out that these are formulated in accordance with Reg. 41B of the Building (Planning) (Amendment) (No. 2) Regulations 1992 and as such are not considered as fire service installations within the meaning of para 1.2 above.

### **1.6 Standards**

The standards, specifications, rules, statutory requirements, etc. quoted in this Code shall be the current version at the time of building plans submission for approval.

**PART II****TABLE AND DEFINITIONS OF SYSTEMS/INSTALLATIONS/EQUIPMENT****2.1 Table**

The following systems/installations/equipment may be required to be installed in various premises under this Code:

1. Audio/visual advisory systems
2. Automatic actuating devices
3. Automatic fixed installations other than water
4. Automatic fixed installations using water
5. Deluge systems
6. Drencher systems
7. Dust detection systems
8. Dynamic smoke extraction systems
9. Emergency generators
10. Emergency lighting
11. Exit signs
12. Fire alarm systems
13. Fire control centre
14. Fire detection systems
15. Fire hydrant/hose reel systems
16. Fireman's lifts
17. Fixed automatically operated approved appliances
18. Fixed foam systems
19. Gas detection systems
20. Gas extraction systems
21. Hose reels
22. Portable hand-operated approved appliances
23. Pressurization of staircases
24. Ring main systems with fixed pumps
25. Sprinkler systems
26. Static smoke extraction systems
27. Supply tank
28. Ventilation/air conditioning control systems
29. Water spray systems
30. Water supplies

**2.2 Definition**

"Audio/visual advisory systems" means

Equipment which is supplementary to exit signs and fire alarm warning devices which, when operated in the event of a fire, provides audio/visual indication of safe direction of egress from the area.

"Automatic actuating devices" means

Building components such as doors, shutters, dampers, fire curtains, etc., and the devices for automatically controlling their movement in the event of fire.

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“Automatic fixed installations other than water” means

A system of cylinders, pipes, valves, and delivery points so designed as to automatically detect and instantaneously attack a fire with an inert medium and sound an alarm (e.g. CO<sub>2</sub> protection of electrical equipment).

“Automatic fixed installations using water” means

A system of water supplies, pumps, pipes, valves and delivery points so arranged as to automatically detect and instantaneously attack a fire with water and sound an alarm. Such requirements for this item may include Sprinklers, Drenchers, Deluge or Water Spray Systems as required and appropriate.

“Deluge systems” means

A system requiring a discharge of water over a considerable area in rapid and certain response to a fire.

“Drencher systems” means

A system which provides a curtain of water for protection against internal and external “exposure” to fire, and/or the protection of large openings.

“Dust detection systems” means

Equipment designed to give warning of a potentially explosive concentration of dust.

“Dynamic smoke extraction systems” means

A mechanical ventilating system capable of removing smoke and products of combustion from a designated fire compartment, and also supplying fresh air in such a manner as to maintain a specified smoke free zone below the smoke layer.

“Emergency generators” means

An independently powered electrical generator of sufficient electrical capacity to meet the essential services it is required to provide.

“Emergency lighting” means

A system of artificial lighting designed to provide adequate illumination and indication of exit routes within a building under emergency conditions.

“Exit signs” means

Fixed illuminated signs indicating an approved exit route.

“Fire alarm systems” means

Any manually operated system designed to give warning of fire.

“Fire control centre” means

A compartment (situated at street level having direct access to open air and vehicular approach) containing annunciator boards, controls, terminals, etc. of the Fire Protection and Life Safety Systems within that building/complex.

“Fire detection systems” means

Any system designed to detect automatically the presence of smoke, heat, combustion products or flame and give warning of same.

“Fire hydrant/hose reel systems” means

An installation of pipes, water tanks, pumps, hydrant outlets and/or hose reels in a building to provide a ready means by which a jet of water can be delivered in any part of the building for the purpose of fire fighting.

“Fireman’s lift(s)” means

A designated lift(s) so designed as to allow Fire Services personnel safe access to at least all alternate floors of the building.

“Fixed automatically operated approved appliances” means

Any fire service equipment which is manufactured, used or designed to be used as an independent unit for the purpose of extinguishing, attacking, preventing or limiting a fire, but automatic in operation and fixed in position, e.g. a BCF sprayer unit in a Dangerous Goods store.

“Fixed foam systems” means

Any combination of generators; pipework; valves; nozzles and pourers designed to deliver finished foam to the seat of a fire which may be automatic in operation.

“Gas detection systems” means

Equipment designed to give warning of the presence of a noxious, toxic, irritant or inflammable vapour in potentially dangerous concentration.

“Gas extraction systems” means

An electrically/mechanically operated system capable of removing flammable vapours/gases from the part of the building where such vapours/gases may be generated through normal operation of the plants or work processes.

“Hose reel” means

Any standard type hose reel of a pattern approved by the Director of Fire Services.

“Portable hand-operated approved appliances” means

Any fire service equipment which is manufactured, used or designed to be used as an independent unit for the purpose of extinguishing, attacking, preventing or limiting a fire, e.g. water type, foam, inert gas, any chemical extinguishers, fire blankets and sand buckets.

“Pressurization of staircases” means

A system designed to protect staircases against the ingress of smoke by maintaining the air within staircases at pressures higher than those in adjacent parts of the building. The number of staircase(s) requiring pressurization shall be determined by the cubical extent of the basement, or building as the case may be, according to the following table provided that the number of pressurized staircases required shall not exceed the total number of staircases required by the Code of Practice for Means of Escape:

| <i>Cubical Extent (cubic metres)</i>            | <i>No. of Staircase(s)</i> |
|---|----------------------------|
| (For basements of three or more levels)         |                            |
| Exceeding 7 000 but not exceeding 56 000        | 1                          |
| Exceeding 56 000 but not exceeding 112 000      | 2                          |
| Exceeding 112 000 but not exceeding 168 000     | 3                          |
| Exceeding 168 000                               | 4                          |
| (For buildings other than hotels and hospitals) |                            |
| Exceeding 28 000 but not exceeding 56 000       | 1                          |
| Exceeding 56 000 but not exceeding 112 000      | 2                          |
| Exceeding 112 000 but not exceeding 168 000     | 3                          |
| Exceeding 168 000                               | 4                          |
| (For hotels and hospitals)                      |                            |
| Not exceeding 56 000                            | 1                          |
| Exceeding 56 000 but not exceeding 112 000      | 2                          |
| Exceeding 112 000 but not exceeding 168 000     | 3                          |
| Exceeding 168 000                               | 4                          |

“Ring main systems with fixed pump(s)” means

A fixed system of piping fitted with delivery outlets at fixed intervals and permanently primed pump(s) set for imparting pressure and flow to the water.

“Sprinkler systems” means

A system designed to discharge water under pressure from sprinkler heads (detecting devices) at/or near the point of origin of the fire and to sound an alarm.

“Static smoke extraction systems” means

A smoke extraction system utilizing smoke reservoirs; localised ducting; and permanent openings and/or automatic opening of windows, panels or external louvers actuated by smoke detectors: to remove, on the principles of natural ventilation, smoke and products of combustion from a designated fire compartment.

Static smoke extraction system may be provided, as the alternative to the Dynamic smoke extraction system if ALL of these three conditions are satisfied:

- (a) smoke reservoirs each not exceeding 500 square metres in area can be provided under the ceiling by fixed or automatically operated smoke screens to the specifications as contained in Part V, and

- (b) the horizontal distance between the perimeter of any smoke reservoir and the external wall of the building where windows, panels or external louvres functioning as smoke outlets are installed, does not exceed 30 metres and that one side of the reservoir shall abut the external wall, and
- (c) the aggregate area of windows, panels or external louvres functioning as smoke outlets is not less than 2% of the floor area this system serves, and that at least half of these outlets are operable by automatic actuating devices.

**“Supply tank” means**

A water tank containing a specified quantity of water reserved solely for fire fighting.

**“Ventilation/air conditioning control systems” means**

An automatic control system, designed to stop mechanically induced air movement within a designated fire compartment, actuated by smoke detectors and provided with a central, manually operated back up facility.

**“Water spray systems” means**

A system designed for extinguishing or controlling fires involving flammable liquids by emulsification, cooling and smothering.

**“Water supplies” means**

A supply acceptable to the Water Authority and the Director of Fire Services.

**PART III****CLASSIFICATION OF PREMISES AND DEFINITIONS****3.1 Definition**

“Audio/Visual Production Facilities” means

Premises used for audio/visual production such as film and television studios.

“Basement Storeys” means

Any storey of a building below the ground storey and from which all required exit routes are in an upward direction to the ground storey.

“Car Parking Facilities” means

See “Car Port” and “Garage”.

“Car Port” means

A covered parking area open for its entire length or width on at least two sides.

“Cold Storage Area” means

Any area incorporating a unit of specific volume which is entirely given over to storage in an atmosphere of less than 10°C above zero.

“Commercial Building” means

A building, or that part of the building, constructed or intended to be used for business, trade or entertainment.

“Composite Building” means

Any building which is constructed or intended to be used for a combination of any two or more of the following purposes, and in respect of each of these purposes, separate sections of this Code shall apply:

- (a) Domestic
- (b) Commercial
- (c) Institutional
- (d) Hotel

“Curtain Walled Building” means

A building which has curtain walls. A curtain wall is a non load bearing wall primarily fixed in front of the structural frame with its own dead weight and wind loads transferred to the structural frame through anchorages.

“Domestic Building” means

A building constructed, used or intended to be used for habitation.

“Garage” means

A covered parking area enclosed by walls, with or without windows, on more than two sides.

“Godown” means

A warehouse or any building used wholly or in part for the storage of goods or raw material of any kind.

“Group I” means

A designated area of special hazard normally within a building.

“Group II” means

A building, group of buildings or complex considered to present special hazard.

“High Rise Building” means

Any building of which the floor of the uppermost storey exceeds 30 m above the point of staircase discharge at ground floor level.

“Hotel” means

Any building used wholly or in part primarily for the purposes of accommodation on a commercial basis.

“Industrial Building” means

Any building used wholly or in part in any process for or incidental to any of the following purposes, namely:

- (a) the making of any article or of part of any article; or
- (b) the altering, repairing, ornamenting, finishing, cleaning or washing or breaking up or demolition of any article; or
- (c) the adapting for sale of any article being a building in which work is carried out by way of trade or for purposes of gain.

**“Institutional Building” means**

Any building used wholly or in part for the purposes of the following:

- (a) Club premises
- (b) Educational establishments
- (c) Hostels
- (d) Hospitals including mental institutions and clinics
- (e) Prisons and similar corrective institutions
- (f) Sanatoria

**“Low Rise Building” means**

Any building of which the floor of the uppermost storey does not exceed 30 m above the point of staircase discharge at ground floor level.

**“Mechanical plant rooms” means,**

“Room accommodating mechanical plants such as air handling unit (AHU), fan, air conditioning (A/C), chiller, compressor, water pump, fire pump and the like.”

**“Passenger Terminals/Station” means**

Any building and/or place used wholly or in part for the purposes of embarking/disembarking passengers to/from any mode of transport.

**3.2 Special and other risks**

**Group I:** A designated area of special hazard normally within a building i.e.:

- Audio/Visual production facilities
- Battery Rooms and electrical charging facilities
- Boiler Rooms
- Bowling Alleys
- Cold Storage Areas
- Dangerous Goods Stores
- Electrical equipment, incorporating transformers, switchgears, (above 1 Kilovolt) generators/alternators, requiring separate installation
- Kitchens
- Lift Motor Rooms
- Telephone Distribution Equipment, computer installation and similar installations

**Group II:** A building, group of buildings or complex considered to present special hazard(s) i.e.:

- Aircraft Maintenance and repair facilities
- Audio/Visual Production Facilities (Building(s) devoted to this purpose)
- Bulk Fuel Storages
- Chemical Manufacturing/Processing Plants
- Cold Storage Areas (Building(s) devoted to this purpose)
- Container Terminals, yards and freight stations
- Curtain Walled Buildings
- Dangerous Goods Stores (Range of D.G. Stores in an area devoted to this purpose)
- Explosive Production and/or Storages
- Mechanical Plant Room
- Open Sites of Public Assembly
- Petro-Chemical Complexes
- Railway Marshalling Yards
- Road Tunnels
- Shipyards

*Note:* “Audio/Visual Production Facilities”, “Cold Storage Areas” and “Dangerous Goods Stores” are included in both groups.



**PART IV**

**REQUIREMENTS FOR PREMISES**

**General**

Attention is drawn to Part I of this Code, under which the Director of Fire Services has discretionary powers to vary any requirements of this Code.

Where the requirements are not detailed hereunder for particular premises, the Director of Fire Services will determine the requirements.

## CLASSIFICATION OF PREMISES AND AREAS OF SPECIAL RISKS

- 4.1 Aircraft Maintenance and Repair Facilities
- 4.2 Audio/Visual Production Facilities
- 4.3 Basements not exceeding 230 m<sup>2</sup> of usable floor area
- 4.4 Basements which exceed 230 m<sup>2</sup> of usable floor area
- 4.5 Battery Rooms and Electrical Charging Facilities
- 4.6 Boiler Rooms
- 4.7 Bowling Alleys
- 4.8 Bulk Fuel Storage
- 4.9 Car Ports
- 4.10 Chemical Manufacturing/Processing Plants
- 4.11 Cold Storage Areas (Group I) Minor (Under 140 m<sup>3</sup> capacity)
- 4.12 Cold Storage Areas (Group I) Major (of and over 140 m<sup>3</sup> capacity)
- 4.13 Cold Storage Areas (Group II)
- 4.14 Commercial Buildings—Low Rise
- 4.15 Commercial Buildings—High Rise
- 4.16 Composite Buildings
- 4.17 Container Terminal Yards and Freight Stations
- 4.18 Curtain Walled Buildings below six storeys in height
- 4.19 Curtain Walled Buildings of and above six storeys in height
- 4.20 Dangerous Goods Stores under 42 m<sup>3</sup> capacity
- 4.21 Dangerous Goods Stores of 42 m<sup>3</sup> capacity and above
- 4.22 Domestic Buildings—Low Rise (up to and including 3 storeys in height)
- 4.23 Domestic Buildings—Low Rise (over 3 storeys in height)
- 4.24 Domestic Buildings—High Rise
- 4.25 Electrical Equipment: incorporating transformers, switchgear above 1 Kilovolt, generators/alternators requiring separate installations
- 4.26 Explosive Production and/or storages
- 4.27 Garages
- 4.28 Hotels—Low Rise
- 4.29 Hotels—High Rise
- 4.30 Industrial/Godown Buildings—Low Rise
- 4.31 Industrial/Godown Buildings—High Rise
- 4.32 Institutional Buildings—Low Rise
- 4.33 Institutional Buildings—High Rise
- 4.34 Kitchens (other than kitchens in domestic premises)
- 4.35 Lift Motor Rooms
- 4.36 Mechanical Plant Rooms (Group I)
- 4.37 Mechanical Plant Rooms (Group II)
- 4.38 Passenger Terminals/Stations
- 4.39 Petro-chemical Complexes
- 4.40 Railway Marshalling Yards (encompassing a site area of more than 2 300 m<sup>2</sup>)
- 4.41 Road Tunnels
- 4.42 Shipyards (encompassing a site area of more than 2 300 m<sup>2</sup>)
- 4.43 Telephone distribution equipment, computer installation and similar installations

#### 4.1 Aircraft maintenance and repair facilities

##### *REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:*

- (i) Automatic actuating devices
- (ii) Automatic fixed installations other than water
- (iii) Automatic fixed installations using water
- (iv) Dust detection systems
- (v) Emergency generators
- (vi) Emergency lighting
- (vii) Exit signs
- (viii) Fire alarm systems
- (ix) Fire control centre
- (x) Fire detection systems
- (xi) Fire hydrant/hose reel systems
- (xii) Fireman's lifts
- (xiii) Fixed automatically operated approved appliances
- (xiv) Fixed foam systems
- (xv) Gas extraction systems
- (xvi) Portable hand-operated approved appliances
- (xvii) Ring main systems with fixed pump(s)
- (xviii) Ventilation/air conditioning control systems

##### *EXTENT*

- (i) As required by that equipment which needs to be automatically actuated.
- (ii) To be provided to areas where the use of water is incompatible with the occupancy or trade.
- (iii) In all areas excepting where covered by (ii) above, including staircases.
- (iv) To be provided in all areas where there is a potential dust explosion hazard.
- (v) An independently powered generator of sufficient electrical capacity to meet the essential services it is required to provide.
- (vi) Emergency lighting shall be provided throughout the entire building and all exit routes leading to ground level.
- (vii) Sufficient directional and exit signs to ensure that all exit routes from any floor within the buildings are clearly indicated as required by the configuration of staircases serving the buildings.
- (viii) One actuating point and one audio warning device to be located at each hose reel point. This actuating point should include facilities for fire pump start and audio warning device initiation.
- (ix) Minimum of one, additional to be provided according to the complexity of the buildings.
- (x) To be provided in areas not covered by automatic fixed installations.
- (xi) There shall be sufficient hydrants and hose reels to ensure that every part of the building can be reached by a length of not more than 30 m of Fire Services hose or hose reel tubing.
- (xii) Lift or lifts as designated.
- (xiii) As required by occupancy.
- (xiv) To be provided as an alternative to other fixed automatic systems, when required by Director of Fire Services.
- (xv) Approved type for the part of building where flammable vapours may be generated, and to reduce the concentration below its lower explosive limit.
- (xvi) As required by occupancy.
- (xvii) To be required to cover those areas of such complexes not adequately served by public water mains.
- (xviii) When a ventilation/air conditioning control system to a building is provided, it shall stop mechanically induced air movement within a designated fire compartment.

*ADDITIONAL REQUIREMENTS*

- (i) All linings for acoustic and thermal insulation purposes in ductings and concealed locations shall be of Class 1 or 2 Rate of Surface Spread of Flame as per British Standard 476: Part 7 or its international equivalent, or be brought up to that standard by use of an approved fire retardant product.
- (ii) All linings for acoustic, thermal insulation and decorative purposes within protected means of escape shall be of Class 1 or 2 Rate of Surface Spread of Flame as per British Standard 476: Part 7 or its international equivalent, or be brought up to that standard by use of an approved fire retardant product.
- (iii) Any intended storage or use of dangerous goods as defined in Chapter 295 of the Laws of Hong Kong should be notified to the Director of Fire Services.

*Note:* Buildings within such complexes shall conform to the requirements specified for similar premises in accordance with this Code.

**4.2 Audio/visual production facilities***REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:*

- (i) Audio/visual advisory systems
- (ii) Automatic actuating devices
- (iii) Automatic fixed installations other than water
- (iv) Automatic fixed installations using water
- (v) Emergency generators
- (vi) Emergency lighting
- (vii) Exit signs
- (viii) Fire alarm systems
- (ix) Fire control centre
- (x) Fire detection systems
- (xi) Fire hydrant/hose reel systems
- (xii) Portable hand-operated approved appliances
- (xiii) Static or dynamic smoke extraction systems
- (xiv) Ventilation/air conditioning control systems

*EXTENT*

- (i) As required by the risk.
- (ii) As required by that equipment which needs to be automatically actuated.
- (iii) To be provided to areas where the use of water is undesirable for the occupancy or trade.
- (iv) As required by the risk.
- (v) An independently powered generator of sufficient electrical capacity to meet the essential services it is required to supply.
- (vi) Emergency lighting shall be provided throughout the entire building and all exit routes leading to ground level.
- (vii) Sufficient directional and exit signs to ensure that all exit routes from the premises within the buildings are clearly indicated as required by the configuration of staircases serving the building.
- (viii) One actuating point and one audio warning device to be located at each hose reel point. This actuating point should include facilities for fire pump start and audio warning device initiation.
- (ix) As required by the risk.
- (x) To be provided in areas not covered by automatic fixed installations.

- (xi) There shall be sufficient hydrants and hose reels to ensure that every part of the building can be reached by a length of not more than 30 m of Fire Services hose or hose reel tubing.
- (xii) As required by the risk.
- (xiii) Required for any fire compartment exceeding 7 000 cubic metres where:
  - (a) the aggregate area of openable windows of the compartment does not exceed 6.25% of the floor area of that compartment, and
  - (b) the designed fire load of that compartment is likely to exceed 1 135 MJ/square metre.
- (xiv) When a ventilation/air conditioning control system to a building is provided, it shall stop mechanically induced air movement within a designated fire compartment.

#### *ADDITIONAL REQUIREMENTS*

- (i) All linings for acoustic and thermal insulation purposes in ductings and concealed locations shall be of Class 1 or 2 Rate of Surface Spread of Flame as per British Standard 476: Part 7 or its international equivalent, or be brought up to that standard by use of an approved fire retardant product.
- (ii) All linings for acoustic, thermal insulation and decorative purposes within protected means of escape shall be of Class 1 or 2 Rate of Surface Spread of Flame as per British Standard 476: Part 7 or its international equivalent, or be brought up to that standard by use of an approved fire retardant product.
- (iii) Any intended storage or use of dangerous goods as defined in Chapter 295 of the Laws of Hong Kong should be notified to the Director of Fire Services.

#### **4.3 Basements not exceeding 230 m<sup>2</sup> of usable floor area**

##### *REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:*

- (i) Automatic fixed installations other than water
- (ii) Emergency lighting
- (iii) Exit signs
- (iv) Fire alarm systems
- (v) Fire detection systems
- (vi) Fire hydrant/hose reel systems
- (vii) Portable hand-operated approved appliances
- (viii) Ventilation/air conditioning control systems

##### *EXTENT*

- (i) To be provided in areas of special risk.
- (ii) Emergency lighting shall be provided throughout the entire basement area and all exit routes leading to ground level.
- (iii) Sufficient directional and exit signs to ensure that all exit routes from the basement are clearly indicated as required by the configuration of staircases serving the basement.
- (iv) One actuating point and one audio warning device to be located at each hose reel point. This actuating point should include facilities for fire pump start and audio warning device initiation.
- (v) The entire basement area shall be covered by a fire detection system, excepting carparking areas, strong rooms and safe deposit vaults.
- (vi) There shall be sufficient hydrants and hose reels to ensure that every part of the basement with the exception of strong rooms and safe deposit vaults can be reached by a length of not more than 30 m of Fire Services hose or hose reel tubing.
- (vii) As required by occupancy.
- (viii) When a ventilation/air conditioning control system to a building is provided, it shall stop mechanically induced air movement within a designated fire compartment.

