# GENERAL REQUIREMENTS FOR OBTAINING FIRE DIRECTORATE CLEARANCE FOR ANY BUILDING PLAN

West Bengal Fire & Emergency Services Directorate





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#### <u>MESSAGE</u>



Regulatory clearances involved in the process of construction have no doubt proliferated over a period of time due to the lessons learnt from various unhappy incidents. They have in turn added to the 'regulatory burden' that every person/organisation needs to comply with if a building were to be utilised by many and have public to ensure the safety and security of users and eliminate any chance of injury/death to the user(s).

2. Every building is 'sui generis' in character and hence an endeavour has been made to prescribe certain universal codes like NBC Part IV, IS Codes etc. to meet all the fire safety requirements of most buildings but for some buildings particular requirements could still subsist. We have taken up the on-line processing of the applications and that should be implemented shortly within this year which we hope would increase the transparency and expedite the preparation of applications and their disposal.

3. The General Requirements prepared by the Fire Directorate is an collaborative effort and we would like to record our sincere thanks and appreciation for the contribution made by the Bengal Chapters of CREDAI and the Indian Institute of Architects. This is yet another milestone in our long standing collaboration with stakeholders to simplify, demystify and present regulatory requirements in an easy and intelligible manner.

4. Lastly, it is our endeavour to reform our systems by simplifying them and by weeding outmoded procedures to grant clearances which may impede in the current scenario as well as to improve the regulatory framework for business which will improve the investment climate in the State. I must thank the Director General Fire & Emergency Services, Shri Sanjoy Mukherjee, IPS for the efforts he has taken to prepare this document which is one step in a series of measures that he has taken to streamline regulatory procedures and expedite the disposal of applications.

nu (S.Suresh Kumar)



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## INTRODUCTION

Dear fellow citizen,

We in Fire Directorate, West Bengal are reinventing ourselves, as some of you may know. Large purchases of technologically advanced firefighting equipment are being made, including many Fire Engines. We are rapidly expanding our footprint of Fire Stations in West Bengal. Regarding firefighting, our core competence, our abiding philosophy is Speedy Response, coupled with Massive Response. Consequently, potentially serious fires have been competently controlled, such those at Jindal House, Chatterjee International Centre, Citi Mart and New Market. Building Awareness for fire prevention has been given a huge boost, through traditional means as well as personalised Advisories to controlling officers of sensitive high footfall buildings such as educational buildings, malls, markets, etc.

But more than half our work is regulatory, seeking to ensure that fire is prevented at the outset, through strict adherence to Government Acts, Rules and Codes.

The storage or processing of hazardous or flammable substances requires a fire LICENSE, whose procedure is fairly straightforward.

However, high rise (above G+IV storeys) and high risk buildings (as notified in Notification No 279/DS/FS/O/C-1/FIA-3/96, Dated: 08th July, 2003) require a different procedure. Before construction, two copies of the plan have to be submitted to Director General, Fire (DG) with a request for FSR (Fire Safety Recommendation, earlier known as Provisional NOC). These are studied by an Inspector in this Directorate, who either raises queries to the applicant, or makes a draft Recommendation as to the fire and life safety measures that the proposed building should incorporate. These draft recommendations are then thoroughly scrutinised by the Technical Expert Committee (TEC) of this Directorate, who recommend to DG whether the draft recommendations, the applicant (developer etc.) submits proof of deposit of the Government monetary Demand (according to a precise monetary scale), and then collects the FSR.

On the basis of the FSR, the applicant constructs the building, in strict adherence to the directives of this Directorate contained in the Fire Safety Recommendation (FSR), and then informs the DG that his new building is ready for Fire Directorate inspection.

This Directorate now sends an Inspector who checks the building for strict compliance with the FSR given earlier. The Inspector's report on compliance, if favourable, is again placed before TEC which may raise queries, recommend a more high-level inspection, or recommend its acceptance by DG. In the last case, the DG issues the FSC (Fire Safety Certificate, earlier known as final NOC or NOC for occupancy) to the applicant, and the building is now fully clear from the Fire point of view, until the time of annual renewal of the FSC.

In this complex process, we deeply feel the need to enhance transparency in the Directorate, while further increasing speed and reducing discretion which would increase predictability and transparency.

By all accounts, there have been significant improvements in this process in recent months, regarding both transparency and speed. The regular meetings of the TEC have resulted in zero pendency most of the time, of both FSRs and FSCs, at the level of TEC and DG. Still, we are keenly aware that there is scope for improvement at our lower levels, and these issues too are being addressed.

The document I place before you now is intended to further increase both the predictability and transparency of the FSR/FSC process. The FSR in particular is unique for each building, not only because buildings belong to different categories (malls, hospitals, schools, multi-storied residences, etc.), but are also uniquely located with regard to surrounding roads and neighbouring buildings. Our TEC (Technical Expert Committee) thus issues a unique FSR for virtually each building. However, if the applicant incorporates some key principles of fire safety considered by the TEC and this Directorate, the proposed building design may be greatly simplified.

Now, all over India, apart from the fire statutes, bye-laws of local bodies etc., the standard code followed for designing fire and life safety is the National Building Code of India, Part 4 (NBC, Part 4). Please do go through this. You will, of course, first see what category of building your proposed construction comes under, which is clarified by NBC Part 4.

While the NBC makes recommendations, we in this Directorate follow it closely, as is the case in the rest of India. We also refer to other Codes where relevant, such as Indian Standard, NFPA (National Fire Protection Association, USA), British Standard, etc.

As a general guideline for preparing yourself for submission of plan to this Directorate for obtaining FSR or FSC (especially the former) we have prepared this document, "General Requirements for obtaining Fire Directorate clearance for any building Plan". The General Requirements contained in this document are a handy set of guidelines which advise you what this Directorate or the TEC will look for when you submit plans seeking an FSR. (Revised FSR, and FSR for existing buildings, perforce, are still more customised).

It should be very clear that this document is a handy set of hints to the applicant about to seek FSR or FSC, but is no way binding on the Directorate. Hence, using this document for fruitless litigation is to be avoided. For that matter, NBC Part 4 is itself recommendatory, if only because each building is unique with respect to plan and situation. Above all, in no way is this document a substitute for NBC Part 4, or the existing statutes, Rules and Bye-laws, or for that matter the deliberations of the Technical Expert Committee (TEC) or of this Directorate.

Suggestions for further improvements to this document, "General Requirements for obtaining Fire Directorate clearance for any building Plan" may be e-mailed at dg.wbfes@gmail.com. Fire away!

We are grateful to the senior officers of this Directorate who have produced this valuable document. We are especially grateful to the CREDAI (Confederation of Real Estate Developers'

Association of India) Bengal team, as well as the West Bengal Chapter of the Indian Institute of Architects (IIA). We are particularly grateful to the esteemed members of the TEC, whose deliberations have guided and influenced this document. The trusty Confidential Section of this Directorate has honed this document with characteristic dedication.

