GOVERNMENT OF ANDHRA PRADESH
ABSTRACT

Municipal Administration & Urban Development Department – The Andhra Pradesh Fire Prevention and Safety Measures in High-rise Hospital Buildings (above 30 mts height) Rules, 2011 - Orders – Issued.

Municipal Administration & Urban Development (M1) Department

G.O.Ms.No.2 **Dated:03.01.2011**

Read the following:

1. G.O.Ms.No.45 MA&UD (M1) Dept., Dated 04.02.2006
2. From the Director General Fire & Emergency Services Department, A.P. Hyderabad, Lr.No.2444/S2/2008, Dated 07.11.2008 & 03.03.2010.
3. G.O.Ms.No.244 MA&UD (M1) Dept., Dated 07.03.2009.
4. From Commissioner, GHMC Lr. No.218/AD/FPW/GHMC/ 2010 dt: 30.06.2010.
5. Govt Lr. No. 803/M1/2007 dt: 21.08.2010
6. From Home (Pri.A2) Dept, U.O.No.13734/Pri.A/A2/2008-9, dt: 18.11.2010

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O R D E R:

In the GO 1st read above, orders were issued constituting High Power Committee pursuant to the Hon'ble High Court orders dated 24.01.2006 in W.P.No.26365 of 2005 to go into all aspects of buildings constructed (Multistoried or otherwise) without obtaining No Objection Certificate from Fire Service Department in violation of statutory provisions and to make comprehensive suggestions for taking remedial steps for Fire Protection and Safety Measures in all such buildings.

2. The Director General of Fire & Emergency Services, A.P. Hyderabad in her letter 2nd read above has informed that according to Section 13 (2) of the Andhra Pradesh Fire service Act, 1999 " the Director General or any member of the service duly authorized by him in this behalf, shall within sixty days of receipt of such application, on being satisfied about the provision of fire prevention and safety measures as stipulated in the National Building Code of India, as amended from time to time or any other law for the time being in force regulating such purpose or activity, shall issue a no objection certificate with such conditions as may be considered necessary and if not so satisfied, reject the same for reasons to be recorded in writing". She has further informed that " According to note 12, table 23 part 4 of National Building Code of India, 2005, buildings above 30 Mts height not to be permitted for Group "B" (Educational), Group "C" (Residential), Group "D" (Assembly) and Group "E" (Mercantile) Occupancies". She has also informed that so far, two applications are received for the issuance of NOC for construction of Hospital Buildings of above 30 mts and requested the Government to issue guidelines on par with multiplex guidelines for construction of hospitals at a height of more than 30 mts by following international standards of design, construction and operational management.

3. In the High Power Committee meeting held on 06-03-2010, it was decided that the Commissioner, Greater Hyderabad Municipal Corporation, Hyderabad may engage a reputed consultant for preparation of guidelines for fire prevention and safety measures for the hospital buildings above 30 meters of height and place the report before the High Power Committee. Pursuant to the above, the Commissioner, Greater Hyderabad Municipal Corporation, Hyderabad has engaged the services of JNTUH and furnished the Draft Fire Safety Guidelines for High-rise Hospitals vide reference 4th read above.

4. After due deliberations and discussions, the High Power Committee has accepted the report of Fire Safety Guidelines for High-rise Hospital Buildings prepared by JNTU, Hyderabad along with additional fire safety measures suggested by the Director General, State Disaster Response and Fire Services, A.P., Hyderabad.

5. Government after careful examination of the matter and the recommendations of High Power Committee and the additional fire safety measures suggested by Director General, State Disaster Response and Fire Services, A.P., Hyderabad and also as recommended by Home Department, hereby approve the same and issue the following rules for Fire prevention and Safety Measures to be adopted in High-rise Hospital Buildings of above 30 mts height.

P.T.O

6. A copy of these rules (containing 40 pages) is available on the internet and can be accessed with the address **www.aponline.gov.in**

7, The following notification will be published in the Andhra Pradesh Gazette.

N O T I F I C A T I O N

In exercise of the powers conferred by Section 44(1) of the Andhra Pradesh Town Planning Act, 1920, Section 585 of the Greater Hyderabad Municipal Corporation Act, 1955, Section 326(1) of the Andhra Pradesh Municipalities Act, 1965, Section 58 of the Andhra Pradesh Urban Areas (Development) Act, 1975, Section 268 of the Andhra Pradesh Panchayat Raj Act, 1994, and Section 56 of the Hyderabad Metropolitian Development Act, 2008, the Government of Andhra Pradesh hereby make the following Rules for prevention of Fire and Safety measures in High-Rise Hospital Buildings.

Short title, Extent and commence ment

1. (1) These rules may be called the Andhra Pradesh Fire Prevention and Safety Measures for High –rise Hospital Buildings Rules, 2011.

(2) They shall be applicable in all Municipal Areas and Urban Development Areas and Hyderabad Metropolitan Development Area in the whole of the State of Andhra Pradesh.

(3) They shall come into force on such date/dates as may be specified by the Government

Definitions

2. In these rules, unless the context otherwise requires,-

(a) 'Building' means a building intended for the use of a hospital of the height of above 30 meters ;

(b) 'Municipal Laws' means,-

(i) the Andhra Pradesh Town Planning Act, 1920.

(ii) the Greater Hyderabad Municipal Corporation Act, 1955 in respect of Greater Hyderabad Municipal Corporation.

(iii) the Visakhapatnam Municipal Corporation Act, 1979 in respect of the Visakhapatnam Municipal Corporation.

(iv)the Vijayawada Municipal Corporation Act, 1981 in respect of Vijayawada Municipal Corporation.

(v) The Andhra Pradesh Municipal Corporation Act, 1994 in respect of the Municipal Corporations;

(vi) the Andhra Pradesh Municipalities Act, 1965 in respect of the Municipalities;

(vii) the Andhra Pradesh Urban Areas (Development) Act, 1975 ;

(viii) the Andhra Pradesh Panchayata Raj Act, 1994 in respect of the Nagar Panchayats and

(ix) The Hyderabad Metropolitan Development Authority Act, 2008 (Act 8 of 2008)

(c) words used but not defined in the rules shall have the meaning assigned to in the Municipal Laws and the Andhra Pradesh Fire Services Act.

Application of Bye-Laws and Rules framed under the Municipal Laws

3. All Bye-laws made under the Municipal Corporation Laws and all Rules framed under the Andhra radesh Municipalities Act, 1965 , the Andhra Pradesh Town Planning Act, 1920, the Andhra Pradesh Urban Areas (Development) Act, 1975 and the Hyderabad Metropolitan Development Authority Act, 2008 shall mutatis mutandis apply subject to such variations as may be specified in these Rules:

Provided that the said Rules or Bye Laws in so far as they are not inconsistant with these rules shall continue to be applicable as those Bye-Laws and Rules are as applicable to the Municipal Corporation or Municipalities or Urban Areas or Hyderabad Metropolitan Development Area as the case may be.

Annexure 4. The Annexure shall form part and parcel of these rules, which specify the requirements to be complied with by all persons for construction of Buildings.

ANNEXURE

1.0 OPEN SPACES

In order to facilitate fire fighting operations and also prevent fire exposure to adjacent buildings, it is essential to have adequate open spaces around the building.

Open spaces around the building shall be as per section 8.2.3.1 Table 2, NBC part III

Height of the Building (in mtrs.)	**Minimum open space on all sides (in mtrs.)**
Above 30 m & up to 35 m	11
Above 35 m & up to 40 m	12
Above 40 m & up to 45 m	13
Above 45 m & up to 50 m	14
Above 50 m & up to 55 m	15
Above 55 m & up to 60 m	16

a) **The Maximum permissible height of Hospital Buildings shall be 60.00 meters**
b) The height of each floor shall be not less than 4.0 meters
c) No relaxation in the above mentioned open spaces in any **c**ase including road widening shall be allowed.
d) Minimum 7 meters wide hard leveled motor able open to sky drive-way shall be provided around the building for the movement and operation of specialized fire vehicles e.g. Hydraulic Platform, Turn Table Ladder, etc.
e) Abutting Road on any side shall not be considered as open space for this purpose.

2.0 FIRE-RESISTIVE REQUIREMENTS

2.1 EXTERIOR WALLS, COLUMNS AND BEAMS

Load bearing exterior walls shall be 3 hour fire resistance provided the building is protected with automatic sprinkler system.

Columns and beams shall be 3 hour fire resistance provided the building is protected with automatic sprinkler system.

Non-load bearing exterior walls shall be 2 hour fire resistance provided the building is protected with automatic sprinkler system.

Opening protection, where required, shall correspond to the rating of the exterior wall. The allowable maximum area of exterior wall openings shall be in accordance with IBC Table 704.8.

2.2 INTERIOR WALLS

Load bearing interior walls shall have minimum 3 hour fire resistance rating provided the building is protected with automatic sprinkler system. They shall be permitted to be reduced to 2 hour fire resistance rated based on compliance with the high-rise provisions in NFPA 5000, Section 33.1.3 as follows:

1. Exits are constructed as smokeproof enclosures;
2. Sprinkler control valves with supervisory initiating devices, and waterflow initiating devices are provided on each floor; and
3. There are no areas that exceed the maximum allowable quantities per control area in accordance with NFPA 5000, Section 34.1.3.

Non-load bearing interior walls shall be permitted to have no fire resistance rating based solely on the specified construction type herein, provided the building is protected with an approved automatic sprinkler system. Interior walls shall be fire resistance rated where required by other provisions in this code.

2.2.1 Separation of Occupancies

Where separated use design is employed and distinct separated occupancies are provided, the health care part of the building shall be separated from other occupancies with 2 hour fire resistance rated barrier construction. Other occupancies shall be separated in accordance with NFPA 5000, Section 6.2.3 and 6.2.4.

2.2.2 Protection of Openings

Opening protection, where required, shall be fire resistance rated based on the rating of the wall assembly having the opening in accordance with NFPA 5000, Table 8.7.2, unless otherwise specified herein. Every opening in a fire barrier shall be protected to limit the spread of fire and restrict the movement of smoke from one side of the fire barrier to the other. The fire resistance rating for opening protectives in 2-hour rated fire barriers, smoke barriers and smoke partitions shall be a minimum of 1-1/2 hours.

2.2.3 Suites

Corridor walls shall be effective in limiting the transfer of smoke and shall be permitted to terminate at the ceiling where the ceiling is constructed to limit the transfer of smoke. The walls shall be 1 hour barrier fire resistance rated in buildings provided with full automatic sprinkler protection.

Sleeping Suites - The size limit on sleeping suites shall not exceed an area of 460 $m^{2.}$

> Exception: The area shall be permitted not to exceed 700 m^2 when the following conditions are met:
>
> - Direct visual supervision is provided from a normally attended location within the suite, and,
> - The patient sleeping room is provided with a total coverage smoke detection system per NFPA 101 Sections 9.6.2.8 and 18.3.4

Non-Sleeping Suites – The size limit shall not exceed 930 m^2.

2.2.3.1 Doors

See section on *Exit Corridors – Doors* herein.

2.2.3.2 Miscellaneous Openings

In other than smoke compartments containing patient bedrooms, miscellaneous openings, such as mail slots, pharmacy pass-through windows, laboratory pass-through windows, and cashier pass-through windows, shall be permitted to be installed in vision panels or doors without special protection, provided that both of the following criteria are met:

> (1) The aggregate area of openings per room does not exceed 80 in.2 (0.05 m2).
> (2) The openings are installed at or below half the distance from the floor to the room ceiling.

2.2.3.3 Transfer Grilles

Transfer grilles are not permitted in walls or doors of suites, regardless of whether or not they are protected by fusible link-operated dampers.

> Exception: Doors to toilet rooms, bathrooms, shower rooms, sink closets, and similar auxiliary spaces that do not contain flammable or combustible materials shall be permitted to have ventilating louvers or to be undercut.

2.2.4 Exit Access Corridors

2.2.4.1 Walls

Corridor walls shall form a barrier to limit the transfer of smoke and shall be permitted to terminate at the ceiling where the ceiling is constructed to limit the transfer of smoke. The walls shall be 1 hour fire rated provided the building is protected with automatic sprinkler system. The exceptions are as follows:

Exception No. 1**:** Such spaces may be unlimited in size and open to the corridor where the following are met:

a) The spaces are not used for patient sleeping rooms, treatment rooms, or hazardous areas.

b) The open space is protected by an electrically supervised, automatic smoke detection system, or the entire space is arranged and located to permit direct supervision by the facility staff from a nurses' station or similar space.

c) The corridors onto which the spaces open in the same smoke compartment are protected by an electrically supervised, automatic smoke detection system, or the smoke compartment in which the space located is protected throughout by quick response sprinklers.

d) The space does not obstruct access to required exits.