*ADDITIONAL REQUIREMENTS*

- (i) All linings for acoustic and thermal insulation purposes in ductings and concealed locations shall be of Class 1 or 2 Rate of Surface Spread of Flame as per British Standard 476: Part 7 or its international equivalent, or be brought up to that standard by use of an approved fire retardant product.
- (ii) All linings for acoustic, thermal insulation and decorative purposes within protected means of escape shall be of Class 1 or 2 Rate of Surface Spread of Flame as per British Standard 476: Part 7 or its international equivalent, or be brought up to that standard by use of an approved fire retardant product.
- (iii) Any intended storage or use of dangerous goods as defined in Chapter 295 of the Laws of Hong Kong should be notified to the Director of Fire Services.

**4.4 Basements which exceed 230 m<sup>2</sup> of usable floor area***REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:*

- (i) Audio/visual advisory systems
- (ii) Automatic fixed installations other than water
- (iii) Emergency lighting
- (iv) Exit signs
- (v) Fire alarm systems
- (vi) Fire detection systems
- (vii) Fire hydrant/hose reel systems
- (viii) Portable hand-operated approved appliances
- (ix) Pressurization of staircases
- (x) Sprinkler systems
- (xi) Static or dynamic smoke extraction systems
- (xii) Ventilation/air conditioning control systems

*EXTENT*

- (i) Required for any part or parts of building where the area occupied by any one single occupancy on any one floor exceeds 2 000 square metres AND where the occupants, due to their transient presence either as shoppers, audience or guests, are exposed to risks to require additional advice through such systems.
- (ii) To be provided to areas where the use of water is undesirable for the occupancy or trade.
- (iii) Emergency lighting shall be provided throughout the entire basement area and all exit routes leading to ground level.
- (iv) Sufficient directional and exit signs to ensure that all exit routes from the basement are clearly indicated as required by the configuration of staircases serving the basement.
- (v) One actuating point and one audio warning device to be located at each hose reel point. This actuating point should include facilities for fire pump start and audio warning device initiation.
- (vi) The entire basement area shall be covered by a fire detection system, excepting car parking areas, strong rooms and safe deposit vaults.
- (vii) There shall be sufficient hydrants and hose reels to ensure that every part of the basement with the exception of strong rooms and safe deposit vaults can be reached by a length of not more than 30 m of Fire Services hose or hose reel tubing.
- (viii) As required by occupancy.
- (ix) Required for basements of three or more levels where:
  - (a) no open air access routes for firemen are provided; and
  - (b) the cubical extent of the basement exceeds 7 000 cubic metres; and
  - (c) the designed fire load of the basement is likely to exceed 1 135 MJ/square metre.

The number of pressurized staircases to be provided shall be determined by the table stipulated under the definition of Pressurization of Staircases in Pt. II provided that the number of pressurized staircases required shall not exceed the total number of staircases required by the Code of Practice for Means of Escape.

- (x) In all parts of the basements excepting strong rooms and safe deposit vaults and where covered by (ii) above.
- (xi) Required for any fire compartment exceeding 7 000 cubic metres where the designed fire load is likely to exceed 1 135 MJ/square metre.
- (xii) When a ventilation/air conditioning control system to a building is provided, it shall stop mechanically induced air movement within a designated fire compartment.

#### *ADDITIONAL REQUIREMENTS*

- (i) All linings for acoustic and thermal insulation purposes in ductings and concealed locations shall be of Class 1 or 2 Rate of Surface Spread of Flame as per British Standard 476: Part 7 or its international equivalent, or be brought up to that standard by use of an approved fire retardant product.
- (ii) All linings for acoustic, thermal insulation and decorative purposes within protected means of escape shall be of Class 1 or 2 Rate of Surface Spread of Flame as per British Standard 476: Part 7 or its international equivalent, or be brought up to that standard by use of an approved fire retardant product.
- (iii) Any intended storage or use of dangerous goods as defined in Chapter 295 of the Laws of Hong Kong should be notified to the Director of Fire Services.

#### **4.5 Battery rooms and electrical charging facilities**

##### *REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:*

- (i) Automatic fixed installations other than water
- (ii) Exit signs
- (iii) Fire alarm systems
- (iv) Fire detection systems
- (v) Gas extraction systems
- (vi) Portable hand-operated approved appliances
- (vii) Ventilation/air conditioning control systems

##### *EXTENT*

- (i) To be provided to areas where the use of water is undesirable for the risk.
- (ii) Sufficient directional and exit signs to ensure that all exit routes from any floor within the premises are clearly indicated as required by the configuration of staircase serving the building.
- (iii) One actuating point and one audio warning device to be located at all exit doorways. This actuating point should include facilities for audio warning device initiation.
- (iv) To be provided in areas not covered by automatic fixed installations.
- (v) Approved type for the part of building where flammable vapours may be generated, and to reduce the concentration below its lower explosive limit.
- (vi) As required by occupancy.
- (vii) When a ventilation/air conditioning control system to a building is provided, it shall stop mechanically induced air movement within a designated fire compartment.

##### *ADDITIONAL REQUIREMENT*

Any intended storage or use of dangerous goods as defined in Chapter 295 of the Laws of Hong Kong should be notified to the Director of Fire Services.

**4.6 Boiler rooms****REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:**

- (i) Automatic actuating devices
- (ii) Automatic fixed installations other than water
- (iii) Emergency lighting
- (iv) Exit signs
- (v) Fire detection systems
- (vi) Fixed foam systems
- (vii) Portable hand-operated approved appliances

**EXTENT**

- (i) As required by that equipment which needs to be automatically actuated.
- (ii) To be provided in gas/oil boiler rooms.
- (iii) Emergency lighting shall be provided throughout the entire area and all exit routes leading to ground level.
- (iv) Sufficient directional and exit signs to ensure that all exit routes from the area within the buildings are clearly indicated as required by the configuration of staircases serving the buildings.
- (v) To be provided in areas not covered by automatic fixed installations.
- (vi) To be provided in oil boiler rooms located in basements.
- (vii) As required by the risk.

**ADDITIONAL REQUIREMENT**

Any intended storage or use of dangerous goods as defined in Chapter 295 of the Laws of Hong Kong should be notified to the Director of Fire Services.

**4.7 Bowling alleys****REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:**

- (i) Audio/visual advisory systems
- (ii) Automatic actuating devices
- (iii) Automatic fixed installations other than water
- (iv) Emergency generators
- (v) Emergency lighting
- (vi) Exit signs
- (vii) Fire alarm systems
- (viii) Fire detection systems
- (ix) Fire hydrant/hose reel systems
- (x) Portable hand-operated approved appliance
- (xi) Sprinkler systems
- (xii) Ventilation/air conditioning control systems

**EXTENT**

- (i) Required for any part or parts of building where the area used for bowling alley on any one floor exceeds 2 000 square metres AND where bowlers and spectators, due to their transient presence, are exposed to risks to require additional advice through such systems.
- (ii) As required by that equipment which needs to be automatically actuated.
- (iii) To be provided to areas where the use of water is undesirable for the risk.
- (iv) An independently powered generator of sufficient electrical capacity to meet the essential services it is required to provide.



- (v) Emergency lighting shall be provided throughout the entire premises and all exit routes leading to ground level.
- (vi) Sufficient directional and exit signs to ensure that all exit routes from any floor within the building are clearly indicated as required by the configuration of staircases serving the building.
- (vii) One actuating point and one audio warning device to be located at each hose reel point. This actuating point should include facilities for fire pump start and audio warning device initiation.
- (viii) To be provided in areas not covered by automatic fixed installations.
- (ix) There shall be sufficient hydrants and hose reels to ensure that every part of the premises can be reached by a length of not more than 30 m of Fire Services hose or hose reel tubing.
- (x) As required by occupancy.
- (xi) In all parts of the alleys and associated areas including staircases and common corridors.
- (xii) When a ventilation/air conditioning control system to a building is provided, it shall stop mechanically induced air movement within a designated fire compartment.

#### *ADDITIONAL REQUIREMENTS*

- (i) All linings for acoustic and thermal insulation purposes in ductings and concealed locations shall be of Class 1 or 2 Rate of Surface Spread of Flame as per British Standard 476: Part 7 or its international equivalent, or be brought up to that standard by use of an approved fire retardant product.
- (ii) All linings for acoustic, thermal insulation and decorative purposes within protected means of escape shall be of Class 1 or 2 Rate of Surface Spread of Flame as per British Standard 476: Part 7 or its international equivalent, or be brought up to that standard by use of an approved fire retardant product.
- (iii) Any intended storage or use of dangerous goods as defined in Chapter 295 of the Laws of Hong Kong should be notified to the Director of Fire Services.

#### **4.8 Bulk fuel storage**

##### *REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:*

- (i) Appropriate requirements of Model Code of Safe Practice published by Institute of Petroleum
- (ii) Automatic actuating devices
- (iii) Automatic fixed installations other than water
- (iv) Automatic fixed installations using water
- (v) Emergency generators
- (vi) Emergency lighting
- (vii) Exit signs
- (viii) Fire alarm systems
- (ix) Fire control centre
- (x) Fire detection systems
- (xi) Fire hydrant/hose reel systems
- (xii) Fixed automatically operated approved appliances
- (xiii) Fixed foam systems
- (xiv) Portable hand-operated approved appliances
- (xv) Ring main systems with fixed pump(s)

##### *EXTENT*

- (i) As considered necessary by Director of Fire Services.
- (ii) As required by that equipment which needs to be automatically actuated.

- (iii) To be provided to areas of special risk where the use of water is undesirable for the risk.
- (iv) To be provided for the cooling and protection of products tanks, product pipelines and jetties.
- (v) An independently powered generator of sufficient electrical capacity to meet the essential services it is required to provide.
- (vi) Emergency lighting shall be provided throughout the entire building and all exit routes leading to ground level.
- (vii) Sufficient directional and exit signs to ensure that all exit routes from any floor within the buildings are clearly indicated as required by the configuration of staircases serving the buildings.
- (viii) One actuating point and one audio warning device to be located at each hose reel point. This actuating point should include facilities for fire pump start and audio warning device initiation.
- (ix) Minimum of one, additional to be provided according to the complexity of the area.
- (x) To be provided in areas not covered by automatic fixed installations.
- (xi) There shall be sufficient hydrants and hose reels to ensure that every part of the buildings can be reached by a length of not more than 30 m of Fire Services hose or hose reel tubing.
- (xii) As required by occupancy.
- (xiii) To be provided as an alternative to other fixed automatic systems, when required by the Director of Fire Services.
- (xiv) As required by occupancy.
- (xv) To be provided to cover those areas of such complexes, not adequately served by public water mains.

*Note:* Buildings within such complexes shall conform to the requirements specified for similar premises in accordance with this Code.

#### **4.9 Car ports**

##### **REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:**

- (i) Exit signs
- (ii) Fire alarm systems
- (iii) Fire hydrant/hose reel systems
- (iv) Portable hand-operated approved appliances

##### **EXTENT**

- (i) Sufficient directional and exit signs to ensure that all exit routes from premises within the building are clearly indicated as required by the configuration of staircases serving the building.
- (ii) As required by the risk.
- (iii) As required by the risk.
- (iv) As required by the risk.

##### **ADDITIONAL REQUIREMENT**

Any intended storage or use of dangerous goods as defined in Chapter 295 of the Laws of Hong Kong should be notified to the Director of Fire Services.

#### **4.10 Chemical manufacturing/processing plants**

##### **REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:**

- (i) Automatic actuating devices
- (ii) Automatic fixed installations other than water
- (iii) Automatic fixed installation using water
- (iv) Dust detection systems

- (v) Emergency generators
- (vi) Emergency lighting
- (vii) Exit signs
- (viii) Fire alarm systems
- (ix) Fire control centre
- (x) Fire detection systems
- (xi) Fixed automatically operated approved appliances
- (xii) Fixed foam systems
- (xiii) Gas detection systems
- (xiv) Gas extraction systems
- (xv) Portable hand-operated approved appliances
- (xvi) Ring main systems with fixed pump(s)
- (xvii) Special Equipment/requirements
- (xviii) Ventilation/air conditioning control systems

#### *EXTENT*

- (i) As required by that equipment which needs to be automatically actuated.
- (ii) To be provided to areas where the use of water is undesirable for the risk.
- (iii) In all areas excepting where covered by (ii) above, including staircases.
- (iv) To be provided in all areas where there is a potential dust explosion hazard.
- (v) An independently powered generator of sufficient electrical capacity to meet the essential services it is required to provide.
- (vi) Emergency lighting shall be provided to all buildings within the premises and in addition, such lighting shall also be provided to ensure adequate external illumination to permit safe evacuation to the outside of the site boundary.
- (vii) Sufficient directional and exit signs to ensure that all exit routes from any floor within the buildings are clearly indicated as required by the configuration of the staircases serving the buildings.
- (viii) One actuating point and one audio warning device to be located at each hose reel point within the buildings. This actuating point should include facilities for fire pump start and audio warning device initiation, and in addition, one actuating point and audio warning device to be provided at each hydrant outlet on the ring main system.
- (ix) Minimum of one, additional to be provided according to the layout of the complex.
- (x) To be provided in areas not covered by automatic fixed installations.
- (xi) As required by the risk.
- (xii) As required by the risk.
- (xiii) To be provided in all areas of risk.
- (xiv) Approved types for the part of building where flammable vapours may be generated, and to reduce the concentration below its lower explosive limit.
- (xv) As required by the risk.
- (xvi) To be provided to cover those areas of such complexes not adequately served by public water mains.
- (xvii) As required by the Director of Fire Services.
- (xviii) When a ventilation/air conditioning control system to a building is provided, it shall stop mechanically induced air movement within a designated fire compartment.

*Note:* Buildings within such complexes shall conform to the requirements specified for similar premises in accordance with this Code.

*ADDITIONAL REQUIREMENT*

Any intended storage or use of dangerous goods as defined in Chapter 295 of the Laws of Hong Kong should be notified to the Director of Fire Services.

**4.11 Cold storage areas (Group I) minor (under 140 m<sup>3</sup> capacity)***REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:*

- (i) Portable hand-operated approved appliances.

*EXTENT*

- (i) As appropriate to the plant and construction.

*ADDITIONAL REQUIREMENTS*

- (i) All linings for acoustic and thermal insulation purposes in ductings and concealed locations shall be of Class 1 or 2 Rate of Surface Spread of Flame as per British Standard 476: Part 7 or its international equivalent, or be brought up to that standard by use of an approved fire retardant product.
- (ii) All linings for acoustic, thermal insulation and decorative purposes within protected means of escape shall be of Class 1 or 2 Rate of Surface Spread of Flame as per British Standard 476: Part 7 or its international equivalent, or be brought up to that standard by use of an approved fire retardant product.
- (iii) Any intended storage or use of dangerous goods as defined in Chapter 295 of the Laws of Hong Kong should be notified to the Director of Fire Services.

**4.12 Cold storage areas (Group I) major (of and over 140 m<sup>3</sup> capacity)***REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:*

- (i) Automatic fixed installations using water
- (ii) Fire alarm systems
- (iii) Portable hand-operated approved appliances

*EXTENT*

- (i) A dry pipe system to be provided in the cold room, as defined by Fire Offices' Committee Rules.
- (ii) The system provided to the building to be extended to cover the cold storage area.
- (iii) As appropriate to the plant and construction.

*ADDITIONAL REQUIREMENTS*

- (i) All linings for acoustic and thermal insulation purposes in ductings and concealed locations shall be of Class 1 or 2 Rate of Surface Spread of Flame as per British Standard 476: Part 7 or its international equivalent, or be brought up to that standard by use of an approved fire retardant product.
- (ii) All linings for acoustic, thermal insulation and decorative purposes within protected means of escape shall be of Class 1 or 2 Rate of Surface Spread of Flame as per British Standard 476: Part 7 or its international equivalent, or be brought up to that standard by use of an approved fire retardant product.
- (iii) Any intended storage or use of dangerous goods as defined in Chapter 295 of the Laws of Hong Kong should be notified to the Director of Fire Services.

**4.13 Cold storage areas (Group II)***REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:*

- (i) Automatic actuating devices
- (ii) Automatic fixed installations using water
- (iii) Emergency generators
- (iv) Emergency lighting

- (v) Exit signs
- (vi) Fire alarm systems
- (vii) Fire hydrant/hose reel systems
- (viii) Gas detection systems
- (ix) Portable hand-operated approved appliances

#### *EXTENT*

- (i) As required by that equipment which needs to be automatically actuated.
- (ii) In all areas including staircases with the exception of cold storage room which should be provided with a dry pipe system in accordance with Fire Offices' Committee Rules.
- (iii) An independently powered generator of sufficient electrical capacity to meet the essential services it is required to provide.
- (iv) Emergency lighting shall be provided throughout the entire area.
- (v) Sufficient directional and exit signs to ensure that all exit routes from any floor within the area are clearly indicated as required by the configuration of staircases serving the area.
- (vi) One actuating point and one audio warning device to be located at each hose reel point. This actuating point should include facilities for fire pump start and audio warning device initiation.
- (vii) There shall be sufficient hydrants and hose reels to ensure that every part of the building can be reached by a length of not more than 30 m of Fire Services hose or hose reel tubing.
- (viii) To be provided in those areas as required by the risk.
- (ix) As required by occupancy.

#### *ADDITIONAL REQUIREMENTS*

- (i) All linings for acoustic and thermal insulation purposes in ductings and concealed locations shall be of Class 1 or 2 Rate of Surface Spread of Flame as per British Standard 476: Part 7 or its international equivalent, or be brought up to that standard by use of an approved fire retardant product.
- (ii) All linings for acoustic, thermal insulation and decorative purposes within protected means of escape shall be of Class 1 or 2 Rate of Surface Spread of Flame as per British Standard 476: Part 7 or its international equivalent, or be brought up to that standard by use of an approved fire retardant product.
- (iii) Any intended storage or use of dangerous goods as defined in Chapter 295 of the Laws of Hong Kong should be notified to the Director of Fire Services.

#### **4.14 Commercial buildings—low rise**

##### *REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:*

- (i) Audio/visual advisory systems
- (ii) Automatic actuating devices
- (iii) Automatic fixed installations other than water
- (iv) Emergency generators
- (v) Emergency lighting
- (vi) Exit signs
- (vii) Fire alarm systems
- (viii) Fire detection systems
- (ix) Fire hydrant/hose reel systems
- (x) Fireman's lifts
- (xi) Portable hand-operated approved appliances
- (xii) Sprinkler systems
- (xiii) Static or dynamic smoke extraction systems
- (xiv) Ventilation, air conditioning control systems

*EXTENT*

- (i) Required for any part or parts of building where the area occupied by any one single occupancy on any one floor exceeds 2 000 square metres AND where the occupants, due to their transient presence either as shoppers, audience or guests, are exposed to risks to require additional advice through such systems.
- (ii) As required by that equipment which needs to be automatically actuated.
- (iii) To be provided to areas where the use of water is undesirable for the occupancy or trade.
- (iv) An independently powered generator of sufficient electrical capacity to meet the essential services it is required to provide.
- (v) Emergency lighting shall be provided throughout the entire building and all exit routes leading to ground level.
- (vi) Sufficient directional and exit signs to ensure that all exit routes from any floor within the building are clearly indicated as required by the configuration of staircases serving the building.
- (vii) One actuating point and one audio warning device to be located at each hose reel point. This actuating point should include facilities for fire pump start and audio warning device initiation.
- (viii) To be provided in areas not covered by automatic fixed installations.
- (ix) There shall be sufficient hydrants and hose reels to ensure that every part of the building can be reached by a length of not more than 30 m of Fire Services hose or hose reel tubing.
- (x) Lift or lifts as designated.
- (xi) As required by occupancy.
- (xii) Required for buildings with total floor areas exceeding 230 square metres and to cover all parts of the buildings including staircases and common corridors.
- (xiii) Required for:
  - (a) atrium of the building, if the compartment of the atrium exceeds 28 000 cubic metres, or any basement level or floor of building forming part of that compartment which exceeds 7 000 cubic metres, and
  - (b) any fire compartment exceeding 7 000 cubic metres in that building where:
    - (i) the aggregate area of openable windows of the compartment does not exceed 6.25% of the floor area of that compartment, and
    - (ii) the designed fire load is likely to exceed 1 135 MJ/square metre.
- (xiv) When a ventilation/air conditioning control system to a building is provided, it shall stop mechanically induced air movement within a designated fire compartment.

*ADDITIONAL REQUIREMENTS*

- (i) All linings for acoustic and thermal insulation purposes in ductings and concealed locations shall be of Class 1 or 2 Rate of Surface Spread of Flame as per British Standard 476: Part 7 or its international equivalent, or be brought up to that standard by use of an approved fire retardant product.
- (ii) All linings for acoustic, thermal insulation and decorative purposes within protected means of escape shall be of Class 1 or 2 Rate of Surface Spread of Flame as per British Standard 476: Part 7 or its international equivalent, or be brought up to that standard by use of an approved fire retardant product.
- (iii) Any intended storage or use of dangerous goods as defined in Chapter 295 of the Laws of Hong Kong should be notified to the Director of Fire Services.

**4.15 Commercial buildings—high rise****REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:**

- (i) Audio/visual advisory systems
- (ii) Automatic actuating devices
- (iii) Automatic fixed installations other than water

- (iv) Emergency generators
- (v) Emergency lighting
- (vi) Exit signs
- (vii) Fire alarm systems
- (viii) Fire control centre
- (ix) Fire detection systems
- (x) Fire hydrant/hose reel systems
- (xi) Fireman's lifts
- (xii) Portable hand-operated approved appliances
- (xiii) Pressurization of staircases
- (xiv) Sprinkler systems
- (xv) Static or dynamic smoke extraction systems
- (xvi) Ventilation/air conditioning control systems

#### *EXTENT*

- (i) Required for any part or parts of building where the area occupied by any one single occupancy on any one floor exceeds 2 000 square metres AND where the occupants, due to their transient presence either as shoppers, audience or guests, are exposed to risks to require additional advice through such systems.
- (ii) As required by that equipment which needs to be automatically actuated.
- (iii) To be provided to areas where the use of water is undesirable for the occupancy or trade.
- (iv) An independently powered generator of sufficient electrical capacity to meet the essential services it is required to provide.
- (v) Emergency lighting shall be provided throughout the entire building and all exit routes leading to ground level.
- (vi) Sufficient directional and exit signs to ensure that all exit routes from any floor within the building are clearly indicated as required by the configuration of staircases serving the building.
- (vii) One actuating point and one audio warning device to be located at each hose reel point. This actuating point should include facilities for fire pump start and audio warning device initiation.
- (viii) Minimum of one, additional to be provided according to the complexity of the building.
- (ix) To be provided in areas not covered by automatic fixed installations.
- (x) There shall be sufficient hydrants and hose reels to ensure that every part of the building can be reached by a length of not more than 30 m of Fire Services hose or hose reel tubing.
- (xi) Lift or lifts as designated.
- (xii) As required by occupancy.
- (xiii) Required where:
  - (a) natural venting of staircase is not provided; and
  - (b) the aggregate area of openable windows of the rooms/units of the building does not exceed 6.25% of the floor area of those rooms/units, calculated on a floor by floor basis; and
  - (c) the cubical extent of the building exceeds 28 000 cubic metres; and
  - (d) the designed fire load of the building is likely to exceed 1 135 MJ/square metre.

