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# Review of Fire Codes and Byelaws



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- The views and opinions expressed are those of the authors and not necessarily of the GSDMA, the World Bank, IIT Kanpur, or the Bureau of Indian Standards.
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# Review of Fire Codes and Practices

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## **1. BACKGROUND INFORMATION**

**1.1** Keeping in view the objectives, terms of reference and methodology to be adopted, as laid down in the Inception Report (revised 17 October 2003) for the Gujarat Emergency Earthquake Reconstruction Project, this Final Report has been prepared.

## **2. WORK PROFILE**

**2.1** For preparation of this Final report on Fire Codes, the following elements of work were involved, and these were taken up broadly in the sequence indicated below:

**2.1.1** Critical study and review of the provisions relating to life safety and fire protection in 2<sup>nd</sup> revision Draft of *Part 4 Fire and Life Safety of National Building Code of India*. The report containing detailed comments on the existing deficiencies/inadequacies in the document with recommended amendments was completed on schedule, and was forwarded to BIS and GSDMA on 24 September 2003 by Professor Sudhir K. Jain, leader of IITK-GSDMA Project Team.

**2.1.2** Collection and perusal of the Local Development Control Regulations (Building Codes) of Gujarat cities - Ahmedabad, Surat and Vadodara (including latest version of SUDA Development Control Regulations, which came into force on 15<sup>th</sup> September 2004)

**2.1.3** Visits to Mumbai, Ahmedabad and Vadodra (combined with the *Inception Report* presentation at Gandhinagar on 27 September 2003 and had interaction with Chief Fire Officers and representatives of Municipal Corporations/Development Control Authorities of Mumbai, Ahemdabad, Vadodara and Surat regarding their respective Development Control Regulations.

- 2.1.4** Critical study and review of the provisions relating to life safety (means of egress/exit) and fire protection in the three local Building Codes of Gujarat, viz, AUDA, VUDA and SUDA Regulations, and obtaining of additional information/documents from the three Chief Fire Officers of Ahmedabad, Surat and Vadodara for compiling the respective reports.
- 2.1.5** Critical study and review of the provisions relating to fire and life safety as contained in the following documents:
- i) Development Control Regulations for Greater Bombay 1991
  - ii) Modified Delhi Building Bye - Laws 1983 (as on 01 January 2003)  
Hyderabad Urban Development Authority documents:
  - iii) Zoning Regulations 1981
  - iv) Multi-Storeyed Building Regulations 1981
  - v) FAR & Building Policy, Government of Andhra Pradesh
  - vi) Master plan for Cyderabad Development Area
  - vii) Related legislation like Delhi Fire Prevention and Fire Safety Act 1986 & Rules, 1987.
- 2.1.6** Visits to Hyderabad and Delhi for discussions with the Director, Addl. Director, Deputy Director and DFO of AP Fire Services and one representative from users' community in Hyderabad, and the Chief Fire Officer and other officers of Delhi Fire Service in Delhi, regarding the fire and life safety provisions in their respective Regulations, and their views and experiences with regard to implementation aspects of the Regulations.
- 2.1.7** Detailed scrutiny of all the above listed documents and preparation of comments and comparative statement reflecting the actual state, as well as extent of incorporation of all the essential requirements of life safety (means of exit) and fire protection in their respective Building/ Development Control Regulations.
- 2.1.8** Preparation of Monthly Progress Reports
- 2.1.9** Continuing study of certain International Fire & Building Codes as well as foreign technical journals to gain an insight into the latest

international trends and practices regarding incorporation of the nature and extent of means of egress and fire protection provisions in their respective Building Regulations and Codes.

- 2.1.10** Meeting of the two fire consultants of IITK team on Fire Codes at Ahmedabad and Cochin on several occasions for discussions/finalization of this Report containing detailed comments on the three local Development Control Regulations (Building Codes) of Ahmedabad, Surat and Vadodara, suggesting modifications where found necessary, so as to bring up the local Codes to generally acceptable standards, as in the case of National Building Code (Part 4) and also incorporating the good points in the local Development Control Regulations of Delhi, Mumbai and Hyderabad and to a limited extent in the International Codes.
- 2.1.11** This Report includes review of Fire Codes and Byelaws, Code and Commentary on NBC Part 4, Fire and Life Safety, House Owners Guide for Fire Safety and Handbook on Building Fire Codes.
- 2.1.12** In fact, House Owners Guide has already been accepted and printed in English and Gujarati languages by GSDMA and is already on sale.
- 2.1.13** Similarly, Handbook on Building Fire Codes has also been accepted and appreciated by GSDMA Experts. The same will be sent for printing, publication and dissemination by GSDMA.

### **3. FIRE AND LIFE SAFETY REQUIREMENTS IN BUILDING CODES**

#### **- AN OVERVIEW**

##### **3.1 GENERAL**

- 3.1.1** The world over, those responsible for Building Codes formulation recognize the need for a modern, up-to-date Fire Code, addressing conditions hazardous to life and property from fire, explosion, use of hazardous materials and the occupancies buildings and premises.
- 3.1.2** Of late, building design, especially for high rise and special buildings,

has become a complex process, integrating many skills, products and techniques into its system. An *intelligent* building design is required to cater to various potential emergency situations. The main objective of fire safety design of buildings should be assurance of life safety, property protection and continuity of operations or functioning.

**3.1.3** The designer must recognize the type of danger posed by each component and incorporate effective counter-measures. Fire Protection Engineering has made substantial strides in its professional development. At present knowledge is available that can confine a hostile fire to a room or area of its origin. However, the new concept of composite construction, which is being increasingly adopted in North America and in some parts of Europe, has thrown up fresh challenges.

**3.1.4** Likewise, there has been tremendous advancement in the use of various kinds of plastics in the building industry and new types of roofings, walls, doors and false ceiling panels, core panels for walls and interior finish materials are being increasingly used. These have brought in their wake new fire and life safety problems. The need for all such products to be tested and evaluated for their behaviour in fire and flame propagation properties cannot be overemphasized in the interest of fire and life safety requirements.

## 3.2 INTERNATIONAL TRENDS AND PRACTICES

### 3.2.1 Purpose of Building Codes

In USA and other advanced countries, the Building Codes are made to provide minimum design regulations to safeguard life, health, property and public welfare and to minimize injuries by regulating and controlling the permitting, design, construction, quality of materials, use and occupancy, location and maintenance of all buildings and structures within the jurisdiction and certain equipment specifically regulated herein (NFPA 5000, 2003).

### 3.2.2 Existing Buildings and Structures

The provisions of the Building Construction and Safety Code, NFPA 5000 are applicable to “existing buildings” where anyone of the following conditions applies:

- i) A change of use or occupancy classification occurs
- ii) A repair, renovation, modification, reconstruction, or addition is made
- iii) The building or structure is relocated
- iv) The building is considered as unsafe building or a fire hazard”

### **3.2.3 Unsafe Buildings**

As per NFPA 5000, “all buildings that are, or that hereafter become as follows shall be considered unsafe buildings:

- i) Unsanitary
- ii) Deficient in means of egress
- iii) A hazard from fire or natural or man-made threats
- iv) Dangerous to human life or public welfare by reasons of illegal or improper use, occupancy or maintenance
- v) Non compliance with the provisions of the applicable Codes
- vi) Significantly damaged by fire or explosion or other natural or manmade cause
- vii) Incomplete buildings for which building permits have expired
- viii) The falling away, hanging loose; or loosening of any sidings; block or other building material; structural member, appurtenance, or part thereof of a building; or the deterioration of the structure or structural parts of the building, a partially destroyed building, or any part of a building when caused by deterioration or overstressing.
- ix) The existence of unsanitary conditions by reason of inadequate or malfunctioning sanitary facilities or waste disposal systems.”

### **3.2.4 Water Supply for Fire Fighting**

Of immediate interest after the attack on World Trade Center was the amount of the water required for fighting fires effectively in high-rise

buildings-an issue that is relevant for the high-rise fire incidents. A project was undertaken in UK, which was aimed to establish the fire areas that can be dealt with at different heights in a building, assuming varying water flow rates. The preliminary findings indicate that there is a disparity between the assumptions currently reflected in building design guidance and associated standards, and the operating procedures used in such buildings. There is need for conducting more operational fire research and studies on this subject.