Exception No. 2*:* Waiting areas and similar spaces shall be permitted to open to corridors without opening protection provided the following are met:

a) The aggregate waiting area in each smoke compartment does not exceed 55.7 m^2.

b) Each area is protected by an electrically supervised, automatic smoke detection system, or each area is arranged and located to permit direct supervision by the facility staff from a nurses' station or similar space; and

c) The area is arranged not to obstruct access to required exits.

Exception No. 3: This requirement shall not apply to spaces for nurses' stations.

Exception No. 4: Gift shops not exceeding 46.45 m^2 in area shall be permitted to open to a corridor or lobby without opening protectives, provided the building is protected throughout by an approved automatic sprinkler system.

2.2.4.2 Doors

Corridor doors in fully sprinklered buildings shall be 3/4-hour fire resistance rated with positive latching, and shall be effective in limiting the transfer of smoke. They shall comply with NFPA 101, Section 18.2.2.2. Roller latches shall not be permitted. Door closing devices shall not be required on doors in corridor wall openings other than those serving required exits, smoke barriers, enclosures of vertical openings, and hazardous areas.

2.2.4.3 Glazing

Vision panels consisting of fire rated glazing or wired glass panels in approved frames shall be fire rated in accordance with the provisions for opening protection and shall be smoke-tight. Glazing in fire rated assemblies shall also comply with NFPA 101, Section 8.3.3.

Fire window assemblies shall not be permitted in fire barriers having a fire resistance rating of 2 hours or greater (see NFPA 5000, Table 8.7.2).

2.2.4.4 Elevator Lobbies

Elevator lobbies shall be required on every floor and shall be enclosed by smoke partition walls having a minimum fire resistance rating of 1-hour.

Exception No. 1*:* Elevator lobbies are not required at the street floor protected with an automatic sprinkler system.

Exception No. 2: Elevator lobbies are not required where elevators are not required to be located in a shaft enclosure.

Exception No. 3: Enclosed elevator lobbies are not required where the elevator hoistway is pressurized.

2.2.4.5 Miscellaneous Openings

In other than smoke compartments containing patient bedrooms, miscellaneous openings, such as mail slots, pharmacy pass-through windows, laboratory pass-through windows, and cashier pass-through windows, shall be permitted to be installed in vision panels or doors without special protection, provided that both of the following criteria are met:

(1) The aggregate area of openings per room does not exceed 80 in.2 (0.05 m2).

(2) The openings are installed at or below half the distance from the floor to the room ceiling.

2.2.4.6 Transfer Grilles

Transfer grilles are not permitted in walls or doors of corridors, regardless of whether or not they are protected by fusible link-operated dampers.

Exception: Doors to toilet rooms, bathrooms, shower rooms, sink closets, and similar auxiliary spaces that do not contain flammable or combustible materials shall be permitted to have ventilating louvers or to be undercut.

2.2.5 Smoke Partitions

2.2.5.1 Materials

The walls shall be constructed of materials as permitted by the building *construction* type.

2.2.5.2 Fire Resistance Rating

Unless otherwise required, smoke partitions shall have a minimum fire resistance rating of 1 hour and shall limit the transfer of smoke.

2.2.5.3 Continuity

Smoke partitions should extend from the floor to the underside of the floor or roof deck above, through any concealed spaces, such as those above suspended ceilings, and through interstitial structural and mechanical spaces. Other alternatives are provided in NFPA 101, Section 8.4.

2.2.5.4 Penetrations and Joints

Penetrations through a smoke partition shall be protected by a system or material that is capable of limiting the transfer of smoke and shall be fire resistance rated per NFPA 5000, Table 8.7.2 based on the rating of the penetrated assembly unless otherwise specified herein.

2.2.5.5 Ducts and Air Transfer Openings

Air-transfer openings in smoke partitions shall be provided with approved combination fire and smoke dampers designed and tested in accordance with the requirements of UL Standards 555 and 555S or ISO equivalent. Dampers shall limit the transfer of smoke and be fire resistance rated based on the rating of the wall assembly having the opening in accordance with NFPA 5000, Table 8.7.2, unless otherwise specified herein. Where the installation of dampers will interfere with the operation of a smoke control system, approved alternative protection shall be utilized.

2.2.5.6 Opening Protectives

Opening protectives for smoke partitions shall comply with NFPA 5000, Section 8.10.3. Doors shall be fire resistance rated based on the rating of the wall assembly having the opening in accordance with NFPA 5000, Table 8.7.2, unless otherwise specified herein. Doors shall limit the transfer of smoke and shall not include transfer grilles. Doors that are normally required to be kept closed shall be automatic-closing or self-closing per NFPA 5000, Section 11.2.1.8.1.

Fire window assemblies, where provided, shall have a minimum fire resistance rating of 20 minutes per Table 8.7.2.

2.2.6 Horizontal Exits

2.2.6.1 Walls

Fire barriers separating building areas between which there are horizontal exits shall have a 2-hour fire resistance rating and shall provide a separation that is continuous to ground.

Where a fire barrier provides a horizontal exit in any story of a building, such fire barrier shall not be required on other stories, provided that the following criteria are met:

(1) The stories on which the fire barrier is omitted are separated from the story with the horizontal exit by construction having a fire resistance rating at least equal to that of the horizontal exit fire barrier.

(2) Vertical openings between the story with the horizontal exit and the open fire area story are enclosed with construction having a fire resistance rating at least equal to that of the horizontal exit fire barrier.

(3) All required exits, other than horizontal exits, discharge directly to the outside.

Where walls terminate at exterior walls at an angle of less than 180 degrees, the outside walls shall be 1-hour fire resistance rated with ¾-hour opening protection for a distance of 3.05 m on each side of the intersecting wall.

2.2.6.2 Openings

Every opening in a fire barrier shall be protected to limit the spread of fire and restrict the movement of smoke from one side of the fire barrier to the other. Doors in horizontal exits shall be designed and installed to minimize air leakage in accordance with NFPA 105, Standard for the Installation of Smoke Door Assemblies.

The fire protection rating for opening protectives in horizontal exits (fire barriers), shall be 1-1/2 hours in accordance with Table 8.7.2, NFPA 5000. Fire window assemblies shall not be permitted in wall openings unless as part of the door assembly.

All fire doors in horizontal exits shall be self-closing or automatic-closing and shall have positive latching hardware. An approved vision panel shall be required in each horizontal exit door. Center mullions shall be prohibited.

2.2.7 Exit Passageways

2.2.7.1 Walls

An exit passageway that serves as a discharge from a stair enclosure for more than 3 stories shall have a fire resistance barrier rating of not less than 2-hours.

An exit passageway not serving as a stair discharge or serving stairs connecting 3 stories or less shall have an enclosure fire resistance barrier rating of not less than 1 hour.

2.2.7.2 Openings

The fire resistance ratings of opening protectives shall be as follows:

- 1-1/2-hour for 2-hour exit passageways; and 3/4-hour for 1-hour exit passageways.

Openings in exit passageways shall be limited to only those necessary to provide egress from normally occupied areas and those necessary for egress from passageways.

2.2.7.3 Penetrations

Penetrations into and openings through an exit enclosure assembly shall be prohibited except for the following:

- Electrical conduits serving the enclosure, required exit doors, ductwork and equipment necessary for independent stair pressurization, water and steam piping necessary for the heating or cooling of the exit enclosure, sprinkler piping, standpipes, fire alarm circuits that are protected in accordance with NFPA 101, Section 8.3.5.

Penetrations shall also be prohibited between adjacent exit enclosures.

2.2.8 Smoke Barriers

2.2.8.1 Walls

Smoke barrier walls shall be constructed per NFPA 101, Section 8.5 and shall have a minimum 1-hour fire-resistance rating.

Walls shall form an effective membrane continuous from outside wall to outside wall and from the top of the foundation or floor/ceiling assembly below to the underside of the floor or roof sheathing, deck or slab above, including continuity through concealed spaces, such as those found above suspended ceilings, and interstitial structural and mechanical spaces. The supporting construction should be protected to afford the required fire-resistive rating of the wall or floor supported.

Exception: Smoke barriers are not required in interstitial spaces where such spaces are designed and constructed with ceilings that provide resistance to the passage of fire and smoke equivalent to that provided by smoke barrier walls.

2.2.8.2 Opening Protectives

Smoke barrier doors shall have a minimum 45-minute fire rating. Fire window assemblies shall have a minimum fire resistance rating of 45 minutes per Table 8.7.2, NFPA 5000. Doors shall be automatic-closing or self-closing. Cross-corridor openings in the means of egress shall be protected by a pair of swinging doors or a horizontal sliding door per NFPA 101, Section 18.3.7.7. Corridor openings not in the means of egress shall be permitted to use single leaf doors.

Where, a pair of opposite swinging doors are installed, they shall be without a center mullion. Vision panels shall also be provided, as for horizontal sliding doors and vision panels shall consist of fire-rated glazing materials in approved frames, the area of which should not exceed that tested. The doors shall be close fitting within operational tolerances, and shall not have undercuts, louvers or grilles. The doors shall have head and jamb stops, astragals or rabbets at meeting edges and shall be automatic closing by smoke detection or self-closing.. Positive-latching devices shall not be required. Air leakage criteria and installation requirements shall be per NFPA 101, Section 8.5.2.

2.3 STRUCTURAL FRAME

The structural frame shall have 3 hour fire resistance rating.

2.4 FLOORS AND FLOOR–CEILINGS

Floor-Ceiling assemblies shall have a minimum 2 hour fire resistance rating.

2.4.1 Openings for Floor-Ceilings

Openings in floors shall comply with the requirements for vertical openings herein. Penetrations shall be protected in accordance with NFPA 5000, Section 8.8.

2.5 ROOFS AND ROOF-CEILINGS

Roof-Ceiling assemblies shall have a minimum 1-½ hour fire resistance rating. Roofing systems shall be permitted to include combustible supports, decking, or roofing in accordance with NFPA 101, Sections 18.1.6.5 and 18.1.6.6.

2.5.1 Openings for Roof-Ceilings

Openings in roof-ceiling assemblies shall be protected identically as openings for floor-ceiling assemblies herein. Skylights shall additionally be permitted per NFPA 5000, Section 8.2.2.3.3.

2.5.2 Roof Covering

The roof covering based on the type of construction specified herein, shall have a minimum classification of Class B per NFPA 5000 Table 38.2.2 and Chapter 38.

2.6 VERTICAL OPENINGS

2.6.1 Protection Requirements

Openings through floors shall be enclosed with 2-hour fire resistance rated barrier walls that shall be continuous from floor to floor, or floor to roof in accordance with NFPA 101, Section 8.6.

> Exception No. 1: pneumatic tube conveyors protected in accordance with NFPA 101, 8.3.5.1.
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> Exception No. 2: atriums as permitted by NFPA 101, 8.6.7.
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> Exception No. 3: convenience openings protected in accordance with NFPA 101, 8.6.8.
>
> Exception No. 4: escalators and moving walks protected in accordance with NFPA 101, 8.6.8.

Note: Unprotected openings in accordance with NFPA 101, Section 8.6.6, Communicating Space, shall *not* be permitted.

2.6.2 Shafts

2.6.2.1 Enclosures

Shaft enclosures shall have minimum 2 hour fire resistance rating.

2.6.2.2 Extent of Enclosures

Shafts that do not extend to the bottom of the building or structure shall:

1. Be enclosed at the lowest or highest level of the shaft with construction of the same fire-resistive rating as the lowest floor through which the shaft passes, but not less than the rating of the shaft enclosure, or,,
2. Terminate in a room having a use related to the purpose of the shaft. The room shall be separated from the rest of the building by a fire barrier having a fire-resistance rating and opening protection at least equal to the protection required for the shaft enclosure, or,
3. Be protected by approved fire dampers installed in accordance with their listings at the lowest or highest floor level of the shaft, as applicable.

2.6.2.3 Opening Protection

Opening protection (doors) for 2-hour rated enclosures shall have a 1½ hour fire resistance rating and shall be self-closing or automatic - closing and positive latching. Openings shall be limited to only those that are necessary for the purpose of the shaft. Fire window assemblies are not permitted in interior walls of shafts.