The number of pressurized staircases to be provided shall be determined by the table stipulated under the definition of Pressurization of Staircases in Pt. II provided that the number of pressurized staircases required shall not exceed the total number of staircases required by the Code of Practice for Means of Escape.
- (xiv) Required to cover all parts of the buildings including staircases and common corridors.

- (xv) Required for:
  - (a) atrium of the building, if the compartment of the atrium exceeds 28 000 cubic metres, or any basement level or floor of building forming part of that compartment which exceeds 7 000 cubic metres, and
  - (b) any fire compartment exceeding 7 000 cubic metres in that building where:
    - (i) the aggregate area of openable windows of the compartment does not exceed 6.25% of the floor area of that compartment, and
    - (ii) the designed fire load is likely to exceed 1 135 MJ/square metre.
- (xvi) When a ventilation/air conditioning control system to a building is provided, it shall stop mechanically induced air movement within a designated fire compartment.

#### *ADDITIONAL REQUIREMENTS*

- (i) All linings for acoustic and thermal insulation purposes in ductings and concealed locations shall be of Class 1 or 2 Rate of Surface Spread of Flame as per British Standard 476: Part 7 or its international equivalent, or be brought up to that standard by use of an approved fire retardant product.
- (ii) All linings for acoustic, thermal insulation and decorative purposes within protected means of escape shall be of Class 1 or 2 Rate of Surface Spread of Flame as per British Standard 476: Part 7 or its international equivalent, or be brought up to that standard by use of an approved fire retardant product.
- (iii) Any intended storage or use of dangerous goods as defined in Chapter 295 of the Laws of Hong Kong should be notified to the Director of Fire Services.

#### **4.16 Composite buildings**

##### *REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:*

&

##### *EXTENT FOR:*

The fire service installations and equipment required for each of the various usages of a composite building shall conform to the relevant section of this Code.

#### **4.17 Container terminal yards and freight stations**

##### *REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:*

- (i) Automatic actuating devices
- (ii) Automatic fixed installations other than water
- (iii) Automatic fixed installations using water
- (iv) Emergency generators
- (v) Emergency lighting
- (vi) Exit signs
- (vii) Fire alarm systems
- (viii) Fire control centre
- (ix) Fire hydrant/hose reel systems
- (x) Fixed automatically operated approved appliances
- (xi) Portable hand-operated approved appliances
- (xii) Pressurization of staircases
- (xiii) Ring main systems with fixed pump(s)
- (xiv) Special equipment/requirements
- (xv) Static or dynamic smoke extraction systems
- (xvi) Ventilation/Air conditioning control system



*EXTENT*

- (i) As required by that equipment which needs to be automatically actuated.
- (ii) To be provided to areas where the use of water is undesirable for the occupancy or trade.
- (iii) In all areas excepting where covered by (ii) above, including staircases.
- (iv) An independently powered generator of sufficient electrical capacity to meet the essential services it is required to provide.
- (v) Emergency lighting shall be provided throughout the entire buildings and all exit routes leading to ground level.
- (vi) Sufficient directional and exit signs to ensure that all exit routes from any floor within the buildings are clearly indicated as required by the configuration of staircases serving the buildings.
- (vii) One actuating point and one audio warning device to be located at each hose reel point. This actuating point should include facilities for fire pump start and audio warning device initiation.
- (viii) Minimum of one, additional to be provided according to the complexity of the building.
- (ix) There shall be sufficient hydrants and hose reels to ensure that every part of the buildings can be reached by a length of not more than 30 m of Fire Services hose or hose reel tubing.
- (x) As required by occupancy.
- (xi) As required by occupancy.
- (xii) Required where:
  - (a) natural venting of staircase is not provided; and
  - (b) the aggregate area of openable windows of the rooms/units of the building does not exceed 6.25% of the floor area of those rooms/units, calculated on a floor by floor basis. The number of pressurized staircases to be provided shall be determined by the table stipulated under the definition of Pressurization of Staircases in Part II provided that the number of pressurized staircases required shall not exceed the total number of staircases required by the Code of Practice for Means of Escape.
- (xiii) To be provided to cover those areas of such complexes not adequately served by public water mains.
- (xiv) As required by Director of Fire Services.
- (xv) Required for any fire compartment exceeding 7 000 cubic meters where
  - (a) the aggregate area of openable windows of the compartment does not exceed 6.25% of the floor area of that compartment, and
  - (b) the designed fire load of that compartment is likely to exceed 1 135 MJ/m<sup>2</sup>.
- (xvi) When a ventilation/air conditioning control system to a building is provided, it shall stop mechanically induced air movement within a designated fire compartment.

*ADDITIONAL REQUIREMENT*

Any intended storage or use of dangerous goods as defined in Chapter 295 of the Laws of Hong Kong should be notified to the Director of Fire Services.

*Note:* Buildings within such complexes shall conform to the requirements specified for similar premises in accordance with this Code.

**4.18 Curtain walled buildings below six storeys in height****REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:**

Normal requirements according to occupancy.

**4.19 Curtain walled buildings of and above six storeys in height****REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:**

Normal requirements according to occupancy. Where a sprinkler system is required, this shall be one grade in excess of that normally required for the accepted risk category.

e.g. XLH (extra light hazard) becomes OH1 (ordinary hazard Group 1);

OH3(S) (ordinary hazard Group 3 special) becomes XHH (extra high hazard).

**4.20 Dangerous goods stores under 42 m<sup>3</sup> capacity****REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:**

- (i) Fixed automatically operated approved appliances.
- (ii) Portable hand-operated approved appliances.

**EXTENT**

- (i) As required by the risk.
- (ii) As required by the risk.

**4.21 Dangerous goods store of 42 m<sup>3</sup> capacity and above****REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:**

- (i) Automatic actuating devices
- (ii) Automatic fixed installations other than water
- (iii) Exit signs
- (iv) Fire alarm systems
- (v) Fixed automatically operated approved appliances
- (vi) Fixed foam systems
- (vii) Gas detection systems
- (viii) Portable hand-operated approved appliances
- (ix) Special equipment/requirements

**EXTENT**

- (i) As required by that equipment which needs to be automatically actuated.
- (ii) To be provided to areas where the use of water is undesirable for the occupancy or trade.
- (iii) Sufficient directional and exit signs to ensure that all exit routes from any floor within the building are clearly indicated as required by the configuration of staircases serving the building.
- (iv) One actuating point and one audio warning device to be located at each exit from the store. This actuating point should include facilities for audio warning device initiation.
- (v) As required by the risk.
- (vi) As required by the risk.
- (vii) To be provided in all areas of risk.
- (viii) As required by the Director of Fire Services.
- (ix) As required by the Director of Fire Services.

**4.22 Domestic buildings—low rise (up to and including three storeys in height)****REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:**

Portable hand-operated approved appliances.

**EXTENT**

One per floor plus additional for car-ports.

**ADDITIONAL REQUIREMENTS**

- (i) All linings for acoustic and thermal insulation purposes in ductings and concealed locations shall be of Class 1 or 2 Rate of Surface Spread of Flame as per British Standard 476: Part 7 or its international equivalent, or be brought up to that standard by use of an approved fire retardant product.
- (ii) All linings for acoustic, thermal insulation and decorative purposes within protected means of escape shall be of Class 1 or 2 Rate of Surface Spread of Flame as per British Standard 476: Part 7 or its international equivalent, or be brought up to that standard by use of an approved fire retardant product.
- (iii) Any intended storage or use of dangerous goods as defined in Chapter 295 of the Laws of Hong Kong should be notified to the Director of Fire Services.

**4.23 Domestic buildings—low rise (over 3 storeys in height)****REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:**

- (i) Fire alarm systems
- (ii) Fire hydrant/hose reel systems

**EXTENT**

- (i) One actuating point and one audio warning device to be located at each hose reel point. This actuating point should include facilities for fire pump start and audio warning device initiation.
- (ii) There shall be sufficient hydrants and hose reels on each floor to ensure that every part of each floor can be reached by a length of not more than 30 m of Fire Services hose or hose reel tubing.

**ADDITIONAL REQUIREMENTS**

- (i) All linings for acoustic and thermal insulation purposes in ductings and concealed locations shall be of Class 1 or 2 Rate of Surface Spread of Flame as per British Standard 476: Part 7 or its international equivalent, or be brought up to that standard by use of an approved fire retardant product.
- (ii) All linings for acoustic, thermal insulation and decorative purposes within protected means of escape shall be of Class 1 or 2 Rate of Surface Spread of Flame as per British Standard 476: Part 7 or its international equivalent, or be brought up to that standard by use of an approved fire retardant product.
- (iii) Any intended storage or use of dangerous goods as defined in Chapter 295 of the Laws of Hong Kong should be notified to the Director of Fire Services.

**4.24 Domestic buildings—high rise****REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:**

- (i) Emergency generators
- (ii) Emergency lighting
- (iii) Exit signs
- (iv) Fire alarm systems
- (v) Fire hydrant/hose reel systems
- (vi) Fireman's lifts

**EXTENT**

- (i) Emergency generators of sufficient electrical capacity to supply power for the fire protection and life safety systems required to be installed in the building.
- (ii) Emergency lighting shall be provided to all staircases, passages and public areas including lift lobbies on all floors and refuge areas.
- (iii) Sufficient directional and exit signs to ensure that all exit routes from public areas to staircases are clearly indicated.
- (iv) One actuating point and one audio warning device to be located at each hose reel point. This actuating point should include facilities for fire pump start and audio warning device initiation.
- (v) There shall be sufficient hydrants and hose reels on each floor to ensure that every part of each floor can be reached by a length of not more than 30 m of Fire Services hose or hose reel tubing.
- (vi) Lift or lifts as designated.

**ADDITIONAL REQUIREMENTS**

- (i) All linings for acoustic and thermal insulation purposes in ductings and concealed locations shall be of Class 1 or 2 Rate of Surface Spread of Flame as per British Standard 476: Part 7 or its international equivalent, or be brought up to that standard by use of an approved fire retardant product.

- (ii) All linings for acoustic, thermal insulation and decorative purposes within protected means of escape shall be of Class 1 or 2 Rate of Surface Spread of Flame as per British Standard 476: Part 7 or its international equivalent, or be brought up to that standard by use of an approved fire retardant product.
- (iii) Any intended storage or use of dangerous goods as defined in Chapter 295 of the Laws of Hong Kong should be notified to the Director of Fire Services.

**4.25 Electrical equipment: Incorporating transformers, switchgear above 1 kilovolt, generators/alternators requiring separate installations**

**REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:**

- (i) Automatic actuating devices
- (ii) Automatic fixed installations other than water
- (iii) Fire detection systems
- (iv) Portable hand-operated approved appliances

**EXTENT**

- (i) As required by that equipment which needs to be automatically actuated.
- (ii) To be provided in oil filled transformer rooms with capacity in excess of 1 500 kVA.
- (iii) To be provided in areas not covered by automatic fixed installations.
- (iv) As required by the Director of Fire Services.

**4.26 Explosive production and/or storages**

**REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:**

Managements shall direct their enquiries to respective licensing authorities, viz. Commissioner of Mines and Commissioner of Police in conjunction with the Building Authority.

**4.27 Garages**

**REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:**

- (i) Automatic actuating devices
- (ii) Emergency lighting
- (iii) Exit signs
- (iv) Fire alarm systems
- (v) Fire hydrant/hose reel systems
- (vi) Portable hand-operated approved appliances
- (vii) Sprinkler systems
- (viii) Ventilation/air conditioning control systems

**EXTENT**

- (i) As required by that equipment which needs to be automatically actuated.
- (ii) Emergency lighting shall be provided throughout the premises and all exit routes.
- (iii) Sufficient directional and exit signs to ensure that all exit routes from the premises within the building are clearly indicated as required by the configuration of staircases serving the building.
- (iv) One actuating point and one audio warning device to be located at each hose reel point. This actuating point should include facilities for fire pump start and audio visual warning device initiation within the premises.
- (v) There shall be sufficient hydrants and hose reels to ensure that every part of the premises can be reached by a length of not more than 30 m of Fire Services hose or hose reel tubing.
- (vi) As required by the risk.
- (vii) Required for garages with total floor areas exceeding 230 square metres and to cover all parts of the garages including the staircases leading to these garages.
- (viii) When a ventilation/air conditioning control system to a building is provided, it shall stop mechanically induced air movement within a designated fire compartment.

*ADDITIONAL REQUIREMENT*

Any intended storage or use of dangerous goods as defined in Chapter 295 of the Laws of Hong Kong should be notified to the Director of Fire Services.

**4.28 Hotels—low rise***REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:*

- (i) Audio/visual advisory systems
- (ii) Automatic actuating devices
- (iii) Automatic fixed installations other than water
- (iv) Emergency generators
- (v) Emergency lighting
- (vi) Exit signs
- (vii) Fire alarm systems
- (viii) Fire control centre
- (ix) Fire detection systems
- (x) Fire hydrant/hose reel systems
- (xi) Fireman's lifts—if lift(s) is/are installed
- (xii) Portable hand-operated approved appliances
- (xiii) Pressurization of staircases
- (xiv) Sprinkler systems
- (xv) Static or dynamic smoke extraction systems
- (xvi) Ventilation/air conditioning control systems

*EXTENT*

- (i) Required for any part or parts of building where the area occupied by any one single occupancy on any one floor exceeds 2 000 square metres AND where the occupants, due to their transient presence either as shoppers, audience or guests, are exposed to risks to require additional advice through such systems.
- (ii) As required by that equipment which requires to be automatically actuated.
- (iii) To be provided to areas where the use of water is undesirable for the occupancy or trade.
- (iv) An independently powered generator of sufficient electrical capacity to meet the essential services it is required to provide.
- (v) Emergency lighting shall be provided throughout the entire building and all exit routes leading to ground level.
- (vi) Sufficient directional and exit signs to ensure that all exit routes from any floor within the building are clearly indicated as required by the configuration of staircases serving the building.
- (vii) One actuating point and one audio warning device to be located at each hose reel point. This actuating point should include facilities for fire pump start and audio warning device initiation.
- (viii) Minimum of one, additional to be provided according to the complexity of the building.
- (ix) A smoke detection system to be provided for the entire floor including the lift lobbies if any part of that floor is used for sleeping accommodation.
- (x) There shall be sufficient hydrants and hose reels to ensure that every part of the building can be reached by a length of not more than 30 m of Fire Services hose or hose reel tubing.
- (xi) Lift or lifts as designated.
- (xii) As required by occupancy.

- (xiii) Required where:
- (a) natural venting of staircase is not provided; and
  - (b) the aggregate area of openable windows of the rooms/units of the building does not exceed 6.25% of the floor area of those rooms/units, calculated on a floor by floor basis.
- The number of pressurized staircases to be provided shall be determined by the table stipulated under the definition of Pressurization of Staircases in Pt. II provided that the number of pressurized staircases required shall not exceed the total number of staircases required by the Code of Practice for Means of Escape.
- (xiv) In all parts of the hotels including staircases and common corridors.
- (xv) Required for:
- (a) all internal means of escape serving all guest rooms irrespective of the cubical extent of the building or the volume of the fire compartment on any floor. "Internal means of escape" for this purpose, means the route leading from the outside of all guest rooms to a pressurized or naturally ventilated staircase; a protected lobby or open air, unless the route itself is provided with openable windows communicating to the open air and the aggregate area of such windows exceeds 6.25% of the floor area of that route, and
  - (b) atrium of the hotel building, if the compartment of the atrium exceeds 28 000 cubic metres, or any basement level or floor of building forming part of that compartment which exceeds 7 000 cubic metres, and
  - (c) any fire compartment exceeding 7 000 cubic metres in that hotel building where:
    - (i) the aggregate area of openable windows of the compartment does not exceed 6.25% of the floor area of that compartment, and
    - (ii) the designed fire load is likely to exceed 1 135 MJ/square metre.
- (xvi) When a ventilation/air conditioning control system to a building is provided, it shall stop mechanically induced air movement within a designated fire compartment.

#### *ADDITIONAL REQUIREMENTS*

- (i) All linings for acoustic and thermal insulation purposes in ductings and concealed locations shall be of Class 1 or 2 Rate of Surface Spread of Flame as per British Standard 476: Part 7 or its international equivalent, or be brought up to that standard by use of an approved fire retardant product.
- (ii) All linings for acoustic, thermal insulation and decorative purposes within protected means of escape shall be of Class 1 or 2 Rate of Surface Spread of Flame as per British Standard 476: Part 7 or its international equivalent, or be brought up to that standard by use of an approved fire retardant product.
- (iii) Any intended storage or use of dangerous goods as defined in Chapter 295 of the Laws of Hong Kong should be notified to the Director of Fire Services.

#### **4.29 Hotels—high rise**

##### **REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:**

- (i) Audio/visual advisory systems
- (ii) Automatic actuating devices
- (iii) Automatic fixed installations other than water
- (iv) Emergency generators
- (v) Emergency lighting
- (vi) Exit signs
- (vii) Fire alarm systems
- (viii) Fire control centre
- (ix) Fire detection systems
- (x) Fire hydrant/hose reel systems
- (xi) Fireman's lifts—if lift(s) is/are installed
- (xii) Portable hand-operated approved appliances

- (xiii) Pressurization of staircases
- (xiv) Sprinkler systems
- (xv) Static or dynamic smoke extraction systems
- (xvi) Ventilation/air conditioning control systems

#### EXTENT

- (i) Required for any part or parts of building where the area occupied by any one single occupancy on any one floor exceeds 2 000 square metres AND where the occupants, due to their transient presence either as shoppers, audience or guests, are exposed to risks to require additional advice through such systems.
- (ii) As required by that equipment which requires to be automatically actuated.
- (iii) To be provided to areas where the use of water is undesirable for the occupancy or trade.
- (iv) An independently powered generator of sufficient electrical capacity to meet the essential services it is required to provide.
- (v) Emergency lighting shall be provided throughout the entire building and all exit routes leading to ground level.
- (vi) Sufficient directional and exit signs to ensure that all exit routes from any floor within the building are clearly indicated as required by the configuration of staircases serving the building.
- (vii) One actuating point and one audio warning device to be located at each hose reel point. This actuating point should include facilities for fire pump start and audio warning device initiation.
- (viii) Minimum of one, additional to be provided according to the complexity of the building.
- (ix) A smoke detection system to be provided for the entire floor including the lift lobbies if any part of that floor is used for sleeping accommodation.
- (x) There shall be sufficient hydrants and hose reels to ensure that every part of the building can be reached by a length of not more than 30 m of Fire Services hose or hose reel tubing.
- (xi) Lift or lifts as designated.
- (xii) As required by occupancy.
- (xiii) Required where:
  - (a) natural venting of staircase is not provided; and
  - (b) the aggregate area of openable windows of the rooms/units of the building does not exceed 6.25% of the floor area of those rooms/units, calculated on a floor by floor basis.  
The number of pressurized staircases to be provided shall be determined by the table stipulated under the definition of Pressurization of Staircases in Pt. II provided that the number of pressurized staircases required shall not exceed the total number of staircases required by the Code of Practice for Means of Escape.
- (xiv) In all parts of the hotels including staircases and common corridors.
- (xv) Required for:
  - (a) all internal means of escape serving all guest rooms irrespective of the cubical extent of the building or the volume of the fire compartment on any floor. "Internal means of escape" for this purpose, means the route leading from the outside of all guest rooms to a pressurized or naturally ventilated staircase; a protected lobby or open air, unless the route itself is provided with openable windows communicating to the open air and the aggregate area of such windows exceeds 6.25% of the floor area of that route, and
  - (b) atrium of the hotel building, if the compartment of the atrium exceeds 28 000 cubic metres; or any basement level or floor of building forming part of that compartment which exceeds 7 000 cubic metres, and
  - (c) any fire compartment exceeding 7 000 cubic metres in that hotel building where:
    - (i) the aggregate area of openable windows of the compartment does not exceed 6.25% of the floor area of that compartment, and
    - (ii) the designed fire load is likely to exceed 1 135 MJ/square metre.
- (xvi) When a ventilation/air conditioning control system to a building is provided, it shall stop mechanically induced air movement within a designated fire compartment.

*ADDITIONAL REQUIREMENTS*

- (i) All linings for acoustic and thermal insulation purposes in ductings and concealed locations shall be of Class 1 or 2 Rate of Surface Spread of Flame as per British Standard 476: Part 7 or its international equivalent, or be brought up to that standard by use of an approved fire retardant product.
- (ii) All linings for acoustic, thermal insulation and decorative purposes within protected means of escape shall be of Class 1 or 2 Rate of Surface Spread of Flame as per British Standard 476: Part 7 or its international equivalent, or be brought up to that standard by use of an approved fire retardant product.
- (iii) Any intended storage or use of dangerous goods as defined in Chapter 295 of the Laws of Hong Kong should be notified to the Director of Fire Services.

**4.30 Industrial/godown buildings—low rise***REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:*

- (i) Automatic actuating devices
- (ii) Automatic fixed installations other than water
- (iii) Emergency generators
- (iv) Emergency lighting
- (v) Exit signs
- (vi) Fire alarm systems
- (vii) Fire control centre
- (viii) Fire detection systems
- (ix) Fire hydrant/hose reel systems
- (x) Fireman's lifts
- (xi) Portable hand-operated approved appliances
- (xii) Sprinkler systems
- (xiii) Static or dynamic smoke extraction systems
- (xiv) Ventilation/air conditioning control systems

*EXTENT*

- (i) As required by that equipment which needs to be automatically actuated.
- (ii) To be provided to areas where the use of water is undesirable for the occupancy or trade.
- (iii) An independently powered generator of sufficient electrical capacity to meet the essential services it is required to provide.
- (iv) Emergency lighting shall be provided throughout the entire building and all exit routes leading to ground level.
- (v) Sufficient directional and exit signs to ensure that all exit routes from any floor within the building are clearly indicated as required by the configuration of staircases serving the building.
- (vi) One actuating point and one audio warning device to be located at each hose reel point. This actuating point should include facilities for fire pump start and audio warning device initiation.
- (vii) Minimum of one, additional to be provided according to the complexity of the building.
- (viii) To be provided in areas not covered by automatic fixed installations.
- (ix) There shall be sufficient hydrants and hose reels to ensure that every part of the building can be reached by a length of not more than 30 m of Fire Services hose or hose reel tubing.
- (x) Lift or lifts as designated.
- (xi) As required by occupancy.
- (xii) Required for buildings with total floor areas exceeding 230 square metres and to cover all parts of the buildings including staircases and common corridors.