It is quite possible that you would be approached by intermediaries who would offer to expedite the disposal or even from the officials. It would be helpful if these illegal contacts are reported to:

> Anti-Corruption Branch, 9<sup>th</sup> Floor, New Secretariat Building, Kolkata-700 001 Control Room No. 033 22625400

Our guiding light has been the State Government's commitment to empower the citizen. If you, dear citizen, feel that these General Guidelines somewhat diminish the discretionary power of this Directorate, we shall feel rewarded for our pains.

5th May, 2016

Kolkata

(Sanjoy Mukherjee) **Director General** West Bengal Fire & Emergency Services

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## Abbreviations

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A.M.L.C.P.	Automated Multi-Level Car Parking.
B.I.S.	Bureau of Indian Standards.
F.C.D.	Fire Check Door.
F.S.C.	Fire Safety Certificate.
F.S.R.	Fire Safety Recommendation.
G.O.	Government Order.
H.V.	High Voltage.
I.S.I.	Indian Standards Institute.
L.P.M.	Litres Per Minute.
L.V.	Low Voltage.
M.O.E.F.A.	Manually Operated Electrical Fire Alarm.
M.R.L. Lift	Machine Roomless Lift.
N.B.C.	National Building Code.
N.O.C.	No Objection Certificate.
P.L.C.	Programmable Logic Controller.
T.E.C.	Technical Expert Committee.

# **GENERAL REQUIREMENTS**

# FOR OBTAINING FIRE DIRECTORATE CLEARANCE FOR ANY BUILDING PLAN

## THE UNDERLYING PHILOSOPHY: PREVENTION IS BETTER THAN CURE

Fire and life safety measures are critical and required features in any new construction. If adhered to in the true sense as per the codes, they will save lives in an emergency. Therefore, due consideration is necessary to incorporate passive protection measures from the design stage. Further, provisions need to be made to allow active protection in case of an emergency. These measures vary from building to building based on type and occupancy. Safety measures must not only by theoretical but also practically implemented with regular care and maintenance, training, and regular evacuation and fire fighting drills. The objective is the maximum preservation of life and property.

#### PLEASE HEED THIS :

- Some of the terms used in the documents are technical and may be clarified by your architect. Larger builders may have employed a Fire Consultant. However, in the name of Consultants, do not hire touts who will claim to intermediate between you and this Directorate. Approach senior officers of this Directorate directly, including the Director General when necessary.
- 2. In keeping with the citizen-friendly philosophy of the State Government, we hope to bring the FSR/FSC process online soon.
- 3. While reading the guidelines below, please use your common sense to estimate the importance of each such guideline. For example, if the driveways around the building, and the entrance gates, are not broad enough, the fire tenders cannot access the fire. If the driveway is obstructed, or constructed without a minimum clearance throughout (including the gate) our huge aerial ladders will not be able to enter and move, to rescue people from high-rise buildings.
- 4. Installing all the equipment and obtaining FSC, is quite useless if the equipment is not maintained regularly, and checked periodically. For example, many fire extinguishers need periodic refilling.
- 5. Use only I.S.I. brand equipment as they are certified by the B.I.S.
- 6. Such periodic checking is best done before annual renewal of the FSC, which is compulsory by law.
- 7. You must also know how to use the different types of equipment, and what to do/where to go, if a fire breaks out. Hence periodic fire drills and evacuation drills are compulsory.
- 8. Good housekeeping is a must. This means looking after the entire building like the inside of your own home. Passageways like stairs and corridors must be free of obstruction, no flammable materials should be stored illegally or carelessly, and so on.

- 9. Other than the owner or builder of a building, the occupier or tenant of the building is also legally responsible for fulfilling fire prevention and fire safety measures, with particular reference to Section 11 C of the West Bengal Fire Service Act 1950.
- 10. Please reference the West Bengal Fire Service Act 1950 and the attendant Rules, Notifications as well as the National Building Code of India, Part 4

#### ROLE OF FIRE DIRECTORATE OF WEST BENGAL :

Under the provision of Section 3AA one Fire Prevention Wing consisting of inspecting officers under the supervision of one Divisional Fire Officer and Director (Fire Prevention) exists in the Fire Directorate. They have the responsibility to ensure required fire and life safety of any high-risk building within their respective jurisdiction. All applications for issue of Fire Safety Certificate (FSC) received from the owner/occupier of any high-risk building are processed by those inspecting officers for issuance of required Fire Safety Recommendations (FSR) in accordance with the relevant Building Codes. On compliance of the same, the Director General issues FSC for that particular occupancy.

#### **ROLE OF TECHNICAL EXPERT COMMITTEE :**

As per G.O. NO. 1426/FES/Secy./195/211 (Pt.-1), Dated:28/08/2014, a Technical Expert Committee comprising of 07 members has been constituted under the chairmanship of Director General by the Government. It is responsible for scrutiny of all proposals and recommending the granting of FSR and FSC for any high-risk building beyond G+V Storeys in height. This committee meets fortnightly to scrutinize all proposals. Once satisfied, they recommend issuance of either the FSR or the FSC by the Director (Fire Prevention) or by the Director General respectively.

#### THE WEST BENGAL FIRE SERVICES ACT, 1950 :

Under the provision of Section 11 C of the West Bengal Fire Services Act 1950 owners or occupiers of high-risk buildings are legally obligated to provide fire prevention and fire safety measures and ensure proper maintenance of equipment. Further, under the above provision owners or occupiers of a high-risk building, shall obtain FSC from the Director General and renew the same annually.

#### ONLINE ISSUE OF FIRE SAFETY RECOMMENDATIONS (FSR) AND FIRE SAFETY CERTIFICATE (FSC) :

The West Bengal Fire and Emergency Services (WBFES) Directorate is going online shortly. This will ensure easy, anywhere and anytime access to Government Services, reduce the number of visits of citizens to a Government Office, reduce administrative burden, cost and service fulfillment time for the Government, encourage e-interaction, and enhance the perception and image of the Department.

#### **GENERAL REQUIREMENTS:**

The following general requirements should be considered while drawing up plans for any class of occupancy, which needs fire clearance. While applying for revised FSR, changes should be clearly indicated in the revised drawing superimposed over the existing drawing either by dotted line or with red and yellow color shades as per the existing practice.

### 1. Maximum Height :

Every building shall be restricted by height above ground level depending on its occupancy and associated height stipulations in the National Building Code of India. Classification of buildings based on occupancy as per NBC Part 4 is as follows :

Group A	Residential
Group B	Educational
Group C	Institutional
Group D	Assembly
Group E	Business
Group F	Mercantile
Group G	Industrial
Group H	Storage
Group J	Hazardous

- Buildings above 15 mtrs. height Not permitted for group A1 (Lodging or rooming houses), A2 (One or two family private dwellings), group G3 (High Hazard Industries), group H (Storage Building)&J (Hazardous Building).
- Buildings above 30 mtrs. height Not permitted for group B (Educational), group C (Institutional), group D (Assembly) and group F (Mercantile).
- Buildings above 18 mtrs. height Not permitted for group G1 (Low Hazard Industries), group G2 (Moderate Hazard Industries).
- No height restrictions for buildings in A5 (Hotels), A6 (Starred Hotels) and group E (Business Buildings).