### **3.2.5 Fire Fighting Shafts**

- (i) As per UK Building Regulations, buildings with a floor at more than 18m above fire service vehicle access level, or with a basement at more than 10m below fire service vehicle access level, should be provided with fire fighting shafts containing fire fighting lifts, fire fighting stairs and fire fighting lobbies which are combined in a protected shaft known as the fire fighting shafts. Again, buildings with two or more basement storeys each exceeding 900m<sup>2</sup> in area, should be provided with fire fighting shafts, which need not include fire-fighting lifts.
- (ii) Currently, several classes of buildings (industrial, storage, and commercial buildings) less than 18m in height are also required to have a fire-fighting shaft.
- (iii) An event tree analysis which was developed showed that the probability of fire spread and casualties varies between building categories, and that other classes of building, such as multi-storey public entertainment premises, have high rates of fire spread and will benefit from the provision of fire fighting shafts.

### **3.2.6 Width of Escape Stairs**

As per UK Building Regulations 2000 Approved Document B, FIRE SAFETY, the width of escape stairs has been regulated as below:

- (i) Stairs with a rise of more than 30m should not be wider than 1400mm unless provided with a central hand rail

(ii) Stairs wider than 1800mm should be provided with a central handrail.

(iii) Provision of a central hand rail for wider stairs was found necessary for safe evacuation especially for tall buildings to avoid possible jostling, collision etc. as well as the tendency for people to stay within reach of a hand rail, especially during prolonged descent.

### **3.2.7 Harmonization Between Security and Fire-Fighting Requirements**

There had been a perennial clash of interests between security restrictions for entry and exit for vital and high value premises, and fire safety (means of Exit) requirements in such premises. This problem has come to more limelight as a result of the more stringent security measures now being observed following the 11 September 2001 catastrophe. This subject is also under investigation and study in U.K. to achieve more practical harmonization between these apparently conflicting requirements.

### **3.2.8 Building Disaster Assessment Group**

Issues relating to building design and fire fighting operations have long been the subjects of research. However, the collapse of World Trade Center on 11 September 2001 has raised numerous questions on relationship between fire service response and building design. The disaster has also highlighted the increased threat from terrorism and the impact this might have on fire fighter safety and on the built environment. To tackle these issues a new organization called *Building Disaster Assessment Group* (BDAG) has been established in UK, chaired by HM Chief Inspector of Fire Services. The primary aim of this Group is to promote the health and safety of fire fighters and building occupants by ensuring that building design reflects the operational response and practices of the fire services and equally, that operational practices reflect building design assumptions.

### **3.2.9 Evacuation Strategies**

Ensuring *life safety* is the most essential aspect of Building Codes. High-

rise and multi storey assembly buildings pose particular challenges due to the large number of occupants and large vertical travel distances. Traditionally the means of escape strategy by and large is based on the principle of *single stage* evacuation as in India and in Hong Kong. To achieve this, buildings are designed with stairways of sufficient width to enable all the occupants to evacuate simultaneously. In high-rise buildings with large number of occupants it has been found that single-phase evacuation is a time consuming process and is impracticable. This has led to a system of evacuation known as *phased evacuation* in which the building is evacuated in different phases in the event of fire. This method is today recognized as the best method for evacuation in high-rise buildings in several countries and in number of prescriptive building codes, applied internationally including NFPA 72 and Australian Standard AS2200.

### 3.2.10 Evacuation Using Lifts

In UK and HongKong, fire fighters as well as disabled people use fire fighting lifts in tall buildings. However there is a much wider potential use for fire protected lifts in ordinary buildings for general evacuation purposes. This method is particularly useful in super high-rise structures where the large vertical travel distances result in a number of significant problems like possible increased exposure to smoke and fire, increased fatigue during evacuation and difficulty in safe evacuation of injured, infants, aged or disabled occupants. BS 5588: *Fire Prevention in the Design, Construction and Use of Buildings, Part 5: Code of Practice for Fire Fighting Stairs and Lifts* recommends the use of lifts under emergency situations with provision for protection against fire, smoke and heat. An emergency lift control procedure is required to be developed for adoption in case of fire emergency. This new concept is becoming increasingly popular in many advanced countries. Incidentally, this new method has been incorporated in the design of the tallest building in the world, Petronas Twin Towers in Kuala Lumpur, Malaysia (as in 2004).

### 3.3 INDIAN SCENARIO

#### 3.3.1 Filling Legislative Gaps

- (a) After the introduction of the National Building Code, by and large, most of the States and Local Bodies have adopted many of the Code provisions in their own Building Regulations. Delhi and Mumbai Regulations on life safety and fire protection requirements of buildings are mostly based on NBC Part 4.
- (b) Of all the Building Codes in India, Delhi Building Bye-Laws are the best in so far as Fire and Life Safety provisions are concerned, and also in the degree of implementation. This is particularly so since it has the additional solid support of another important and unique legislation in the form of “Delhi Fire Prevention and Fire Safety Act, 1986 and “*Delhi Fire Prevention and Fire Safety Rules 1987*”, which give vast powers to Chief Fire Officer, even to seal buildings or premises which are considered unsafe and a hazard to public safety.
- (c) In fact, the standard of life safety and fire protection in the buildings in the cities and towns in the country as a whole can be raised to a substantially high level if similar legislation is introduced in other states also. It is strongly recommended that similar legislation be enacted in Gujarat state also expeditiously.

**3.3.2** As already brought out in the *Inception Report*, although Building Codes do exist in various cities in India, enforcement of these Regulations leaves much to be desired. Due to the vested interests and the political pressures, implementation of some of the provisions in the Regulations is rendered difficult, and Code violations are frequent.

#### 3.3.3 Court Interventions

Fortunately, the judiciary in many states has been intervening in several cases of Building Code violations; particularly in cases involving violations of Fire Safety rules. Some of the cases where the Judiciary had intervened to safeguard the Code interests are cited below:

- i) A Division Bench of Gujarat High Court directed AUDA to ask AEC to disconnect power supply to 42 high rise buildings in Satellite, Vastrapur, Drive-in Road Areas of AUDA that had not taken any action on installation of fire fighting equipment as per repeated directives of AUDA. Following this HC judgment on 27 September 2000, which affected about 3500 families in Ahmedabad and led to a tense law and order situation also. SMC and VMC also swung in to action by issue of Notices to Code violators in their respective areas as a sequel to this HC order.
- ii) In August 1997, the Orissa High Court on a PIL had issued Notice to the State Government on account of reported danger to human lives because of high-rise buildings and multi-storeyed market complexes which had come up in large numbers in the state without having fire prevention measures.
- iii) In August 2000, the Supreme Court had quashed 62 Government Orders issued by Tamil Nadu Government between 1 July 1971 and 29 January 1998 under section 113 under Tamil Nadu Town Planning and Country Planning Act 1971, granting exemptions to large number of buildings from the 1971 Act provisions, including illegal constructions.
- iv) There had been several other similar instances of intervention by other High Courts also. Efforts are being made to collect more data of the kind for further study and analysis.

#### **4. GENERAL REPORT ON STUDY AND REVIEW OF FIRE AND LIFE SAFETY PROVISIONS EXISTING IN NBC (PART 4) AND DEVELOPMENT CONTROL REGULATIONS OF AUDA, VUDA AND SUDA**

##### **4.1 NBC (PART 4) ON FIRE AND LIFE SAFETY**

**4.1.1.**The study review and comments relating to NBC part 4 on Fire and Life safety ,in so far as GEERP is concerned , were undertaken in three phases

as explained below.

**4.1.2.** NBC as a whole including Part 4 is presently under revision, and this being the basic model Code for all other Building Codes in the country, in-depth study of the draft document was carried out by us for a few months, even prior to the starting of the GEERP activities and detailed comments covering about 24 pages were forwarded to BIS, as well as to GSDMA on 24 September 2003.

**4.1.3.** The earlier expectation was that the BIS would be putting out the revised edition/ finalised draft NBC part 4 by the end of November 2003. However, BIS could not adhere to their previous schedule for various reasons. Therefore it has to be specially mentioned that all our comments/ recommendations made in the earlier review reports on AUDA, VUDA and SUDA Regulations included in the interim as well as the Draft final reports were based on Draft NBC Part 4 document for its 2<sup>nd</sup> revision which was sent in circulation by BIS, and the Minutes of the meeting of the concerned sub- Committee of BIS held on 4<sup>th</sup> and 5<sup>th</sup> September 2003.