- (xiii) Required for any fire compartment exceeding 7 000 cubic metres where:
  - (a) the aggregate area of openable windows of the compartment does not exceed 6.25% of the floor area of that compartment, and
  - (b) the designed fire load is likely to exceed 1 135 MJ/square metre.
- (xiv) When a ventilation/air conditioning control system to a building is provided, it shall stop mechanically induced air movement within a designated fire compartment.

#### *ADDITIONAL REQUIREMENT*

Any intended storage or use of dangerous goods as defined in Chapter 295 of the Laws of Hong Kong should be notified to the Director of Fire Services.

#### **4.31 Industrial/godown buildings—high rise**

##### *REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:*

- (i) Automatic actuating devices
- (ii) Automatic fixed installations other than water
- (iii) Emergency generators
- (iv) Emergency lighting
- (v) Exit signs
- (vi) Fire alarm systems
- (vii) Fire control centre
- (viii) Fire detection systems
- (ix) Fire hydrant/hose reel systems
- (x) Fireman's lifts
- (xi) Portable hand-operated approved appliances
- (xii) Pressurization of staircases
- (xiii) Sprinkler systems
- (xiv) Static or dynamic smoke extraction systems
- (xv) Ventilation/air conditioning control systems

##### *EXTENT*

- (i) As required by that equipment which needs to be automatically actuated.
- (ii) To be provided to areas where the use of water is undesirable for the occupancy or trade.
- (iii) An independently powered generator of sufficient electrical capacity to meet the essential services it is required to provide.
- (iv) Emergency lighting shall be provided throughout the entire building and all exit routes leading to ground level.
- (v) Sufficient directional and exit signs to ensure that all exit routes from any floor within the building are clearly indicated as required by the configuration of staircases serving the building.
- (vi) One actuating point and one audio warning device to be located at each hose reel point. This actuating point should include facilities for fire pump start and audio warning device initiation.
- (vii) Minimum of one, additional to be provided according to the complexity of the building.
- (viii) To be provided in areas not covered by automatic fixed installations.
- (ix) There shall be sufficient hydrants and hose reels to ensure that every part of the building can be reached by a length of not more than 30 m of Fire Services hose or hose reel tubing.
- (x) Lift or lifts as designated.
- (xi) As required by occupancy.

- (xii) Required where:
- (a) natural venting of staircase is not provided; and
  - (b) the aggregate area of openable windows of the rooms/units of the building does not exceed 6.25% of the floor area of those rooms/units, calculated on a floor by floor basis; and
  - (c) the cubical extent of the building exceeds 28 000 cubic metres; and
  - (d) the designed fire load of the building is likely to exceed 1 135 MJ/square metre.
- The number of pressurized staircases to be provided shall be determined by the table stipulated under the definition of Pressurization of Staircases in Pt. II provided that the number of pressurized staircases required shall not exceed the total number of staircases required by the Code of Practice for Means of Escape.
- (xiii) In all parts of the buildings including staircases and common corridors.
- (xiv) Required for any fire compartment exceeding 7 000 cubic metres where:
- (a) the aggregate area of openable windows of the compartment does not exceed 6.25% of the floor area of that compartment, and
  - (b) the designed fire load is likely to exceed 1 135 MJ/square metre.
- (xv) When a ventilation/air conditioning control system to a building is provided, it shall stop mechanically induced air movement within a designated fire compartment.

#### *ADDITIONAL REQUIREMENT*

Any intended storage or use of dangerous goods as defined in Chapter 295 of the Laws of Hong Kong should be notified to the Director of Fire Services.

#### **4.32 Institutional buildings—low rise**

##### *REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:*

- (i) Audio/visual advisory systems
- (ii) Automatic actuating devices
- (iii) Automatic fixed installations other than water
- (iv) Emergency generators (in hospitals and prisons only)
- (v) Emergency lighting
- (vi) Exit signs
- (vii) Fire alarm systems
- (viii) Fire detection systems
- (ix) Fire hydrant/hose reel systems
- (x) Fireman's lifts
- (xi) Portable hand-operated approved appliances
- (xii) Sprinkler systems
- (xiii) Ventilation/air conditioning control systems

#### *EXTENT*

- (i) Required for any part or parts of building where the area occupied for institutional purposes on any one floor exceeds 2 000 square metres AND where the occupants, due to their transient presence either as guests or visitors, are exposed to risks to require additional advice through such systems.
- (ii) As required by that equipment which needs to be automatically actuated.
- (iii) To be provided to areas where the use of water is undesirable for the occupancy or trade.
- (iv) An independently powered generator of sufficient electrical capacity to meet the essential services it is required to provide.
- (v) Emergency lighting shall be provided throughout the entire building and all exit routes leading to ground level.

- (vi) Sufficient directional and exit signs to ensure that all exit routes from any floor within the building are clearly indicated as required by the configuration of staircases serving the building.
- (vii) One actuating point and one audio warning device to be located at each hose reel point. This actuating point should include facilities for fire pump start and audio warning device initiation.
- (viii) A smoke detection system to be provided for the entire floor including the lift lobbies if any part of that floor is used for sleeping accommodation.
- (ix) There shall be sufficient hydrants and hose reels to ensure that every part of the building can be reached by a length of not more than 30 m of Fire Services hose or hose reel tubing.
  - (x) Lift or lifts as designated.
  - (xi) As required by occupancy.
- (xii) Required for all parts of buildings including staircases and common corridors with total floor area exceeding 230 square metres.
- (xiii) When a ventilation/air conditioning control system to a building is provided, it shall stop mechanically induced air movement within a designated fire compartment.

#### **ADDITIONAL REQUIREMENTS**

- (i) All linings for acoustic and thermal insulation purposes in ductings and concealed locations shall be of Class 1 or 2 Rate of Surface Spread of Flame as per British Standard 476: Part 7 or its international equivalent, or be brought up to that standard by use of an approved fire retardant product.
- (ii) All linings for acoustic, thermal insulation and decorative purposes within protected means of escape shall be of Class 1 or 2 Rate of Surface Spread of Flame as per British Standard 476: Part 7 or its international equivalent, or be brought up to that standard by use of an approved fire retardant product.
- (iii) Any intended storage or use of dangerous goods as defined in Chapter 295 of the Laws of Hong Kong should be notified to the Director of Fire Services.
- (iv) Protection for hospital lifts which are designated for evacuation purpose shall satisfy every condition for a Fireman's lift with the exception of the internal floor area of car, and the minimum rated load factors.

#### **4.33 Institutional buildings—high rise**

##### **REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:**

- (i) Audio/visual advisory systems
- (ii) Automatic actuating devices
- (iii) Automatic fixed installations other than water
- (iv) Emergency generators
- (v) Emergency lighting
- (vi) Exit signs
- (vii) Fire alarm systems
- (viii) Fire control centre
- (ix) Fire detection systems
- (x) Fire hydrant/hose reel systems
- (xi) Fireman's lifts
- (xii) Portable hand-operated approved appliances
- (xiii) Pressurization of staircases
- (xiv) Sprinkler systems
- (xv) Ventilation/air conditioning control systems

*EXTENT*

- (i) Required for any part or parts of building where the area occupied for institutional purposes on any one floor exceeds 2 000 square metres AND where the occupants either as guests or visitors, due to their transient presence, are exposed to risks to require additional advice through such systems.
- (ii) As required by that equipment which needs to be automatically actuated.
- (iii) To be provided to areas where the use of water is undesirable for the occupancy or trade.
- (iv) An independently powered generator of sufficient electrical capacity to meet the essential services it is required to provide.
- (v) Emergency lighting shall be provided throughout the entire building and all exit routes leading to ground level.
- (vi) Sufficient directional and exit signs to ensure that all exit routes from any floor within the building are clearly indicated as required by the configuration of staircases serving the building.
- (vii) One actuating point and one audio warning device to be located at each hose reel point. This actuating point should include facilities for fire pump start and audio warning device initiation.
- (viii) Minimum of one, additional to be provided according to the complexity of the building.
- (ix) A smoke detection system to be provided for the entire floor including the lift lobbies if any part of that floor is used for sleeping accommodation.
- (x) There shall be sufficient hydrants and hose reels to ensure that every part of the building can be reached by a length of not more than 30 m of Fire Services hose or hose reel tubing.
- (xi) Lift or lifts as designated.
- (xii) As required by occupancy.
- (xiii) Required for hospitals where:
  - (a) natural venting of staircase is not provided; and
  - (b) the aggregate area of openable windows of the rooms/units of the building does not exceed 6.25% of the floor area of those rooms/units, calculated on a floor by floor basis.  
The number of pressurized staircases to be provided shall be determined by the table stipulated under the definition of Pressurization of Staircases in Pt. II provided that the number of pressurized staircases required shall not exceed the total number of staircases required by the Code of Practice for Means of Escape.
- (xiv) Required for all parts of buildings including staircases and common corridors.
- (xv) When a ventilation/air conditioning control system to a building is provided, it shall stop mechanically induced air movement within a designated fire compartment.

*ADDITIONAL REQUIREMENTS*

- (i) All linings for acoustic and thermal insulation purposes in ductings and concealed locations shall be of Class 1 or 2 Rate of Surface Spread of Flame as per British Standard 476: Part 7 or its international equivalent, or be brought up to that standard by use of an approved fire retardant product.
- (ii) All linings for acoustic, thermal insulation and decorative purposes within protected means of escape shall be of Class 1 or 2 Rate of Surface Spread of Flame as per British Standard 476: Part 7 or its international equivalent, or be brought up to that standard by use of an approved fire retardant product.
- (iii) Any intended storage or use of dangerous goods as defined in Chapter 295 of the Laws of Hong Kong should be notified to the Director of Fire Services.
- (iv) Protection for hospital lifts which are designated for evacuation purpose shall satisfy every condition for a Fireman's lift with the exception of the internal floor area of car, and the minimum rated load factors.

**4.34 Kitchens (other than kitchens in domestic premises)****REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:**

Kitchens shall normally be required to incorporate the fire protection and life safety systems in the building in which they are located with the addition of any special equipment/requirements as may be required by the Director of Fire Services.

**4.35 Lift motor rooms****REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:**

- (i) Fire detection systems.
- (ii) Portable hand-operated approved appliances.

**EXTENT**

- (i) To be provided in all lift motor rooms.
- (ii) As required by occupancy.

**4.36 Mechanical plant rooms (Group I)****REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:**

*Note:* Plant Rooms to exclude open gas fired appliances

- (i) Automatic actuating devices
- (ii) Fire detection systems
- (iii) Gas detection systems
- (iv) Gas extraction systems
- (v) Portable hand-operated approved appliances
- (vi) Ventilation/air conditioning control systems

**EXTENT**

- (i) As required by that equipment which needs to be automatically actuated.
- (ii) To be provided in areas not covered by automatic fixed installations.
- (iii) To be provided where flammable vapours may be generated.
- (iv) Approved type for the part of building where flammable vapours may be generated, and to reduce the concentration below its lower explosive limit.
- (v) As required by the risk.
- (vi) When a ventilation/air conditioning control system to a building is provided, it shall stop mechanically induced air movement within a designated fire compartment.

**ADDITIONAL REQUIREMENT**

Any intended storage or use of dangerous goods as defined in Chapter 295 of the Laws of Hong Kong should be notified to the Director of Fire Services.

**4.37 Mechanical plant rooms (Group II)****REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:**

*Note:* Plant Rooms to exclude open gas fired appliances

- (i) Automatic actuating devices
- (ii) Automatic fixed installations other than water
- (iii) Emergency generators
- (iv) Emergency lighting
- (v) Exit signs
- (vi) Fire detection systems
- (vii) Fixed automatically operated approved appliances

- (viii) Gas detection systems
- (ix) Gas extraction systems
- (x) Portable hand-operated approved appliances
- (xi) Ventilation/air conditioning control systems

#### *EXTENT*

- (i) As required by that equipment which needs to be automatically actuated.
- (ii) To be provided to areas where the use of water is undesirable for the occupancy or trade.
- (iii) An independently powered generator of sufficient electrical capacity to meet the essential services it is required to provide.
- (iv) Emergency lighting shall be provided throughout the entire building and all exit routes.
- (v) Sufficient directional and exit signs to ensure that all exit routes from any floor within the building are clearly indicated as required by the configuration of staircases serving the building.
- (vi) To be provided in areas not covered by automatic fixed installations.
- (vii) As required by the risk.
- (viii) To be provided where flammable vapours may be generated.
- (ix) Approved type for the part of building where flammable vapours may be generated, and to reduce the concentration below its lower explosive limit.
- (x) As required by the risk.
- (xi) When a ventilation/air conditioning control system to a building is provided, it shall stop mechanically induced air movement within a designated fire compartment.

#### *ADDITIONAL REQUIREMENT*

Any intended storage or use of dangerous goods as defined in Chapter 295 of the Laws of Hong Kong should be notified to the Director of Fire Services.

#### **4.38 Passenger terminals/stations**

##### *REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:*

Such terminals/stations to be the subject of individual consideration by the Director of Fire Services, taking into account their size and complexity. Requirements will be based generally on the various usages of the terminals/stations in accordance with the relevant sections of this Code for similar usages, with additional requirements for other areas as considered necessary e.g. passenger movement areas.

#### **4.39 Petro-chemical complexes**

##### *REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:*

- (i) Automatic actuating devices
- (ii) Automatic fixed installations other than water
- (iii) Automatic fixed installations using water
- (iv) Dust detection systems
- (v) Emergency generators
- (vi) Emergency lighting
- (vii) Fire alarm systems
- (viii) Fire control centre
- (ix) Fire detection systems
- (x) Fixed automatically operated approved appliances
- (xi) Fixed foam systems
- (xii) Gas detection systems

- (xiii) Gas extraction systems
- (xiv) Portable hand-operated approved appliances
- (xv) Ring main systems with fixed pump(s)
- (xvi) Special equipment/requirements
- (xvii) Ventilation/air conditioning control systems

#### *EXTENT*

- (i) As required by that equipment which needs to be automatically actuated.
- (ii) To be provided to areas where the use of water is undesirable for the risk.
- (iii) In all areas including staircase excepting where covered by (ii) above.
- (iv) To be provided in all areas where there is a potential dust explosion hazard.
- (v) An independently powered generator of sufficient electrical capacity to meet the essential services it is required to provide.
- (vi) Emergency lighting shall be provided to all buildings within the complex and in addition, such lighting shall also be provided to ensure adequate external illumination to permit safe evacuation to the outside of the site boundary.
- (vii) One actuating point and one audio warning device to be located at each hose reel point within the buildings. This actuating point should include facilities for fire pump start and audio warning device initiation, and in addition, one actuating point and one audio warning device to be provided at each hydrant outlet on the ring main system.
- (viii) Minimum of one, additional to be provided according to the layout of the complex.
- (ix) To be provided in areas not covered by automatic fixed installations.
- (x) As required by the risk.
- (xi) As required by the risk.
- (xii) To be provided in all areas of risk.
- (xiii) Approved type for the part of building where flammable vapours may be generated, and to reduce the concentration below its lower explosive limit.
- (xiv) As required by the risk.
- (xv) To be provided to cover those areas of such complexes not adequately served by public water mains.
- (xvi) As required by the Director of Fire Services.
- (xvii) When a ventilation/air conditioning control system to a building is provided, it shall stop mechanically induced air movement within a designated fire compartment.

*Note:* Buildings within such complexes shall conform to the requirements specified for similar premises in accordance with this Code.

#### **4.40 Railway marshalling yards (encompassing a site area of more than 2 300 m<sup>2</sup>)**

##### *REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:*

- (i) Automatic fixed installations other than water
- (ii) Automatic fixed installations using water
- (iii) Emergency generators
- (iv) Emergency lighting
- (v) Fire alarm systems
- (vi) Fire Control Centre
- (vii) Fire hydrant/hose reel systems
- (viii) Portable hand-operated approved appliances
- (ix) Ring main systems with fixed pump(s)
- (x) Special equipment/requirements
- (xi) Static or dynamic smoke extraction system.

*EXTENT*

- (i) To be provided to areas where the use of water is undesirable for the risk.
- (ii) In all areas including staircase excepting where covered by (i) above.
- (iii) An independently powered generator of sufficient electrical capacity to meet the essential services it is required to provide.
- (iv) Emergency lighting shall be provided to all buildings within the yard, and in addition, such lighting shall also be provided to ensure adequate external illumination to permit safe evacuation to the outside of the site boundary.
- (v) One actuating point and one audio warning device to be located at each hydrant point on the ring main systems. This actuating point should include facilities for fire pump start and audio warning device initiation.
- (vi) Minimum of one, additional to be provided according to the layout of the yard.
- (vii) There shall be sufficient hydrants and hose reels to ensure that every part of the building can be reached by a length of not more than 30 m of Fire Services hose or hose reel tubing.
- (viii) As required by occupancy.
- (ix) To be provided to cover those areas of the yard not adequately served by public water mains.
- (x) As required by the Director of Fire Services.
- (xi) Required for any fire compartment exceeding 7 000 m<sup>3</sup> where
  - (a) the aggregate area of openable windows of the compartment does not exceed 6.25% of the floor area of that compartment, and
  - (b) the designed fire load of that compartment is likely to exceed 1 135 MJ/m<sup>2</sup>.

*Note:* Buildings within the yard shall conform to the requirements specified for similar premises in accordance with this Code.

**4.41 Road tunnels****REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:**

- (i) Automatic fixed installations other than water
- (ii) Closed circuit television system
- (iii) Dynamic smoke extraction systems
- (iv) Emergency generators
- (v) Emergency lighting
- (vi) Fire alarm systems
- (vii) Fire control centre
- (viii) Fire hydrant/hose reel systems
- (ix) Fireman's communication system(s)
- (x) Gas detection system(s)
- (xi) Pedestrian cross over facilities
- (xii) Portable hand-operated approved appliances
- (xiii) Traffic control signs

*EXTENT*

- (i) To be provided to areas where the use of water is undesirable for the risk.
- (ii) To be provided to enable clear visual observation throughout the length of the tunnel.
- (iii) To be provided where the tunnel exceeds 230 m and may be incorporated into the ventilating system of the tunnel.
- (iv) An independently powered generator of sufficient electrical capacity to meet the essential services it is required to provide.
- (v) Emergency lighting shall be provided throughout the entire tunnel.



- (vi) One actuating point and one visual warning device to be located at each hose reel point. This actuating point should include facilities for fire pump start and audio visual warning device initiation within the tunnel control centre.
- (vii) A fire control centre to be provided. This may be part of the tunnel control centre.
- (viii) There shall be sufficient hydrants and hose reels to ensure that every part of the tunnel can be reached by a length of not more than 30 m of Fire Services hose or hose reel tubing.
- (ix) Direct telephone system with telephones sited alongside the hydrant/hose reel points, terminating at the fire control centre.
- (x) Gas detection system(s) to include carbon monoxide indication and alarm.
- (xi) Facilities to be provided in twin tube tunnels where practicable.
- (xii) As required by the risk.
- (xiii) To be provided at each entrance together with warning lights within the tunnel.

#### **4.42 Shipyards (encompassing a site area of more than 2 300 m<sup>2</sup>)**

##### **REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:**

- (i) Automatic actuating devices
- (ii) Emergency generators
- (iii) Emergency lighting
- (iv) Fire alarm systems
- (v) Fire control centre
- (vi) Portable hand-operated approved appliances
- (vii) Ring main systems with fixed pump(s)
- (viii) Special equipment/requirements

##### **EXTENT**

- (i) As required by that equipment which needs to be automatically actuated.
- (ii) An independently powered generator of sufficient electrical capacity to meet the essential services it is required to provide.
- (iii) Emergency lighting shall be provided to all buildings within the yard, and in addition, such lighting shall also be provided to ensure adequate external illumination to permit safe evacuation to the outside of the site boundary.
- (iv) One actuating point and one audio warning device to be located at each hydrant point on the ring main systems. This actuating point should include facilities for fire pump start and audio warning device initiation.
- (v) Minimum of one, additional to be provided according to the layout of the yard.
- (vi) As required by occupancy.
- (vii) To be provided to cover those areas of the yard not adequately served by public water mains.
- (viii) As required by the Director of Fire Services.

*Note:* Buildings within the yard shall conform to the requirements specified for similar premises in accordance with this Code.

##### **ADDITIONAL REQUIREMENT**

Any intended storage or use of dangerous goods as defined in Chapter 295 of the Laws of Hong Kong should be notified to the Director of Fire Services.

#### **4.43 Telephone distribution equipment, computer installation and similar installations**

##### **REQUIREMENTS—SYSTEMS/INSTALLATIONS/EQUIPMENT FOR:**

- (i) Automatic actuating devices
- (ii) Automatic fixed installations other than water
- (iii) Automatic fixed installations using water

- (iv) Emergency lighting
- (v) Exit signs
- (vi) Fire alarm systems
- (vii) Fire detection systems
- (viii) Fixed automatically operated approved appliances
- (ix) Portable hand-operated approved appliances
- (x) Ventilation/air conditioning control systems

#### *EXTENT*

- (i) As required by that equipment which needs to be automatically actuated.
- (ii) To be provided if not otherwise protected by automatic fixed installations using water.
- (iii) To be provided if not otherwise protected by automatic fixed installations other than water.
- (iv) Emergency lighting shall be provided throughout the entire building and all exit routes leading to ground level.
- (v) Sufficient directional and exit signs to ensure that all exit routes from the premises within the buildings are clearly indicated as required by the configuration of staircases serving the building.
- (vi) As required by the risk.
- (vii) To be provided in areas not covered by automatic fixed installations.
- (viii) As required by the equipment at risk.
- (ix) As required by the risk.
- (x) When a ventilation/air conditioning control system to a building is provided, it shall stop mechanically induced air movement within a designated fire compartment.