2.6.2.4 Stair Penetrations

Penetrations into and openings through an exit enclosure assembly shall be prohibited except for the following:

- Electrical conduits, required exit doors, ductwork and equipment necessary for independent stair pressurization, water and steam piping necessary for the heating or cooling of the exit enclosure, sprinkler piping, standpipes.

Penetrations shall also be prohibited between adjacent exit enclosures.

2.6.2.5 Refuse and Laundry Chutes

2.6.2.5.1 Access Rooms

Access openings for refuse and laundry chutes shall be located in rooms or compartments enclosed by a fire barrier that has a fire-resistance rating of not less than 1 hour. Openings into the access rooms shall be protected by opening protectives having a fire protection rating of not less than 3/4 hour. Doors shall be self- or automatic-closing upon the detection of smoke in accordance with IBC Section 715.4.7.3.

2.6.2.5.2 Termination Rooms

Refuse and laundry chutes shall discharge into an enclosed room separated from the remainder of the building by a fire barrier that has a fire-resistance rating of not less than 1 hour. Openings into the termination room shall be protected by opening protectives having a fire protection rating of not less than ¾ hour. Doors shall be self- or automatic closing upon the detection of smoke in accordance with IBC Section 715.4.7.3.

2.7 PENETRATIONS

Penetrations of fire resistance rated or smoke resistant construction shall be protected as follows.

2.7.1 Fire Rated Assemblies

Firestop systems and devices protecting through-penetrations and membrane-penetrations of fire resistance rated walls and horizontal assemblies shall be protected in accordance with NFPA 101, Section 8.3.5.

Where required per NFPA 5000, Section 8.8.8, fire dampers shall have minimum damper ratings as follows:

- 3 hours for fire resistance rated assemblies of 3 hours or greater
- 1-1/2 hours for fire resistance rated assemblies of less than 3 hours.

Fire dampers shall also comply with NFPA 101, Section 8.3.5 for penetrations.

2.7.2 Smoke Resistant Assemblies

Penetrations passing through smoke barrier or smoke partition assemblies shall be protected by a system or material capable of restricting the transfer of smoke per NFPA 101, Section 8.5.6.

Where a smoke resistant assembly is also constructed to have a fire resistance rating, penetrations shall also comply with the requirements in NFPA 101, Section 8.3.5 for purposes of limiting the spread of fire for a time period equal to the fire resistance rating of the assembly.

Where smoke dampers are provided, they shall be designed and tested in accordance with the requirements of UL 555S, Standard for Smoke Dampers. Where combination fire/smoke dampers are required, they shall be designed and tested in accordance with the requirements of UL 555, Standard for Fire Dampers.

3.0 SPECIAL HAZARDS

3.1 SEPARATION REQUIREMENTS

The following special hazard rooms and spaces shall be separated from the remainder of the building as follows.

3.1.1 Transformer Location

The location of different types of transformers, the required enclosure construction and enclosure fire-rating shall conform to Part B of Article 450 and Section 450-41 of NEC.

3.1.2 Rooms containing combustion engine or gas, turbines, emergency generator room

The enclosing construction of these rooms shall have a minimum 2-hour barrier fire resistance rating.

3.1.3 Boiler and Fuel-fired Heaters

The Boiler and fuel-fired heaters housing / room shall have a minimum 2-hour barrier fire resistance rating where the largest piece of equipment is over 15 psi and 10 HP.

3.1.4 Gift Shops

Gift shops not exceeding 46.45 m^2 in area shall be permitted to open onto a corridor or lobby without opening protective's, provided the building is protected throughout by an automatic sprinkler system.

3.1.5 Waste and Linen Rooms

Waste and linen rooms shall have a minimum 2-hour barrier fire resistance rating.

3.1.6 Storage Rooms and Laundries Greater than 9.29 m^2

Storage rooms and laundries greater than 9.29 m^2 shall have a minimum 2-hour barrier fire resistance rating.

3.1.7 Plant Maintenance Shops

Plant maintenance shops shall have a minimum 2-hour barrier fire resistance rating.

3.1.8 Trash Collection Rooms

Trash collection rooms shall have a minimum 2-hour barrier fire resistance rating.

3.1.9 Laboratories Using Hazardous Materials Considered a Severe Hazard

Laboratories using hazardous materials considered a severe hazard shall have a minimum 2-hour barrier fire resistance rating.

3.1.10 Paint Shops

Paint shops shall have a minimum 2-hour barrier fire resistance rating.

3.1.11 Vocational Shops Not Classified as Group H

Vocational shops not classified as Group H shall have a minimum of 1-hour barrier fire resistance rated construction.

3.1.12 Kitchens

Kitchens shall have a minimum 2-hour barrier fire resistance rating. Separate exhaust ducting for all kitchens/Cafeteria in the building shall be provided to discharge the smoke and hot gases outside the building. Kitchen and cafeteria/ dining shall not be located in basement. They shall be located at Ground, first or second floor.

3.1.13 Boiler Rooms

Provision of boiler and boiler room (if applicable) shall conform to Indian Boiler Act. The boilers shall be installed in a fire resistant room of 2-hours fire rating. Catch pits shall be provided at the low level. The boiler room shall be provided with fresh air inlets and smoke exhausts directly to atmosphere.

3.1.14 Medical Gas Storage Areas

Medical gas storage areas shall have a minimum 2-hour barrier fire resistance rating

3.1.15 Anesthetizing Locations

These storage areas are considered as hazardous and protected in accordance with Annex E of NFPA 99.

3.2 LOCATION OF CRITICAL SERVICES:

All critical services such as Operation theatres, ICU, ICCU etc. shall be located **at lower floors in the Ground to 4th floor only**

4.0 INTERIOR FINISHES

4.1 WALLS AND CEILINGS

4.1.1 Minimum Flame Spread

The reduction in flame spread classification as indicated below shall be permitted where the building is fully sprinkler protected in accordance with NFPA 13. The occupancy group (Annexure-I) and minimum flame spread classification requirement are given below:

Group I-2 Occupancy (Health care)	
a. Exit enclosures and passageways	Class B minimum.
b. Corridors	Class B minimum.
c. Rooms and spaces	Class B minimum.
Group A occupancies (Assembly)	
a. Exit enclosures and passageways	Class B minimum.
b. Corridors	Class B minimum.
c. Rooms and spaces	Class C minimum.
Group B occupancies (Business)	
a) Exit enclosures and passageways	Class B minimum.
b) Corridors	Class C minimum.
c) Rooms and spaces	Class C minimum.
Group S-1 occupancies (Storage)	
a. Exit enclosures and passageways	Class C minimum.
b. Corridors	Class C minimum.
c. Rooms and spaces	Class C minimum.

4.1.2 Textile Materials Applied to Walls and Ceilings

Class A, only permitted in rooms and areas protected throughout by an approved sprinkler system.

4.1.3 Special Insulation Requirements

Cellular or foamed plastic materials shall not be used as interior wall or ceiling finish unless specifically permitted by NFPA 101, Section 10.2.4.3.1 or 10.2.4.3.2.

5.0 MEANS OF EGRESS

5.1 GENERAL

All components of egress shall be in accordance with NFPA 101, Chapter 7 unless modified herein or by NFPA 101, Section 18.2.

5.1.1 Occupant Load Factors

The occupant load factors (square meter per person) provided in Annexure II shall be used for purposes of determining the required number of exits and exit capacity for rooms, floors, areas, and buildings.

5.1.2 Number of Exits

a. There shall be a minimum of 2 exits per floor and 2 exits from each smoke compartment. Not less than one exit shall be one of the following:
    i. Door leading directly outside the building
    ii. Stair
    iii. Smokeproof enclosure
    iv. Ramp
    v. Exit passageway

b. Not less than 2 exits shall be provided from each smoke compartment. Egress shall be permitted through an adjacent compartment or compartments, but only if it shall not involve the return through the compartment of fire origin.

c. The general guideline for the number of required exits from various spaces described by functional use is given below :

Occupancy	Number of Exits
i. Hospital	Sleeping Rooms or Suites – Two exit access doors shall be required from any patient sleeping rooms or suites over 93 m^2. Non-Sleeping Rooms or Suites – Two exit access doors are required for rooms or suites exceeding 230 m^2.
ii. Assembly	At least 2 exits required.
iii. Office	At least 2 exits are required in rooms or spaces exceeding an occupant count of 49, or exceeding a common path of travel of 30 m. Other variations may apply per NFPA 101, Section 38.2.4.
iv. Kitchen	At least 2 exits are required in rooms or spaces exceeding an occupant count of 29, or exceeding a common path of travel of 30 m. Other variations may apply per NFPA 101, Section 42.2.4.

v. Mechanical	At least 2 exits are required in rooms or spaces exceeding an occupant count of 29, or exceeding a common path of travel of 30 m. Other variations may apply per NFPA 101, Section 42.2.4.
vi. Outpatient	At least 2 exits required for any room exceeding 232 m^2.
vii. Retail	At least 2 exits are required in rooms or spaces exceeding an occupant count of 49, or exceeding a common path of travel of 30 m. Other variations may apply per NFPA 101, Section 36.2.4.

d. A minimum 3 exit staircases shall be provided where the calculated occupant load on a floor is greater than 500 and does not exceed 1,000 persons.

e. Minimum 4 Exit staircases shall be provided where the calculated occupant load on a floor exceeds 1,000 persons.

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5.1.3 Means of Egress Height

The minimum means of egress height shall comply with the following requirements.

a. Group I-2 portions	2.4 m.
b. Elsewhere	
i. General (i.e. corridors, hallways)	2.4 m. Exceptions: Sloped ceilings, Allowable projections, Stair headroom, Door height.
ii. Doors	2.03 m.
iii. Stairway headroom	2.03 m, measured vertically above a plane, parallel to and tangent with the most forward projection of the stair tread

5.1.4 Changes in Elevation along Path of Exit Travel

The Changes in elevation along path of exit travel shall meet the following requirements.

a. Less than 0.3 m.	Via sloped surface. Where the slope is greater than 5-percent, ramps complying with Section 1010 shall be required.
b. Less than 0.15 m.	Ramps shall be equipped with either handrails or floor finish materials that contrast with adjacent floor finish materials.

5.1.5 Guard Rails

Where the elevation along open sides of a means of egress is more than 760 mm above the adjacent grade level below, guards shall be provided in accordance with NFPA 101, Section 7.2.2.4.

5.1.6 Impediments to Egress

Devices installed to restrict or impede the use of a means of egress under normal conditions shall be designed and installed such that they will provide free and clear access to the means of egress under emergency conditions unless otherwise specified in the special locking arrangement provisions of 7.2.1.6 and Chapter 18 of NFPA 101.

5.1.7 Obstructions to Egress

Means of egress shall be maintained free of all obstructions or impediments at all times in the case of fire or other emergency.

5. 2 ARRANGEMENT AND EXIT ACCESS

The exit access i.e. the portion of aggress system that leads from any occupied portion of a building or structure to an exit shall comply with the following requirements.

5.2.1 Corridor Access

a. Every habitable room shall have an exit access door leading directly to an exit access corridor unless otherwise specified herein and NFPA 101, Section 18.2.5.5.1.

   Exception: Rooms with exit doors opening directly to the outside at ground level per NFPA 101, Section 18.2.5.5.3

b. Sleeping suites and non-sleeping suites shall have a minimum of one means of egress be directly to a corridor. Where suites are required to have two means of egress, the second one shall be permitted through another suite, provided that the separation between the suites complies with the corridor separation requirements herein (NFPA 101, Sections 18.3.6.2 through 18.3.6.5.

5.2.2 Remoteness of Exits or Exit Access Doorways

When two means of egress are required, exits or exit access doorways shall be separated by a minimum of one-third the maximum diagonal of a space or building in a sprinklered building.

When three or more means of egress are required, two exits or exit access doorways shall meet the requirements above and the additional exits shall be arranged a reasonable distance apart, so that if one becomes blocked the others will remain available.