**4.1.4.** BIS was again contacted on 18<sup>th</sup> February 2005, when it was learnt that the final revised version of NBC Part 4 on Fire and Life Safety was under print. On a written request, BIS had been kind enough to send us a copy of the finalized document (under print) which was received by us in early March 2005. On perusal of the same, it was observed that in the final document several clauses had undergone further modifications, some of which warranted fresh comments. Moreover, the text contained some errors both from editorial and IS reference points of view. After detailed study and discussions on 18<sup>th</sup> and 19<sup>th</sup> March 2005 we decided to take the following actions.

(i) To intimate the BIS immediately about the editorial and such other corrections, so that the same can be effected in the final document, which is expected to be out by June 2005. (As per BIS)

(ii) To forward the fresh comments, where found necessary, immediately to DR. S. K. Jain, leader of IITK Team, for onward transmission to BIS for their consideration.

(iv) To incorporate few more important fresh modifications in the final document in AUDA, VUDA and SUDA Regulations (under Review).

(v) To prepare revised document on Commentary on National Building Code (part 4)- Fire and Life Safety, based on the latest document now under print, which is received from BIS

**4.1.5.** All the above actions have been completed and new documents mentioned under 4.1.4 above have since been prepared and are attached to this report.

## **4.2 AUDA REGULATIONS**

### **4.2.1. General Comments**

#### **4.2.1.1. 2001 Census Highlights**

- i) Gujarat has always been one of the most urbanized states in India.
- ii) In 1991, 34.49% of population resided in urban areas.
- iii) In 2001, 37.67% reside in urban areas.
- iv) The Ahmedabad District is the most urbanized district in the State, where 80.09% of the population resides in urban areas.
- v) Ahmedabad District has the largest population of 58,08,378.
- vi) It has the highest density of 718 persons per km<sup>2</sup>, as against the state average of 258.
- vii) The population of Ahmedabad UA (Urban Agglomeration) is 45,19,278 (Area of AUDA is approx. 1,300 km<sup>2</sup>).
- viii) The population of Ahmedabad City is 35,15,361 and the AMC area is approximately 191 km<sup>2</sup>.
- ix) In 1991 there were 21 cities/Urban Agglomerations (having population of 1,00,000 and above Class I town) in Gujarat. In 2001, the number has risen to 27.
- x) The phenomenon of rapid urbanization in conjunction with industrialization has resulted in growth of slums as squatter colonies in Gujarat cities (as is the problem in most of the 600 and odd cities in

India).

**4.2.1.2. Fire and Life Safety Information (AUDA)**

- i) As per information collected from local authorities, there are around 1,100 high rise buildings (19.3m and above height) in AUDA.
- ii) In the AMC area itself, there are about 423 high-rise buildings.
- iii) It was gathered that the means of exit and fire protection requirements in many of the high rise buildings, both in AMC and AUDA areas, were not adequate as per the standards prescribed in the AUDA Regulations.
- iv) An independent Survey of Fire Safety Provisions in High-Rise Buildings (Residential and Commercial) conducted by the Students of School of Building Science and Technology CEPT, Ahmedabad in 1999, in respect of 51 high rise buildings in the western part of Ahmedabad city, viz, Navrangpura, Ashram Road, Ambavadi, Paladi, Satellite and Vastrapur revealed the following:
  - v) Out of 51 buildings surveyed, 24 had no installations for fire fighting including wet risers, fire extinguishers, or fire alarm systems.
  - vi) Among the fire fighting systems/equipment, most commonly available items were dry Risers & Fire Extinguishers.
  - vii) Those buildings, which had the systems, installed lacked in proper maintenance of the systems.
  - viii) Majority of the residents were ignorant about the installations and their working principles.
  - ix) There was a severe lack of awareness about the rules and regulations on fire safety.
    - x) Only a negligible percentage of people have attended the awareness campaigns conducted by the Fire Fighting Department. Even the residents of the Societies hardly conduct any fire drills (88% do not conduct any drills).
    - xi) National Association of Fire Officers (of which one of the authors of this Report, Sri. G. B. Menon, was the President), in co-

sponsorship with the Indian Institute of Architects, Gujarat Chapter, had organized on 19 February 2000 in Vadodara a National Seminar on Fire Safety in High-Rise and Special Types of Buildings and on NBC (Part IV: Fire Protection), with the main objective of creating public awareness in the provision and maintenance of adequate fire safety and fire protection requirements in the high rise and special hazard buildings.

**4.2.1.3. Fire Brigade Cover (including the entire Gujarat State Profile)**

(a) As in the case of other City Fire Brigades in Gujarat, Ahmedabad Municipal Corporation Fire Brigade functions under the provisions of Bombay Provincial Municipal Act 1949 (Chapter 17 deals with Fire Brigade). The provisions under this Act are all quite out-dated, inadequate and inconsistent with the present conditions. Serious consideration needs to be given for replacing this decadent Act with a completely new one, on the lines of Fire Service Act and Rules prevalent in many other States, which had been framed on the Model Fire Force Bill circulated by the Ministry of Home Affairs, Govt. of India way back in 1957.

(b)

i) As mentioned earlier, 37.67% of population in Gujarat State resides in urban areas. There are 27 class I towns (including 6 City Corporations) and 143 Municipalities/Nagar Palikas. It is gathered that apart from the 6 Municipal Corporations (Ahmedabad, Surat, Vadodara, Rajkot, Bhav Nagar and Jamnagar) and the important class I towns, most of the 143 Municipalities/Nagar Palikas are not provided with any fire service cover (Full time Fire Brigade with authorized Fire Fighting Vehicles and equipment.) The details of the existing fire service cover in the Municipalities/Nagar Palikas in the state are given in the Final Report submitted to Home Department on 1<sup>st</sup> January 2004 on 'Alternative Organization

Arrangements for Fire and Emergency Services in Gujarat. However, a study of this report reveals the appalling situation that there are only five Municipal Fire Brigades fulfilling all the requirements in terms of Fire Stations, operationally sound Fire Vehicles, and trained Fire Staff (Ref annexure 1 of the report). However, it is also now gathered that efforts have already been made by GSDMA to impart training on Fire Fighting and rescue aspects relating to Disaster Response to staff in 100 municipalities and 6 Corporations.

- ii) The norms prescribed by the Standing Fire Advisory Council, Govt. of India, are as follows for number of Fire Stations (Urban and Rural) Fire fighting pumps (fire appliances) and manpower:

Urban Areas	Rural Areas	No. of Fire Stations
For every 10 km <sup>2</sup>	For every 50 km <sup>2</sup>	One Fire Station
<ul style="list-style-type: none"> <li>• One Pumping unit/Fire fighting vehicle for every 50,000 population</li> <li>• Manpower for every Fire Tender:               <ul style="list-style-type: none"> <li>• 1 Leading Fireman, 1 Driver-Cum-Pump Operator, and 4 Firemen</li> </ul> </li> <li>• One Sub Officer for every shift for small Fire Brigade</li> <li>• Station Officer-1 for every shift per station for major Fire Brigades, or Station-in-Charge for small Fire Brigades</li> <li>• The scales for other Senior Officers in the Brigade are also laid down.</li> </ul>		

- iii) The SFAC scales are mentioned above so that the actual assessment of the Fire Fighting cover required for the entire Gujarat State can be calculated for the purpose of making good substantial deficiencies in Fire Stations, various types of Fire Fighting appliances and equipment, and manpower for Fire Brigades which exist at the moment, and which are required to be provided. This exercise has already been initiated by the State Government through the Report prepared by GSDMA on 'Alternative Organization

Arrangements for Fire and Emergency services in Gujarat which is under consideration of the State Government.

iv) Filling up Vacancies in Existing Establishment

It is understood that in all the 3 Municipal Fire Brigades in Ahmedabad, Surat and Vadodara, there are large numbers of vacancies existing in various ranks since long. When the existing Establishment of the Fire Services is falling much short of the laid down scales, it is unreasonable, and also not in the public interest, to say the least, to maintain City Fire Brigades with depleted staff strength. Hence, it is recommended that the existing vacancies in all the ranks should be filled up expeditiously. Incidentally, it is understood that over 450 trainees have undergone Firemen Training Course under Ahmedabad Fire Brigade. These men, as well as other candidates who have undergone Government approved 'Basic Fire fighting Training Courses' constitute a good source for filling up the existing vacant posts in Firemen Cadre, provided they fulfil other prescribed qualifications.