#### *ADDITIONAL REQUIREMENTS*

- (i) All linings for acoustic and thermal insulation purposes in ductings and concealed locations shall be of Class 1 or 2 Rate of Surface Spread of Flame as per British Standard 476: Part 7 or its international equivalent, or be brought up to that standard by use of an approved fire retardant product.
- (ii) All linings for acoustic, thermal insulation and decorative purposes within protected means of escape shall be of Class 1 or 2 Rate of Surface Spread of Flame as per British Standard 476: Part 7 or its international equivalent, or be brought up to that standard by use of an approved fire retardant product.
- (iii) Any intended storage or use of dangerous goods as defined in Chapter 295 of the Laws of Hong Kong should be notified to the Director of Fire Services.

**PART V****SPECIFICATION AND TESTING**

- 5.1 Audio/Visual Advisory Systems
- 5.2 Automatic Actuating Devices
- 5.3 Automatic Fixed Installations Other Than Water
- 5.4 Automatic Fixed Installations Using Water
- 5.5 Deluge Systems
- 5.6 Drencher Systems
- 5.7 Dust Detection Systems
- 5.8 Emergency Generators
- 5.9 Emergency Lighting
- 5.10 Exit Signs
- 5.11 Fire Alarm Systems
- 5.12 Fire Control Centre
- 5.13 Fire Detection Systems
- 5.14 Fire Hydrant/Hose Reel Systems
- 5.15 Fireman's Lifts
- 5.16 Fixed Automatically Operated Approved Appliances
- 5.17 Fixed Foam Systems
- 5.18 Gas Detection Systems
- 5.19 Hose Reels
- 5.20 Portable Hand-Operated Approved Appliances
- 5.21 Pressurization of Staircases
- 5.22 Ring Main Systems with Fixed Pumps
- 5.23 Smoke Extraction Systems
- 5.24 Sprinkler Systems
- 5.25 Supply Tank
- 5.26 Ventilation/Air Conditioning Control Systems
- 5.27 Water Spray Systems
- 5.28 Water Supplies

## 5.1 Audio/visual advisory systems

### (i) SPECIFICATION

Fire alarm bells, klaxons, sirens etc. which are an integral part of an automatic or a manual fire alarm system are not included in this section.

#### AUDIO

A system of records/signals either verbal or musical or direct transmission over a Public Address System to advise staff and other occupants of emergency conditions and the action to be followed.

In special occupancy premises e.g. hospitals, cinemas, an agreed sound signal may be broadcast to give early warning to staff of emergency conditions which may or may not necessitate action by them at that time.

In a major building the power supply to the sound system should be from both main and emergency (essential) circuits.

#### VISUAL

A system of coloured and/or flashing lights, which may be incorporated to the Exit Signs and Directional Signs as required under 5.10 and supplemented by low-level Directional Signs to indicate:

- (a) the floor/floors to be evacuated by operating the lights on that floor/those floors in flashing mode,
- (b) the evacuation routes to be followed by operating the lights of the low-level Directional Signs.

### (ii) TESTING

A weekly visual and audio check of all signals.

The system shall also be checked during any fire drill.

## 5.2 Automatic actuating devices

### (i) SPECIFICATION

Components under this section will include fire stop doors, fire dampers, fire curtains and other means of providing compartmentation/fire separation automatically in the event of fire. Automatic fire detection and fire suppression systems are not included in this section.

They shall be constructed and installed in accordance with Fire Offices' Committee Rules or other standards acceptable to the Director of Fire Services.

### (ii) TESTING

The component shall be capable of manual and automatic operation and regular testing. Test shall confirm that the designed enclosure/separation shall be completed within the time specified for that particular device.

## 5.3 Automatic fixed installations other than water

### (i) SPECIFICATION

Carbon dioxide, BCF and BTM or similar extinguishing system, shall be installed in accordance with standards acceptable to the Director of Fire Services.

When installed the system may be combined manual/automatic with or without remote operation.

Such systems in their simplest form consist of one or more storage containers with discharge valves, detection heads, piping and discharge nozzles.

If the system is intended for total flooding of the premises/compartment, then automatic actuating devices (Section 5.2) may be necessary, in addition, to ensure complete compartmentation.

(ii) *TESTING*

The system shall be tested by direct and/or remote control in accordance with test procedures as laid down in the acceptable standard.

If any part of the system fails during test, then the whole system shall be brought up to full readiness by a registered fire service installation contractor.

**5.4 Automatic fixed installations using water**

These may include:

Deluge Systems

Drencher Systems

Sprinkler Systems

Water Spray Systems

Fixed Foam Systems

Specifications and testing for the above are in the respective sections.

**5.5 Deluge systems**(i) *SPECIFICATION*

A deluge system may be required in a risk area where fire may be expected to spread quicker than the progressive operation of normal sprinkler heads.

The design of such system will be the subject of consultation with Fire Services Department.

(ii) *TESTING*

Testing shall be in accordance with the requirements of the Director of Fire Services.

**5.6 Drencher systems**(i) *SPECIFICATION*

Such system shall be installed in accordance with the current edition of Fire Offices' Committee Rules or other standards acceptable to the Director of Fire Services.

(See Water Supplies—Section 5.28)

(ii) *TESTING*

The testing procedure shall be in accordance with the appropriate standard or as required by the Director of Fire Services.

**5.7 Dust detection systems**(i) *SPECIFICATION*

Very few types of premises will require such a system and the type will depend on the industry/trade/usage of the premises.

Each required system shall be designed in consultation with and to the approval of the Fire Services Department.

Each system shall:

(a) be automatic in action;

(b) close down the affected process;

(c) operate pressure relief vent (if appropriate);

(d) be connected to the fire alarm systems for the premises.

(ii) *TESTING*

Testing appropriate to the system will be carried out at intervals agreed with the Director of Fire Services.

If the system is capable of being actuated manually, such manual actuation will be tested to confirm subsequent operations.

## 5.8 Emergency generators

### (i) SPECIFICATION

#### (a) GENERAL

The emergency generator set shall be designed for cold starting and be capable of supplying power for the full rated essential load in not more than 15 seconds from initiation of the starting procedure.

The emergency generator set shall be capable of continuously operating under the appropriate site conditions which shall normally be a temperature range of 5 deg. C to 40 deg. C, relative humidity 100% and the altitude of the actual site.

Each essential item of equipment incorporated in the emergency generator set shall be to the latest edition of the relevant British Standard or alternative equivalent national or international standard. Full compliance with the current edition of the I.E.E. Wiring Regulations shall also be necessary.

The emergency generator set shall be completely assembled and tested at the manufacturer's works and delivered to site as a complete unit.

The prime mover may be of any form provided that the start-up time of 15 seconds is not exceeded and reliability is ensured.

Petrol, kerosene and similar highly volatile liquid fuels are not acceptable.

The emergency generator set shall have a minimum continuous full load rating of not less than the consumption of all fire service installations devices connected thereto, running simultaneously. Under all load conditions the output voltage and frequency shall be maintained for satisfactory operation of all fire service installations devices.

#### (b) FUEL STORAGE

The unit shall be complete with a fuel storage system capable of sustaining full load operation for a period of not less than 6 hours.

#### (c) INSTALLATION

Adequate (not less than 600 mm) space all round units shall be provided for maintenance and cleaning.

Adequate ventilation shall be provided for both combustion and cooling air. If fans are necessary to provide this air they shall operate at all times while the emergency generator set is running.

The air supply and discharge shall be direct to outside air without any possible obstructions i.e. no fire, smoke or regulating dampers shall be fitted. Where the air supply and/or exhaust ductwork is not fully contained within the generator room but passes through adjacent compartments or units the ductwork shall be so constructed as to have the same F R P as the F R P required for either the generator room or the compartment through which it passes, whichever is the greater.

Exhaust discharge of combustion products shall not cause a public nuisance and shall be in accordance with the guidelines and requirements of the Director of Environmental Protection.

#### (d) OPERATION

Failure of one or more phases of the mains supply, or a reduction of voltage to less than 70% of normal, for a duration exceeding 1 second, shall initiate automatic starting of the emergency generator set. Full load transfer shall take place automatically. Should the prime mover fail to start, a further attempt to start shall then be made.

If it again fails to start, the starting sequence shall be locked out, an audible and visual alarm shall be given locally, and at the fire control main panel, and it shall remain in this locked out condition until manually reset.

The starting system shall have a capacity to ensure four starting operations.

Restoration of the mains supply during the starting period shall not interrupt the starting sequence but shall prevent operation of the load transfer.

Subsequent failure of the mains supply for a duration exceeding 0.5 second, while the unit is running, shall cause the load transfer to take place.

An indicator light on the fire control main panel, or if no fire panel, outside the generator room, shall indicate that the fire service installations are operating on emergency electricity supply.

(ii) *ACCEPTANCE TESTING*

On completion of the installation a full test of the fire service installations shall be carried out, with all systems connected to the "normal" electricity supply.

On satisfactory testing on "normal" supply, the normal supply shall be switched off, and the emergency generator set shall be started.

When the emergency generator set is ready to accept the fire service installations load, each fire service installation shall be started, one at a time, until all installations are running. A "simultaneous running" test shall then take place and shall last for a continuous period of one hour. During this period the performance of each fire service installation shall be monitored.

After one hour of testing the emergency generator set shall be examined and all instruments, safety devices, etc. shall indicate "normal" running of the generator.

(iii) *ROUTINE MAINTENANCE AND TESTING*

All units shall be run once per month under load conditions for a period of not less than 30 minutes by the building owner. During this running period all operating conditions shall be checked. Following this running period functional tests shall be carried out on all automatic and manual starting devices and safety controls.

A log book shall be provided, and retained in the plant room, management office or building supervisor office, and be kept up to date by the building owner. The records shall be made at the time of the occurrence and shall include details of all operations; faults and corrective actions taken; routine servicing; maintenance and periodic operation; etc. including dates, times, hour meter readings, workers/supervisors names and signatures, etc. for the unit, batteries, compressors, etc.

Further routine testing and maintenance for a particular installation may be required by the Director of Fire Services.

Fuel tanks shall be left filled after testing.

**5.9 Emergency lighting**(i) *SPECIFICATION*

Emergency lighting for all premises shall comply with British Standard 5266: Part 1 except that exit signs shall be as at Section 5.10. hereof.

*CINEMAS, THEATRES, ETC.*

Emergency lighting for cinemas/theatres and other specified premises used for entertainment shall, additionally, comply with the following:—

- (a) Battery emergency lighting systems shall be operated at a normal battery voltage of not less than 24 volts and not more than 120 volts D.C., from a common bank.
- (b) Batteries used shall be heavy duty of rechargeable (secondary) type; batteries of primary cells of any type whatsoever will not be acceptable.
- (c) Batteries shall be installed in a room approved for this purpose by the Licensing Authority.
- (d) Batteries in celluloid containers shall not be installed, stored or used.
- (e) A margin allowance of  $12\frac{1}{2}\%$  of the total required battery capacity (amperehour rating not voltage) shall be provided, i.e.  $100\% + 12\frac{1}{2}\% = 112\frac{1}{2}\%$ .
- (f) All batteries for the emergency lighting circuits shall be kept fully charged at all times and shall be capable of maintaining the stipulated lighting levels for a period of not less than 2 hours.
- (g) An automatic trickle charger with mains input and suitable output, fitted with meters, regulators and pilot lights, shall be provided for the batteries. The charger shall be capable of fully re-charging the batteries in not more than 12 hours.
- (h) Upon failure of the main lighting system the emergency lighting system shall automatically light up.

- (i) In the event of failure of the main lighting the public shall, unless the capacity of the battery is sufficient to maintain specified conditions for not less than four hours, within one hour be required to leave the building and they shall not be re-admitted until the general lighting has been fully restored and the emergency system recharged.
- (j) The supply from the batteries shall feed a main distribution fuse board and thence be subdivided to four subdistribution fuse boards, as follows:—
  - Exit lighting
  - Stair lighting
  - Auditorium lighting
  - Stage lighting
- (k) Outgoing circuits shall be suitably protected by fuses to British Standard 88 or miniature circuit breakers to British Standard 3871: Part 1.
- (l) A diagram showing details of the distribution system and the circuit wiring of the emergency lighting system shall be erected at the main distribution board.
- (m) The emergency lighting system shall be wired in M.I.C.C. cable to British Standard 6207 or other fire resistant cable approved by the Loss Prevention Council and be fully segregated from the general distribution system.
- (n) The minimum illumination provided at floor level by the emergency lighting system shall be:—
 

|  |                        |
|--|------------------------|
| Staircase  | not less than 2 Lux.   |
| Nightclub, restaurant, dance hall, or premises where people have freedom of movement and there are loose fixtures and fittings | not less than 1 Lux.   |
| Cinemas and theatres   | not less than 0.5 Lux. |

measured at the mid-point between any two emergency lighting fittings. A discretionary tolerance of minus 10% is permitted and all readings shall be taken by a portable photoelectric photometer.
- (o) All points shall have equal lumen output and distribution characteristics giving equal intensity of light in all material directions. Each point shall be so sited as to avoid impairment of vision from glare. Points, except where so specified and approved, shall be mounted at a height of not less than 2 metres.
- (p) The maximum permissible period for visual adaptation shall not exceed 5 seconds at any point on the premises.
- (q) The minimum number of fittings permissible in any installation shall not be less than two (N.B. if only one fitting were provided and a lamp filament failure occurred, a hazardous situation would result.)
- (r) All lighting fittings in the emergency lighting system shall be of flame retardant construction, shall comply with British Standard 4533 Section 1.13 and be permanently fixed in position.

(ii) *MAINTENANCE*

- (a) Once every month a discharge test, for 1 minute at the 10-hour discharge rate, shall be carried out, and the results entered in a register, the on-load voltage of each cell after this test shall be not less than 2.01 for Lead Acid and 1.25 for Nickel Cadmium.
- (b) For battery systems the control and safety devices installed, shall be regularly tested as under:—
  - (1) Connections between the battery and the source of charging current shall be such that in no circumstances shall the battery discharge other than to the secondary lighting circuits.
  - (2) A rectifier for charging shall be for that purpose only and shall be so regulated that the battery cannot discharge appreciably under normal conditions.
- (c) Voltage and Hydrometer tests shall be carried out weekly and recorded in a register.

(iii) *TESTING*

- (a) Further tests shall be carried out in accordance with British Standard 5266: Part 1.



- (b) Emergency lighting systems installed in cinemas/theatres and other specified premises used for entertainment shall additionally be tested annually by the appropriate power supply company who shall issue to the Director of Fire Services a certificate of a satisfactory test result.

### 5.10 Exit signs

#### (i) SPECIFICATION

Exit signs shall be internally illuminated bearing the word and characters "EXIT 出口" in block letters and characters of not less than 125 mm high with 15 mm wide strokes.

#### COLOURS

Colour contrast for translucent surrounds to lettering shall be as follows:

| <i>Colour</i> | <i>Contrasting Colour</i> |
|---------------|---------------------------|
| Green         | White                     |
| Green         | Black                     |
| White         | Green                     |

The colour combination selected shall be consistent throughout the same building.

#### DIRECTIONAL SIGNS

If a sign is not installed immediately above an exit or if an exit is not clearly visible from normally occupied parts of the premises, directional sign conforming to Table 10 of British Standard 5499: Part 1 shall be erected.

#### SELF LUMINOUS SIGNS

Self luminous signs to British Standard 5499: Part 2 are approved for use in Hong Kong, however, their use is not permitted where legislation specifies illuminated exit signs.

#### (ii) TESTING

Exit signs shall be tested whenever an emergency lighting system is tested. As exit signs are normally lit when premises are occupied, no additional test procedure is necessary, other than regular maintenance.

### 5.11 Fire alarm systems

#### (i) SPECIFICATION

*Note:* This section deals only with manually operated alarm points of a system. (See British Standard 5839: Part 1)

Pure manual systems such as hand bells, whistles, rotary gongs, etc. are not within the scope of this Code, however, subject to the approval of the Director of Fire Services, an existing sound signal system within a premises may be utilized as a manual fire alarm system (e.g. school premises) subject to the specific signal being used solely to notify occupants of a fire situation.

Manual actuating points of a pattern conforming with standards acceptable to the Director of Fire Services may be installed as an integrated part of an automatic fire detection system. Such manual actuating points shall be installed in compliance with the appropriate standard, in such locations within the premises, as set out elsewhere in this Code for the individual types of premises.

#### (ii) TESTING

Manual fire alarm points are to be tested when the whole system is required to be tested in accordance with the appropriate standard.

Attention is drawn to Regulation 38 of the Education Regulations, Chapter 279 in respect of fire alarm testing and fire drills in schools.

### 5.12 Fire control centre

#### (i) SPECIFICATION

A room, compartment normally at ground floor level on the main face of a building, preferably adjacent to main entrance.

The room shall be separated from the remainder of the building by walls having a minimum fire resisting period of one hour, and shall be large enough to house equipment, recorders, annunciators, etc. ancillary to the fire protection system installed in the building.

It shall be continuously manned by trained personnel.

Local termination/repeaters of fire protection and life safety systems will be installed together with test facilities of the systems as appropriate.

Electrical supply will be from the essential supplies circuit (both normal and emergency).

It may be called into use as Fire Services Department Command Unit during an incident involving the premises.

(ii) *TESTING*

The routine testing of the various systems within the premises will be carried out in accordance with the appropriate standard or code and as outlined elsewhere in this Code.

No other individual test is considered appropriate.

**5.13 Fire detection systems**

(i) *SPECIFICATION*

Systems shall be installed in accordance with Fire Offices' Committee Rules or other standards acceptable to the Director of Fire Services. A direct line connection shall be provided to the Fire Services Communication Centre or such other premises as may be agreed with the Director of Fire Services.

Detection heads may be of heat detecting type or smoke detecting type and heads of both types may be installed within the same system. The choice of type of head will in most instances be dictated by the circumstances, however, liaison with the Fire Services Department in the planning stage is essential.

Monitoring of the system in the early stages of building operation will be necessary to "locate" any head that, for any reason, is originating false/unwanted alarms.

(ii) *TESTING*

The system and components will be tested in accordance with the appropriate standard or as required by the Director of Fire Services.

The direct line connection will be tested at such time and interval as agreed by the Director of Fire Services.

**5.14 Fire hydrant/hose reel systems**

(i) *SPECIFICATION*

(a) *HYDRANT*

Each hydrant assembly shall conform with British Standard 5041: Part 1 as appropriate.

The hydrant shall be of non-corrosive metal. Each outlet of all hydrants shall be of male round thread or female instantaneous type conforming to British Standard 336 and be individually controlled by a wheel-operated screw valve designed to open by counter-clockwise rotation. The direction of opening of the valve shall be clearly engraved in both English and Chinese on the wheel of the valve.

The hydrant outlet shall be not less than 800 mm nor more than 1 200 mm above finished floor level.

The hydrant shall be prominently sited in an approach lobby to a staircase or in the staircase enclosure. When recessed there shall be an all round clearance between any part of the hydrant outlet and valve and the enclosing walls sufficient to permit the free use of the hydrant and the fitting of an adaptor. When not recessed the hydrant shall be adequately protected against damage. As an optional safe guard against tampering or pilfering, the hydrant whether or not installed in recessed position, may be protected by lockable glass panels/cabinets, provided that the glass shall be of frangible type and shall not exceed 3 mm in thickness, and that it shall be of such size and design as would not cause any obstruction to the free use of the hydrant. Such glass panels/cabinets may be linked to security alarms.

The hydrant shall not obstruct wholly, partly or indirectly any door opening, or the required width of any exit route.

The hydrant shall be so sited as not to be concealed by the leaves of an adjacent door when that door is opened.

Water supply for hydrant system may be fed by static pressure directly from the elevated water tank without fixed fire pump if such pressure and flow are sufficient to give the required performance as that specified with fixed fire pump provided.

(b) *HOSE REEL*

The design of the hose reel shall be such that the tubing is permanently connected, via pipes in the drum of the hose reel and such stuffing boxes as may be necessary, to the supply main or the hydrant supply main.

The internal bore of the hose reel tubing shall be not less than 19 mm, such tubing shall have a bursting pressure of not less than 2 700 kPa and shall not be porous nor exhibit any sign of percolation under pressure up to 2 000 kPa.

The tubing of every hose reel shall not exceed 30 metres in length and be capable of being wound round a drum of not less than 150 mm in diameter and led around sharp obstructions without kinking. When fitted with hose reel nozzle, the tubing shall be capable of projecting a jet not less than 6 metres in length.

The hose reel nozzle shall have a 4.5 mm orifice and be fitted with a simple two-way valve to open or shut off the jet. The valve shall not be spring-loaded.

The hose reel control valve shall be of gate valve type approved by the Hong Kong Water Authority. Such valve shall be closed by turning the hand-wheel in a clockwise direction. A simple two-way ball valve approved by the Hong Kong Water Authority may be used as an alternative to a gate valve.

Hose reel drums shall be painted in red. The hose reel assembly shall be robust in construction and be capable of withstanding normal impact and stress during operation.

Rising mains and associated pipework used for the hose reels shall be not less than 40 mm nominal bore and pipes feeding individual hose reel shall not be less than 25 mm nominal bore.

A hose reel shall be so installed that its control valve and nozzle, which should be situated adjacent to each other, are at a position above and not more than 1 350 mm from the finished floor level. For a recessed type hose reel, such control valve and nozzle may be recessed to a discernible and accessible position of not more than 500 mm from the surface of the wall.

The hose reel should normally be located in occupied units/areas to enable the occupants of the building to attack a fire. However, in case of a building having a number of small units, hose reels may be located in common areas immediately outside the occupied units/areas on that floor to provide coverage as specified in respective paragraphs of Part IV.

Any hose reel sited on any escape route may be of fixed type or swinging cradle type and recessed into the wall. If the hose reel is carried on a swinging cradle, it should be constructed in such a way that when not in use the outer face of the reel is flush with the wall and when required for use the cradle may swing out freely into the corridor or passage. If the hose reel is of a fixed type, suitable guide ring(s) shall be installed to permit easy withdrawal of the hose reel tubing.

If hose reels are located in recesses to which doors are fitted, such doors shall be hinged so that when they are opened, they shall not cause obstruction to any means of escape nor to the operation of the hose reels nor to the hose being run out in either directions. The doors shall bear the words "FIRE HOSE REEL" (消防喉轆), lettering of which shall be of at least 50 mm high. Door locks shall not be fitted to such doors. As an optional safe guard against tampering or pilfering, the hose reels, whether or not installed in recessed position, may be protected by lockable glass panels/cabinets, provided that the glass shall be of frangible type and shall not exceed 3 mm in thickness, and that it shall be of such size and design as would not cause any undue obstruction to the free use of the hose reel. Such glass panels/cabinets may be linked to security alarms.