5.2.3 Maximum Allowable Exit Access Travel Distances

The maximum travel distance of 45.0 meters is only allowed according to clause 4.5 Table (22) Part (4) of NBC, 2005

a.	Sleeping Rooms – From any point in a health care sleeping room and an exit access door	15.24 m
b.	Sleeping Suites – From any point in a health care sleeping suite to an exit access door	30.48 m. without having to pass through more than one intervening room
c.	Non-Sleeping Suites – From any point in a health care non-sleeping suite to an exit access door	30.48 m where the suite is arranged with one intervening room 15.24 m where the suite is arranged with two intervening rooms
d.	From any room door required as an exit access door to a required exit	Within healthcare areas 45 m.
e.	From any point within a room to an exit	
	i. Group I-2 occupancy (includes Child Care)	45m

ii. Laboratories classified as Group H Occupancies	22.86 m. (H-1), 30.48 m. (H-2), 45 m. (H-3), 45 m (H-4) and 45 m. (H-5). (Classification as per IBC 2006 Section 307)
iii. Health Care	45 m.
iv. Business	45 m.
v. Assembly	45 m. when protected throughout by an approved, supervised automatic sprinkler system.
vi. Storage	45 m
vii. Outpatient	45 m
f. Common Path of Travel	
i. Business	22.86 m
ii. Assembly	Permitted the first 6.10 m. from any point where serving any number of occupants and for the first 22.86 m. from any point where serving not more than 50 occupants.
iii. Storage	30.48 m
g. From any point to a Smoke Barrier	45 m.
h. Within an atrium on other than the lowest level	45 m.

5.2.4 Travel through Intervening Rooms

Exiting from any portion of the building shall be directly to an exit or a corridor.

Exceptions:

a. Access to exits shall be permitted to occur through foyers, lobbies and reception rooms when constructed as required for corridors (IBC 1017.5).

b. Access from rooms or spaces shall be permitted to be through adjoining or intervening rooms, provided that such adjoining rooms are accessory to the areas served and are of less or equal hazard, or as permitted herein for Suites in the section on Maximum Allowable Travel Distances.

c. Patient sleeping rooms shall be permitted to have one intervening room if the intervening room is not used as an exit access for more than eight patient beds.

d. Special nursing suites shall be permitted to have one intervening room where the arrangement allows for direct and constant visual supervision by nursing personnel.

e. For rooms other than patient sleeping rooms located within a suite, exit access travel from within the suite shall be permitted through one intervening room where the travel distance to the exit access door is not greater than 30.48 m.

f. For rooms other than patient sleeping rooms located within a suite, exit access travel from within the suite shall be permitted through two intervening rooms where the travel distance to the exit access door is not greater than 15.24 m.

5.2.5 Exit Access Components
Corridors

i. Width	
1. In patient areas for bed movement	Minimum of 2.44 m

2. Other than patient area	Minimum of 1.12 m
3. Reduction in width	Doors in fully opened position and handrails must not reduce the required width by less than 0.18 m. Doors in any position must not reduce width by more than one-half. Projections into the clear width shall not exceed 0.11 m at or below the handrail height.
ii. Dead Ends	Maximum of 9.14 m
iii. Separation Requirements	See 2.2.3 Suites, and 2.2.4 Exit Corridors herein.
Doors	Doors compliant with NFPA 101, Section 7.2.1 shall be permitted.
i. Clear width - minimum	
Serving I-2 portions used for movement of beds	2.0 m
Other doors	1.2 m.
ii. Width - maximum	2.0 m. max door leaf.
1) Means of egress	Swing in the direction of exit travel when serving an occupant load of 50 or more.
2) Roller latched doors	Not permitted.
iii. In smoke barrier cross-corridor openings in the means of egress	45-minute fire resistance rated, smoke- and draft-control doors shall be opposite swinging when installed across corridors with egress in both directions. Additionally these doors shall comply with the following: Have no center mullion. Have vision panels. Be closefitting and should be withoutundercuts, louvers or grilles. Have stops at the heads and jambs, and rabbet and astragals at the meeting edges. Be automatic closing by smoke detection. Positive latching devices are not required.
iv. Other special doors	Special doors, such as revolving doors or sliding doors, may be used as egress doors per NFPA 101, Section 18.2.2.2.9.
v. Panic hardware	Each door in a means of egress from a Group A having an occupant load of 50 or more and any Group H occupancy should not be provided with a latch or lock unless it is panic hardware or fire exit hardware.
vi. Locking	Patient sleeping room doors shall not be permitted to be locked except as permitted by NFPA 101, Section 18.2.2.2.2.

Doors within the required means of egress shall not be equipped with a latch or lock requiring a tool or key from the egress side except as permitted by NFPA 101, Section 18.2.2.2.4.

Doors within the required means of egress that are permitted by exception to be locked shall have provisions made for the rapid unlocking of the locks or locking devices per NFPA 101, Section 18.2.2.2.5.

Doors in an exit passageway, stairway enclosure, horizontal exit, smoke barrier, or hazardous area enclosure (except boiler rooms, heater rooms, and mechanical equipment rooms) shall be permitted to be held open only by an automatic release device that complies with NFPA 101, 7.2.1.8.2. The doors shall release upon an alarm signal from the fire alarm system.

Where egress doors are used in pairs, approved automatic flush bolts may be used, provided that the door leaf having the automatic flush bolts has no doorknob from the inside or surface-mounted hardware. (IBC 1008.1.8.3)

Manually operated flush bolts or surface bolts are only allowed where a pair of doors serves a storage or equipment room. In these cases, the manually operated edge- or surface-mounted bolts are permitted on the inactive leaf. (IBC 1008.1.8.3)

5.3 THE EXIT

Permissible exits shall be as follows:

- Doors leading directly to the outside of the building.
- Stairs
- Smokeproof Enclosures.
- Ramps
- Exit Passageways.
- Horizontal Exits.

5.3.1 Exit Width and Capacity

For exit stairways, a factor of 7.6 mm per occupant shall be applied. For other exit components, a factor of 5.0 mm per occupant shall be applied.

5.3.2 Stairs

Stairs shall comply with NFPA 101, Section 7.2.2 unless otherwise modified herein.

a. Stair width	Minimum stair width shall be 2.0 m. clear width**.**
b. Permissible projections	Shall not exceed 0.11 m. at or below the handrail height. Not limited above the headroom height required.
c. Steps	
i. Riser height	Minimum of 0.1 m; Maximum of 0.18 m
ii. Minimum tread	Minimum of 0.28 m
d. Stair landing	Dimension in the direction of travel equal to the stair width
e. Handrails	Required on both sides.
iii. Continuity	Shall be continuous, without interruption by newel posts or other obstructions for the full length of each flight of stairs.
iv. Height	Handrails shall be not less than 865 mm, and not more than 965 mm above the surface of the tread, measured vertically to the top of the rail from the leading edge of the tread.
f. Roof access	In building four or more stories in height, one stair shall provide access to the roof.
g. Stairway identification	Shall be provided per NFPA 101, Section 7.3.3.5.4.
h. Variation of riser height	The variation of riser height for a flight of stairs shall not exceed 9.5 mm.
i. Distance between landings	The vertical distances between landings as measured between the horizontal planes of adjacent landings shall not exceed 3.66 m.
j. Exterior exit stairways	Not permitted as a required means of egress per IBC 1023.2 for Group I-2 occupancies or for any occupancies in high-rise buildings.
k. Enclosures	Stair enclosures shall have minimum 2 hour barrier fire resistance rating. See Section 2.6.2 on Shafts herein.
l. Openings	See protection of openings in Section 2.6.2.3 herein.
m. Stairway marking	Stairway marking shall be in accordance with NFPA 101, Section 7.2.2.5.4.
n. Stairway door locking	Stairway doors other than the exit discharge doors shall be permitted to be locked from stairway side. Stairway doors that are locked from the stairway side shall be capable of being unlocked simultaneously without unlatching upon a signal from the fire command center
o. Stairway re-entry access	Re-entry access for health care occupancies shall be provided per NFPA 101 Section 7.2.1.5.7.

5.3.3 Smokeproof Exit Enclosures

Smokeproof enclosures shall comply with NFPA 101, Section 7.2.3 unless otherwise modified herein. Every required stairway serving floors more than 22.86 m. above the lowest level of fire department vehicle access shall comply with the provisions for smoke proof enclosures in accordance with NFPA 101: 7.2.3.

5.3.3.1 Enclosure

A smokeproof enclosure shall be enclosed from the highest point to the lowest point and shall be separated from the remainder of the building by not less than 2-hour fire barriers. Access to the stairway shall be by way of a vestibule. The vestibule shall be within the 2-hour rated enclosure and shall be considered part of the smokeproof enclosure. The smokeproof enclosure shall be without openings other than the required means of egress doors.

Exception: When a stair pressurization system is used, a stair entrance vestibule is not required.

5.3.3.2 Vestibule

Access to the stairway shall be by way of a vestibule. The vestibule shall be within the 2-hour rated enclosure and shall be considered part of the smokeproof enclosure. The door opening into the vestibule shall be protected with an approved fire door assembly having a minimum 1 ½-hour fire protection rating. The door from the vestibule into the stairway shall have a minimum 20-minute fire protection rating. Doors shall be self-closing or shall be automatic-closing by actuation of a smoke detector located within 3.05 m of the vestibule entrance door.

5.3.3.3 Discharge

Every smokeproof enclosure shall discharge into a public way, into a yard or court having direct access to a public way, or into an exit passageway. Such exit passageways shall be without openings, other than the entrance to the smokeproof enclosure and the door opening to the outside yard, court, or public way. The exit passageway shall be separated from the remainder of the building by a 2-hour fire resistance rating.

5.3.3.4 Stair Pressurization Alternative

When a stair pressurization system is used, a stair entrance vestibule is not required. Smokeproof enclosures using stair pressurization shall use an approved engineered system with a design pressure difference across the barrier of not less than 12.5 N/m^2, and shall be capable of maintaining these pressure differences under likely conditions of stack effect or wind. The pressure difference across doors shall not exceed that which allows the door to begin to be opened by a force of 133 N.

5.3.3.5 System Activation

The activation of the stair pressurization system *shall* be initiated by smoke detectors installed at each floor level in an approved location within 3.05 m. of the entrance to the smokeproof enclosure. *When the closing device for the stair shaft is activated by smoke detection or power failure, the mechanical equipment shall activate and operate at the required performance levels.*

The required mechanical systems *shall* operate upon the activation of the smoke detectors specified above and by manual controls accessible to the fire department. The required system shall also be initiated by the following, if provided:

1. Water flow signal from a complete automatic sprinkler system
2. General evacuation alarm signal

5.3.4 Ramps

a) **Ramp (a) from Ground floor to the critical areas (b) from terrace to the refuge floor shall be provided.**

b) The open external ramp with fire doors on each floor in the mandatory side and rear open space may also be considered after leaving clear 7.0 meters driveway.

5.3.5 Exit Passageways

- Exit passageways shall comply with NFPA 101, Section 7.2.6 unless otherwise modified herein.
- Separation of exit passageways from the rest of the building shall be by construction having a minimum barrier fire resistance rating of not less than 2-hours.

  - Exception: Where the exit connects three stories or less, the separation shall have a barrier fire resistance rating of not less than 1-hour.
- Fire windows shall be permitted in openings per NFPA 101, Section 7.2.6.2.
- Exit passageways that discharge from stair enclosures shall have fire resistance ratings and protection of openings not less than those required of the stair enclosure (also see Section 2.2.7 herein).
- The width of an exit passageway shall be adequate to accommodate the aggregate required capacity of all exits that discharge through it.

  Exception: the capacity shall not be required to be aggregated where an exit passageway additionally serves occupants on the level of exit discharge.
- The floor of an exit passageway shall be solid and without perforations.

5.3.6 Horizontal Exits

Horizontal exits shall comply with NFPA 101, Section 7.2.4 unless otherwise modified herein or by NFPA 101, Section 18.2.2.5.

Accumulation space shall be provided on each side of the horizontal exit as follows:

- Not less than 2.8 (net) sq m per patient in a hospital or nursing home, or not less than 1.4 (net) sq m per resident in a limited care facility, shall be provided within the aggregated area consisting of corridors, patient rooms, treatment rooms, lounge or dining areas, and other similar areas
- On stories not housing bed or litterborne patients, not less than 0.56 (net) sq m per occupant shall be provided for the total number of occupants in adjoining compartments.

Horizontal exits shall be permitted for substitution of other exits to the extent that the total exit capacity shall not be reduced by more than 1/3 for healthcare or more than 50 percent for other occupancies

A single door shall be permitted across a corridor of a horizontal exit if all of the following conditions are met:

- The exit serves one direction only.
- Such door is a swinging door or a horizontal-sliding door complying with 7.2.1.14.
- The door is not less than 41½ in. (1055 mm) in clear width.