v) Gujarat is one among the 6 States in India yet to re-organize the Fire and Emergency Services in the State as a separate Directorate under a professional Head as has been laid down in the Standing Fire Advisory Council norms. This re-organization is long overdue, and especially since this very important Emergency Organization charged to safe-guard the lives, limbs and property of the community, has been renamed as FIRE & EMERGENCY SERVICES, endowed with additional responsibilities for answering to all types of emergencies, including terrorism, arson and disasters. It is strongly recommended that the Fire Services in the State, which are working independently in various Corporations/Municipalities be re-organized into a full

fledged Directorate of Fire Services, as in other States, so as to ensure more uniformity and efficiency in the functioning of this specialized emergency service which will also help to enhance the Fire Safety Standards in the community as a whole. Actions already initiated by the State Government in this regard, as referred to earlier in this para may be expedited.

vi) Unified Building Codes in Gujarat:

The three regulations (AUDA, SUDA and VUDA Regulations) had been formulated in different periods and have vastly differing approaches leaving several gaps in various types of requirements, particularly in the cases of SUDA and VUDA. In comparison to these two Codes, AUDA is fairly comprehensive except for Fire Protection Requirements, which we have covered adequately now. The latest version of SUDA Regulations which came into force from 15<sup>th</sup> September, 2004, also has taken care to obviate several of the earlier lacunae.

It is not only highly desirable and even necessary, that a Unified Building Code is formulated for the entire Gujarat State, applicable for all Cities and Towns.

vii) Existing Ahmedabad Fire Brigade:

- a) Number of Fire Stations is 10 (as against the requirement of 19 Fire Stations as per SFAC norms)
- b) Total number of appliances is 99
- c) Total operational manpower (including officers) is 437 (to be reviewed in the light of added responsibilities)
- d) Total number of Fire calls attended during the year 2002-2003 is 1639.
- e) Total number of special service calls attended is 413.
- f) Annual Budget is Rs. 7 Crores

- g) AMC Fire Brigade, deployed in 10 Fire Stations (as against 19 Fire Stations required for the entire AMC area), is now providing fire cover for not only the AMC area, but for the entire AUDA area also, covering approx. 1300 km<sup>2</sup> area, where no fire stations exist at present, although the area has several fire hazardous buildings and premises like high rise and special types of occupancies, Industrial Estates, Warehouses etc. AUDA has a fully developed urban area of 60 km<sup>2</sup>.
- viii) It is certainly a matter of pride for Gujarat that the State is the first one in India to bring in the *Disaster Management Act*. This is understandable and as it should be, since Gujarat State had the misfortune to face series of disasters in the recent past. All the same, it is imperative and urgent that the Fire and Emergency Services in the State is fully trained, adequately equipped and manned to cope-up with all types of disasters.

#### **4.2.1.4. Accountability and Liability for Penal Action for Negligence or non-compliance of Codes**

A Central Government Notification dated 21 March 2001 issued by the Ministry of Urban Development, Government of India, clearly emphasizes the importance of accountability and liability for penal action for negligence or for non-compliance with building codes on the part of all stakeholders in the Building Industry, including Architects, Engineers, Builders, Contractors, and Enforcement Agencies. The relevant provisions in this Notification should be included in all Building Codes.

#### 4.2.2. Comments on AUDA Regulations to highlight good points worthy of adoption in other Codes as well as clauses which need amendment

AUDA Regulations Reference No.	Remarks
2.61 and 2.62	These are also not found in other codes.
4.5	Inspection - The requirements specified under this Regulation are important and should be incorporated in all Codes. The stipulations under <i>Unsafe Buildings</i> and <i>Unauthorized Development</i> are quite original.
6.2 (a)	Clearly lays down the various recognized stages for inspection during construction
6.6	These provisions are worth inclusion in all Codes
7.1 and 7.2	Under this clause sub clauses (iii) Certificate of Lift Inspector (iv) Regular Maintenance of Lift, and (v) Regular Maintenance of Fire Protection Services, are quite important, and should be incorporated in all Codes.
9	Along with the Architect, Engineer, Structural Engineer, Clerk of Works, Developer etc. it is necessary to add Fire Protection Consultant also for Registration/ Accreditation
9.3.1	The General Duties and Responsibilities of all concerned have been well spelt out
11.10	The stipulations relating to seismic forces/seismic resistant requirements for new structures even for Walled City and Gamtal areas are quite appropriate.
12.2	The procedure followed in specifying the minimum area of Building Unit (or plot area) for certain types of occupancies like high rise buildings, educational buildings, community/ marriage/town/assembly etc. halls, Cinemas, Petrol Pumps, Worship and Religious Places etc. and also the restriction that the maximum built-up area shall not be more than 20% of the building unit (plot) area is really worth adoption in other Codes. (In Hyderabad Regulations also, the same procedure is followed.)
15.1	In AUDA Regulations, the maximum number of storeys for Low Cost Housing Buildings has been limited to two storeys (Ground plus one), which is a welcome step from Fire Safety Point of View.
16	(i) The regulatory clauses framed herein with the aim of conservation of buildings having historic, architectural, and archeological significance, provide good guidance material for adoption in other Codes as well.

	(ii) The same comments as above hold good for Slum Rehabilitation Schemes also.
<b>16.4</b>	<b>Group Housing</b> – Residential cluster type development has also been included which is also worthwhile for adoption. Another desirable feature found in AUDA Regulations in this context is that the maximum permissible height of the building unit is put at 10m, whereas in Part III NBC (Clause 9.6.2) preference is given for multi-storeyed blocks, with no limitations to floors and heights.
<b>17</b>	<b>General Building Requirements : Lifts</b> - The details regarding the number of lifts (Rate) to be provided based on the number of tenements for residential buildings or built-up area in the case of non-residential buildings (as given in clause 17.1 (ii) and height of buildings, i.e., 21m or more (as given in clause 17.1 (iii) are as per rules and are worth adoption in other Codes.
<b>17.13 (ii) and (iii)</b>	These are good suggestions. In sub clause (iii) the provision of ramps are recommended as requirements for the handicapped, where there are gradients on the floor or for ramped approaches in raised doors etc. Apart from handrails, such ramps should not have a slope greater than 1 in 20 or maximum of 1 in 12 for short distances up to 9m. Full details of <i>Special Requirements for Planning of Public Building meant for Use of Physically Handicapped</i> are specified in Annex E of Part 3 of NBC as well as in IS 4963-1987, <i>Recommendations for Buildings and Facilities for the Physically Handicapped</i> . The relevant portions from these should be incorporated in all the codes.
<b>17.14</b>	Mandatory provisions for use of Rain Water Harvesting methods for roofs of buildings is also another plus point in these AUDA Regulations which should be adopted in other Codes as well
<b>17.15 &amp; 17.21</b>	All these mandatory provisions regarding <i>Terrace, Parapet, Mosquito-Proof Water Tanks, Refuse Area/Disposal of Solid Waste, Discharge of Rain Water, Heritage Buildings, And Provision of Letter Box</i> , are all good points worthy of adoption in all Codes.
<b>18.3 (4) (d) and (g)</b>	These clauses are worthy of adoption in other Codes.
<b>18.4</b>	<b>Structural Safety and Services</b> (i) The provisions under <i>Quality Control Requirements and Tests</i> are worthy of adoption in other Codes also. (ii) The provision made in this regulation for assessment of structural and/or fire safety in existing buildings /structures at stipulated periodical intervals through expert(s) chosen from a Panel of Experts identified by the Competent