An operation instruction notice of the hose reel shall be provided and affixed to the wall in a prominent position adjacent to the hose reel. If the hose reel is located in a recess to which a door is fitted, such notice shall be affixed immediately below the words "FIRE HOSE REEL" on the outer surface of the door. They shall be finished in such a way that they would not be subject to undue weathering. The notice shall be clearly marked with the following standard wordings in English and Chinese characters of at least 5 mm high in red lettering on white background or white lettering on red background. Pictorial instructions showing the components and operation of the hose reel set may be provided in addition to the standard notice.

**TO OPERATE FIRE HOSE REEL**

使用消防喉轆

- (1) **BREAK GLASS OF THE FIRE ALARM CALL POINT. (or)**  
打爛火警鐘玻璃  
**ACTUATE FIRE ALARM CALL POINT.**  
按動火警鐘掣
- (2) **OPEN CONTROL VALVE BEFORE RUNNING OUT HOSE.**  
先開啟來水掣，再拉出膠喉
- (3) **TURN ON WATER AT NOZZLE AND DIRECT JET AT BASE OF FIRE.**  
將喉咀掣開啟，然後射向火之底部  
**(NOT SUITABLE FOR ELECTRICAL FIRES)**  
不適用於電火

Manual fire alarm call points shall be positioned at prominent and accessible locations near the hose reels at a level of not more than 1 200 mm above finished floor level.

Upon actuation of any manual fire call point in the building, the fixed fire pump(s) shall come into operation regardless of the zoning of the manual fire alarm call point. An independent indication shall be provided at the fire control room or at the main entrance of the building to indicate the floor upon which the manual fire alarm call point has been actuated.

Water supply for hose reel system or part of the system may be fed by static pressure directly from an elevated water tank if such pressure is sufficient for its designed operation.

(c) **SUPPLY TANK**

The reserve water supply for fire fighting shall be contained in a supply tank. (See Section 5.25)

(d) **FIXED FIRE PUMP**

The fixed fire pump shall preferably be electrically driven. Where the motive power for the pump is not electricity, alternative means for starting the pump manually in addition to manual fire alarm call points, shall be provided adjacent to the pump together with starting instructions prominently displayed. Once started, the pump must run continuously until stopped manually at the pump control panel installed near the pump. In addition, a lock-off button may be installed adjacent to this fire pump.

The fixed fire pumps shall be capable to provide adequate flow in the case of:—

- (1) Industrial/godown buildings, for  
any 3 hydrant outlets (i.e. each with a flow of 450 L/min at a running pressure of not less than 350 kPa) operating simultaneously with an aggregate flow of not less than 1 350 L/min.
- (2) Buildings other than industrial/godown buildings, for  
any 2 hydrant outlets (i.e. each with a flow of 450 L/min at a running pressure of not less than 350 kPa) operating simultaneously with an aggregate flow of not less than 900 L/min.

The pressure at any fire hydrant outlet shall in no case exceed 850 kPa. The running pressure at any hydrant outlet when delivering 450 L/min shall be not less than 350 kPa.

The fixed fire pump shall be duplicated for duty and standby use. The fire pump starting control shall be wired through a selector switch for duty and standby pump selection. Should the duty pump fail to operate within 15 seconds the standby pump shall be energized to become the duty pump.

The motor/engine driving the fixed fire pump shall be rated to give 20% more power in addition to the hydraulic power required for the rated flow of the system.

Fixed fire pumps shall be permanently primed with non-return valves installed at the discharge side of the pumps. Where necessary, non-return valves shall also be installed in other locations to prevent water backflow into the water tank.

The status of each fixed fire pump comprising "Power Supply On", "Pump Running" and "Pump Failed" shall be monitored and displayed at the pump control panel and repeated at the fire control room or to a status panel at the main entrance of the building.

All fixed fire pumps shall be housed in suitable enclosures, preferably brick or concrete, designed solely for occupation by the pump. Such pump enclosures shall lie clear of any exit or normal communication routes through the premises and shall be clearly marked in English and Chinese characters "FIXED FIRE PUMP" (消防泵) and suitably locked to prevent unauthorized tampering of the pumps.

(e) *INTERMEDIATE BOOSTER PUMP*

In all buildings where the height between the topmost hydrant and the lowest Fire Service Inlet is in excess of 60 m, the flow and pressure, where necessary, shall be maintained by intermediate booster pumps incorporated in the rising main system.

With the fire engines boosting water into the Fire Service Inlet at a constant pressure of 800 kPa upstream of the Inlet, the intermediate booster pumps shall be capable to provide adequate flow for:—

(1) Industrial/godown buildings

—if only 1 rising main is installed in the building, the aggregate flow shall be not less than 1 350 L/min. (i.e. any 3 hydrant outlets each with a flow of 450 L/min at a running pressure of not less than 350 kPa)

—if 2 or more rising mains are installed in the building, the aggregate flow shall be not less than 2 700 L/min. (i.e. any 6 hydrant outlets each with a flow of 450 L/min at a running pressure of not less than 350 kPa. with not more than 3 hydrant outlets operating in one rising main)

(2) Domestic buildings

—the aggregate flow shall be not less than 900 L/min. (i.e. any 2 hydrant outlets each with a flow of 450 L/min at a running pressure of not less than 350 kPa)

(3) Other buildings

—if only 1 rising main is installed in the building, the aggregate flow shall be not less than 900 L/min. (i.e. any 2 hydrant outlets each with a flow of 450 L/min at a running pressure of not less than 350 kPa)

—if 2 or more rising mains are installed in the building, the aggregate flow shall be not less than 1 800 L/min. (i.e. any 4 hydrant outlets each with a flow of 450 L/min at a running pressure of not less than 350 kPa. with not more than 2 hydrant outlets operating in one rising main)

The pressure at any fire hydrant outlet shall in no case exceed 850 kPa. The running pressure at any hydrant outlet when delivering 450 L/min shall be not less than 350 kPa.

Intermediate booster pumps shall be duplicated for duty and standby use. One set of intermediate booster pumps (duty and standby) may feed all risers in the same system to supply the required flow and pressure. Should the duty pump failed to operate, the standby pump shall be energized to become the duty pump within 15 seconds.

Two or three pumps of same capacity arranged in parallel using sequential starting may be employed as the duty intermediate booster pumps to achieve the required pressure and flow within 30 seconds. Under this arrangement, only one standby pump is required and shall be arranged in parallel to the above duty pumps. This standby pump shall be identical to a duty pump and capable to come into operation automatically upon failure of any duty pump.

The motor engine driving the intermediate booster pump shall be rated to give 20% more power in addition to the hydraulic power required for the rated flow of the system.

All intermediate booster pumps shall be permanently primed and electrically driven. Once started, the pump must run continuously until stopped manually. Suitable start/stop push buttons together with pump running indicator lights and alarm buzzers shall be provided adjacent to the Fire Service Inlets to enable Fire Service personnel to exercise control of the intermediate booster pumps. For building with tower(s) on podium, such start/stop buttons shall be provided adjacent to the Fire Service Inlet nearest to the staircase serving the tower. Clear indications in English and Chinese characters "INTERMEDIATE BOOSTER PUMP CONTROL" (中途泵開關掣) of at least 5 mm high shall be provided.

The status of each intermediate booster pump comprising "Power supply on", "Pump running" and "Pump failed" shall be monitored and displayed at the pump control panel and repeated to the fire control room or to a status panel at the main entrance of the building.

All intermediate booster pumps shall be housed in suitable enclosures, preferably brick or concrete, designed solely for occupation of the pump(s). Such pump enclosures shall lie clear of any exit or normal communication routes through the premises and suitably locked to prevent unauthorized tampering of the pump(s). Such enclosures shall be clearly marked in English and Chinese characters "INTERMEDIATE BOOSTER FIRE PUMP" (中途泵) of at least 50 mm high.

The intermediate booster pumps may also be utilized as the fixed fire pump if they are arranged to perform both functions as stipulated.

(f) *RISING MAIN*

The nominal bore of the rising main, in industrial/godown buildings shall be not less than 100 mm. Each rising main shall supply 2 hydrant outlets per floor.

The nominal bore of the rising main in other types of buildings shall be not less than 80 mm. Each rising main shall supply one hydrant outlet per floor.

Each rising main shall be provided with a standard Fire Service Inlet at ground floor level. Where the intermediate booster pump is interposed between the Fire Service Inlet and the hydrant outlets, provision must be made for the water supplied to the Inlet to by-pass this pump in the event of failure of the pump.

All rising and down coming mains shall be permanently primed with water and fitted with air relief valves at suitable locations to prevent air lock in the installation.

Each rising main shall be connected to an independent Fire Service Inlet. Where there are several rising mains in the system, such Inlets shall be interconnected. Header pipe(s) may be provided to connect the Fire Service Inlets to the rising mains. The diameter of the header pipe shall be not less than 150 mm nominal bore for industrial/godown buildings and 100 mm nominal bore for other buildings.

In the case of an industrial/godown building, a rising main shall be provided for each staircase, with independent Fire Service Inlet and inter-connection as described above.

The Director of Fire Services may require additional rising mains dependent upon the layout of the building.

(g) *FIRE SERVICE INLET*

Each Fire Service Inlet shall be in a prominent position on the exterior of the building and must be suitably identified, enclosed and protected against corrosion and abuse. The Inlet shall be readily accessible by Fire Service personnel.

The inlet couplings shall be not less than 600 mm nor more than 1 000 mm above the ground level and shall be of a standard pattern approved by the Director of Fire Services.

There shall be a non-return valve behind each inlet.

Each Inlet shall be affixed with a metal identification plate raised or engraved with English and Chinese characters. The frontage of each Inlet enclosure shall be clearly and permanently indicated in English and Chinese characters "F.S. INLET" (消防入水掣) of at least 50 mm high.

(ii) *TESTING*

The system shall be tested in accordance with test procedures as approved by the Director of Fire Services.

### 5.15 Fireman's lifts

- (i) *SPECIFICATION* (Formulated in accordance with Reg. 41B of the Building (Planning) (Amendment) (No. 2) Regulations 1992)

(a) *FLOORS SERVICED*

Fireman's lift(s) shall aim to enable Fire Services personnel to reach any floor that may be on fire in the building without having to traverse more than two floors, and arranged in such a way that;

- in the case of single fireman's lift, it will serve at least the alternate floors,
- in the case of multiple fireman's lifts within the common lift shaft, the lifts may serve different zones of the building, which shall be clearly indicated.
- in all cases, the pattern of service must be uniform and regular. That is, either serving the odd floors, the even floors or all floors.

(b) *LIFT SHAFT*

Separate lift shaft must be provided for fireman's lift(s) and up to three lifts may share the same shaft provided all these lifts are designated as fireman's lifts.

A notice shall be displayed outside the lift shaft indicating which is/are fireman's lift(s) by the words "FIREMAN'S LIFT" (消防升降機) in English and Chinese and the floors served.

(c) *LIFT CAR*

The lift car shall be of a minimum size of 1.35 square metres net internal floor area with a minimum rated load of 680 kg.

The electric fan on top of the lift car shall be provided with automatic stop upon the opening of the safety hatch.

The speed of the lift car shall be such that it will reach the topmost discharge point of the building in not more than 1 minute, calculating from the time when the lift doors on the lowest discharge point are completely closed to the time when the lift doors at the topmost discharge point start to open.

(d) *LIFT LOBBY*

Each point of discharge from the fireman's lift shall be through a lift lobby protected by separation with a minimum of 1 hr. FRP, except the designated point of entry in the building.

(e) *LIFT DOOR*

The opening of the lift shall not be less than 800 mm wide and 2 000 mm high. The doors shall be fitted with power operated automatic self-closing device.

(f) *FIREMAN'S SWITCH*

The fireman's lift shall be provided with a suitable control switch, clearly indicated in English and Chinese as Fireman's Switch (消防掣), at the designated point of entry to enable Fire Services personnel to gain control over the lift which, on operation shall over-ride the instructions registered inside the lift and return to the designated point of entry as quickly as mechanically possible.

For easy identification of Fireman's lifts which conform to this standard, a red and white diagonal striped backing shall be provided behind the glass of the Fireman's switch.

(g) *POWER SUPPLY*

The power supply to the fireman's lift(s) shall be connected to a sub-main which shall be exclusive and independent of any other sub-main circuit. When a fireman's lift is one of a battery of lifts, the other lifts may be fed from the same supply, provided it is adequate for this purpose, and that arrangements are such that a fault occurring in any other lift or the battery will not affect in any way the operation of the fireman's lift.

*(h) OPERATION*

The purpose of the fireman's lift is aimed to protect the passengers from the effects of fire and smoke by keeping the lift doors automatically closed until operated to open from the inside. Therefore its operation shall be programmed in such a way that upon switching on the Fireman's Switch to gain control of the lift car, the Fire Services personnel need only take three simple steps to operate the lift.

Press the desired floor button or "door close" button continuously to close lift door and register call.

On arrival at the desired floor, press "door open" button continuously until lift doors are fully open.

If another floor is desired, press floor button of that floor.

*(ii) TESTING*

Lifts shall be tested against the specifications in association with the registered lift contractors.

**5.16 Fixed automatically operated approved appliances***(i) SPECIFICATION*

Such appliances designed to operate as independent units are included in this section.

Nevertheless, subject to the agreement of the Director of Fire Services a number of units, may be installed within a compartment such that operation of any one unit will automatically cause all units within the compartment to operate.

All appliances shall be approved by the Loss Prevention Council or to other acceptable national standards.

*(ii) TESTING*

No test is suitable however a check on the content weight to be made either by weighing or by reference to a pressure or other gauge which may be installed as part of the appliance.

**5.17 Fixed foam systems***(i) SPECIFICATION*

Systems shall be installed in compliance with standards acceptable to the Director of Fire Services.

Attention is drawn to British Standard 5041: Part 5.

Consultation with the Fire Services Department is strongly recommended in the design stage of any system. Particular attention to be placed on compatibility of various foam compounds, and integration of Fire Services equipment into the system.

A comprehensive ongoing training programme is necessary if the system is intended to be brought into use by employees.

*(ii) TESTING*

Tests to be carried out in accordance with the appropriate code and in compliance with manufacturer's instructions for the various items of equipment within the system.

**5.18 Gas detection systems***(i) SPECIFICATION*

Very few types of premises will require such a system. Each system must be designed to detect the escape or excessive concentration of the specific gases appropriate to the area of risk.

The system shall be designed in consultation with the Fire Services Department.

Each system shall:

- (a) monitor the area of risk continuously;
- (b) be automatic in operation;
- (c) close down affected process if circumstances permit;



- (d) operate ventilation/exhaust system if appropriate;
- (e) be connected to the fire alarm system for the premises.

(ii) *TESTING*

The system shall be tested by allowing sufficient amount of the gas across the detection point and efficient operation of all ancillary procedures will be confirmed.

**5.19 Hose reels**

This section has been considered as part of Section 5.14—Fire hydrant/hose reel systems.

No further detail is considered necessary.

**5.20 Portable hand-operated approved appliances**

(i) *SPECIFICATION*

Attention is drawn to Fire Service (Installations and Equipment) Regulations, Chapter 95.

Appliances shall have received the Loss Prevention Council or other acceptable standard approval.

(ii) *TESTING*

Appliances will be tested by a registered fire service installation contractor to comply with Fire Service (Installations and Equipment) Regulations, Chapter 95.

Tests will be carried out in accordance with appropriate standard and the manufacturer's instructions.

**5.21 Pressurization of staircases**

A. *DESIGN AND SUBMISSIONS*

- A. 1 The designer shall have a suitable qualification based on a professional course in a discipline which emphasises mechanical ventilation and air handling and not less than five years post membership experience in practical design of air handling systems.
- A. 2 The designer shall be responsible for all submissions to the Fire Services Department and each drawing and all calculations shall be signed by the designer on behalf of the design company/organisation, as having been checked by him, and that they comply fully with the requirements of this Code of Practice.
- A. 3 All drawing submissions shall be in the form set out in the "REQUIREMENTS for Smoke Extraction & Staircase Pressurization Systems Submissions" issued by the Hong Kong Fire Services Department.
- A. 4 All submissions shall include all necessary schematic diagrams required to fully explain the operation of the installations including not less than "normal", "fire", and "no power" modes.
- A. 5 System design shall be based on the requirements of British Standard 5588 "Fire Precautions in the Design of Buildings": Part 4 "Smoke Control in protected escape routes using pressurization" (latest edition) with the following changes:—
  - (a) Table 1—the minimum pressurization level of 50 Pa shall be achieved with all doors closed and all pressure relief systems operating. The maximum design pressurization level shall be such that under no circumstances shall the combined force, to overcome the pressure differential across any door and the action of the door closer, exceed 133N (13.5 kgf) when applied at the designed door opening handle or push plate position.
  - (b) Calculations shall allow for pressurization to be maintained and/or the minimum average egress velocity through doorways of 0.75 m/s be maintained with any three single leaf entry doors (one on each of 3 levels) and the largest exit door open, plus leakage allowances for all other doors.
  - (c) Note that in British Standard 5588: Part 4 CLAUSE 6.1, Code of Practice 352 has been withdrawn and replaced by British Standard 5720.
  - (d) The minimum fire resistance rating for the enclosure of the pressurization plant detailed in clause 6.3.4 of British Standard 5588: Part 4 should be the same as that of the staircase served.

- (e) See Section G hereof for amendments to Clause 6.3.2 of British Standard 5588: Part 4 on standby plant requirements.
- (f) The staircase pressurization system shall be designed either as a single or multiple injection system based on the following criteria:—
- (i) For buildings with an overall height less than 30 m, a single injection or multiple injection system shall be acceptable.
  - (ii) For buildings with an overall height of 30 m or more, only a multiple injection system with air supplies at no greater than 12 m apart, shall be acceptable.
  - (iii) For buildings with refuge floors the criteria in (i) and (ii) shall apply, but the height shall be measured from the floor level of the lower refuge floor to the floor level of the next refuge floor.

This supersedes the requirements of Clause 5.4.1 of British Standard 5588: Part 4.

#### B. BASIC CONSIDERATIONS

- B. 1 All systems shall be as simple as practicable in all aspects.
- B. 2 Fire compartmentation shall be ensured at all times.
- B. 3 Duct construction within the fire compartment that is served by the system shall be, as a minimum requirement, to not less a standard than Heating and Ventilation Contractor Association specification D.W. 142 or subsequent amendments. Flat oval ducts wider than 1 m shall not be used. Aluminium sheets shall NOT be used.
- B. 4 All ductwork, including builders work ducts or shafts or other construction, in these systems shall be pressure tested to Heating and Ventilation Contractor Association specification D.W. 143 or subsequent amendments. Retest as necessary after correcting any excessive losses. All results obtained shall be recorded and the record shall be signed by both the person carrying out the test and an independent witness. (see also section "H. COMPLETION, TESTING AND OPERATION").
- B. 5 Generally there shall be no fire or smoke dampers nor other restrictions in the ductwork or shafts.
- B. 6 Generally all systems shall be automatically activated whenever *any* fire service installation in the building is activated. (see section "E. ACTUATION AND CONTROL")
- B. 7 All systems shall be provided with remote on/off override control at the fire control panel. (see section "E. ACTUATION AND CONTROL")
- B. 8 The AIR INTAKE ARRANGEMENTS should be in accordance with Clause 6.2 of British Standard 5588: Part 4.
- B. 9 In order to prevent "over pressure" within the staircase the designer shall provide a pressure relief system. This shall be provided by any one or combination of the following:—
- (i) automatic opening of the external exit doors on operation of the fan.  
*Note:* For single injection system this method of "over pressure" relief cannot be utilized if the system is designed with the supply air point at the same level as the exit door.
  - (ii) Barometric Pressure relief vents to open automatically when the pressure exceeds the highest designed pressure. The location and arrangement of these valves shall be selected to maintain both the integrity of the fire rating of the staircases and the minimum design pressure.
  - (iii) an exhaust fan actuated by differential pressure sensors so that it will not operate when the pressure falls below a specified level.
  - (iv) a supply fan bypass which will vary the amount of air entering the staircase by actuating modulating bypass dampers controlled by differential pressure sensors sensing the pressure differences between the staircases and the building.
- B. 10 At every floor served by the Pressurized Staircase, a low resistance air flow path shall be provided to allow the designed air flow rate through the door, to be vented to the open air.

#### C. ARCHITECTURAL AND CONSTRUCTION CONSIDERATIONS

- C. 1 The stair enclosure shall be constructed in such a manner as to reduce the number and size of air leakage paths to a minimum.

#### D. DOOR SETS

- D. 1 All doors sets (i.e. doors, frames and hardware) providing access to or from any pressurized staircase shall be to the satisfaction of the Building Authority.
- D. 2 The provision of supplementary gaskets to assist in preventing smoke leakage will not be permitted.
- D. 3 All doors, closers, hardware, etc. shall be suitable for continual use in an atmosphere of 35 deg. C and 100% R.H.
- D. 4 Door sets shall be installed in such a manner as to be smoke-resistant and all joints between frames and building structure shall be provided with sealants complying with British Standard 476: Part 23.
- D. 5 Self closers shall be provided for all doors to ensure integrity of the enclosure. The closers shall have been part of a "door, door frame and ironmongery" test assembly which has successfully passed the test in accordance with British Standard 476: Part 22. The closers shall be of such a design that they cannot be defeated i.e. no removable pins or bolts, etc.
- D. 6 Door closers shall be adjusted such that the force necessary to open the door shall comply with that allowed in the design calculations see para. A.5(a). The testing of such force shall take place under static conditions i.e. the Staircase Pressurization system *not* operating.
- D. 7 Care shall be taken that the finished sill under the closed doors shall be wear resistant i.e. of terrazzo or similar finish.
- D. 8 Inspection and testing of all door sets, closers, releases, etc. shall form part of the acceptance tests conducted under para. H hereof.
- D. 9 Further inspection and testing of these components shall take place as part of the annual maintenance certificate inspection detailed under para. J.4 hereof.