Horizontal exits serving as a means of egress from both sides shall be permitted to be protected by a pair of swinging doors that swing in opposite directions from each other and each having a clear width as follows:

- Not less than 1055 mm for corridor widths of 2440 mm or greater, and,
- Not less than 810 mm for corridor widths of 1830 mm but less than 2440 mm..

Exception: Openings shall be permitted to be protected by horizontal sliding doors complying with NFPA 101 Section 7.2.1.14 that provide clear widths as follows:

- Not less than 2110 mm for corridor widths of 2440 mm or greater, and,
- Not less than 1625 mm for corridor widths of 1830 mm but less than 2440 mm

5.4 THE EXIT DISCHARGE

Exit discharge shall comply with NFPA 101, Section 7.7 unless otherwise modified herein.

5.4.1 Termination

Exits shall be permitted to terminate at the following:

- directly at a public way, exterior exit discharge, yard, court, open space, or other portions of the exit discharge that are of adequate width and size to provide occupants with a safe and unobstructed access to a public way,
- to an interior exit discharge in accordance with NFPA 101, Section 7.7.2,

- to a rooftop exit discharge in accordance with NFPA 101, Section 7.7.6, or,
- to a vestibule or foyer in accordance with NFPA 101, Section 7.7.2.5.

5.4.2 Discharge inside of a building through the level of exit discharge

Not more than 50 percent of the required number of exits, and not more than 50 percent of the required egress capacity shall discharge through areas on the level of exit discharge. The discharge shall lead to a free and unobstructed way to the exterior of the building, and such way shall be readily visible and identifiable from the point of discharge from the exit.

The area on the level of discharge shall be separated from areas below by construction having a fire resistance rating not less than that required for the exit enclosure.

> Exception: The separation shall not be required where the levels below are part of an atrium with the level of discharge and the atrium is protected in accordance with NFPA Section 8.6.7.

5.4.3 Marking of Exit Discharge

Stairs shall be arranged and the exit discharge marked to make clear the direction of egress to a public way. Stairs that continue more than one-half story beyond the level of exit discharge shall be interrupted at the level of exit discharge by partitions, doors, or other effective means.

5.4.4 Exit Courts

The width shall not be less than 1.12 m. The required width shall be unobstructed to a minimum height of 2.13 m.

An exit court serving an occupant load of 10 or more and less than 3.05 m. in width shall have court walls of 1-hour fire-resistive construction for a distance 3.05 m. above the floor of the court and openings protected by fixed or self closing assemblies having a 3/4 –hour fire-protection rating.

5.5 ACCESSIBLE MEANS OF EGRESS

Accessible means of egress shall comply with the IBC as follows:

1. Where Required

   Accessible spaces shall be provided with not less than one accessible means of egress. Where more than one means of egress is required from any accessible space, each accessible portion of the space shall be served by accessible means of egress in at least the same number as the minimum required number of exits. In addition, the means of egress which provides access to or egress from, buildings for persons with disabilities, shall also comply with the requirements.

   Exceptions:

   1. Not required in alterations to existing buildings.
   2. One accessible means of egress is required from an accessible mezzanine.

2. Continuity and Components

   Shall be continuous to a public way and shall consist of one or more of the following components:

   1. Accessible routes.
   2. Stairways with vertical exit enclosures.
   3. Exterior exit stairways (not permitted in a Group I-2 occupancy).
   4. Elevators.
   5. Platform lifts.
   6. Horizontal exits.

7. Ramps (exterior ramps not permitted for hospitals or high-rise buildings).
8. Areas of refuge.

Exceptions:

1. Where the exit discharge is not accessible, an exterior area of assisted rescue shall be provided.
2. Where the exit stairway is open to the exterior, the accessible means of egress shall include either an area of refuge or an exterior area for assisted rescue.

3. Elevators

One accessible means of egress shall be provided by an elevator in buildings where a required accessible floor is four or more stories above or below a level of exit discharge.

In order to be considered part of an accessible means of egress, an elevator shall comply with the emergency operational and signaling device requirements of Section 2.227 of ASME A17.1. Standby power shall be provided and the elevator shall be accessed from either an area of refuge or a horizontal exit.

4. Exit Stairways

In order to be considered part of an accessible means of egress, an exit stairway shall have a clear width of not less than 1.22m between handrails and shall either incorporate an area of refuge within an enlarged floor-level landing or shall be accessed from either an area of refuge or a horizontal exit.

5 Platform Lifts

Shall not be part of an accessible means of egress except where allowed as part of a required accessible route in IBC Section 1109.7. Standby power shall be provided and the lift should not be enclosed.

6 Areas of Refuge

Shall be accessible from the space it serves by an accessible means of egress. Every required area of refuge shall have direct access to an enclosed stairway or an elevator. Where an elevator lobby is used as an area of refuge, the shaft and lobby shall be a smokeproof enclosure except where the elevators are in an area of refuge formed by a horizontal exit or smoke barrier.

a. Size

Sized to accommodate a wheelchair space of not less than 30 inches by 48 inches for each 200 occupants or portion thereof, based on the occupant load of the area of refuge and areas served by the area of refuge. The wheelchair space shall not reduce the required means of egress width. Access to any of the required wheelchair spaces in an area of refuge shall not be obstructed by more than one adjoining wheelchair space.

b. Separation

Each area of refuge shall be separated from the remainder of the story by a smoke barrier or a horizontal exit except those located within vertical exit enclosures.

c. Two-way communication

Shall be provided between area of refuge and the central control point. If the central control point is not constantly attended, the area of refuge shall have access to a public telephone system. The two-way communication system shall include both audible and visible signals.

d.	Instructions	Shall be posted adjoining the two-way communication system.
e.	Identification	Each door providing access to an area of refuge shall be provided with a sign stating "Area of Refuge" and the International Symbol of Accessibility.
7	Signage	At exits and elevators serving as a required accessible space but not providing an approved accessible means of egress, signage shall be installed indicating the location of accessible means of egress.
8	Exterior area for Assisted Rescue	Shall be open to the outside air and meet the requirements of IBC Section 1007.6.1. Separation walls shall comply with the requirements for exterior walls. Where walls or openings between the area for assisted rescue and the interior of the building, the building exterior walls within 3.048 m. horizontally of a non-rated wall or unprotected opening should have a fire-resistance rating of not less than 1 hour. Openings within such exterior walls should be protected by opening protectives having a fire protection rating of not less than ¾ hour. This construction should extend vertically from the ground to a point 3.048 m. above the floor level of the area for assisted rescue or to the roof line, whichever is lower.
a.	Openness	Shall be at least 50 percent open.
b.	Exterior exit stairway	Not permitted in a Group I-2 occupancy.
c.	Identification	Shall be provided.

6.0 EMERGENCY SYSTEM REQUIREMENTS

6.1 MEANS OF EGRESS IDENTIFICATION

Signs shall comply with NFPA 101, Section 7.10 unless otherwise modified herein.

a. ***Required Locations:*** Exits and exit access doors shall be marked by an approved exit sign readily visible from any direction of egress travel. Access to exits shall be marked by readily visible exit signs in cases where the exit or the path of egress travel is not immediately visible to the occupants. Exit sign placement shall be such that no point in a corridor is more than 30.48 m. or the listed viewing distance for the sign, whichever is less, from the nearest visible exit sign.

   Exceptions:

   1. Exit signs are not required in rooms or areas that require only one means of egress.
   2. Main exterior exit doors or gates that are obviously and clearly identifiable as exits need not have exit signs where approved by the Authority Having Jurisdiction.

b. ***Power Requirements:*** Exit signs shall be illuminated at all times. To ensure continued illumination for duration of not less than 90 minutes in case of primary power loss, the sign illumination means shall be connected to an emergency power system provided from storage batteries, unit equipment or an on-site generator.

   Illumination of exit sign and directional signs shall be supplied by life safety branch of the electrical system as described in NFPA 99, *Standard for Health Care Facilities*.

6.2 MEANS OF EGRESS ILLUMINATION (NFPA 101, 7.8)

a. ***Lighting Requirements:*** Means of egress illumination shall be a *minimum of 10.8 lux at the floor level throughout the means of egress (including the exit discharge) at all times the building is occupied.*

b. ***Power Requirements:*** Means of egress illumination shall be on emergency power supplied by life safety branch of the electrical system as described in NFPA 99, *Standard for Health Care Facilities*.

The power supply shall normally be provided by the premises' electrical supply. In the event of power failure, an emergency electrical system shall automatically illuminate the following areas:

i. Aisles and unenclosed stairways in rooms requiring two or more means of egress.

ii. Corridors, exit enclosures, and exit passageways in buildings required to have two or more exits.

iii. Interior exit discharge elements in buildings required to have two or more exits.

6.3 EMERGENCY POWER SYSTEMS

An emergency power system complying with IBC Section 2702 shall be provided for the following emergency power loads:

Exit signs and means of egress illumination

Elevator car lighting

Emergency voice/alarm communications systems

Automatic fire detection systems

Fire alarm and monitoring systems

Power and lighting for the fire command center

Electrically powered fire pumps

Ventilation and automatic fire detection equipment for smoke proof enclosures

Not less than one elevator serving all floors, with standby power transferable to any elevator

Mechanical equipment for smoke control systems.

Horizontal sliding doors

Standby generators shall be located in a room having a minimum 2 hour fire resistance-rated separation from the remainder of the building.

6.4 EMERGENCY AND STANDBY POWER BRANCH CIRCUITS

Emergency and standby power shall be provided in accordance with NFPA 99: 4.4.2.2.2 and shall be supplied by an on-site generator.

i. *Life Safety Branch*

- Illumination of means of egress.
- Exit signs and exit directional signs.
- Fire alarm systems.
- Alarms required for systems used for the piping of non-flammable medical gases.
- Hospital communication systems when used for emergency instructions.
- Emergency generator room lighting and selected receptacles.
- Elevator cab lighting, control, communication, and signal systems.
- Automatically operated doors used for building egress.

- Lighting in rooms where life-support systems are in use.

ii. *Critical Branch*

- Critical care areas that use anesthetizing gases, task illumination, selected receptacles, and fixed equipment.
- Isolated power systems in special environments.
- Task illumination and selected receptacles in the following:
  1) Patient care areas including infant nurseries, selected acute nursing areas, psychiatric bed areas, and ward treatment rooms.
  2) Medication preparation areas.
  3) Pharmacy dispensing areas.
  4) Nurses' stations.
- Additional specialized patient care task illumination and receptacles where required.
- Nurse call systems.
- Blood, bone, and tissue banks.
- Telephone equipment rooms and closets.
- Task illumination, select receptacle and selected power circuits for:
  1) General care beds (at least one duplex receptacle per patient bedroom).
  2) Angiographic labs.
  3) Cardiac catheterization labs.
  4) Coronary care units.
  5) Hemodialysis rooms or areas.
  6) Emergency room treatment areas (selected).
  7) Human physiology labs.
  8) Intensive care units.
  9) Post-operative recovery rooms (selected).
- Additional task illumination, receptacles, and selected power circuits needed for effective facility operation. Single-phase fractional horsepower exhaust fan motors that are interlocked with three-phase motors on the equipment system *shall* be permitted to be connected to the critical branch

a. ***Source:*** On-site generator.

b. ***Transfer Time:*** For life safety and critical branch 10 seconds or UPS where required.

c. ***Fuel Supply:*** An on-premises fuel supply sufficient not less than 2 hours full demand operation of the system shall be provided.

7.0 ELEVATORS

Minimum Dimensions: Elevators shall be sized in accordance with requirements of ANSI / ASME A17.1, unless otherwise modified herein. Elevators shall be sized to accommodate a 4-bed minimum to provide for bed / stretcher coupled with life saving equipments.

a. ***Elevator Operation and Installation:*** Elevators shall comply with ANSI / ASME A17.1.

b. ***Fire Emergency Controls:*** Elevators shall be provided with Phase I emergency recall operation and Phase II emergency in-car operation in accordance with ANSI / ASME A17.1.

c. ***Hoistway Venting:***

i. *Required Locations:* For elevator shafts extending through more than three stories.

ii. *Vent Area:* Not less than 3.5 percent of the area of the hoistway nor less than 0.28 m^2 for each elevator car, and not less than 3.5 percent nor less than 0.047 m^2 for each dumbwaiter car in the hoistway, whichever is greater.

iii. *Vent Configuration:* Of the total required vent area not less than one-third shall be permanently open. Closed portions of the required vent area shall consist of openings glazed with annealed glass not greater than 3.2 mm. in thickness.

iv. Equipment Venting: When solid-state equipment is used to operate the elevators the elevator equipment room shall be provided with an independent ventilator or air conditioning system to prevent overheating.