	<p>Authority is particularly important and imperative from fire and life safety point of view. Unfortunately this highly essential provision is lacking in most of our Building and Fire Codes. This important provision must be adopted in all Building Codes with additional penalty clauses as necessary. It is worth mentioning that the system is in conformity with International Practices and Codes.</p>
18.5 (2) (b)	<p>This clause laying down the requirements of regular maintenance of lift installations is also quite important and should be adopted in all Codes, especially in the light of the large number of lift accidents, which are being reported in many Municipal Corporation and Development Authority areas.</p>
20	<p><b>Gasoline Filling Stations</b> - These provisions are also worthy of adoption in all Codes.</p>
24	<p><b>Maintenance of Buildings</b> - This very essential requirement also quite often does not find a place in many of our Codes. The regular maintenance of all the fire protection equipment and installations provided in the buildings, particularly in high-rise, hazardous and other special types of occupancies, is of utmost importance from fire safety point of view. In fact, past experience indicates that many serious fire losses had occurred in buildings on account of functional failure of fire protection equipments and installed systems.</p> <p>Since the performance of system, product, component or structure is dependent upon satisfactory site installation, testing and periodical maintenance, independent schemes of certification and registration/ accreditation of installers, consultants and maintenance agencies by the Competent Authority are essential mandatory requirements. This requirement equally applies to the Fire Protection Consultants also, who have a specific role to perform in the Building Industry, so as to ensure installation and maintenance of adequate fire and life safety requirements in buildings. These essential requirements should also be incorporated in all building codes in the country.</p>
28	<p><b>To Provide Facilities for Physically Handicapped Persons</b></p> <p>(i) The inclusion of these provisions in the AUDA Regulations is a unique and welcome feature in line with the modern trends and International practice, and should be adopted in all Codes.</p> <p>(ii) The inclusion of the special requirements/slight alterations in design etc. are also a welcome feature.</p>
32	<p><b>Zoning and Use Provisions</b></p> <p>The preparation and method of projection of Zoning Regulations through <i>Use Zone Table</i> is unique and quite</p>

	<p>useful. This method is worth adoption in other Codes as well.</p> <p>The Zoning Map showing separately the types of development intended may be permitted by Competent Authority, and may not be permitted, is also well prepared and quite comprehensive.</p>
<b>32.1</b>	<p>The requirements for exercising control and regulation of land use and building construction methods for minimizing damage to human habitat in Natural Hazard prone areas in the State have been well taken care of in these AUDA Regulations.</p> <p>The Guidelines for Land Use Zoning in Hazard Prone Areas (Regulation No. 32.1) given in Appendix A and Protection of Building Structures and Infrastructures in Hazard Prone Areas (Building Regulation No. 32.1) given in Appendix B are quite exhaustive.</p>

#### 4.2.3. Comments on AUDA Regulations Which Need Amendment

<p><b>General Recommendations:</b></p> <p>The following are general recommendations which are applicable for all the three Regulations (AUDA, VUDA and SUDA), which are under review:</p> <ol style="list-style-type: none"> <li>1. Uniform definitions in line with national/international codes for all cities. A few new definitions are added.</li> <li>2. Regular refresher training courses for the fire brigade personnel</li> <li>3. Enlarged definition for special structures in line with practice followed in other places</li> <li>4. Elaborate questionnaire for high rise buildings to bring out all aspects at time of receipt of application only</li> <li>5. Reference is given to latest acts</li> <li>6. Recommendation for creating Rural Fire Services in areas which are not at present not under any full time Fire Service cover</li> <li>7. It is presumed that Gujarat Govt. Notification dated 30.9.2003 for amendments of the AUDA Regulations will be duly taken care of.</li> <li>8. It is recommended to start system of renewal inspections by Fire Brigade for high rise buildings in SURAT also as is case with other 2 cities.</li> <li>9. Augmentation of Municipal Hydrant System</li> <li>10. Adoption of best practices from other city codes like Mumbai Delhi and Hyderabad</li> <li>11. Clarifying position of CFO and Fire Protection Consultant in approval procedures</li> <li>12. Recommendation for establishment of Disaster Control Room for the three cities</li> <li>13. A passing reference to NBC rules is many a time overlooked. It is</li> </ol>
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<p>therefore ensured that at least all-important rules are taken care of.</p> <p>14. Fire protection requirements which were earlier scattered at various places are now kept under only one section which are governing all types of buildings</p> <p>15. Whenever in doubt NBC part 4 should be followed</p> <p>16. Importance of basic fire fighting and exit requirements is specifically taken care of</p> <p>17. Danger of unsafe buildings and erratic water supply in cities is duly addressed</p> <p>18. Exemption for Gamtal areas and public buildings is proposed to be removed</p>
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AUDA Regulations Reference No.	Remarks
2.9(j)	There is no need to define <i>Low-Rise Building</i> separately, when the definition for <i>High Rise Building</i> is given, Hence this term can be deleted.
2.9(k)	<p><b>High Rise Building:</b> The parameters adopted in the current AUDA Regulations for defining <i>High Rise Building</i> need to be reviewed for the following reasons:</p> <p>(a) The existing regulatory provision for excluding the height of the <i>hollow plinth</i> (i.e., the height of the stilt portion) up to 2.8m, as prescribed under regulation 2.9 (j) and (k) is quite irrational and is tantamount to violation of established fire protection requirements as per national and international practices.</p> <p>(b) There is no uniformity in the matter of prescribing norms for high rise buildings even among the three Municipal Corporations in Gujarat, viz, Ahmedabad, Surat and Vadodara. All the three respective Codes give different parameters, (as per AUDA it is 19.3m, including the height of the hollow plinth of stilt, or having ground floor plus four floors; as per SUDA it is more than 13m or having more than ground floor plus three floors; and as per VUDA it is more than 15m if on stilt or more than 13m if on solid plinth). None of them conform to the norms given in Part 4 NBC, viz, 15m and above. In this same Regulations also under sub clause (o) (iv) 15m heights is mentioned which is again causing confusion.</p> <p>Therefore, an agreeable uniform formula has to be evolved by the State Govt. authorities, which can be made applicable throughout the State. It is, however, recommended that NBC Part 4 norms be adopted for high</p>

	rise building as in many other Regulations
<b>2.47 and 2.49</b>	It is not understood why <i>high flood level</i> has also been included as a yard stick for arriving at the height of the building. This may be removed. The <i>ground level</i> should be reckoned at the <i>average level of the ground around and contiguous to the building</i> as adopted in NBC Part 3 and other International Codes.
<b>7.2 (iii)</b>	In Gujarat urban areas, there are around 10,000 lifts as per media reports. Several lift accidents have also been reported. A handicapped youth was killed when a lift in New Civil Hospital in Ahmedabad suddenly slipped on 20 February 1999. Fire Brigade claimed that they rescued 17 persons in lift accidents in Ahmedabad in 1997. The standard of maintenance of lifts leaves much to be desired. Besides, it appears that there is acute shortage of Lift Inspectors in Gujarat to monitor the safety and fail safe operation of large number of lifts. Bombay Lift Act 1939, which is being followed in Gujarat, is antiquated and needs revision.
<b>9 (i)</b>	Include Fire Protection Consultant also in the title as well as in other relevant sub-clauses.
<b>11</b>	<b>Special Development Requirements for Existing Old Walled City and Gamtal Area</b> It is seen from all the three Regulations of AUDA, SUDA & VUDA, quite a liberal approach granting several relaxations to the normal provisions is being extended to the buildings & structures existing, under construction, and also for future constructions, in certain specific areas like Walled City, Gamtal, Nucleus etc., falling within Corporation/ Development Authority areas. Since primary consideration for all human habitats should be fire and life safety, health, sanitation, welfare etc., continuance of such relaxations, which are contrary to the principles of good practice in building construction and fire and life safety, may not be in the public interest. It is, therefore, recommended that all such relaxation clauses, which have anachronistic significance, wherever occurring in the AUDA, SUDA and VUDA Regulations be scrapped.
<b>15.1</b>	<b>Low Cost Housing</b> Maximum Permissible Density (number of dwelling units) per hectare, as given in AUDA Regulations is 225, as against 100-125 for Cities as given in Annex D to Part 3 NBC. Consideration has to be given for bringing this requirement in conformity with NBC norms, at least for the future.
<b>15.5(i)</b>	While Structural Requirements for Low Cost Housing have been specified, no mention has been made of the Fire Protection/Fire Safety Requirements. The provisions