#### E. ACTUATION AND CONTROL

- E. 1 All systems shall be automatically actuated and shall remain in operation until manually reset. Actuation of all systems shall be direct from the building Automatic Fire Alarm panel whenever that panel transmits a "Fire" signal to the Fire Services Communication Centre.
- E. 2 Where any building or that portion of a building immediately adjacent to a designated pressurized staircase is not provided with a smoke detection system, smoke detectors shall be installed at a distance not exceeded 1 m from and outside the access doors to the staircase or its approach lobbies to activate the system.
- E. 3 When in "fire" mode no system connected therewith shall be controlled or under the influence of any Building Management or Automation System nor shall failure or close down of such B.M.S. or B.A.S. prevent its operation. However, such B.M.S. or B.A.S. may monitor the operations if desired.
- E. 4 No transmission of actuating signals for the staircase pressurization system shall be effected by multiplex or similar devices unless such devices have the approval or certification of one of the Testing Authorities recognised by the Fire Services Department.
- E. 5 Each system shall be provided with a manual on/off control switch and indicator light at the fire control panel. The indicator lights to show manual on or off operation shall be provided with a red bezel and be flashing. Those showing satisfactory operation of the fan(s) shall have a green bezel and be a steady light.
  - (a) Switches for all staircase pressurization systems shall be grouped in one area of the panel together with those for smoke extraction/removal systems or the like.
  - (b) All switches shall have the same method/direction of operation.
  - (c) The indicator light showing operation of each fan shall be actuated by a device that senses effective operation e.g. a centrifugal switch or air flow switch.
  - (d) All switches and indicators shall be clearly labelled (red letters on white background, not less than 3 mm high) to show operating positions and systems served.
  - (e) A further label shall be provided with letters not less than 6 mm high stating that the controls shall be operated only by authorized personnel.
  - (f) All labels shall be permanent, legible and mechanically secured (adhesive is not satisfactory) and shall be lettered in both English and Chinese by engraving or similar.
- E. 6 In each Staircase Pressurization fan intake duct, a suitably designed smoke sensor shall be installed which, when sensing the passage of smoke, shall override all other controlling devices. and shut down the Staircase Pressurization System, being served by that fan.

#### F. ELECTRICAL & AUTOMATIC CONTROLS

- F. 1 All systems shall be as simple as possible. Complex and untried electronic devices shall not be used.
- F. 2 All equipment serving Staircase Pressurization systems shall be provided with an electrical supply from both non-essential and essential sources.
- F. 3 Cable routes shall be selected in such a way as to protect them from a fire anywhere in the building and to reduce likelihood of failure due to external effects—mechanical, electrical or physical.
- F. 4 All wiring, cables, electrical equipment, starters, relays, controls, etc. from the building primary and secondary source of supply shall be suitable for continuous operation at 250 deg. C ambient for 1 hour.

However the following situations are acceptable:—

- (a) Provided the main switchboard is of a type tested cubicle form constructed to British Standard 5486 from not less than 2 mm panel steel and is installed in a room having an F.R.P. (including self-closing doors) of not less than 2 hours and containing no other equipment, no further protection will be required. Also no further protection will be required for wiring, cables, or other electrical equipment.
  - (b) Sub-distribution boards and/or motor control centres constructed and installed as in (a) are similarly acceptable.
  - (c) All wiring, starters and other electrical equipment installed in the pressurization fan protecting structure detailed under para. A.5(d) hereof (i.e. in a plant room not solely housing the Staircase Pressurization fan) shall be suitable for continual operation in an ambient temperature of 170 deg. C for 1 hour.
  - (d) Pressure sensors in the pressurized space shall be suitable for normal ambient conditions only i.e. not less than 37 deg. C and 100% R.H.
  - (e) Wiring to pressure sensors may be high temperature grade P.V.C. to British Standard 6141 (minimum 135 deg. C) run in either surface galvanised conduit within the pressurized space or embedded in steel conduit in the structural enclosure of the space as close as possible to the face of the wall in the space.
- F. 5 Pressure sensors and associated equipment shall be of industrial process grade to British Standard 5967 (being IEC 654). Commercial quality heating, ventilation and air-conditioning controls are not acceptable.

#### G. STANDBY OR DUPLICATE EQUIPMENT

- G. 1 For sleeping risk premises, i.e. Hotels, Hospitals, and where designated by the Director of Fire Services, with a single pressurized staircase, duplicate fans and motors shall be provided.
- G. 2 For buildings with more than one pressurized staircase, single fans with duplicate motors fully belted and/or connected up shall be provided.
- G. 3 If, however, *except for sleeping risk premises*, the total air requirement is made up from two or more separate supplies acting together (e.g. top and bottom plants), then no further duplication of equipment is necessary.
- G. 4 These requirements are based on Clause 6.3.2. of British Standard 5588: Part 4.

#### H. COMPLETION, TESTING AND OPERATION

- H. 1 Where interaction with other systems is part of the designed operational mode, all such systems shall also be correctly functioning before a final Fire Services inspection takes place.
- H. 2 "Completion" shall include all necessary permanent labels, instruction plaques, fully detailed operating and maintenance manuals and diagrams, record "as built" drawings, etc.
- H. 3 Ensure tests required under para. B.4 hereof are carried out, recorded and record certified.
- H. 4 All systems are to be completed and tested and the designer is to satisfy himself that they are functioning correctly before the final full test and demonstration takes place with the Fire Services Inspecting Officers in attendance. A full set of test and functional operation check records (see para. H.10) shall be submitted with the request for the attendance of the Fire Services Inspecting Officers, accompanying the records shall be a certificate signed by the designer on behalf of the design company or organisation confirming or otherwise that he is satisfied that the installation(s) are operating in accordance with his design and the requirements of the Fire Services Department.

- H. 5 Acceptance tests shall be carried out in accordance with Clause 7.2 of British Standard 5588: Part 4. It is *necessary* for the design engineer to be present at the tests.
- H. 6 It is preferable that the format/methods of the required operational and functional test be agreed with the Fire Services Department before any such work commences.
- H. 7 The Fire Service Department will inspect the system and carry out a functional check against a standard check list.
- H. 8 If the inspection is satisfactory a Fire Certificate (FS 172) will be issued, subject to all other fire service installations having been successfully tested.
- H. 9 Except for simple devices such as pitot-static tubes, inclined manometers, U gauges and the like all instruments, meters, etc. used for testing purposes shall:—
- (a) be provided in duplicate
  - (b) have a manufacturers claimed accuracy of not more than plus or minus two percent of range.
  - (c) shall be manufactured to an appropriate British Standard or recognised equal International or National Standard where appropriate and available.
  - (d) have been calibrated by a recognised testing or calibration laboratory not more than 3 months prior to the date of test. The calibration certificate provided by the laboratory shall be available during the test.
- H. 10 Full and complete records are to be taken of all tests and the results thereof including not less than:—
- (a) records of pressure testing during construction—see para. B.4.
  - (b) make, serial no., type and owner of all instruments used, with a copy of the calibration certificates.
  - (c) actual measurements taken.
  - (d) corrected measurements from (b).
  - (e) resulting air flows.
  - (f) make, serial no., type and use of every device checked.
  - (g) date and time of test.
  - (h) signature of operator/tester or supervisor and any witnesses for each test.
  - (i) signature of acceptance of and by designer.

#### J. ROUTINE ACTIVATION, MAINTENANCE AND ANNUAL CERTIFICATION

- J. 1 For systems that only operate in an emergency (i.e. single stage systems), they shall be actuated at not more than three monthly intervals and checked to ensure that all functions sequence and operate correctly. (see para. J.3)
- J. 2 For systems that operate continuously at a low level and at an increased level in an emergency (i.e. two stage systems), they shall be actuated into emergency mode at not more than six monthly intervals and checked to ensure that all emergency functions sequence and operate correctly (see para. J.3).
- J. 3 Periodic actuation shall include, at least, the following actions:—
- (a) Activate system by manual switch.
  - (b) Check that indicator lights give correct signal.
  - (c) Inspect staircase to ensure all doors are closed especially if magnetically held doors are utilised.
  - (d) Full inspection of fan rooms including:—
    - (i) fresh air inlet is clear of debris and area in front is free of obstruction.
    - (ii) filters (if provided) correctly in place and not at end of useful life.
    - (iii) check any flexible connections for deterioration.
    - (iv) motor operating satisfactorily; not overheating, etc.
    - (v) belt drive tension and alignment correct or other type of drive functioning correctly.

- (vi) fan bearings satisfactory.
  - (vii) electrical equipment satisfactory (no contactor hum, etc.)
  - (viii) record motor currents on each phase.
  - (ix) no significant air leaks.
  - (x) check operation of pressure relief or fan by-pass dampers (and indirectly, pressure sensor) by opening and closing staircase entry door or door(s).
  - (xi) check plant room free of debris, stored materials, etc.
  - (xiii) check fan room entry door self-closers.
- (e) Traverse staircase and check air is discharging from all outlets also that pressure sensor is clean and free from interference.
- (f) Remove manual activation.
- (g) Record actions progressively. Complete and sign record log.
- J. 4 In addition to the foregoing, at intervals not exceeding 12 months the systems shall be actuated and a full test shall be carried out as described in para. H.5 hereof, by a registered Fire Service Installation Contractor and a maintenance certificate issued to the Director of Fire Services as required by Reg. 9 of Fire Service (Installations and Equipment) Regulations.
- J. 5 A record log shall be maintained for each and all systems providing a complete record of the actions carried out under para. J.1, J.2 and J.3 hereof and the results thereof under signature of the supervisor and witness. Records shall be retained for a period of at least seven years and shall be available at any reasonable time to the Director of Fire Services or his representative.

## 5.22 Ring main systems with fixed pumps

### (i) SPECIFICATION

Attention is drawn to British Standard 5041, 5306: Part 1 and 5908. The system shall be specifically for fire fighting purposes, however if the water supply is adequate there is some merit in using the system for cleaning purposes, thereby effectively testing the system.

The mains may be over or underground but must obviously be protected against physical damage.

The system shall be fed from at least 2 water supplies to the satisfaction of the Director of Fire Services and the Water Authority. (See Section 5.28)

Pumps will be fixed and capable of automatic and manual start. Fire pumps shall be permanently primed and duplicated for duty and stand-by use. In respect of any particular project the Director of Fire Services may permit fire pumps serving other systems to be utilized for stand-by purposes.

Hydrant outlets will be to standard Hong Kong Fire Services Department pattern.

Hose reels may be installed at selected, or all, hydrant outlets as required by the Director of Fire Services.

### (ii) TESTING

The fixed pump will be tested monthly by both automatic and manual start.

The system shall be generally examined to ensure that pipework and hydrant outlets are in good order.

See also British Standard 5908.

## 5.23 Smoke extraction systems

### (i) DYNAMIC SYSTEMS

#### A. DESIGN AND SUBMISSIONS

- A. 1 The designer shall have a suitable qualification based on a professional course in a discipline which emphasizes mechanical ventilation and air handling and not less than five years post membership experience in practical design of air handling systems.
- A. 2 The designer shall be responsible for all submissions to the Fire Services Department and each drawing and all calculations shall be signed by the designer, on behalf of the Design Company/Organization, as having been checked by him.

- A. 3 All drawing submissions shall be in the form set out in the "Requirements for Smoke Extraction and Staircase Pressurization Systems Submissions" issued by the Hong Kong Fire Services Department.
- A. 4 All submissions shall include all necessary schematic diagrams required to fully explain the operation of the installations including not less than "normal", "fire", and "no power" modes as well as a full written description thereof.
- A. 5 Submissions shall include all details; certificates, etc. concerning temperature rating of equipment handling smoke, as required in para. B.20. The details can either be submitted on an item-by-item basis or on a complete system basis.

**B. BASIC CONSIDERATIONS**

- B. 1 All systems shall be as simple as practicable in all aspects and each shall comprise extraction and supply/make up air installations.
- B. 2 Fire compartmentation shall be ensured at all times.
- B. 3 All systems shall be "fail safe" to ensure a free passage of smoke and
- B. 4 Systems shall be arranged such that the travel of the smoke is generally counter-flow to that of the egress/escape route.
- B. 5 Egress/escape routes shall be kept as free as possible of smoke i.e. smoke flow shall be away from these routes.
- B. 6 Air/smoke flow paths shall be such that a "scouring" or "cross-flow" effect occurs in all areas within a fire compartment.
- B. 7 Smoke shall not travel more than 30 m before entering the nearest point of inlet to the extract system and at least one extract point shall be provided within each 500 square metres unit of floor area. The exceptions are Atria and Tunnels which shall be agreed on an individual project basis, and Hotels where requirements shall comply with para. G.2(2) hereof.
- B. 8 Point(s) of smoke extraction shall be from high level in the space concerned and shall be reasonably distributed.
- B. 9 Makeup air, where not mechanically propelled, shall have as direct and short a route as possible.
- B. 10 Make-up air shall enter at a low level and/or in such a manner as to avoid premature mixing with the hot gases.
- B. 11 Maximum velocities, based on free area of the grille, shall be:—
  - (a) At make-up air inlets where not mechanically propelled—3 m/s.
  - (b) At make-up air inlets where mechanically propelled—6 m/s.
  - (c) At extract grilles or outlets—6 m/s.
- B. 12 Generally, the minimum supply or make-up air rate shall be 80% of the extraction rate. When supply or make-up air is provided by mechanical means this shall be supplied by a separate independent system or by the normal air conditioning system changing over to full outside air subject to para. B.10. i.e. positive ducted system, special air inlets, low level air supply points. As stated in para. B.2, fire compartmentation shall be ensured at all times.
- B. 13 Separate systems shall be provided for each Atria or Basement compartment and/or as otherwise designated by the Fire Services Department. (see also section "D. BASEMENTS")
- B. 14 Duct construction within the fire compartment that is served by the system shall be, as a minimum requirement, to not less a standard than Heating and Ventilation Contractor Association specification D.W.142 or subsequent amendments. Flat oval ducts wider than 1 m shall not be used. Aluminum sheets shall not be used. Care shall be taken to ensure that no failure of ductwork will be caused by any pressure changes due to the sudden closure of fire or smoke dampers.
- B. 15 As a general principle there shall be no fire and smoke dampers nor other restrictions in the ductwork of smoke control systems. The exceptions shall be where one extraction/supply system serves several compartments where motorised fire and smoke dampers shall be required, and at the main exhaust outlet louvre and main supply intake louvre, where motorised fire and smoke dampers may be required.

- B. 16 If smoke extract system ductwork passes through compartments, any part of the ductwork within the serviced compartment beyond the fire and smoke dampers provided in accordance with para. B.15, and any part outside the serviced compartment shall be fire resisting to British Standard 476: Part 24, or be totally enclosed by fire resisting construction to British Standard 476: Part 20, to the same fire resisting period as the serviced compartment or the containing compartment whichever is the higher. This fire resisting ductwork shall be constructed from material which, apart from its fire resisting quality, shall be capable of resisting accidental mechanical damage and to this end shall require to pass the hard body impact test section of British Standard 5669 with the weight being dropped through not less than one metre. Alternatively the exterior surface of the fire resisting ductwork shall require to be totally protected from accidental mechanical damage.
- B. 17 All ductwork including builders work ducts or shafts and other construction, in these systems shall, where outside the serviced fire compartment, be pressure tested to Heating and Ventilation Contractor Association specification D.W. 143 or subsequent amendments. No pressure sensitive tapes shall be used for sealing. The ductwork system shall be retested as necessary after remedial action has been taken to reduce any excessive losses until satisfactory results are obtained.
- B. 18 Shafts used for smoke extraction purposes shall contain no other services.
- B. 19 Fans shall be connected directly to the outside inlet or discharge by non-combustible ducting.
- B. 20 Equipment handling smoke shall be suitable for continuous operation at 250 deg. C for not less than 1 hour. This includes fans, motors, drives, damper operators, ductwork, flexible ducts (preferably not to be used at all), etc.
- B. 21 To prevent recirculation of smoke as far as possible, discharge outlets for smoke shall be separated by not less than 5 m in any direction from all air inlets or other openings into any building. They shall not discharge into any means of escape nor a free air Fireman's Staircase. No discharges shall be at a height above the surrounding horizontal surface of less than 3 m to the bottom of the outlet and where below 6 m shall not discharge downwards. No discharges shall be under any canopy or overhang.
- B. 22 Systems used for "normal" purposes may be utilised for smoke extraction purposes provided that under smoke extraction mode the construction and operation of the system complies with the requirements herein.
- B. 23 All systems to be automatically activated. (see section "K. CONTROL AND ACTUATION")
- B. 24 All systems shall be provided with remote on/off/override control at the fire control panel. (see section "K. CONTROL AND ACTUATION")
- B. 25 Actuation of systems shall be by a smoke detector installation serving the area unless otherwise detailed. Where considered appropriate and to reduce false alarms it is preferable that cross zoned smoke detector systems be utilised. Where a sprinkler system is provided, a flow switch on the main sprinkler feed pipe serving the area shall activate the system. In addition the system shall be operated by the operation of any other detection/protection system excluding the manual fire alarm system in the area/floor served.
- B. 26 Extract systems from hazardous or potentially hazardous processes i.e. fume cupboards in laboratories, pickling baths, etc. shall continue to operate under smoke extract conditions and shall be of fire resisting construction to British Standard 476: Part 24 and conform with para. B.20.
- B. 27 Extract systems, except small toilet exhausts, which are not of fire resisting construction throughout shall be automatically shut down in a fire situation. This shall include any associated supply air.

#### C. *ATRIA*

- C. 1 To be detailed as required.

#### D. *BASEMENTS*

- D. 1 Comply with all requirements as detailed under:—
- (i) B. BASIC CONSIDERATIONS
  - (ii) K. CONTROL AND ACTUATION
  - (iii) L. ELECTRICAL AND AUTOMATIC CONTROLS
  - (iv) M. STANDBY OR DUPLICATE EQUIPMENT
  - (v) N. COMPLETION, TESTING AND OPERATION
  - (vi) O. MAINTENANCE AND ANNUAL CERTIFICATION



- D. 2 Separate systems shall be provided for each compartment and each system shall comprise at least two independent plants and ductwork i.e. for a proportion of the area and extract/supply volumes.
- D. 3 Where small separated areas which are normally not occupied occur within larger compartments, such as pump rooms, these areas may be connected to the extract system and be provided with fire dampers in all ducts serving the area at the separation wall. This does not apply to fire service installation rooms which are to have independent systems.
- D. 4 The minimum extraction rate shall be equivalent to not less than eight air changes per hour of the total compartment volume.
- D. 5 Emergency electrical supplies shall be capable of operating simultaneously all systems relevant to Smoke Extraction Systems in the two adjacent compartments having the highest total electrical load. "Adjacent" shall be in any direction.

#### E. *BATTERY ROOMS AND ELECTRICAL CHARGING FACILITIES*

- E. 1 Details of smoke extraction/removal systems are as set out in separate requirements for these particular facilities.

#### F. *COMMERCIAL BUILDINGS*

- F. 1 Comply with all requirements as detailed under:—
  - (i) B. BASIC CONSIDERATIONS
  - (ii) K. CONTROL AND ACTUATION
  - (iii) L. ELECTRICAL AND AUTOMATIC CONTROLS
  - (iv) M. STANDBY OR DUPLICATE EQUIPMENT
  - (v) N. COMPLETION, TESTING AND OPERATION
  - (vi) O. MAINTENANCE AND ANNUAL CERTIFICATION
- F. 2 Any Basements shall comply with section "D. BASEMENTS" hereof.
- F. 3 The minimum extraction rate shall be equivalent to eight air changes per hour of the total compartment volume.
- F. 4 Any one smoke extraction/make-up air system may serve up to ten separate "above ground" fire compartments but shall be capable of fully operating any one such compartment. Fire separation shall be maintained at all times.
- F. 5 Emergency electrical supplies shall be capable of operating simultaneously all systems relevant to Smoke Removal/Extraction Systems in any one "above ground" fire compartment in addition to any requirements for Basements and Atria.

#### G. *HOTELS*

##### G. 1 General

- 1. Comply with all requirements as detailed under:—
  - (i) B. BASIC CONSIDERATIONS
  - (ii) K. CONTROL AND ACTUATION
  - (iii) L. ELECTRICAL AND AUTOMATIC CONTROLS
  - (iv) M. STANDBY OR DUPLICATE EQUIPMENT
  - (v) N. COMPLETION, TESTING AND OPERATION
  - (vi) O. MAINTENANCE AND ANNUAL CERTIFICATION
- 2. Any Basements shall comply with section "D. BASEMENTS" hereof.
- 3. Any atria, commercial or shopping areas shall comply with the relevant sectional requirements detailed herein.

##### G. 2 Internal Means of Escape shall comply with the following:—

- (1) The minimum extraction rate shall be not less than 10 air changes per hour of the total compartment "Internal Means of Escape" volume.

- (2) The supply and extraction points shall be distributed along the Corridor in such a manner that the distance between any supply and extraction point shall not exceed 10 m.
- (3) Any one smoke extraction/make up air system may serve the Internal Means of Escape of up to ten separate above ground fire compartments but shall be capable of fully operating any two such compartments simultaneously. Fire separation shall be maintained at all times.

#### H. INDUSTRIAL/GODOWN BUILDINGS

H. 1 Comply with all requirements as detailed under:—

- (i) B. BASIC CONSIDERATIONS
- (ii) K. CONTROL AND ACTUATION
- (iii) L. ELECTRICAL AND AUTOMATIC CONTROLS
- (iv) M. STANDBY OR DUPLICATE EQUIPMENT
- (v) N. COMPLETION, TESTING AND OPERATION
- (vi) O. MAINTENANCE AND ANNUAL CERTIFICATION

H. 2 Comply in all respects with Factories and Industrial Undertakings Ordinance Cap. 59.

H. 3 Any Basements shall comply with section "D. BASEMENTS" hereof.

H. 4 The minimum extraction rate shall be equivalent to not less than eight air changes per hour of the total compartment volume.

H. 5 In industrial processes where the hazard of fire is higher than normal, appropriate smoke hoods, boards or barriers should be provided to prevent spread of smoke.

H. 6 Any one smoke extraction/make-up air system may serve up to ten separate above ground fire compartments but shall be capable of fully operating any one such compartment. Fire separation shall be maintained at all times.

#### I. PLACES OF PUBLIC ENTERTAINMENT

I. 1 To be detailed as required.

#### J. TUNNELS

##### J. 1 ROAD TUNNELS

J. 1.1 Comply with all requirements as detailed under:—

- (i) B. BASIC CONSIDERATIONS  
A smoke free zone of 2.5 m high is required. All other considerations in section B with exception of para. B.7 and B.13.
- (ii) K. CONTROL AND ACTUATION  
except where modified by para. J.1.4 below.
- (iii) L. ELECTRICAL AND AUTOMATIC CONTROLS
- (iv) M. STANDBY OR DUPLICATE EQUIPMENT
- (v) N. COMPLETION, TESTING AND OPERATION
- (vi) O. MAINTENANCE AND ANNUAL CERTIFICATION  
except in para. O.1 and O.2 read "one month intervals".