[Rationale: Hazard as well as risk of the building depends upon the height and use of the building, so category of building with its height and use will be followed as per NBC Part 4 since this is the minimum requirement.]

#### 2. Side Open Space :

- (a)The side open space around a building shall conform to requirements of relevant statutes & bye-laws of that area in accordance with building height while keeping in mind that maneuvering of fire vehicles for fire fighting and rescue is ensured.
- (b) In general minimum driveway for movement of fire tenders and aerial ladders around the building shall be as follows:

SI. No.	Building Height	Required Side Open Space
1.	Building height upto 20 mtrs.	4 mtrs.
2.	Building height from 20 mtrs. upto 40 mtrs.	5 mtrs.
3.	Building height from 40 mtrs. upto 60 mtrs.	6 mtrs.
4.	Building height 60 mtrs. and above	6 mtrs. with 15 x 9 mtrs. clear space below each refuge area, for jacking and working of aerial ladder for rescue from refuge area.

- (c) The compulsory open spaces around the building shall not be used as parking space.
- (d) In order to ensure easy entry and exit of fire vehicles the main entrance and exit gate shall be minimum 4.5 mtrs. width and 5 mtrs. height. There shall be no obstruction of required height clearance (5 mtrs.) all along the driveway. This is the minimum height needed for free movement of large fire tenders, and especially the massive aerial ladders.

[Rationale: Requirement of side open space for buildings of different height have been stipulated by keeping in mind the minimum clearance required for easy maneuvering and operation of different types of fire appliances including aerial ladder of 30 to 90 mtrs. of height, to be utilised for tackling any emergency situation.]

#### 3. Width of abutting road :

For high rise buildings above 30 mtrs. of height, the width of the main street on which the building abuts shall not be less than 12 mtrs. and not terminating in a dead end and one end of this street shall join another street not less than 12 mtrs. in width.

[Rationale: 9 mtrs. width is required for anchoring of aerial ladder in the street and another 3 mtrs. width are also required for other small vehicle movement like Ambulance, Police vehicle, etc. Thus requirement of our 12 mtrs. abutting road will stand.]

#### 4. Provision of service ducts/shafts :

All vertical or horizontal openings in walls or floors for various services shall be protected by enclosure in the form of ducts/shafts having minimum 2 hrs. fire rating.

#### 5. Enclosed vertical openings :

Every vertical opening between the floors of a building shall be suitably enclosed or protected to prevent spread of fire, smoke, or fumes through vertical openings from floor to floor so that occupants can use the same as means of egress in case of fire.

#### 6. Exit Requirements :

Sufficient number of exits of suitable height and width as per associated occupants load shall have to be provided to ensure safe escape of occupants.

Occupants per Unit Exit Width				
SI.	Group of Occupancy	Number of Occupants		
No.		Stairways	Ramps	Doors
1	Residential (A)	25	50	75
2	Educational (B)	25	50	75
З	Institutional (C)	25	50	75
4	Assembly (D)	40	50	60
5	Business (E)	50	60	75
6	Mercantile(F)	50	60	75
7	Industrial (G)	50	60	75
8	Storage (H)	50	60	75
9	Hazardous (J)	25	30	40

[In this point, 2 nos. of staircases are recommended from evacuation point of view, other than residential building below 15 mtrs. height with 1.5 mtrs. width stair case, maintaining travel distance.]

#### 7. Arrangement of Exits :

Exits shall be so arranged that the travel distance on the floor shall be within the stipulated limits (Table below) as per National Building Code for a particular class of occupancy and should not be more than half of that travel distance from the dead end of a corridor with the exception that for assembly and institutional occupancies it shall not exceed 6 mtrs.

Travel Distance for Occupancy and Type of Construction				
SI.	Group of Occupancy	Maximum Travel Distance (in mtrs.)		
No.		depending on the Type of Construction		
		Types 1&2	Types 3&4	
1	Residential (A)	30.0	22.5	
2	Educational (B)	30.0	22.5	
3	Institutional (C)	30.0	22.5	
4	Assembly (D)	30.0	30.0	
5	Business (E)	30.0	30.0	
6	Mercantile (F)	30.0	30.0	
7	Industrial (G)	45.0	NP	
8	Storage (H)	30.0	NP	
9	Hazardous (J)	22.5	NP	

NB 1: Construction of type 3 & 4 is not permitted.

NB 2 : The smaller the type number, the greater the fire resistance, and hence the greater the permissibility of the concerned building in a Fire Zone of higher risk.

[It is the basic requirement of the travel distance as specified in NBC Part 4. It should be strictly followed.]

#### 8. Number of Staircases :

All buildings having 15 mtrs. of height or above used as educational, assembly, institutional, industrial, storage, hazardous occupancies or mixed occupancies with any of the aforesaid occupancies having more than 500 sg. mtrs. floor area shall be provided with minimum of two staircases of enclosed type of required width placed as far from each other as possible, complying with the travel distance requirements for that particular class of occupancy.

[Rationale: In this point, 2 nos. of staircases are recommended from evacuation point of view, other than residential building below 15 mtrs. height with 1.5 mtrs. width stair case, maintaining travel distance.]

#### 9. Exit Doorways :

Every exit doorway having width as per occupancy class requirements shall open into an enclosed stairway or a horizontal exit of a corridor or passageway providing continuous and protected means of egress.

#### 10. Corridors and passageways :

Exit corridors and passageways shall have adequate width as stipulated for a particular class of occupancy.

#### 11 Internal Staircases :

Required numbers (occupancies having more than 500 sq. mtrs. floor area shall be provided with minimum of two staircases) of completely enclosed type internal staircases having required fire rated check door, not surrounding the lift shaft, having sufficient width (Table Below) as per occupancy shall have to be provided.

S I.	Оссирапсу Туре	Width of Staircase (in mtrs.)
NO.		
1.	Residential Buildings	1.0
2.	Residential Hotel Buildings	1.5
3.	Assembly Buildings	2.0
4.	Educational Buildings up to 30 mtrs	1.5
5.	Institutional Buildings	2.0
6.	All other Buildings	1.5

#### 12. External Staircases :

External Staircases directly connected to the ground having remote and separate entrance from the internal staircase having flight width not less than 1250 mm shall have to be provided for high-rise buildings. It is applicable for buildings up to 15.5 mtrs. in height.

#### 13. Refuge Areas :

For buildings more than 24 mtrs. in height, refuge area of 15 Sq. mtrs. or an area equivalent to 0.3 Sq. mtrs. per person to accommodate the occupants of two consecutive floors, whichever is higher, shall be provided on the floor immediately above 24 mtrs. and then after every 15 mtrs. interval on the periphery of the floor or on a cantilever projection open to air, protected with suitable railings and FCD of 1 hr. fire rating. In exceptional cases, a verandah accessible to all flats/units of a building in each floor with at least a 3000 mm wide external opening, can be considered as refuge area subject to the fulfillment of the requirements of refuge area.