	contained in 17.2 have to be repeated.
17.2(v)	Since Water Mains fitted with fire hydrants for fire fighting purposes are non-existent in MC/AUDA areas; this requirement cannot be implemented. Hence, the Clause has been suitably modified, bringing in the mention of yard hydrants.
17.2 (x)	To specify number and type of fire extinguishers per floor for any building without taking into consideration the area as well as the type of fire risks (classification of fire) involved is wrong. Hence, the Clause has been amended.
17.8	The requirements specified under this regulation should strictly conform to those given in the relevant Clauses in Part 4 NBC. Reference to <i>authorized standards of starred hotels</i> , etc. as given under 17.89 (a) should be avoided. As mentioned under 3.2.6, central handrails should be provided for stairs wider than 1.8m and for buildings over 30m heights with stair width exceeding 1.4m, as per UK Building Regulations.
17.13(1)	<b>(c) Handrail</b> Apart from both the size of the ramp, it will be necessary to provide a middle hand rail also for the 2m wide ramp, to serve as additional aid in avoiding any undue jostling and fall during emergency evacuation as per UK Building Regulations.
18.3(2)	(b) The figure 90 cm specified as the minimum reduced width of stairway or landing on opening of a door is too less and not in conformity with approved Code provisions for Assembly Buildings, and also inconsistent to what is already stated in this regulations 18.1 (f). Hence, in conformity with Part 4 NBC and also 18.1 (f), the whole sub Clause has been amended.
18.3(3)	<b>Revolving Doors</b> Regulation No. 18 deals with Special Structures like Cinemas, Theatres, Meeting Halls, Lecture Halls, Town Halls, and such other Assembly occupancies as explained under the general Clause 18.1. Hence question of inclusion of Revolving Doors under this Regulation does not arise, and, therefore, have been deleted.
25	The cut-off date for applicability of the Regulations has to be specified. Since the main part of the AUDA Regulations had been in existence even prior to the Revised Edition, perhaps, a suitable date may have to be identified for notification of the applicability as had been done in some other Regulations/Bye-laws like Delhi Building Bye-laws, which has clearly stated that all buildings constructed after 2/3/1987 have to follow the Delhi Building Bye-laws 1983,

	and the old buildings are governed by Delhi Fire Prevention and Fire Safety Act & Rules where they have to incorporate 12 important fire protection requirements.
27	<p><b>Relaxation</b></p> <p>(i) Fire and Life Safety in buildings are essential requirements in public interest irrespective of whether the buildings are owned by Government, Public Sector or Private Sector agencies or individuals. Hence, the existing practice of permitting relaxations, exemptions waivers etc., for Government/Public Sector or such other favoured sections of the society need serious review. In several developed countries such relaxations are not permitted.</p> <p>(ii) No doubt in the instant Regulation, high rise buildings and certain other factors have been excluded from the application of relaxation etc. provisions, However, a suitable specific mention of the fact that such exemptions/relaxations, wherever made by the Competent Authority in deserving cases should be without causing any adverse effects on the fire and life safety requirement provisions in the building, has to be made. In fact, this idea is more or less conveyed in Clause 29.2 of the regulation.</p>
28.	<p><b>Facilities for Physically Handicapped Persons</b></p> <p>The Regulations are not actually meant for application to <i>buildings of physically handicapped persons</i> but for all public buildings, which members of the public, including physically handicapped persons, have to use. This aspect has been made abundantly clear in NBC Part 3, Annex E, <i>Special Requirements for Planning of Public Buildings meant for use of Physically Handicapped Persons</i>. Hence, the clause has to be reworded as: <i>These Regulations shall apply to Public Buildings and facilities meant for use by physically handicapped persons also.</i></p>
30	<p><b>Penalties</b></p> <p>The penalties liable to be imposed for violations/deviations of the various provisions in the AUDA Regulations, as they exist today, seem to be quite lenient. Consideration will have to be given for review of these punitive provisions contained in the relevant Act and Rules so as to minimize such violations, and facilitate more easy and effective implementations of the Regulations.</p>
31	<p><b>Tree Plantation</b></p> <p>While tree plantation is a part of land development process, care has to be taken particularly in urban areas that such plantation activities do not result in causing obstruction to the easy movement of fire fighting vehicles in case of a fire emergency in the premises.</p>
32	<b>Zoning ad Use Provisions</b>

	<p><i>Appendix A: Land Use Zoning in Hazard Prone Areas- Guidelines</i></p> <p>(ii) The following may also be included in Priority 1 Oil and Gas Installations, Heritage Buildings</p> <p>(iii) The last portion may be modified as “.....with contents of high national, public utility and economic value”</p>
<b>32.1</b>	<p><b>Use Zone Table</b></p> <p>S.No.6. <i>Industries</i> are seldom categorized or qualified as <i>obnoxious</i>. The term is generally used to describe gases, vapours or such other offensive or repulsive environment. Hence, the word may be dropped.</p>

#### 4.2.4. Points for Amendments in AUDA Regulations

These are attached at Annex. A

### 4.3 VADODARA URBAN DEVELOPMENT AUTHORITY (VUDA) REGULATIONS

#### 4.3.1.

##### (a) General Information on VUDA and VMC

1. Vadodara District is 7794 km<sup>2</sup> in area, has 1691 villages, and has a population of 36.4 lakhs.
2. VUDA Area is 714 km<sup>2</sup> and has 104 villages. VUDA area spreads around VMC area to a distance ranging from 10 km to over 20 km
3. VMC area is 148.95 km<sup>2</sup> with a population of 18 lakhs, as informed by local authorities (as per 2001 Census, VMC area shown is 108.26 km<sup>2</sup> with a population of 13,06,035)
4. GAMTAL area is approximately 8-10 km<sup>2</sup>.
5. Node (Heritage Buildings) area is 4-5 km<sup>2</sup> (covering Sayajiganj, Fatehganj and M S University Campus)
6. About 3.5 lakh people stay in slums in 250 pockets and 57,000 zopadis.
7. BPMC (Bombay Provincial Municipal Corporation) Act 1949 is being followed, which is quite outdated and has lot of discrepancies and limitations. It needs replacement with a Unified Municipal Act for the entire State.
8. The current VUDA 10 year Development Plan is up to 2006.

##### (b) Fire and Life Safety Related Information

###### (i) Industrial Hazards

1. There are about 90,000 industries in Gujarat, out of which about 8,000 are highly polluting chemical industries, including approx. 850 large and medium scale industries.
2. VUDA has several industrial estates in its area, and has the Country's biggest Industrial Complex in Vadodara. Besides, it also covers Nandesari Industrial Estate spread over 220 hectares area with 250 Industrial Units producing chemicals, pharmaceuticals, dyes, pesticides, plastics etc., including 26 highly polluting industries.

3. There are around 67 hazardous industries in VUDA area, each having its own on-site and off-site Disaster Management Plans with a round-the-clock Disaster Control Room in IPCL, which is functioning efficiently.
4. The 265 km stretch of National Highway No. 8 between Surat and Ahmedabad is an accident-prone area where number of hazardous chemical transportation accidents had happened. Under the new *Golden Hour Project*, provision exists for 24-hour emergency services response, where VMC Fire Service plays a major role besides SMC and AMC Fire Brigades at either end.
5. In the VUDA area, frequent fire outbreaks, including major fires do occur in chemical industries, warehouses, cotton mills, oil extraction plants, petro chemical units etc, some of them causing heavy losses.
6. It was gathered that a Report on the Fire Safety/Fire Service Cover for the Industrial Estates in Gujarat was submitted to the State Government some time back by Sri. H. J. Taparia, Station Officer, VMC Fire Brigade.
7. The standard of public awareness about chemical hazards and accidents resulting from them in the region is quite satisfactory because of the series of Campaigns and Seminars conducted by several safety oriented organizations, including National Association of Fire Officers.