8.0 FIRE PROTECTION SYSTEMS

8.1 AUTOMATIC SPRINKLER SYSTEM

The building shall be fully sprinklered and supervised in accordance with NFPA 13, and modified herein.

A secondary water supply equal to the hydraulically calculated sprinkler demand, including the hose stream requirement, shall be provided for high-rise buildings in Seismic Design category C, D, E or F as determined by the IBC. The secondary water supply shall have a duration of not less than 30 minutes as determined by the occupancy hazard classification in accordance with NFPA 13.

A Class I standpipe system shall be provided.

Listed quick-response or listed residential sprinklers shall be used throughout smoke compartments containing patient sleeping rooms.

8.2 PORTABLE EXTINGUISHERS

a) Portable extinguishers shall be provided at each compartment / floor of the building in accordance with the more stringent requirements of IS 2190 and NFPA 10.

b) Mist equipment i.e., 9 liters (2 nos) per floor and 600 liters Mist (Trolley mounted) with 60.00 meters hose in Fire Control Room shall be provided.

8.3 HOSE REELS

One First Aid hose reel shall be provided for every 1000 sq.m. Floor area, located in the vicinity of an exit staircase.

8.4 YARD HYDRANTS AND WET STANDPIPES

Yard hydrants and wet standpipe connections shall be provided per NFPA Standards unless otherwise modified herein. The most stringent of the requirements shall apply. Requirements are as follows:

Wet standpipes shall be provided for every 1000 sq. m of floor area with a minimum of the greater of 2 per floor, or one for each exit staircase.

Yard hydrants shall be provided around the perimeter of the building at a distance of every 45 m.

8.5 FIRE PUMPS

Fire pumps and jockey pumps shall be designed and installed per NFPA 20 based on the hydraulic demands of the fire protection systems provided.

8.6 WATER SUPPLY TANKS

Terrace tank with a minimum capacity of 100,000 Litres shall be installed to provide an adequate water supply for fire protection systems.

An underground water tank with a minimum capacity **of 4.00 lakhs** Litres shall be provided for fire fighting purposes.

9.0 FIRE DETECTION AND ALARM SYSTEMS

Health care occupancies (per NFPA 101, Section 18.3.4) shall be provided with fire alarm and detection systems. They shall be Designed and installed per the more stringent of IS 2189 and NFPA unless as modified herein.

9.1 ALARM INITIATING DEVICES

Initiation of the required fire alarm systems shall be by manual means and by means of any required detection devices, detection systems, or sprinkler system water flow alarms. When activated, alarm initiating devices shall activate audible and visible alarm signals. The general evacuation alarm signal shall operate throughout the entire building.

Operation of any control initiating device in the fire alarm system shall automatically accomplish the fire safety control function(s) for which the device is designed.

9.1.1 Manual Fire Alarm Stations

Manual call points (Pull stations) shall be provided *in the natural path of escape* near every exit door at each floor including basements. The travel distance to a Manual call point shall not be more than 60.96 m.

Manual pull stations may alternatively be located at nurses' stations in patient sleeping areas in lieu of required exits provided they are visible and continuously accessible, and do not exceed 60.96 m. travel distance.

9.1.2 Smoke Detectors

- Duct smoke detectors shall be provided in air supply systems over 0.94 m3/s, located in the main return air and exhaust air plenums.
- Duct smoke detectors shall be provided in return air systems serving more than 1 story and 7.08 m3/s, located at each connection to a vertical duct or riser.
- Smoke detectors shall be provided in spaces open to corridors unless they are directly supervised from the nurse’s station. This includes waiting and similar spaces open to the corridor.
- Smoke detectors shall be provided in elevator lobbies and machine rooms to recall elevators.
- Smoke detector shall be provided at each smoke damper for damper activation.
- Smoke detectors shall be provided at hold-open doors, located on each side of the doors.
- Smoke detectors, which receive primary power from the building wiring, shall be provided in the patient sleeping rooms with visual display in corridor outside room and at the nurses’ station.
- In each mechanical equipment, electrical, transformer, telephone equipment or similar room which is not provided with sprinkler protection, elevator machine rooms and in elevator lobbies.
- Corridor smoke detection is not required in smoke compartments containing patient sleeping units where patient sleeping units are provided with smoke detectors that comply with UL268. Such detectors shall provide a visual display on the corridor side of each patient sleeping unit and an audible and visual alarm at the nursing station attending each unit.
- Corridor smoke detection is not required in smoke compartments containing patient sleeping units where patient sleeping units are equipped with automatic door –closing devices with integral smoke

detectors on the unit sides installed in accordance with their listing, provided that the integral detectors perform the required alerting function

9.1.3 Sprinkler System Water Flow Devices

A supervised control valve tamper switch and water flow detection device shall be provided at the lateral connection to the sprinkler system on each floor.

All valves controlling the water supply for automatic sprinkler systems, pumps, water levels and temperatures, critical air pressures and water-flow switches on all sprinkler systems shall be electrically supervised.

Exceptions:

1. Jockey pump control valves that are sealed or locked in the open position.
2. Control valves to commercial kitchen hoods, paint spray booths or dip tanks that are sealed or locked in the open position.
3. Valves controlling the fuel supply to fire pump engines that are sealed or locked in the open position.

9.2 ALARM INITIATION

Where an alarm notification system is required, it shall be activated by the following devices sending signals to the fire alarm system:

- Automatic detection devices
- Sprinkler water-flow devices and other extinguishing system operation

Manual fire alarm boxes

9.3 ALARM ANNUNCIATION AND ZONING

Alarm annunciation and zoning shall be per NFPA 101, Section 9.6.7 unless modified as follows.

Alarm zones shall be permitted to coincide with the areas of compliant smoke compartments.

9.4 OCCUPANT NOTIFICATION

Audible and visual alarms shall be provided in all non-patient areas and shall be listed for their purpose.

Automatic occupant notification of alarm shall be provided in accordance with NFPA 101, Section 9.6.3. with the following exceptions:

Exceptions:

- Smoke detectors located at doors for the exclusive operation of automatic door release shall be required to activate the building evacuation alarm, provided that the power supply and installation wiring to the detectors are monitored by the building fire alarm system, and the activation of the detectors initiates a supervisory signal at a constantly attended location.
- Visual alarms shall be permitted to replace audible alarms for critical-care areas of Group I-2 occupancies.

9.5 FIRE SERVICES NOTIFICATION

Notification of the fire services shall be in accordance with NFPA 101 Section 9.6.4.

10.0 EMERGENCY VOICE ALARM COMMUNICATION SYSTEMS

10.1 EMERGENCY VOICE/ALARM SYSTEM

An emergency voice/alarm communication system shall be required.

The operation of any automatic fire detection, sprinkler water-flow device or manual fire alarm box shall automatically sound an alert tone followed by voice instructions giving approved information on a minimum of the alarming floor, the floor above and the floor below in accordance with Section 404 of the International Fire Code. Speakers shall be provided throughout the building by paging zones. As a minimum, paging zones shall be provided as follows:

1. Elevator groups
2. Exit stairways
3. Each floor
4. Areas of refuge as defined in IBC Section 1002.1

In Group I-2 occupancies, the alarm shall sound in a constantly attended area and a general occupant notification should be broadcast over the overhead page.

10.1.1 Manual Override

A manual override for emergency voice communication shall be provided on a selective and all-call basis for all paging zones.

10.1.2 Live Voice Messages

The emergency voice/alarm communication system shall also have the capability to broadcast live voice messages through paging zones on a selective and all-call basis.

10.1.3 Design and Installation

The emergency voice/alarm communication system shall be designed and installed in accordance with NFPA 72.

10.2 FIRE DEPARTMENT COMMUNICATIONS SYSTEM

An approved two-way fire department communications system shall be provided for fire department use and shall be designed and installed in accordance with NFPA 72. It shall operate between a fire command centre and elevators (lifts), elevator lobbies (lift landings), emergency and standby power rooms, fire pump rooms, areas of refuge, and inside enclosed exit stairways. The main control unit shall be located in the fire command centre. Fire department communication devices / telephones shall be provided at the following areas:

- Stairway landings at each floor level within enclosed stairways
- Lifts and lift landings
- Refuge areas
- All critical service areas such as Operation theatres, ICU, ICCU etc

Fire department radio systems shall be permitted to be provided where approved by the fire department.

10.3 FIRE COMMAND CENTER

A fire command center shall be provided. The location and accessibility shall be approved by the fire department. The fire command center shall be separated from the remainder of the building by not less than 1-hour fire barrier or horizontal assembly, or both. The room shall be a minimum of 9 m^2 with a minimum dimension of 2.44 m. A layout of the fire command center and all features required shall be submitted for approval prior to installation. The fire command center shall comply with NFPA 72 and contain the following features:

1. The emergency voice/alarm communication system unit
2. The fire department communications unit
3. Fire detection and alarm system annunciator unit
4. Annunciator unit visually indicating the location of the elevators and whether they are operational
5. Status indicators and controls for air-handling systems
6. The fire-fighter's control panel required for smoke-control systems
7. Controls for unlocking stairway doors simultaneously
8. Sprinkler valve and water-flow detector display panels
9. Emergency and standby power status indicators
10. A telephone for fire department use with controlled access to the public telephone system
11. Fire pump status indicators
12. Schematic building plans indicating the typical floor plan and detailing the building core, means of egress, fire protection systems, fire-fighting equipment and fire department access
13. Worktable
14. Generator supervision devices, manual start and transfer features
15. Public address system, where specifically required by other sections of the IBC
16. **Evacuation Chairs and Evacuation Stretchers (each 4 no's per floor) shall be provided for evacuation in case of emergency.**

11.0 ATRIUM REQUIREMENTS

11.1 DEFINITION

A large-volume space created by a floor opening or series of floor openings connecting two or more stories that is covered at the top of the series of openings and is used for purposes other than an enclosed stairway; elevator hoistway; escalator opening; or utility shaft used for plumbing, electrical, air-conditioning, or communication facilities.

11.2 USES PERMITTED WITHIN ATRIA

The occupancy within the atrium space shall meet the specifications for classification as low or ordinary hazard contents.

11.3 SEPARATION

An atrium shall be separated from the adjacent spaces by fire barriers of not less than 1-hour fire-resistance rating with opening protectives for corridor walls.

Exceptions*:*

1. Any number of levels of the building shall be permitted to open directly to the atrium without enclosure based on the results of the smoke control engineering analysis described above.
2. Glass walls and inoperable windows shall be permitted in lieu of the fire barriers where automatic sprinklers are spaced along both sides of the glass wall and the inoperable window at intervals not to exceed 1.83 m. The automatic sprinklers shall be located at a distance from the

glass not to exceed 0.3 m. and should be arranged so that the entire surface of the glass is wet upon operation of the sprinklers. The glass shall be tempered, wired, or laminated glass held in place by a gasket system that allows the glass framing system to deflect without breaking (loading) the glass before the sprinkler*s* operate. Sprinklers shall not be required on the atrium side of the glass wall and the inoperable window where there is no walkway or other floor area on the atrium side above the main floor level. Doors in such walls *shall* be glass or other material that resists the passage of smoke. Doors shall be self-closing or automatic-closing upon detection of smoke.

3. A glass-block wall assembly in accordance with IBC Section 2110 and having a ¾-hour fire protection rating.
4. The adjacent spaces of any three floors of the atrium shall not be required to be separated from the atrium where such spaces are included in the design of the smoke control system.

11.4 SMOKE CONTROL

11.4.1 System Design Criteria

Where an atrium exceeds 2 stories, an engineering analysis shall be performed to demonstrate that the building is designed to keep the smoke layer interface above the highest unprotected opening to adjoining spaces, or 1.83 m. above the highest floor level of exit access open to the atrium for a period equal to 1.5 times the calculated egress time or 20 minutes, whichever is greater. A smoke control system, where required, shall be installed in accordance with IBC Section 909.

11.4.2 System Activation

Where an engineered smoke control system is installed, the system shall be independently activated by each of the following:

1. The required automatic sprinkler system or automatic smoke detection device designed to activate the smoke control system.
2. Manual controls that are readily accessible to the fire department.

11.5 EGRESS TRAVEL

In other than the lowest level of the atrium, where the required means of egress is through the atrium space, the portion of exit access travel distance within the atrium space shall not exceed 60.96 m.