#### 14. Horizontal Exits :

The width of horizontal exit shall be same as for the exit doorways. A horizontal exit shall be equipped with at least one fire/smoke check door of minimum 1 hr. fire rating of self closing type.

#### 15. Fire Towers :

Very tall buildings should have the provision of fire towers constructed of walls with a two hours fire resistance rating without openings other than the exit doorways, with platforms, landings and balconies having the same fire resistance rating. Fire tower to be provided for buildings above 24 mtrs. in height as per existing standard code of practice.

#### 16. Compartmentalization :

High Rise Buildings should be suitably compartmentalized so that fire/smoke remains confined to the area where fire incident has occurred and does not spread to the remaining part of the building.

#### 17. Lifts :

- (a) Walls of lift enclosures shall have a fire rating of 2 hrs., lift shafts shall have a vent at the top, of area not less than 0.2 sq. mtr.
- (b) Lift motor room shall be located preferably on top of the shaft and separate from the shaft by the floor of the room. However for M.R.L. Lifts, this is not applicable.
- (c) Landing doors in lift enclosures shall have a fire resistance of not less than 1 h.

- (d) The number of lifts in one row for a lift bank shall not exceed 4 and the total number of lifts in the bank (of two rows) shall not exceed 8. A wall of 2 h fire rating shall separate individual shafts in a bank.
- (e) Lift car door shall have a fire resistance rating of half an hour.
- (f) Collapsible gates shall not be permitted for lifts and shall have solid lift doors with fire resistance of at least 1 h.
- (g) If the lift shaft and lobby is in the core of the building, a positive pressure of 50 Pascals shall be maintained in the lift shaft. The mechanism for pressurization shall act automatically with the fire alarm; it shall be possible to operate this mechanically also.
- (h) Exit from the lift lobby, if located in the core of the building, shall be through a self-closing smoke stop door of half an hour fire resistance.
- (i) Lifts shall not normally communicate with the basement; if, however, lifts are in such communication, the lift lobby of the basements shall be pressurized as in (g), with self-closing door as in (h).
- (j) Grounding switch(es), at ground floor level, shall be provided on all the lifts to enable the fire service to ground the lifts.
- (k) Telephone or other communication facilities shall be provided in lift cars for building of 30 m height and above. Communication system for lifts shall be connected to fire control room for the building.
- (I) Suitable arrangements such as providing slope in the floor of lift lobby shall be made to prevent water used during fire fighting, etc., at any landing from entering the lift shafts.
- (m) A sign shall be posted and maintained on every floor at or near the lift indicating that in case of fire, occupants shall use the stairs unless instructed otherwise. The sign shall also contain a plan for each floor showing the locations of the stairways.

Alternate source of power supply shall be provided for all the lifts through a manually operated changeover switch.

- (n) Fire lifts: For every type of high rise buildings, fire lift is required. Following details shall apply for a fire lift:
  - (1) To enable fire services personnel to reach the upper floors with the minimum delay, one fire lift per 1200 m2 of floor area shall be provided and shall be available for the exclusive use of the fireman in an emergency.
  - (2) The lift shall have a floor area of not less than 1.4 m<sup>2</sup>. It shall have loading capacity of not less than 545 kg (8 persons lift) with automatic closing doors of minimum 0.8 m width.
  - (3) The electric supply shall be on a separate service from electric supply mains in a building and the cables run in a route safe from fire, that is, within the lift shaft. Lights and fans in the elevators having wooden paneling or sheet steel construction shall be operated on 24 V supply.
  - (4) Fire fighting lift should be provided with a ceiling hatch for use in case of emergency, so that when the car gets stuck, it can be easily opened.
  - (5) In case of failure of normal electric supply, it shall automatically trip over to alternate supply. For apartment houses, this changeover of supply could be done through manually operated changeover switch. Alternatively, the lift shall be so wired that in case of power failure, it comes down at the ground level and comes to standstill with door open.

- (6) The operation of a fire lift is by a simple toggle or two-button switch situated in a glassfronted box adjacent to the lift at the entrance level. When the switch is on, landing callpoints will become inoperative and the lift will be on car control only or on a priority control device. When the switch is off, the lift will return to normal working. This lift is usable by the occupants in normal times.
- (7) The words 'Fire Lift' shall be conspicuously displayed in fluorescent paint on the lift landing doors at each floor level.

The speed of the fire lift shall be such that it can reach the top floor or any refuge floor from ground level within 1 min.

#### 18. Basements :

(a) Each basement shall be separately ventilated. Vents with cross-sectional area (aggregate) not less than 2.5 percent of the floor area spread evenly round the perimeter of the basement shall be provided in the form of grills, or pavement lights or by way of shafts. Alternatively, a system of air inlets shall be provided at basement floor level and smoke outlets at basement ceiling level. Inlets and extracts may be terminated at ground level with stall board or pavement light as before, but ducts to convey fresh air to the basement floor level have to be laid. Stall board and pavement lights should be in positions easily accessible to the fire brigade and clearly marked 'SMOKE OUTLET' or 'AIR INLET' with an indication of area served at or near the opening.

The staircase of basement shall be of enclosed type having fire resistance of not less than 2 h and shall be situated at the periphery of the basement to be entered at ground level only from the open air. Its position must be such that smoke from the any fire in the basement shall not obstruct any exit serving the ground and upper stories of the building. It shall communicate with the basement through a lobby provided with fire resisting self-closing doors of 1 h resistance. If the travel distance exceeds as given in Table 21, additional staircases shall be provided at proper places.

In case the basement is extended, the stairs of the building shall be isolated and terminated to ground at the periphery of the building.

- (b) In multi-storey basements, intake ducts may serve all basement levels, but each basement level and basement compartment shall have separate smoke outlet duct or ducts. Ducts so provided shall have the same fire resistance rating as the required smoke extraction time taken by smoke extraction ducts.
- (c) Mechanical extractors for smoke venting system from lower basement levels shall also be provided. The system shall be of such design as to operate on actuation of heat/smoke sensitive detectors or sprinklers, if installed, and shall have a considerably superior performance compared to the standard units. It shall also have an arrangement to start it manually.
- (d) Mechanical extractors shall have an internal locking arrangement, so that extractors shall continue to operate and supply fans shall stop automatically with the actuation of fire detectors.
- (e) Mechanical extractors shall be designed to permit 30 air changes per hour in case of fire or distress call.
- (f) Mechanical extractors shall have an alternative source of supply.