**(ii) Building Fire Safety**

1. As in the other major Urban Agglomerations in Gujarat, several fire accidents are reported in VMC and VUDA areas, which are tackled by VMC Fire Brigade.
2. Traffic congestion and insufficient width of road and streets, especially in the Gamtal and Walled City areas had been the most serious handicaps faced by the Fire Brigade in attending promptly to such fire calls, invariably causing undue delay in fire fighting operations which, in turn, provides the otherwise small fires enough time to grow into big fires.
3. There had been frequent kitchen fires in dwellings due to cooking gas cylinder leakages and fires. Some cases of gas cylinder explosions leading to collapse of buildings had also occurred. Presently, a good part of Vadodara City has piped gas (natural gas) connections also. Hence, it is essential that all those involved in the Building Industry must be familiar with the necessary Regulations concerning gas supply installations in buildings, particularly regarding the Safety Regulations. It is therefore necessary that a reference should be made in the VUDA Regulations for complying with the relevant provisions contained in *NBC Part 9 (Plumbing Services): Section 2 GAS SUPPLY* whenever a building is provided with piped gas supply. (This is equally applicable to other codes also)

**(iii) High Rise Buildings**

1. There are about 366 high-rise buildings in VUDA area, as informed. Most of them are in VMC area, leaving only a few in other areas in VUDA (In VMC area reportedly there are about 351 high rise buildings)
2. 285 high rise buildings out of the above have fire fighting system
3. 28 high-rise buildings, which are reportedly either in Nucleus area or not in use, are without any fire fighting systems or falling much below the stipulated requirements.
4. Due to shortage of staff, VMC Fire Brigade is unable to fulfill the building inspection responsibilities in full measure.
5. Out of 273 high rise buildings provided with fire protection systems, during the current year only about 111 renewal applications had been received by paying the renewal fees of Rs. 1000/- each. Balance 162 had not applied for renewal till 29 September 2003.
6. During the Meeting held in the office of the CFO, VMC Fire Brigade on 29 September 2003, it was proposed that CFO should issue Notice to defaulters who had failed to apply for renewal to the effect that "In the event of their failure to apply for renewal within the stipulated date, the building will be declared *unsafe* with attendant penalties. (The necessary penalty clauses have to be incorporated in the VUDA Regulations)."
7. The general state of fire safety in the high rise buildings in the VUDA area is by no means reaching the required standards, and needs to be brought up to the satisfactory level by ensuring more frequent inspections of the premises by the Fire Department officials and by imposing more stringent enforcement measures.
8. The water supply for the fire fighting requirements for the VMC area is far from the satisfactory. Although about 300 fire hydrants installed during the pre-independence days do exist on record, they are hardly serviceable. Hence, this important requirement for fire fighting operations is presently solely dependent on the limited number of large size Water Tenders in the Fire Brigade.

**(iv) VMC Fire Brigade**

1. In the VMC area covering approx. 149 sq. km, there are only 5 Fire Stations at present, as against the total requirements of about 15 Fire Stations as per SFAC norms. Apart from the existing 5, two more Fire Stations are reportedly going to be added shortly one each at Harni and Channi Road. There are some Industrial Fire Brigades in the major Industries like Gujarat Refinery, IPCL, GSFC etc., but they are actually meant for fire safety in their own areas.
2. Nandesari Industrial Estate also has a Fire Station run on contract basis, catering solely to the needs of the Industrial Estate.
3. A Fire Station building had been constructed in the Savali Industrial Estate premises, but neither fire fighting vehicles nor fire service personnel had been provided yet.

4.	Total number of fire fighting appliances is 90, including one Snorkel (Hydraulic Platform) or tall ladder, ambulances etc.
5.	VMC Fire Brigade is yet to be provided with special Rescue Tender and other appliances, which are authorized under Disaster Management Program, as, provided to some other corporation Fire Brigades. The authorized appliances may be provided to VMC Fire Brigade also expeditiously.
6.	Total number of fire staff, including officers in the authorized establishment is 271, including 30 Drivers engaged on daily wages.
7.	There are only 4 Fire Officers, including the CFO & DCFO for the entire Fire Brigade.
8.	50% of the authorized posts are lying vacant without being filled up since long.
9.	With the fresh challenges being posed by terrorism, arson, natural as well as man made disasters, besides the serious fire hazards inherent in the whole area due to the cluster of large number of hazardous industries, transportation risks, high rise and special types of buildings etc., the existing depleted Corporation Fire Brigade is too inadequate to provide even a fraction of the fire cover expected to safeguard such a vast fire sensitive area.
10.	At present, this depleted fire service is being summoned to fight fires in the entire VUDA area, even covering distances of over 30 to 40 km in some cases. (There are some villages in the Vadodara district, which are situated even over 100 km from Vadodara City.
11.	As said earlier, the actual requirement of Fire Stations for the VMC area alone is around 15, as per SFAC scales. For the time being at least, there is an urgent and imperative requirement of raising the number of Fire Stations in the city area to a minimum of 10, supplemented with appropriate scales of equipment and manpower.
12.	For the VUDA area additional Fire Stations may have to be provided for which separate assessment will have to be made.

### 4.3.2. VUDA Regulations

#### 4.3.2.1. Good Points

3.4(h)	Under the Proceedings for Securing Development Permission, this is an important binding sub-clause, which should be added in all Codes.
9.2(4)	This requirement for <i>arranging for test of building materials</i> as mentioned in (c), (g) is an important one. In addition relevant provisions from the Government of India Ministry of Urban Development notification dated 21 March 2001 are also to be included in all Codes.
	<b>Common Plot:</b> The inclusion of Common Plot details for various types of occupancy buildings is a welcome feature.
22.	<b>Drainage, Sewers, etc.:</b> The requirements for these have been given

in great details.
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#### 4.3.2.2. Points for Amendments in VUDA Regulations:

These are attached at Annex. B

### 4.4. SURAT URBAN DEVELOPMENT AUTHORITY (SUDA) REGULATIONS

#### 4.4.1. General Information on SUDA and SMC

1. Surat District has an area of 7,657 km<sup>2</sup> with a total population of 49.96 lakhs and 1,280 villages.
2. The area under SUDA is not known.
3. SMC area is 112 km<sup>2</sup>, and population is 24.33 lakhs.
4. From 14.98 lakhs in 1991 the population in SMC area has increased to 24.33 lakhs in 2001, an increase of nearly 10 lakhs.
5. Among the Class 1 Cities in Gujarat, the City of Surat has grown fastest at a rate of 62.68% during 1991-2001.
6. Surat City has also several large number of slum blocks
7. SMC is considered as one of the richest Corporations in the Country.

##### (a) Industrial and Commercial Hazards

1. Surat is considered as the hub of commercial activities in Gujarat and has a long history of trade even with foreign countries.
2. There are several industries also in and around Surat.
3. Apart from Hajira, which is a leading industrial complex about 22 km from Surat, there are several industrial estates also in SUDA area.
4. In SMC area, there are large number of small scale industries (cottage industries)

##### (b) Fire & Life Safety In Buildings

1. The general state of fire and life safety standards in the buildings of SMC area is not satisfactory, mainly because of inadequacy of the fire protection requirements provided in the buildings, and their lack of periodical maintenance.
2. SMC had also issued Notices to 500 high-rise buildings that had not installed fire protection systems. Most of these high rises are commercial - cum-residential complexes (multi-occupancy units). More than 90% of them are believed to have flouted fire safety Norms. The tallest building in Surat City is a 20 year old 14 story building used for whole sale cloth storage. The inherent fire hazards in this building can well be imagined.
3. Traditionally also, the majority of the city dwellers are engaged in various commercial and small scale industrial activities, some of them utilizing their own residential premises as their working units. Such residential working units indulge in storage and handling of fire hazardous chemicals, and also in fire hazardous operations, albeit not falling within the purview of Factories Act and Rules.
4. The prevailing Building Codes in Surat like the SUDA Regulations also exhibit an implicit permissive approach for continued existence of several such residences -cum-industrial/commercial units in the city. The specific inclusion of the provision of lofts and cellars for

*low-rise residential buildings to be used as storage space as provided in the existing SUDA Regulations bear testimony to this tacit liberal approach.*

5. Because of such laxity in certain aspects of the Building Codes, which are detrimental to fire and life safety, even some of the new constructions also derive undue advantages.
6. The fact that such liberal approach in the Code has not been in the best interests of promoting fire safety standards of buildings has been amply brought out by the occurrence of several major fires, explosions and collapses of buildings in Surat city in the last two decades.
7. A few such major incidents are cited below:
  - i. 14 December 1991 - Mukesh Dying Mills - 3 Storyed Building Boiler leakage and typical 3-dimensional fire - Within 30 minutes of fire call and while fire fighting operations were in progress, the entire building collapsed causing a heavy death toll of 27 persons, out of which 20 were fire fighters, including a Fire Officer - 26 trapped fire service personnel were rescued alive.
  - ii. 18 February 2000 - 8 persons sustained severe burns due to LPG cylinder burst in a residential premises in Khetrival, Surat-The building was damaged in the fire that followed
  - iii. 3 August 2003 - At least 43 people were killed and 10 injured after an explosion caused the collapse of 3 buildings in Surat - The ground floor was used for diamond cutting and polishing work while the other floors were residential. Explosion was caused either due to leakage and fire from one of the many LPG gas cylinders used in the diamond work areas or by a faulty boiler.
8. Number of high-rise buildings in SMC area is approximately 500.
9. Number of high-rise buildings in SUDA area is about 200.
10. Comments: SUDA Regulations give conflicting interpretations about high-rise buildings. Under R. 2.22 it is defined as *a building having more than 3 floors excluding the ground floor*, whereas R.18 GENERAL BUILDING REQUIREMENTS, and particularly R.18.2 FIRE PROTECTION, specifies fire protection arrangements for buildings over 25m or more in height only. Therefore, only *NBC Part 4 Clauses on Fire Protection* have been recommended for inclusion in all the three Codes (AUDA, VUDA and SUDA) for uniformity and good practice.