12.0 RISK ASSESSMENT REPORT

The fire and life safety risk assessment report of High Rise Hospital Building conforming to NFPA-1031 (Sec 5 &7) shall be prepared by, but not limited to any of the following reputable Institutions or organizations:

a. Institution of Fire Engineers (IFE, India) (or) BE Fire Engineers
b. Authorized agency / experts panel of Institution of Fire Engineers (IFE) (or)
c. National Association of Fire Officers (NAFO, India) (or)
d. Any recognized university or any other agency approved by the Director General of Fire and Emergency Services, A.P., Hyderabad.

13.0 BASEMENT PROTECTION

13.1 General

i) Basements shall comply with the IBC for S-2 Storage occupancies.

Exception: Means of Egress shall be in accordance with NFPA 5000 and NFPA 101.

ii) Basements shall not be used for any other purpose except parking and building services

Exception: Specialized medical facilities/services compliant with NFPA 99 shall be permitted in the second level basement.

13.2 VENTILATON AND SMOKE MANAGEMENT

Basements Ventilation shall be provided as below: (NBC Part-4 (C.1.6).

i) The building shall be provided with the ventilation strictly in accordance with Part-VIII Section-I and Clause C-1.6.1 to C — 1.6.6 of Part-IV of National Building Code of India. The smoke control/extraction system shall be designed as per NBC Part-4/IBC Section 909 and NFPA-92. Where conflicts exist, the most stringent provisions shall apply.

ii) 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 breakable stall board lights 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 lights should be in position 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. (NBC Part-4 (C.1.6.1).

iii) The staircase serving basements shall be of enclosed type with a fire resistance the greater of not less than 2 hours or the floor/ceiling construction that it is penetrating, and shall be situated at the periphery of the basement to be entered at ground level only from the open air and in such positions that smoke from any fire in the basement shall not obstruct any exit serving the ground and upper stories of the building and shall communicate with basement through a lobby provided with fire resisting self closing doors of 1 hour resistance. (NBC Part-4 (C.1.6.2), or as otherwise specified herein.

iv) In multi-storey basements, intake ducts may serve all basements levels, but each-basement level shall have separate smoke outlet duct or ducts. Ducts so provided shall have the same fire resistance rating as the compartment itself. (NBC Part-4 (C.1.6.3) or as otherwise specified herein.

v) Mechanical extractors for smoke venting system from lower basement levels shall also be provided. The system shall be of such design as to automatically operate on activation of heat/smoke sensitive defectors or sprinklers. It shall also have an arrangement to be capable of a manual start. (NBC Part-4 (C.1.6.4).

vi) Mechanical extractors shall have an internal locking arrangement, so that extractors shall continue to operate and supply fans shall stop automatically with actuation of fire detectors. (NBC Part-4 (C.1.6.4.1).

vii) Mechanical extractors shall be designed to permit 30 air changes per hour in case of fire or distress call. (NBC Part-4 (C.1.6.4.2).

viii) Mechanical extractor shall have an alternative source of supply. (NBC Part-4 (C.1.6.4.3).

ix) 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. (NBC Part-4 (C.1.6.4.4).

x) If cutouts are provided from basements to the upper floors, these openings shall be protected by sprinkler head at close spacing so as to form a water curtain in the event of fire. (NBC Part-4 (C.1.6.6).

14.0 SMOKE COMPARTMENTATION

i) For every storey used by patient for sleeping or treatment, or other stories with an occupant load of 50 or more persons, floors shall be divided into separate fire/ smoke compartments with areas not exceeding **500 m^2** and enclosing construction having a minimum 2 hour fire rating, unless otherwise specified herein.

ii) The services, standby generator and store must be segregated from others by erecting fire-resistant wall of not less than 2 hours rating. Each of the compartments must be individually ventilated and the opening for entry into each of these compartments must be fitted with self-closing fire / smoke check doors of not less than 1-1/2 hour fire rating.

iii) All electric cables shall be laid in separate shafts and shall be sealed at every floor with fire resistant material of similar rating. The wall in between and all around the shafts shall also be of minimum two hours fire rating. (clause 6.3 and C-9 Part-4 NBC, 2005).

iv) The entry to the staircase from all levels shall be segregated with a self-closing fire / smoke check door of not less than a 1-1/2 hour fire rating. All vertical and horizontal openings at each floor level throughout the building shall be sealed properly with the non-combustible material in order to maintain the rating of the barrier element. Wherever false ceiling / suspended ceiling is provided, it shall be of one hour fire rated material. The compartmentation shall be extended up to ceiling level. (clause 6.3 and C-9 Part-4 NBC, 2005). Fire rated compartments shall extend slab to slab when a suspended ceiling is used.

v) The maximum travel distance to a smoke compartment door within a smoke compartment shall be 45.0 m.

vi) The smoke compartment shall be sized to accommodate occupants of the compartment plus occupant from adjacent compartments using 2.8 m^2 per non-ambulatory occupants and 0.56 m^2 for others.

vii) A means of egress shall be provided from each smoke compartment created by smoke barriers without having to return through the smoke compartment from which the egress path originated.

viii) Smoke compartments shall have 1-hour fire-resistive, smoke tight construction extending from exterior wall to exterior wall, or smoke barrier to smoke barrier, slab to slab, or any combination.

Exception: Smoke barriers shall not be required in interstitial spaces, where such spaces are designed and constructed with ceilings that provide resistance to the passage of fire and smoke equivalent to the provided by the smoke-barrier walls.

ix) Smoke compartment doors and draft assemblies shall have a minimum fire resistance rating of 45-minutes per 2.2.8.2 herein. Where doors are installed across corridors, a pair of opposite swinging doors without a center mullion or horizontal sliding doors shall be installed having vision panels consisting of fire-rated glazing materials in approved frames, the area of which should not exceed that tested. The doors shall be close fitting within operational tolerances, and shall not have undercuts, louvers or grilles. The doors shall have head and jamb stops, astragals or rabbets at meeting edges and should be automatic closing by smoke detection. Positive-latching devices are not required.

x) Where ducts penetrate smoke compartments, a listed smoke damper designed to resist the passage of smoke shall be provided at each point a duct or air transfer opening penetrates a smoke barrier. Smoke dampers and smoke damper actuation methods shall comply with IBC Section 716.3.2.1.

Exception: Smoke dampers are not required where the openings in ducts are limited to a single smoke compartment and the ducts are constructed of steel.

xi) Buildings containing health care facilities shall be subdivided by smoke barriers into compartments as follows:

(1) To divide every story used by inpatients for sleeping or treatment into not less than two smoke compartments,
(2) To divide every story having an occupant load of 50 or more persons, regardless of use, into not less than two smoke compartments,
(3) To limit the size of each smoke compartment required by (1) and (2) to an area not exceeding 2100m^2, unless the area is an atrium separated in accordance with NFPA 101 Section 8.6.7, in which case no limitation in size is ,required, and,
(4) To limit the travel distance from any point to reach a door in the required smoke barrier to a distance not exceeding 45.0 m.

xii) The smoke barrier subdivision requirement in Item xi) herein shall not apply to the following:
(1) Stories that do not contain a health care occupancy located directly above the health care occupancy,
(2) Areas that do not contain a health care occupancy and that are separated from the health care occupancy by a fire barrier complying with NFPA 101, Section 7.2.4.3,
(3) Stories that do not contain a health care occupancy and that are more than one story below the health care occupancy, and,
(4) Open-air parking structures protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

15.0 ELECTRICAL REQUIREMENTS

Only Dry Type Transformer should be installed if located in the basements.

The construction of electric sub-station and installation of Transformer, LT & HT panels shall be as per the provisions specified by the Electrical Authority. However, the following points shall be followed:

i) The HT & LT panels shall be separated with walls of 2 hours fire resistance rating. **Enclosure walls shall extend** up to one meter above the highest point of the transformer.

ii) LT & HT panels shall be protected with manually operated CO2 protection system **designed and installed per NFPA 12.** Two dry chemical powder type fire extinguishers of 10 kg with BIS Certification marks shall be provided outside the transformer room.

iii) Insulated mats tested on 11 KV and at least one pair rubber gloves shall be provided in every electrical switch/panel room of sub station. Independent ventilation system shall be provided for LT/HT panel and transformer rooms.

15.1 EMERGENCY ELECTRICAL SERVICES

Provide separate electrical circuits to feed emergency services and systems such as fire fighting pumps, lifts, automatic fire detection, emergency voice/communication, fire alarm, staircase and emergency lighting, and exit signage shall be provided. Smoke venting and signage circuit shall be laid in separate conduit so that fire in one circuit will not affect the others. Master switches controlling essential services circuits shall be clearly labeled.

See Section 6.0 herein for additional requirements.

15.2 ELECTRICAL WIRINGI) The electrical wiring shall be provided in metal / FRLS PVC conduits. MCBs and ELCB shall be installed. The electrical services shall be strictly in accordance to Clause C. 1.12 of Appendix-D' of NBC Part-IV/NFPA – 70. Fire resisting cables or fire resistance achieved by enclosing construction shall be used in the building. Power supply cables and the ducting shall not be taken through the staircase or any passage way used as an escape route. All the cables shall be only of Fire Resistant Low Smoke type when the fire resistance rating is derived solely from the cable use.

ii)Fault tolerant wiring in alarm system to be used (NFPA, 72 (3-4).

15.3 EMERGENCY POWER SUPPLY

a. The standby electric generator installed shall be of adequate capacity to supply power to staircase and emergency lighting circuits, lifts, exit signs, automatic fire detection, emergency voice/communication, fire alarm, and fire pumps 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 and must be automatic in action (NFPA-110). The engine starting Battery system should be duplicated.

b. UPS shall be installed to cater to the critical load of Alarm and Public Address System (NFPA-111).

c. A dedicated 25 KW emergency electrical generator should be installed to back up the main standby generator for alarm system, Public Address System and UPS.

See Section 6.0 herein for additional requirements.

16.0 DECORATIVE MATERIALS AND FURNISHINGS

i) All the fabric used for seats, curtain, covering on sidewall, matting/ carpeting etc. shall also have Class-I rating as prescribed in NBC Part-IV/NFPA,99.

ii) Draperies, curtains, furnishings and decorations shall comply with Chapter 10 – Interior Finish, Contents and Furnishings, NFPA 101.

iii) Only flame retardant material shall be used for interior decoration and upholstery to prevent generation of toxic smoke / fumes. (NBC Part-4 (3.4.15)

See NFPA 101 Section 18.7.5 for additional requirements.

17.0 AIR-CONDITIONING SYSTEM

Air conditioning system shall conform to Clause D-1.17 of part IV and Section 3 of Part VIII of National Building Code of India. However, following points shall be ensured:

a) Air ducts serving main floor areas, corridors etc. shall not pass through the staircase enclosures.

b) Automatic fire dampers shall be provided in the ducts at the inlets of the fresh air and return air of each compartment /floor on every floor. The fire dampers shall be so arranged so as to close by gravity in the direction of the air movement and to remain tightly closed automatically upon operation of smoke/ heat detectors and signal transmittal to the fire alarm system.

c) The air handling units shall be separate for each floor/each compartment at each floor level. The air ducts for every floor/compartment shall be separated and not interconnected with the ducting of any other compartment.

See NFPA 101 Section 18.5.2 for additional requirements.

18.0 REFUGE FLOOR/AREA

a) One refuge floor at a height of 30.0 meters shall be provided for safe evacuation with maximum of 2.5 meters floor height.

b) Refuge areas as per clause 4.12.3 part 4 of NBC 2005, i.e., 0.3m^2 per person of two consecutive floors at the height of 24m, 39m and 54m levels shall be provided.

c) Refuge area - definition: An area of refuge is a location in a building designed to hold occupants during a fire or other emergency, when evacuation may not be safe or possible. Occupants can wait there until rescued by firefighters. This can apply to the following:

- any persons who cannot access a safe escape route
- any persons assisting another person who is prevented from escaping
- patients in a hospital
- sick people
- people with disabilities
- old people
- very young children or infants
- Medical personnel who may be operating on a patient at the time of the emergency.

d) Technical requirements: An Area of refuge is typically equipped with a steady supply of fresh outside air. The ducting that must supply such fresh air is referred to as pressurization ductwork. Such ductwork are items of passive fire protection, subject to fire testing, product certification, and listing and approval use and compliance. The idea is that the ductwork must remain operable even while exposed to fire for a duration of two hours. The electrical equipment supplying power must also be equipped with approved circuit integrity measures. (NFPA 70 & 99)

e) Refuge area shall not be utilized for any other purpose and shall be kept vacant for the assembly of occupants in case of any emergency.