- (g) Ventilating ducts shall be integrated with the structure and made out of brick masonry or reinforced cement concrete as far as possible and when this duct crosses the transformer area or electrical switchboard, fire dampers shall be provided.
- (h) Use of basement for kitchens working on gas fuel shall not be permitted.
- (i) The basement shall not be permitted below the ward block of a hospital/nursing home unless it is fully covered with sprinklers. However, basement for all building shall be fully sprinklered.
- (j) Building services such as electrical sub-stations, boiler rooms in basements shall comply with the provisions of the Indian Electricity Act/Rules.
- (k) If cut outs are provided from basements to the upper floors or to the atmosphere, all sides cut out openings in the basements shall be protected by sprinkler heads at close spacing so as to form a water curtain in the event of fire.
- (I) Openable windows on external walls shall be fitted with such locks that can be opened by a fireman's axe.
- (m) All floors shall be compartmented with area not exceeding 750 m2 by a separation wall with 2 h fire rating, for floors with sprinklers the area may be increased by 50 percent. In long building, the fire separation walls shall be at distance not exceeding 40 m. For departmental stores, shopping centers and basements, the area may be reduced to 500 m2 for compartmentalization. Where this is not possible, the spacing of the sprinklers shall be suitably reduced. When reducing the spacing of sprinklers, care should be taken to prevent spray from one sprinkler impeding the performance of an adjacent sprinkler head.
- (n) It is essential to make provisions for drainage of any firefighting or other water on all floors to prevent or minimize water damage of the contents of the basements. The drainpipes should be provided on the external wall for drainage of water from all floors. On large area floors several such pipes may be necessary which should be spaced 30 m apart. Care shall be taken to ensure that the construction of the drainpipe does not allow spread of fire/smoke from floor to floor.

#### 19. Pressurization of staircase :

The pressurization of staircases shall be adopted for high rise buildings and building having mixed occupancy/multiplexes having covered area more than 500 m<sup>2</sup>.

Building Height & Pressure Difference				
SI.	Building Height	Pressure Difference		
No.		Reduced OperationEmergency Operation (Stage 2)		
		(Stage 1 of a 2-Stage of a 2-Stage System or Single		
		System) Stage System)		
		Pascals (Pa)	Pascals (Pa)	
1	Less than 15 m	8	50	
2	15 m or above	15	50	

(a) The pressure difference for staircases shall be as under :

If possible, the same levels shall be used for lobbies and corridors, but levels slightly lower may be used for these spaces if desired. The difference in pressurization levels between staircase and lobbies (or corridors) shall not be greater than 5 Pa.

[Rationale: For exclusion of smoke and toxic gases from the protected exit, pressurization of staircases is recommended for high rise buildings and buildings having mixed occupancy/multiplexes and hospitals having covered area more than 500 sqm excluding spaces/areas naturally ventilated.]

- (b) The normal air-conditioning system and the pressurization system shall be treated as an integral one, especially for a two-stage system. When the emergency pressurization is brought into action, the following changes in the normal air-conditioning system shall be effected:
  - (i) Any re-circulation of air shall be stopped and all exhaust air vented to atmosphere;
  - (ii) Any air supply to the spaces/area other than escape routes shall be stopped;
  - (iii) The exhaust system may be continued provided:
    - (1) The position of the extraction grills permit a general air flow away from the protected escape route entry;
    - (2) The construction of the ductwork and fans is such that, it will not be rendered inoperable by hot gases and smoke; and
    - (3) There is no danger of spread of smoke to other floors by the path of the extraction system, which can be ensured by keeping the extraction fans running.
- (c) The pressurization system can be interconnected with the automatic/manual fire alarm system for actuation.
- (d) In case a pressurization system is used, it is preferred that all the staircases in a building be pressurized. The combination of pressurized and naturally ventilated staircases in the same building may be permissible, if they are segregated by suitable compartmentation. Wherever pressurized staircase is to be connected to un-pressurized areas, the two areas shall be segregated.

#### 20. Emergency & Escape Lighting :

Emergency lighting shall be powered from a source independent of that supplying the normal lighting. Escape lighting shall be capable of:

- (a) Indicating clearly and unambiguously the escape routes,
- (b) Providing adequate illumination along such routes to allow safe movement of persons towards and through the exits,

Ensuring that fire alarm call points and fire-fighting equipment provided along the escape routes can be readily located.

The emergency lighting should automatically activate within 1 second of the failure of the normal lighting supply.

The emergency lighting system shall be capable of continuous operation for a minimum duration of 1 hour and 30 minutes even for the smallest premises.

#### 21. Illumination of Means of Exit :

Staircase and corridor light shall conform to the following:

The staircase and corridor lighting shall be on separate circuits and shall be independently

connected so that it could be operated by one switch installation on the ground floor. This control system must be easily accessible to fire fighting staff at any time irrespective of the position of the individual control of the light points, if any. It should be of miniature circuit breaker type of switch so as to avoid replacement of fuse in case of crisis;

- (a) Staircase and corridor lighting shall also be connected to alternative supply. The alternative source of supply may be provided by battery, continuously trickle charged from the electric mains; and
- (b) Suitable arrangements shall be made by installing double throw switches to ensure that the lighting installed in the staircase and the corridor does not get connected to two sources of supply simultaneously. Double throw switch shall be installed in the service room for terminating the stand-by supply.

### 22. Service ducts/Shafts :

- (a) Service ducts and shafts shall be enclosed by walls of 2 hours, and doors of 1 hour fire rating. All such ducts/shafts shall be properly sealed and fire stopped at all floor levels.
- (b) A vent opening at the top of the service shaft shall be provided having between one-fourth and one-half of the area of the shaft.

### 23. Electrical Service :

- (a) The electric distribution cable / wiring shall be laid in a separate duct. The duct shall be sealed at every floor with non-combustible materials having the same fire resistance as that of the duct. Low and medium voltage wiring running in shaft and in false ceiling shall run in separate conduits.
- (b) Water mains, telephone lines, intercom lines, gas pipes or any other service line shall not be laid in the duct for electrical cable; use of bus ducts/solid rising mains instead of cables is preferred.

#### 24. Separate Circuit :

Separate circuits for firefighting pumps, lifts, staircases, corridor lighting and blowers for pressuring system shall be provided directly from the main switch gear panel and these circuits shall be laid in separate conduit pipes, so that fire in one circuit will not affect the others. Such circuits shall be protecting at origin in an automatic circuit breaker. Master switches controlling essential service circuits shall be clearly labeled.

#### 25. The Inspection Panel Doors :

The inspection panel doors and any other opening in the shaft shall be provided with airtight fire doors having fire resistance of not less than 1 hour.

#### 26. Stand-by Electric Generator:

A stand-by electric generator shall be installed to supply power to staircase and corridor lighting circuits, fire lifts, the stand-by fire pumps, pressurization and damper system in case of failure of normal electric supply. The generator shall be capable of taking starting current of all the machines and circuits stated above simultaneously. If the stand-by pump is driven by diesel engine, the generator supply need not be connected to the main electrical pump. Where parallel HV/LV supply from a separate sub-station is provided with appropriate transformer for emergency, the provision of generator may be waived in consultation with the Authority.

### 27. Transformer :

Transformer shall conform to the following :

A sub-station or a switch-station with oil filled equipment shall not be located in the building. The sub-station structure shall have separate fire resisting walls/ surroundings and shall necessarily be located at the periphery of the flow having separate access from fire escape staircase. The outside walls, ceiling, floor, openings including doors and windows to the sub-station area shall be provided with a fire resisting door of 2 hours fire rating. Direct access to the transformer room shall be provided, preferably from outside the fire escape staircase.