J. 1.2 The fire/smoke calculations per tube shall be based on the formula included in the "Technical Committee Report No. 5 on Road Tunnels, 1987" presented and agreed by the "Permanent International Association of Road Congress (PIRAC)" unless otherwise agreed and:—

- (a) Where vehicles conveying Dangerous Goods of Category 2 and Category 5 are excluded:—  
20 MW, of a fire size equal to a burning lorry approx. 3 m × 15 m.
- (b) Where there are no restrictions as to vehicle loads:—  
50 MW, of a fire size equal to a burning petrol tanker approx. 3 m × 15 m.

J. 1.3 Emergency electrical supplies shall, as a minimum, be capable of operating simultaneously all emergency fans in any one tube plus the "normal" system in other tubes.

J. 1.4 (a) The Fire Services Department policy as stated in para. B.23 and K.1 is that actuation of any Smoke Extraction or Control System shall be fully automatic.

(b) However, for road tunnels where such smoke extraction/control systems are required and the tunnels are provided with a Control Room manned 24 hours a day plus a traffic monitoring system, the traffic monitoring system may be used as the alerting means subject to the following conditions being met:—

1. The traffic control room shall be continuously manned.
2. Traffic control room operators shall be properly trained so that should a "fire incident" occur, prompt notification to the Fire Services Communication Centre and actuation of the smoke extraction/control system are ensured.
3. The traffic monitoring system shall be provided with an audible warning device in the traffic control room in the event of an incident occurrence, i.e. stopping or slowing of vehicles.
4. The signal loops shall be installed in the roadway at not more than 200 metre centres.
5. Signals from the loops shall be transmitted by individual lines to the master controlling device.
6. Signal lines shall be protected against mechanical or fire damage.
7. If signal amplifiers are necessary they shall be automatically and continuously monitored for correct operation.
8. Signal lines for individual tunnel tubes shall be run by separate routes.
9. Multiplexing of the signals is not acceptable unless the multiplexing units to be used have a certificate of approval of a Testing Authority recognised by the Fire Services Department.
10. The master controlling device for the traffic monitoring system shall not form an integral part of a major system but shall be capable of continuing to operate and provide an alert signal should the major system malfunction.
11. The traffic monitoring master controlling device shall be provided with a duplicate "hot" back-up.
12. It is preferable that a hard copy printout of all incidents records be available.
13. The traffic monitoring master controlling device, back-up and ancillary components shall be of high quality and reliability conforming with the following, the data being based on field experience:—
  - (i) The system reliability and that for the various portions of the system shall be in determined accordance with British Standard 5760.
  - (ii) Availability shall be calculated using Mean Time Between Failures (MTBF) and Mean Time to Repair (MTTR) data.
  - (iii) MTBF and availability shall be not less than the following:—
 

|  | <i>MTBF</i>  | <i>Availability</i> |
|--|--------------|---------------------|
| (a) Master controlling device  | 10 000 hrs.  | 0.9980              |
| (b) Any changeover unit  | 20 000 hrs.  | 0.9990              |
| (c) Other relevant components individually:—<br>line amplifiers, peripherals, etc. | 5 000 hrs.   | 0.9976              |
| (d) The system as a whole  | 100 000 hrs. | 0.99998             |
  - (iv) Should the duty controller fault when the standby controller is not available a separate and strident audible alarm shall sound in the control room.
  - (v) The response time of the system shall be not more than 1 sec.
14. Power supply for the traffic monitoring system shall be derived from an uninterruptible power supply (UPS) capable of operating the system for not less than two hours.

15. The control panel for smoke extraction/control system shall be situated adjacent to the traffic control room operators position; shall be simple and easy to operate; and shall be clearly labelled as to usage.
16. A full operating and instruction panel and/or manual shall be available at the smoke control panel at all times.
17. In the event of a system failure, a contingency plan to the satisfaction of the Director of Fire Services shall be implemented.

## J. 2 RAIL TUNNELS

To be detailed as required.

## K. CONTROL AND ACTUATION

- K. 1 All systems shall be automatically actuated and shall remain in operation until manually reset. Actuation of the system in each zone or compartment shall be direct from the local Automatic Fire Alarm panel whenever that panel transmits a "Fire" signal to the Fire Services Communication Centre. (see also para. B.25)
- K. 2 When in "fire" mode no system connected therewith shall be controlled or under the influence of any Building Management or Automation System. However, such B.M.S. or B.A.S. may monitor the operations if desired.
- K. 3 No transmission of actuating signals from the automatic fire alarm panel for the operation of the smoke extraction systems shall be effected by multiplex or similar devices unless such devices have the approval or certification of one of the Testing Authorities recognised by the Fire Services Department.
- K. 4 Each system shall be provided with a manual on/off control switch and indicator light at the fire control panel.
  - (a) Switches for all smoke extraction/removal systems shall be grouped in one area of the panel together with those for staircase pressurization systems or the like. Where the smoke extraction/removal system is served by both supply and extract fans, on/off switches for each fan shall be provided.
  - (b) All switches shall have the same method/direction of operation.
  - (c) The indicator light shall be actuated by a device that senses effective operation, such as a centrifugal switch or an air pressure switch, of the relevant smoke/air handling system.
  - (d) All switches and indicators shall be clearly labelled (red letters on white background, not less than 3 mm high) to show operating positions and systems served.
  - (e) A further label shall be provided with letters not less than 6 mm high stating that the controls shall be operated only by authorised personnel.
  - (f) All labels shall be permanent, legible and firmly secured (adhesive is not satisfactory) and shall be lettered in both English and Chinese by engraving or similar.

## L. ELECTRICAL AND AUTOMATIC CONTROLS

- L. 1 All systems shall be as simple as possible. Complex and untried electronic devices shall not be used.
- L. 2 All equipment serving Smoke Removal/Extraction and complementary air make-up systems shall be provided with an electrical supply from both non-essential and essential sources.
- L. 3 Cable routes shall be selected in such a way as to protect them from a fire anywhere in the building and to reduce likelihood of failure due to external mechanical, electrical, or physical, effects.
- L. 4 All electrical wiring, controls, starters, relays, etc. shall be suitable for continuous operation at 250 deg. C for 1 hour. Where pneumatic controls are used these shall be similarly rated. All wiring from the building primary and secondary source of supply for these systems shall comply with these requirements.

However, the following situations are acceptable:—

- (a) Provided the main switchboard is of a type tested, cubicle form, constructed to British Standard 5436 from not less than 2 mm panel steel and is installed in a room having an F.R.P. (including self-closing doors) of not less than 2 hours and containing no other equipment, no further protection will be required for this switchboard. Also no further protection will be required for wiring, cables, or other electrical equipment.

- (b) Sub-distribution boards and/or motor control centres constructed and installed as in (a) are similarly acceptable.

- L. 5 P.V.C. or similar material shall not be used for pneumatic system tubing or components.
- L. 6 All controls and equipment utilised shall be of industrial grade—controls of normal commercial heating, ventilation and air-conditioning quality shall not be acceptable.

**M. STANDBY OR DUPLICATE EQUIPMENT**

- M. 1 In all premises where sleeping normally occurs all fans, motors, drives, starters, etc., shall be installed in duplicate with automatic changeover facilities, should one unit fail to operate for any reason. Each fan/motor/drive set shall be capable of operation on both non essential and essential electrical supplies (as required for para. L.2). This shall be achieved by the two electrical supplies being routed separately into the fan room and then connected into the switchboard, which serves the fan/motor/drive sets, via an automatic changeover device. This switchboard must also be located in the fan room.
- M. 2 In premises where dual purpose systems are utilised and those systems are in regular use for 12 hours per day or more, duplicate plants as detailed in para. M.1 above shall be provided.

**N. COMPLETION, TESTING AND OPERATION**

- N. 1 Ensure tests required under para. B.17 hereof are carried out, recorded and record certified.
- N. 2 Where interaction with other systems is part of the operational mode, all such systems shall also be correctly functioning while commissioning and testing takes place and before a fire certificate will be issued.
- N. 3 "Completion" shall include all necessary permanent labels, instruction plaques, fully detailed operating and maintenance manuals and diagrams, record "as built" drawings, etc.
- N. 4 All systems shall be completed and tested, and the designer is to satisfy himself that they are functioning correctly, before the final full test and demonstration takes place with the Fire Services Inspecting Officers in attendance. A full set of test and functional operation check records (see para. N.7) shall be submitted with the request for the attendance of the Fire Services Inspecting Officers. Accompanying the records shall be a certificate signed by the designer, on behalf of the design company/organization, confirming or otherwise that he is satisfied that the installations are operating in accordance with his design and the requirements of the Fire Services Department.
- N. 5 It is preferable that the format/method of the required operational and functional test be agreed with the Fire Services Department before any such work commences.
- N. 6 Except for simple devices such as pitot-static tubes, inclined manometers, U gauges and the like all instruments, meters, etc. used for testing purposes shall:—
- (a) be provided in duplicate
  - (b) have a manufacturers claimed accuracy of not more than plus or minus two percent of range.
  - (c) shall be manufactured to an appropriate British Standard or recognised equal International or National Standard where appropriate and available.
  - (d) have been calibrated by a recognised testing or calibration laboratory not more than 3 months prior to the date of test. The calibration certificate provided by the laboratory shall be available during the test.
- N. 7 Full and complete records are to be taken of all tests and the results thereof including, not less than:—
- (a) records of pressure testing during construction—see para. B.17
  - (b) make, serial no., type and owner of all instruments used, with a copy of the calibration certificates.
  - (c) actual measurements taken
  - (d) corrected measurements from (b)
  - (e) resulting air flows, current, belt tensions, shaft speeds, etc.
  - (f) make, serial no., type and use of every device checked including rotational speeds, pressure drops, generation, etc.

- (g) date and time of tests
- (h) signature of operator/tester or supervisor and any witnesses for each test
- (i) signature of acceptance of designer

O. *MAINTENANCE AND ANNUAL CERTIFICATION*

- O. 1 Where dedicated systems are installed they shall be actuated at intervals not exceeding three months and checked to ensure that all functions sequence and operate correctly.
- O. 2 Where dual purpose systems are provided they shall be actuated into smoke extraction mode at intervals not exceeding six months and checked as in para. O.1.
- O. 3 Where systems are mixed types the shorter period shall apply.
- O. 4 In addition to the foregoing, at intervals not exceeding 12 months the systems shall be actuated and a full test shall be carried out as described in section N hereof.
- O. 5 All systems shall be maintained in a clean and operating condition at all times. The owner shall ensure that all routine oiling, greasing, etc. is carried out from time to time to ensure reliable operation.
- O. 6 Any fire dampers installed shall be maintained regularly and an annual certificate shall be issued by a Registered Ventilation Contractor in the normal way to comply with the Building (Ventilating Systems) Regulations.
- O. 7 All installations are required to be included in the annual Fire Service Installations Maintenance Certificates issued by the Registered Fire Service Installation Contractor. Such Certificates, when submitted, shall include a copy of the results recorded when carrying out the annual tests detailed under para. O.4 hereof.
- O. 8 A record log shall be maintained for all systems, providing a complete record of the actions carried out under para. O.1 to O.6 hereof and the results thereof under signature of the supervisor and witness.

(ii) *STATIC SYSTEMS*

A. *SMOKE BARRIER*

- (a) The smoke barrier may be permanently fixed or operate only when activated.
- (b) The smoke barrier shall be constructed of substantial non-combustible materials that will resist the passage of smoke and have an F.R.P. of not less than 1 hour when tested to British Standard 476: Part 8 or Parts 20 to 23 inclusive.
- (c) Where a smoke barrier consists of a number of separate units, care shall be taken to ensure smoke resistant junctions or joints. This is particularly necessary when using flexible materials.
- (d) For "below ground" compartments the smoke barrier shall extend to a depth of 800 mm below the lowest beam, obstruction, window head or top of vent opening situated in the compartment.  
For "above ground" compartments the smoke barrier shall extend to a depth of 500 mm below the lowest beam, obstruction, window head or top of vent opening.
- (e) The lowest portion of the smoke barrier, when in the fire position, shall be not less than 2 000 mm above the finished floor.
- (f) If not permanently fixed, the moving parts and any operating mechanism shall be suitable for atmospheric conditions of 35 deg. C and 100% R.H. unless the space is permanently air conditioned. If the space is to be used for any particular process the parts and mechanisms shall be suitable for the most adverse conditions likely to be encountered.
- (g) All movable smoke barriers shall be arranged to "fail safe". That is to move to the "barrier down" position on power failure or any other fault.
- (h) For services, passing through the smoke barrier, having maximum cross-sectional dimensions of 100 mm W × 100 mm H, no fire/smoke stopping shall be required, all other services shall be fire/smoke stopped.

*Note:* Large sized services in the smoke reservoir shall not interfere with the effectiveness of the static smoke extraction system for that reservoir.

## B. SMOKE DISCHARGE

- (a) The smoke discharge may be permanently open or open only when the system activates.
- (b) The free area of the smoke discharge is required to be not less than 2% of the floor area served by the system. Of this not less than half shall be permanently open or automatically actuated.
- (c) If permanent openings are provided, signs shall be permanently displayed on or adjacent to the openings on the inside of the building with the following wording in both English and Chinese:—

THIS OPENING IS A SMOKE VENT.  
DO NOT COVER OR CLOSE

此乃排煙口  
不得遮蓋或關閉

- (d) The lettering shall be not less than 25 mm high, red on a white background. One notice shall be provided for every 3 square metres of opening or at not more than 4 m spacings, whichever is the lesser.
- (e) Openable discharges may open by gravity after a release is actuated or opened by a suitable mechanical or electrical device (operating devices).
- (f) Openable discharges shall be provided with high quality mechanisms and operating devices to suit, at least, the environmental conditions given under para. A.(f) hereof.
- (g) The operating devices for openable discharges shall be manufactured by a recognised reputable manufacturer with not less than two years experience in the production of such devices.
- (h) The operating devices shall be to the approval of the Fire Services Department.
- (i) All discharges shall be arranged to be "fail safe".
- (j) If considered necessary by the designer, manual operating devices may be provided for automatically openable discharges provided such operation does *NOT* interfere with automatic operation.
- (k) The sections of discharges not required to be operated automatically shall be provided with easily operated and accessible quick release operating devices fixed at a height above floor not exceeding 1 800 mm. The minimum possible number of operating devices is desirable.
- (l) All discharges shall be provided with signs as described under para. (c) hereof except the wording shall be:—

THIS OPENING IS A SMOKE VENT.  
DO NOT COVER OR OBSTRUCT

此乃排煙口  
不得遮蓋或阻塞

## C. ACTUATION AND OPERATION

- (a) Systems with permanently fixed smoke barriers and permanently open discharges require no actuation.
- (b) All other systems shall be actuated by smoke detectors installed in accordance with the requirements of the Fire Services Department.
- (c) It is recommended that a cross-zoned system be utilised for the smoke detectors to reduce false alarms, especially under industrial conditions.
- (d) The smoke detector installation may be zoned, at the discretion of the designer, to serve only one smoke compartment or several smoke compartments.
- (e) Electrical supplies for the automatic operating devices/actuators where necessary for operation and for the detector installation shall be provided with an approved secondary source i.e. batteries or emergency generator where electrically operated or a pressure receiver having a capacity double that required to operate all units once, if air actuated.

**D. INSPECTION AND TESTING OF NEW INSTALLATION**

- (a) On completion of the installation the whole shall be inspected by the Registered Fire Service Installation Contractor. For installations with permanent barriers and/or exhaust openings this shall ensure that all barriers and openings are properly provided also all labels provided and fixed.
- (b) For systems without permanently fixed barriers and openings, all devices shall be checked in the non-operated position; the actuation system shall then be operated and all devices checked to ensure they have operated correctly.
- (c) All components shall then be reset to the non-operated position and the power source removed. All devices shall again be checked to ensure that all have correctly "failed safe" i.e. are in the fire position.
- (d) Ensure all labels and instructions are provided.
- (e) Following successful completion of the above procedures the Registered Fire Service Installation Contractor shall submit form F.S. 501 to the Fire Services Department for inspection.
- (f) The Fire Services Department inspection will repeat and record the above inspections and operational tests.

**E. ANNUAL INSPECTION**

- (a) The installation shall be installed, inspected and a certificate issued annually by a Registered Fire Service Installation Contractor to ensure that they are in efficient working order in accordance with the Fire Service (Installations and Equipment) Regulations.
- (b) The inspections shall include all actuation, checking of notices, etc. as described under section D hereof.

**5.24 Sprinkler systems****(i) SPECIFICATION**

Such systems shall be designed and installed in accordance with Fire Offices' Committee Rules (with suitable modification pertinent to Hong Kong) or other standards acceptable to the Director of Fire Services.

For the avoidance of doubt, a system is deemed to commence at the point of entry, to the building, of the pipework.

(See Water Supplies—Section 5.28)

**(ii) TESTING**

The testing procedure shall be in accordance with the appropriate standard or as required by the Director of Fire Services.

**5.25 Supply tank****(i) SPECIFICATION**

Supply tank for fire hydrant and hose reel installation of adequate capacity shall be provided when a wet system is installed in a building.

The tank shall be fed from such source of supply approved by the Water Authority and the Director of Fire Services.

The tank may be used for the combined storage of domestic (e.g. flushing) and fire fighting water provided that the maximum potential draw off by domestic services can in no way diminish the supply for fire fighting below the required reserve.

The minimum quantity of water required to be available, having regard to the floor area factor of the largest floor is as follows:

| Floor area (gross)   | Water storage required        |
|--|-------------------------------|
| Not exceeding 230 m <sup>2</sup> .....                             | 9 000 L ( 9 m <sup>3</sup> )  |
| Over 230 m <sup>2</sup> but not exceeding 460 m <sup>2</sup> ..... | 18 000 L (18 m <sup>3</sup> ) |
| Over 460 m <sup>2</sup> but not exceeding 920 m <sup>2</sup> ..... | 27 000 L (27 m <sup>3</sup> ) |
| Over 920 m <sup>2</sup> .....                                      | 36 000 L (36 m <sup>3</sup> ) |

A non-ferrous non-return valve to be provided between the downcoming main and the fixed fire pump.



(ii) *TESTING*

No test is appropriate other than periodic checking for water leakage.

**5.26 Ventilation/air conditioning control systems**(i) *SPECIFICATION*

"Ventilation/air conditioning system" refers to a mechanical ventilating system defined as follows:—

Any air moving system, with the exceptions as listed hereunder, utilizing both a fan and duct, to mechanically force air into, around, or out of, any building or part thereof and includes systems which contain devices for reducing or increasing the temperature and/or humidity of the air inside any building, or part thereof, below or above the temperature of the external air for the purpose of environmental control.

The following mechanical ventilating systems shall be exempted from these requirements:—

- (a) Any mechanical ventilating system forming part of the Fire Service Installations and installed solely for fire protection or fire fighting purposes i.e. Staircase Pressurization Systems and Smoke Extraction Systems.
- (b) Individual, self contained or split type, direct expansion room cooling units not connected to ductwork systems.
- (c) Minor mechanical ventilating systems which comply with ALL of the following criteria:—
  - (1) all air distribution ductwork systems are contained within the same compartment.
  - (2) the air flow rate handled by each air distribution ductwork system does not exceed 1 000 litres per second.
- (d) Mechanical ventilating systems handling toxic gas or grease/air mixtures i.e. fume cupboard ventilation, kitchen ventilation, systems handling toxic gases/explosive gases, etc.
- (e) Mechanical ventilating systems where all air is supplied at low level and/or extracted (not recirculated) at high level.
- (f) Individual plant rooms, and individual toilets which are mechanically ventilated directly (i.e. ventilating system not serving other areas) to outside.

The objective of this requirement is, in the event of fire, to reduce air movement within the affected compartment i.e. to allow smoke to rise and form a layer at ceiling level which will not be disturbed by the introduction of air into that smoke layer.

Any one of the following methods of override control shall be used:—

Method "A"—If the compartment/unit is provided with a smoke detector automatic fire alarm system, on activation of that system all fans serving the compartment shall be shut down.

Method "B"—Smoke detectors of a type suitable for use in air ducts, shall be installed in the exhaust and/or recirculation ductwork serving the compartment/unit, which on sensing smoke, will automatically shut down all fans in the mechanical ventilating system serving the compartment/unit.

Method "C"—The override control can be arranged to completely shut down all the fans in the building instead of isolated compartments/units, but this could lead to inconvenience for the building users. The actuation shall be provided by the building smoke detector automatic fire alarm system.

If the designer wishes the override control can, in addition, also be actuated by the sprinkler system.

In addition to Method "A", Method "B" or Method "C", manual override switches shall be provided at the central fire control panel to allow the engineering staff of the Building Operator, or the Fire Services Department personnel, to switch off the fans for all the mechanical ventilating systems serving the building in the event of an emergency.

*Notes:* (a) For Method B, the smoke detectors installed in the exhaust and/or recirculation ductwork shall be considered as part of the mechanical ventilating system and not a Fire Service Installation.

- (b) For buildings where central mechanical fresh air supply and/or exhaust systems are installed, either
- (1) the central fresh air supply and/or exhaust system shall be shut down,
- or
- (2) the central fresh air supply and/or exhaust system shall not required to be shut down but the fresh air and/or exhaust to the affected compartment/unit shall be closed off from the central system by actuation of a local motorised smoke damper.
- (c) Shut down of the mechanical ventilating systems utilizing a multiplex automatic fire alarm or Building Automation System shall be permitted so long as the multiplex system is on the Fire Services Department list for this type of equipment/system.

(ii) *TESTING*

The override control of the mechanical ventilation system shall be tested to ensure satisfactory operation to the approval of the Director of Fire Services.

The operation of this override control system, shall be tested at least once every six months and the results entered in a log book, by the Building Owner. This log book shall be kept on the premises and be available for inspection by the Director of Fire Services at any time.

**5.27 Water spray systems**

(i) *SPECIFICATION*

Such systems shall be installed in accordance with the standards acceptable to the Director of Fire Services.

(ii) *TESTING*

The testing procedure shall be in accordance with the appropriate standard or as required by the Director of Fire Services.

**5.28 Water supplies**

(i) *SPECIFICATION*

All fixed systems using water will be served by water from at least two supplies to the satisfaction of the Director of Fire Services and Water Authority.

The types of supply as listed in Fire Offices' Committee Rules are acceptable EXCEPT

- (a) Town main with either a pressure tank, gravity tank or elevated private reservoir;
- (b) Town mains with automatic pump.

However, due to possible disruption of water supplies from town mains during water restriction periods, unless the town main is on 24 hour supply, provision must be made to guarantee 30 minutes stored supply, the town main feeding the storage tank.

(ii) *TESTING*

No actual testing of water supplies is appropriate other than periodic checking for leaks.