19. 0 OTHER REQUIREMENTS

a) Provision for Helipad should be made on the terrace floor (roof) according to the guidelines issued by the Director General, Civil Aviation, Government of India, New Delhi in Section (4) Series 'B' Part-ll dt. 21.12.2005. NFPA 418 shall be used as guidance.

b) Fluorescent coloured floor strips / glowing paint signs on the walls shall be provided on all floors at each level to guide the direction for escaping towards a safe place in case of an emergency.

c) Separate Ramps to the Basement for entry and exit of vehicles shall be provided.

d) The hospital developer/firm shall provide all the required Fire Safety measures (Passive & active) and Fire prevention procedures and planning, training and drills programmers' for the isolation of fire, transfer of occupants to areas of refuges or total evacuation of the building during the course of constructing Hospitals. The builder shall submit the certificates from the manufacturers of all Fire Fighting Equipments installed.

Also see Section 5.5, Item 6 herein for additional requirements pertinent to Areas of Refuge.

20.0 MANAGEMENT AND MAINTENANCE OF GENERAL FIRE SAFETY MEASURES

The Management of the High Rise Hospital Building shall observe the following: General Fire Safety measures that shall be adhered to at all times for purposes of fully complying with the Manufacturer's instructions and NBC/NFPA stipulations. NFPA 13,25,99,101, and 110 provide several options so that the more suitable option is adopted. The particular option adopted shall be clearly indicated and approval from Fire Services should be obtained.

20.1 FLAMMABLE LIQUIDS

The maximum allowable quantities (MAQ's) of flammable materials shall comply with NFPA 30. The handling of such liquids shall not be permitted by unauthorized persons. (NFPA 99)

20.2 HEATING EQUIPMENT:

i. The doors to furnace room shall be equipped with automatic closers and be kept closed.
ii. The flues, pipes and steam lines shall be in good condition and properly insulated.
iii. There shall be a gas cut-off outside the building.

20.3 KITCHENS :

i. The cooking equipment shall be provided with a steel range hood.
ii. The cooking facilities shall be provided with a pre-engineering fire suppression system..
iii. The discharge of automatic extinguishing system shall be monitored by the fire alarm system and provide occupant notification.
iv. Cooking facilities shall be protected per NFPA 101, Section 18.3.2.5.

20.4 LAUNDRY:

i. The laundry doors to the main building shall be kept normally closed.
ii. The electric devices and irons shall have operative automatic heat controls.
iii. Keep the tumbler free from lint and dust.
iv. Safety pilot lights shall be operative.

20.5 LABORATORY:

i. Flammable liquids shall be stored properly in listed flammable liquids cabinets or an other approved manner.
ii. The acids stored shall be handled and properly stored.

iii. The connections of gas fired or open flame equipment shall be in good condition.

20.6 OXYGEN & NITROUS OXIDE STORAGE :

i. The oxygen and nitrous oxide cylinders shall be stored separately from other gases in accordance with the applicable NFPA standards.

ii. 'No Smoking' signs and nitrous oxide warnings shall be posted on store room doors.

iii. The cylinders shall be protected from the sun.

iv. The cylinders shall be removed from steam pipes or radiators to prevent contact.

20.7 GENERATORS:

i. Generators shall be in good operating condition.

ii. Generators shall start automatically.

iii. Generators shall be tested under load monthly.

20.8 WATER HEATERS :

i. The water heaters shall be properly vented.

ii. The water heaters shall be equipped with 100% safety pilots.

iii. The water heaters shall be equipped with pressure relief valves.

20.9 GENERAL

i. Corridors shall be kept free from storage of beds, linen, carts, etc.

ii. The space beneath stairs and elevators shall be kept free from storage of any materials.

iii. The trash and laundry chutes shall be sprinklered and additionally comply with NFPA 101 Section 18.5.4.

iv. The covers on breaker panels and face plates shall be kept in good condition.

v. The appliance cords shall be kept in good condition.

vi. The appliance cords shall be protected against mechanical injury.

vii. Only approved metal containers shall be used for all oily waste, polishing or cleaning materials.

viii. Combustible liquids shall be kept in approved metal cans.

ix. The refuse should be removed from the premises or burned daily.

x. The sprinkler heads shall be unobstructed and adequate clearances maintained.

xi. All employees shall be made aware of the location of fire extinguishers and be trained in its use and operation.

xii. The fire alarm devices on each floor shall be maintained in good working condition.

xiii. The signs giving location of pull stations should be properly maintained.

xiv. The pull stations shall be unobstructed and plainly marked.

xv. The plan for evacuation of patients shall be prepared and displayed at appropriate places

20.10 FIRE ALARM SYSTEM SEQUENCE OF OPERATION:

i) Operation of any manual pull station, automatic smoke defector, heat detector, duct mounted smoke detector or water flow switch shall cause the following actions and indications:

   a) The system common alarm LED on the CPU shall flash. The internal audible device shall sound.

   a) The 80 character backlit alphanumeric display, shall display the device type, device location, time and date of alarm and a unique custom message.

   b) Transfer common alarm contacts for sending an alarm signal to an approved central station. (Two dedicated telephone lines, connection and service by owner).

   c) Activate the fire alarm audio/visual signals throughout the facility.

   d) Shutdown all AHUs over 2000 cfm.

ii) Operation of any operating room ceiling mounted smoke detector or return air duct smoke detector shall cause the following actions and indications:

a) Return air damper shall transfer to fully closed.

b) Outside air damper shall transfer to fully open.

c) Exhaust damper shall transfer to fully open and activate exhaust fan.

iii) Operation of outside air or supply air duct smoke detector unit shall shut down. Exhaust damper shall remain in full open position or transfer to that position and activate exhaust fan.

21.0 FIRE MANAGEMENT

a) FIRE CONTROL ROOM: - Fire control room shall be established on the ground floor, near the entrance and shall be manned round the clock.

b) FIRE STATION: **The builder shall provide a Fire Station on a suitable plot measuring 1000 sq.yards with (i) one time Non-Recurring cost of Building, Water Tender & Equipment and a Hydraulic platform with 54.0 meters working height and (ii) Recurring cost of salaries, POL, etc., for 5 years as processing fee.**

c) FIRE OFFICER AND CREW :- A Fire Officer with experience of not less than 3 years in Government / public Sector undertakings / corporate Sector in the rank of Station Fire Officer or above shall be available on the premises along with security personnel trained in fire fighting and rescue for purposes of maintaining fire safety systems in trim working condition at all times and to conduct training in first aid fire fighting and fire drills. The Fire Officer with trained fire personnel shall respond to all emergency calls in the Hospital round the clock.

d) FIRE SAFETY PLAN : (NFPA – 101 (18.7.2.1)

Fire Safety plan should be developed by the management and should be approved by the Director General of Fire and Emergency Services before occupancy. The following shall be provided in the written Fire safety Plan to train response teams, maintenance staff, nursing staff and fire wardens.

i) The use of alarms

ii) Staff response to alarms

iii) Fire Confinement

iv) Occupant evacuation of the immediate area

v) Occupant evacuation of Individual smoke compartment

vi) Total building evacuation

vii) Fire extinguishment

e) BUILDING EVACUATION SUPERVISOR: The Owner / Occupier shall appoint a Building Evacuation Supervisor for conducting and documenting results of periodical Fire Drills for compliance of timed egress provisions in the NBC.

f) FIRE DRILLS : Fire drills shall be conducted once in every month and shall include the employees and staff members of all shifts. Fire Drills shall include assignment of staff to close doors where necessary to prevent spread of smoke or fire, to search the lavatories or other rooms, to account for all occupants, to achieve prompt, quiet, orderly evacuation of the building or relocation to area of refuge, (refer Annexure - E part - 4 of NBC of India, 2005).

22.0 OTHER STIPULATIONS

(Reproducing as provisioned in department draft guidelines)

a) INSPECTION:- Inspections shall be undertaken at periodic intervals as below:

(i) The inspection of High Rise Building shall be conducted once in a year for the issuance of renewal of No Objection Certificate for occupancy. A certificate to the effect that all the required fire safety measures are provided and functioning satisfactorily shall be enclosed to the application duly signed by the Fire Protection Engineer for considering the renewal of No Objection Certificate for occupancy. Random checks will be done by the State Disaster Response & Fire Services Department.

(ii) Periodical Inspection by the officers of State Disaster Response & Fire Services Department shall be once in six months after receipt of certificate as above and it is the responsibility of the Management to ensure that all fire prevention and Safety Systems installed are maintained in good working condition.

b) INSURANCE: The builder shall duly insure all the occupiers (i.e., Doctors, Nurses, employees, patients, visitors attendants and emergency service personnel etc.) of High Rise Hospital including Building and equipment against all Disasters after obtaining No Objection Certificate for Occupancy from Fire Services Department.

c) MAINTENANCE & MANAGEMENT: Such High Rise Hospital Building shall be under the overall control and management of a single management body who shall be responsible for the fire and life safety. Maintenance shall comply with applicable standards and NFPA.

d) PENALTIES: The owner/firm or occupier and Fire Protection Engineer of the premises who contravenes these stipulations shall be guilty of an offence and is liable for penal action under Section 31 of the A.P. Fire Service Act, 1999 and other relevant laws.

23.0 PLANNING AND EXECUTION

i) The Fire Prevention and Life safety requirements shall be met by engaging the services of an experienced engineering firm with a track record of having designed and executed minimum five such Buildings of similar in height as per NFPA. Apart from providing facilities for undertaking external fire fighting measures, internal fire safety and protection measures are required to be provided and maintained as given in these stipulations. (NFPA-1-17.8.4.5, NFPA – 1031-5.7)

ii) The designer shall ascertain local conditions like availability of Water, reliable power, material and equipment certified to be fit for fire service, maintenance resources, traffic conditions, communications, record of compliance of similar hospitals and any additional information provided by the Department. He shall be familiarized with nature of occupants including non- patients who would have to be safely exited in emergencies. He shall confirm and explain how the above have been factored in the design.

iii) Adverse local conditions, known to have contributed to poor compliance with fire safety shall have mandatorily to be factored in by stipulating possible compensative measures to ensure effective compliance, enforcement and provide for human errors, duly considering local constraints, so that safety is not compromised and INTENT of any code provision is not violated. The above is in line with, sec.13 of AP Fire Act, CL.10 part-2 of NBC and NFPA – 1.

iv) Intelligent Smoke management to ensure safe evacuation and non-erasable record of alarm to monitor integrity of critical safety equipment like Sprinkler system, Public Address system and emergency generators shall be provided.

(BY ORDER AND IN THE NAME OF THE GOVERNOR OF ANDHRA PRADESH)

T.S. APPA RAO
PRINCIPAL SECRETARY TO GOVERNMENT

To
The Commissioner and Director, Printing, Stationery and Stores Purchase A.P. Hyderabad (in duplicate, with a request to publish the in the Extraordinary Gazette of A.P. dated: 06.01.2011 and furnish 500 copies to Government)

The Prl. Secy to Government (Home Dept/HM&FW Dept)
The Commissioner, Greater Hyderabad Municipal Corporation, Hyderabad.
The Director of Town and Country Planning, A.P. Hyderabad.
The Commissioner and Director of Municipal Administration, A.P. Hyderabad.
The Metropolitan Commissioner, Hyderabad Metropolitan Development Authority, Hyderabad.
The Commissioners of all Municipal Corporations/ Municipalities in the State, through Commissioner & Director of Municipal Administration, Hyderabad.
The Vice-Chairmen's of all Urban Development Authorities in the State
All the Committee Members.
All Departments of Secretariat
All Heads of Department.
The Director General Fire Services, A.P Hyderabad.
The Chairperson, AP Transco.
The Managing Director, H.M.W.S&S.B, Hyderabad.
The Engineer in Chief (Public Health) Hyderabad.
The Commissioner & Inspector General of Registration & Stamps.
A.P Hyderabad.
The Managing Director, AP Housing Board, Hyderabad.
The District Collectors of all Districts.
All members of High power committee on High Rise Hospital Buildings.

Copy to:

The PS to Spl. Secy to CM
The P.S. to M (M.A)/M (Home).
The P.S. to Principal Secretary to Government, (UD) & (MA)
The P.S. to Secretary to Government, (MA)
The Law (A) Department
Sf/Sc.

//FORWARDED BY ORDER//

SECTION OFFICER