### 28. Air-Conditioning System :

Air-conditioning system shall conform to the following:

- (a) Escape routes like staircases, common corridors, lift lobbies, etc., shall not be used as return air passage.
- (b) The ducting shall be constructed of substantial gauge metal in accordance with good practice.
- (c) Wherever the ducts pass through fire wall or floors, opening around the ducts shall be sealed with materials having fire resistance rating of the compartment;
- (d) Where a duct crosses a compartment, which is fire rated, the duct shall be fire rated for same fire rating. Further, depending upon services passing around the duct work, which may get affected in case of fire temperature rising, the ducts shall be insulated;
- (e) As far as possible, metallic ducts shall be used even for the return air instead of space above the false ceiling;
- (f) Where plenum is used for return air passage, ceiling and its fixtures shall be of noncombustible material;
- (g) The materials used for insulating the duct system (inside or outside) shall be of noncombustible materials. Glass wool shall not be wrapped or secured by any material of combustible nature.
- (h) Area more than 750 m<sup>2</sup> on individual floor shall be segregated by a fire wall and automatic fire dampers for isolation shall be provided.
- (i) Air duct serving main floor area, corridors, etc., shall not pass through the staircase enclosure;
- (j) The air-handling units shall be separate for each floor and air ducts for every floor shall be separated and in no way inter-connected with the ducting of any other floor.
- (k) If the air-handling unit serves more than one floor, the recommendations given above shall be complied with in addition to the conditions given below:
- (i) Proper arrangements by way of automatic fire dampers working on smoke detector / or fusible link for isolating all ducting at every floor from the main riser shall be made;
- (ii) When the automatic fire alarm operates, the respective air-handling units of the airconditioning system shall automatically be switched off.
- (I) The vertical shaft for treated fresh air shall be of non-combustible materials;
- (m) The air filters of the air-handling units shall be of non-combustible materials;
- (n) The air handling unit rooms shall not be used for storage of any combustible materials;

- (o) Inspection panels shall be provided in the main trunk to facilitate the cleaning of ducts of accumulated dust and to obtain access for maintenance of fire dampers;
- (p) No combustible materials shall be fixed nearer than 150 mm of any duct unless such duct is properly enclosed and protected with non-combustible materials (glass wool or spun glass with neoprene facing, enclosed and wrapped with aluminum sheeting) at least 3.2 mm thick, which would not readily conduct heat.

#### 29. Fire Dampers :

- (1) These shall be located in conditioned air ducts and return air ducts / passages at the following points:
  - (i) At the fire separation wall;
  - (ii) Where ducts pass through floors, and;
  - (iii) At the inlet of supply air duct and the return air duct of each compartment on every floor;
- (2) The dampers shall operate automatically and shall simultaneously switch off the airhandling fans. Manual operation facilities shall also be provided.

Note:- For blowers, where extraction system and duct accumulators are used, dampers shall be provided.

(3) Fire / smoke dampers (for smoke extraction shafts) for building more than 24 meter in height:

For apartment house - in non-ventilated lobbies / corridors operated by fusible link / smoke detector with manual control.

For other buildings - On operation of smoke detection system and with manual control.

(4) Automatic fire dampers shall be so arranged as to close by gravity in the direction of air movement and to remain tightly closed on operation of a fusible link / smoke detector.

#### 30. Fire Alarm System :

- (a) All buildings with height of 15 m or above shall be equipped with Manually Operated Electrical Fire Alarm (MOEFA) system and automatic fire alarm system in accordance with good practice. However, apartment building between 15 m and 30 m height may be exempted from the installation of the automatic fire alarm system provided the local fire brigade is suitably equipped for dealing with fire in a building of 15 m in height or Above, and in the opinion of the authority, such building does not endanger property or occupants of the building itself.
- (b) Manually operated electrical fire alarm system shall be installed in the building with one or more call boxes located at each floor. The call boxes shall conform to good practice and,
- (c) The installation of call boxes in hostel and such other places where these are likely to be misused shall be avoided. Location of all boxes in dwelling units shall preferably be inside the building.

#### 31. Fire Control Room :

For all buildings 15 m in height and above, and apartment buildings with a height of 30 m and above, there shall be a Control Room on the entrance floor of the building with communication system (suitable public address system) to all floors and facilities for receiving the message from different floors. Details of all floor plans along with the details of firefighting equipment and installations shall be displayed in the fire control room. The

fire control room shall also have facilities to detect the fire on any floor through indicator board's connection, fire detection and alarm systems on all floors. The fire staff in charge of the fire control room shall be responsible for maintenance of the various services and the firefighting equipment and instillations in co-ordination with security, electrical and civil staff of the building.

#### 32. Fire Drills & Fire Orders:

Fire notice / orders shall be prepared to fulfill the requirements of fire fighting and evacuation from the buildings in the event of emergency. The occupants shall be made thoroughly conversant with their actions in the event of emergency by displaying fire notices at vantage points and also through regular training. Such notices should be displayed prominently in broad lettering.

#### 33. Static Water Storage Reservoirs:

A satisfactory supply of water for the purpose of fire fighting shall always be available in the form of underground / terrace level static storage tank with capacity specified below, with arrangements for replenishment by means of alternative source of supply at the rate of 1000 liters per minute for underground static tank. When this is not practicable, the capacity of static storage tank(s) shall be increased proportionately in consultation with the local fire brigade.

SI. No.	Classification	Height Of Building	Reservoir Capacity
1.	Group A - Residential	Up to 15 mtrs.	Not Required
		Above 15 mtrs. up to 24 mtrs.	Not Required
		Above 24 mtrs. up to 45 mtrs.	200000 ltrs.
		Above 45 mtrs. up to 60 mtrs.	250000 ltrs.
		Above 60 mtrs.	350000 ltrs.
2.	Group A - Hotels	Up to 15 mtrs.	200000 ltrs.
		Above 15 mtrs. up to 24 mtrs.	250000 ltrs.
		Above 24 mtrs. up to 45 mtrs.	300000 ltrs.
		Above 45 mtrs.	350000 ltrs.
З.	Group B&C –	Up to 15 mtrs.	75000 ltrs.
	Educational &	Above 15 mtrs. up to 24 mtrs.	100000 ltrs.
	Institutional	Above 24 mtrs. up to 30 mtrs.	150000 ltrs.
4.	Group C – Hospitals &	Up to 15 mtrs.	150000 ltrs.
	Nursing Homes	Above 15 mtrs. up to 30 mtrs.	250000 ltrs.
5.	Group D- Assembly	Up to 15 mtrs.	150000 ltrs.
	Buildings	Above 15 mtrs. up to 24 mtrs.	200000 ltrs.
		Above 24 mtrs. up to 30 mtrs.	250000 ltrs.
6.	Group D - Multiplexes		350000 ltrs.
7.	Group E & F – Business	Up to 15 mtrs.	100000 ltrs.
	& Mercantile Buildings	Above 15 mtrs. up to 24 mtrs.	200000 ltrs.
		Above 24 mtrs. up to 45 mtrs.	250000 ltrs.
		Above 45 mtrs.	350000 ltrs.
8.	Group G – Industrial	Up to 15 mtrs.	150000 ltrs.
	Buildings.	Above 15 mtrs. up to 24 mtrs.	200000 ltrs.
9.	Group H & J – Storage &	Single Storied having 1000 Sq. mtrs. area	200000 ltrs.
	Hazardous Buildings.	Single Storied having more than 1000 Sq. mtrs. area	300000 ltrs.
		Up to 15 mtrs. height	350000 ltrs.

## 34. Wet Riser System :

SI. No.	Classification	Building Status	Wet Riser Requirement
1.	Residential Buildings	Above 15 mtrs. up to 45 mtrs.	100 mm dia riser with single outlet landing valve.
		Above 45 mtrs. In height	150 mm dia riser with twin outlet landing valve.
		Hotel building having above 15 mtrs. height but less than 30 mtrs. In height with floor area not exceeding 600 sq. mtrs.	100 mm dia riser with single outlet landing valve.
		Hotel building above 24 mtrs. In height	150 mm dia riser with twin outlet landing valve.
		Hotel building of 4 & 5 star grade of height above 15 mtrs.	150 mm dia riser with twin outlet landing valve.
2.	Educational Buildings	Above 15 mtrs. up to 30 mtrs.	100 mm dia riser with single outlet landing valve.
3.	Institutional Buildings	Above 15 mtrs. up to 30 mtrs.	100 mm dia riser with single outlet landing valve.
4.	Educational & Institutional Buildings	Above 30 mtrs. In height	150 mm dia riser with twin outlet landing valve.
5.	Assembly buildings	Above 15 mtrs. up to 24 mtrs.	100 mm dia riser with single outlet landing valve.
		Above 24 mtrs. Upto 30 mtrs.	150 mm dia riser with twin outlet landing valve.
6.	Business buildings	Above 15 mtrs. Upto 30 mtrs.	100 mm dia riser with single outlet landing valve.
		Above 30 mtrs.	150 mm dia riser with twin outlet landing valve.
7.	Mercantile buildings	Above 15 mtrs. Upto 24 mtrs.	100 mm dia riser with single outlet landing valve.
		Above 24 mtrs. Upto 30 mtrs.	150 mm dia riser with twin outlet landing valve.
8.	Industrial Buildings	Above 15 mtrs. Upto 18 mtrs.	150 mm dia riser with twin outlet landing valve.
9.	Storage buildings	Above 10 mtrs. Upto 15 mtrs.	150 mm dia riser with twin outlet landing valve.

35. A	35. Automatic Sprinklers :			
SI. No.	Building Classification	Building Status	Requirement of Sprinkler	
1. Residential Buildings	Residential Buildings	Upto 45 mtrs.	To be installed in basement if base area exceeds 200 Sq. mtrs.	
		Above 45 mtrs.	To be installed in the entire building.	
2.	Hotel Buildings	Covered area upto 1000 Sq. mtrs. per floor	To be installed in the basement irrespective of height if basement area exceeds 200 Sq. mtrs.	
		Covered area more than 1000 Sq. mtrs. per floor	To be installed in the entire building irrespective of height.	
		Height 15 mtrs. and above	To be installed in the entire building irrespective of the floor area.	
3.	Educational Buildings		To be installed in the basement if basement area exceeds 200 Sq. mtrs.	
4.	Institutional Buildings	Height Below 15 mtrs.	To be installed in the basement if basement area exceeds 200 Sq. mtrs.	
		Height 15 mtrs. and above	To be installed in the entire building.	
5.	Assembly Buildings	Upto 15 mtrs. Height	To be installed in the basement if basement area exceeds 200 Sq. mtrs.	
		Height above 15 mtrs.	To be installed in the entire building.	
6.	Multiplexes		To be installed in the entire building.	
7.	Business Buildings	Upto 15 mtrs. in height	To be installed in the basement if basement area exceeds 200 Sq. mtrs.	
		Height above 15 mtrs.	To be installed in the entire building.	
8.	Mercantile Buildings	Height upto 15 mtrs.	To be installed in the basement if basement area exceeds 200 Sq. mtrs.	
		Height above 15 mtrs.	To be installed in the entire building.	
9.	Industrial, Storage & Hazardous Buildings		Required to be installed in entire area.	

# 36. Pump Requirement :

SI. No.	Building Classification	Building Status	Requirement of Pumps
1.	Residential Buildings	Upto 45 mtrs.	One electric + one diesel engine pump of LPM + one jockey pump of 180 LPM
	(, (, ', ', ', ', ', ', ', ', ', ', ', ', ',	Above 45 mtrs, below 60 mtrs,	One electric + one diesel engine pump
			of 2280 LPM + one jockey pump of 180 LPM
		Above 60 mtrs.	Two electric + one diesel engine pump of
			2280 LPM + one jockey pump of 180 LPM
	Residential Buildings	Above 15 mtrs. Below 24 mtrs.	Terrace pump of 900 LPM
	(A2 & A4)	Above 24 mtrs. Below 45 mtrs.	One electric + one diesel engine pump of 2280 LPM + one jockey pump of 180 LPM
		Above 45 mtrs. Below 60 mtrs.	One electric + one diesel engine pump of $2280 \downarrow PM + one lockey pump of 180 \downarrow PM$
	Hotels	Upto 1000 Sq. mtrs. floor area	One electric + one diesel engine pump of 180 L PM
		Above 1000 Sa mtrs floor area	One electric $\pm$ one diesel engine nump of
		Above 1000 Sq. mitis. hoor area	$1620 \downarrow PM + one jockey pump of 180 \downarrow PM$
		Above 15 mtrs. Below 24 mtrs.	One electric $\pm$ one diesel engine pump of
			2280 LPM + one jockey pump of 180 LPM
		Above 24 mtrs. Below 45 mtrs.	Two electric + one diesel engine pump of
			2280 LPM + one jockey pump of 180 LPM
		Above 45 mtrs.	Two electric + one diesel engine pump of
			2280 LPM + one jockey pump of 180 LPM
2.	Educational &	Upto 15 mtrs.	Terrace pump of 450 LPM capacity
	Institutional Buildings	Above 15 mtrs. Below 24 mtrs.	Terrace pump of 900 LPM capacity
		Above 24 mtrs. Below 30 mtrs.	Terrace pump of 900 LPM capacity
	Hospital &	Upto 15 mtrs.	One electric + one diesel engine pump of
	Nursing Homes		1620 LPM + one jockey pump of 180 LPM
		Above 15 mirs. Opto 30 mirs.	2280 L PM L and idekey number of 180 L PM
3	Assembly Buildings	Linto 156 mtrs	$O_{\text{P}}$ electric + one diesel engine pump of
0.	Assembly buildings		2280 LPM + one jockey pump of 180 LPM
		Above 15 mtrs. Upto 24 mtrs.	One electric + one diesel engine pump of 2280 LPM + one jockey pump of 180 LPM
		Above 24 mtrs. Upto 30 mtrs.	Two electric + one diesel engine pump of
			2280 LPM + one jockey pump of 180 LPM
	Multiplexes		Two electric + one diesel engine pump of
			2280 LPM + one jockey pump of 180 LPM
4.	Business & Mercantile Buildings	Upto 15 mtrs.	One electric + one diesel engine pump of 2280 LPM + one jockey pump of 180 LPM
		Above 15 mtrs. Upto 24 mtrs.	One electric + one diesel engine pump of
		Above 24 mtrs. Upto 45 mtrs.	Two electric + one diesel engine pump of
			2280 LPM + one jockey pump of 180 LPM
		Above 45 mtrs.	2850 LPM + one jockey pump of 180 LPM
5.	Industrial buildings	Upto 15 mtrs.	One electric + one diesel engine pump of
		Above 15 mtrs Upto 24 mtrs	One electric + one diesel ongine pump of
		Above 15 mus. opto 24 mus.	$2280 \downarrow PM + one jockey number of 180 \downarrow PM$
6	Storage &	Area exceeding 1000 Sq. mtrs	Two electric + one diesel engine nump of
0.		Area exceeding 1000 Sq. IIII's.	$2280 \downarrow PM + one jockey pump of 180 \downarrow PM$
		Upto 15 mtrs. In height	Two electric + one diesel engine pump of
			2850 LPM + one jockey pump of 180 LPM

## 37. Detectors & Alarm System :

Automatic detectors are to be installed as per the following requirement.

SI.	Classification	Building Status	Requirement of detectors
No.			
1.	Residential	Upto 15 mtrs.	Not required.
	Buildings	Above 15 mtrs. upto 60	Manually operated alarm system to be
		mtrs.	installed.
		Above 60 mtrs.	Automatic detection & alarm system to be
			installed in all floor area. Installation of
			additional manually operated alarm
			system is optional.
2.	Hotels		Automatic detection & alarm system to be
			installed in all floor area.
3.	Educational	Above 15 mtrs. Upto 30	Manually operated alarm system to be
	Buildings	mtrs.	installed.
4.	Institutional		Automatic detection & alarm system to be
	Buildings		installed in all floor area.
5.	Assembly		Automatic detection & alarm system to be
	Buildings		installed in all floor area.
6.	Multiplexes		Automatic detection & alarm system to be
			installed in all floor area.
7.	Business		Automatic detection & alarm system to be
	Buildings		installed in all floor area.
8.	Mercantile	Upto 15 mtrs. in height	Manually operated alarm system to be
	Buildings		installed.
		Height above 15 mtrs.	Automatic detection & alarm system to be
			installed in all floor area.
9.	Industrial,	Low & moderate hazard	Automatic detection & alarm system to be
	Storage &	with built up area more	installed in all floor area.
	Hazardous	than 500 Sq. mtrs.	
	Buildings	High hazard with built up	Automatic detection & alarm system to be
		area more than 50 Sq.	installed in all floor area.
		mtrs.	

#### 38. Yard Hydrants :

SI.	Classification	Building Status	Requirement of
1	Residential Buildings	Above 45 mtrs	Required
2	Hotels	Covered area more than 1000 Sq. mtrs	Required
2.		on each floor	
		Above 15 mtrs.	Required
3.	Institutional Buildings	Less than 15 mtrs. with plot area more	Required
		than 1000 Sq. mtrs.	
		15 mtrs. & above	Required
4.	Custodial & Penals	10 mtrs. & above	Required
5.	Assembly buildings	Above 15 mtrs.	Required
6.	Multiplexes		Required
7.	Business buildings	Above 15 mtrs.	Required
8.	Mercantile Buildings	Above 24 mtrs.	Required
9.	Underground shopping		Required
	complexes		
10.	Industrial Buildings	Built up area more than 500 Sq. mtrs.	Required
11.	Storage buildings	Below 15 mtrs. in height with covered	Required
		area more than 250 Sq. mtrs.	
12.	Hazardous Buildings		Required

#### 39. Helipad :

For high-rise buildings above 60 m in height, provision for helipad should be made.

[Rationale: The above provision of helipad is as per existing NBC Part 4. However, NBC is believed to be under revision, and this provision will be stipulated as and when finalized.]

#### 40. Automated Multi-Level Car Parking :

Automated Multi-Level Car Parking (AMLCP) is a method of automatically parking and retrieving cars that typically uses a system of pallets and lifts. The purpose of AMLCP is to compact more cars in the same space. AMLCP can be situated above or below ground, or a combination of both. Multi-level car parks offer provide a fast parking process in which the driver does not have to maneuver his car on each level. If there is no vacant space on the first floor, the lift will automatically go to the second floor and so on. A multi-level car parking is in fact a building with a number of floors or layers for the cars to be parked.

An automated car park has mechanized lifts, which transport the car to the different levels. Therefore, such car parks need less building volume and less ground space and thus save the cost of parking. It also reduces the personnel requirement for monitoring by relying on programmable logic controllers (PLC), which control the entire operation. The PLCs use sensors and actuators to drive an elevator, which carries the car to its designated floor. Availability of parking space is automatically calculated and cars are designated to the first available spot. In case no spots are available, the driver is so informed. To exit, the elevator carries the car to the ground floor. The main objectives are to create a space efficient, cost effective parking and management system for vehicles.

### A. Types of AMLCP :

- (1) Two-step simple stacker parking
- (2) Puzzle parking system
- (3) Stacker crane parking system
- (4) Cart parking system
- (5) Level parking system
- (6) Tower parking system
- (7) Chess parking system

### B. Main hazards associated with AMLCP :

- (a) Close stacking of cars one to another, each containing fuel
- (b) Lack of provision of fire separation to prevent rapid fire spread
- (c) Non-availability of fire fighting access
- (d) Extensive height and depth involved with highly combustible load
- (e) Inaccessibility of interior to firefighters

### C. Fire Safety Provisions for AMLCP :

Fire Safety provisions stipulated for high hazard storage building shall be applicable for AMLCPs. However, there are different types of AMLCP, as above, and within each type each one is unique based on its location within the overall building, nearby buildings and roads, etc. Hence fire safety provisions will differ widely from installation to installation. Inbuilt systems are of VITAL importance in an AMLCP.

#### 41. House Keeping :

To eliminate fire hazards, thorough and a good housekeeping inside the building and outside the building shall be strictly maintained by the occupant's and/or the owner of the building.

#### 42. Trained Fire Personnel :

Trained Fire Personnel under a qualified Fire Officer having requisite experience shall have to be appointed for all high-risk buildings to ensure proper maintenance and operation of all inbuilt fire detection, alarm, & suppression system.

#### 43. Please read our Introduction again ! (Click Here)

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## West Bengal Fire & Emergency Services Directorate

13D, Mirza Ghalib Street, Kolkata, West Bengal, India. Pin : - 700016.

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