**(c) SMC Fire Brigade**

1. Number of Fire Stations is 10 (As per SFAC scales, SMC should have 11 Fire Stations).
2. Total number of staff authorized is 513 (~35 posts are vacant).
3. Officers: CFO 1, DCFOs 3, DFOs 5, Station Officers 6, Sub-officers 8
4. Total number of appliances is 99.
5. As compared to AMC and VMC, SMF Fire Brigade has more number

of specialist appliances. It has 5 Snorkels (Hydraulic Platforms) of various heights, 3 High Pressure Pumping Units, 2 Foam Tenders, 1 DCP (2000 kg) Tender, 1 Crash Fire Tender, 2 Emergency Tenders, 3 Cranes, 1 BA Charging Set etc.

6. As stated under AUDA and VUDA, practically no fire cover is provided for the entire SUDA area outside SMC area, which has fire hazardous units, high rise and special types of buildings. The actual requirements will have to be assessed based on a fire risk analysis. It is gathered that the State Government proposes to develop an Airport in the City precincts, and connect SURAT City by air shortly.

#### 4.4.2. Comments on SUDA Regulations

##### 4.4.2.1. Good Points

5.1	The Clause that <i>Every order granting permission subject to conditions or refusing permissions shall state the ground for imposing such conditions for such refusal</i> is an essential one which can be adopted in all Codes.
5.4	This Clause stipulating liability for any injury or loss to any one during construction on the part of developers/contractors is a welcome one worthy of adoption in all Codes.
12.3.2	This Regulation restricting the maximum height of any high rise building to 40m is also a welcome step.
12.8	High-rise building with podium and Tower. Inclusion of this new design concept is quite unique and worthy of adoption.
13	Even the height of compound walls for certain types of buildings and areas have been specified. This is also a good step.

#### (B) Points for Amendments in SUDA Regulations

These are given in Annex C attached.

#### 4.5. QUALIFICATIONS, EXPERIENCE, SCOPE OF WORK, AND DUTIES AND RESPONSIBILITIES OF FIRE PROTECTION CONSULTANTS

These are given in Annex D attached.

## ANNEXURE A

# Ahmedabad Urban Development Authority GENERAL DEVELOPMENT CONTROL REGULATIONS 2002 (PART III).

### *Proposed Amendments in Fire Related Regulations*

AUDA Reg. Ref. No.	Proposed Amendments
<b>2. DEFINITIONS</b>	
Following definitions should be amended as under:	
No 2.7	<p><b>AUTOMATIC SPRINKLER SYSTEM</b> A system of water pipes fitted with sprinkler heads at suitable intervals and heights, and designed to actuate by heat automatically, control and extinguish a fire by discharge of water.</p>
2.9	<p><b>Buildings</b> All buildings shall be classified according to the use or the character of the occupancy in one of the following groups: <i>Residential, Educational, Institutional, Assembly, Business, Mercantile, Industrial, Storage and Hazardous.</i></p> <p><b>(a) Residential Buildings</b> These shall include any building in which sleeping accommodation is provided for normal residential purposes with or without cooking or dining or both facilities, except any building classified under institutional buildings.</p> <p><b>(b) Educational Buildings</b> These shall include any building used for school, college, other training institutions or day-care purposes involving assembly for instruction, education or recreation for not less than 20 students.</p> <p><b>(c) Institutional Building</b> These shall include any building or part thereof, which is used for purposes, such as medical or other treatment or care of persons suffering from physical or mental illness, disease or infirmity; care of infants, convalescents or aged persons and for penal or correctional detention in which the liberty of the inmates is restricted. Institutional buildings ordinarily provide sleeping accommodation for the occupants.</p> <p><b>(d) Assembly Buildings</b> These shall include any building or part of building, where number of persons not less than 50 congregate or gather for</p>

amusement, recreation, social, religious, patriotic, civil, travel and similar purposes, for example, theatres, motion picture houses, assembly halls, auditoria, exhibition halls, museums, skating rinks, gymnasiums, restaurants, places of worship, dance halls, club rooms, passenger stations and terminals of air, surface and marine public transportation services, recreation piers and stadia, etc.

**(e) Business Building**

These shall include any building or part of a building which is used for transaction of business (other than that covered by mercantile buildings) for keeping of accounts and records and similar purposes, professional establishments, service facilities, etc. city halls, town halls, court houses and libraries shall be classified in this group so far as the principal function of these are for transaction of public business and keeping of books and records.

**(f) Mercantile Building**

These shall include any building, which is used as shops, stores, market, for display and sale of merchandise, either wholesale or retail.

**(g) Industrial Building**

These shall include any building or part of a building or structure, in which products or materials of all kinds and properties are fabricated, assembled, manufactured or processed, for example, assembly plants, industrial laboratories, dry cleaning plants, power plants, generating units, pumping stations, fumigation chambers, laundries, buildings or structures in gas plant, refineries, dairies and saw-mills etc.

**(h) Storage Building**

These shall include any building or part of a building used primarily for the storage or sheltering (including servicing, processing or repairs incidental to storage) of goods, ware or merchandise (except those that involve highly combustible or explosive products or materials) vehicles or animals, for example, warehouses, cold storage, freight depots, transit sheds, storehouses, truck and marine terminals, garages, hangers, grain elevators, barns and stables. Storage properties are characterized by the presence of relatively small number of persons in proportion to the area. Any new use which increases the number of occupants to a figure comparable with other classes of occupancy shall change the classification of the building to that of the new use, for example, hangars used for assembly purposes, warehouses used for office purposes, garage buildings used for manufacturing.

**(i) Hazardous Buildings**

These shall include any building or part of a building which is used for the storage, handling, manufacture or processing of highly combustible or explosive materials or products which are liable to burn with extreme rapidity and or which may produce

poisonous fumes or explosions on storage, handling, manufacturing or processing. These include highly corrosive, toxic or noxious alkalis, acids or other liquids or chemicals producing flame, fumes and explosive, poisonous, irritant or corrosive gases; and material producing explosive mixtures of dust which result in the division of matter into fine particles subject to spontaneous ignition.

**Some other definitions relating to buildings are as follows:**

**(a) Detached building**

A building with walls and roofs independent of any other building and with open spaces on all sides.

**(b) Semi-Detached Building**

A building having one or more sides attached with wall and roof with other building.

**(c) High Rise Building**

All buildings 15 m or above in height shall be considered as high rise buildings.

**(d) Office Building**

A building or premises or part thereof whose sole or principle use is for an office or for office purposes or clerical work .Office purposes includes the purpose of administration , clerical work , handling money, telephone, telegraph and computer operation; and clerical work includes writing, book-keeping, sorting papers, typing, filing, duplicating, punching cards or tapes, machine calculations, drawing of matter for publication and editorial preparation of matter of publication.

**(f ) Public Building**

A building constructed by Government, Semi-Government organizations, public sector under-takings, registered Charitable Trust or such other organizations for their non-profitable public activities

**(g) Special Building**

(i) A building solely used for the purpose of a drama or cinema theatre, motion picture a drive-in-theatre, an assembly hall or auditorium, town hall, lecture hall, an exhibition hall, theatre museum, stadium, community hall, marriage hall.

(ii) A hazardous building;

(iii) An Institutional Building

(iv) An Industrial Building

(v) A Storage Building.

**(h) Unsafe Building**

A building which,

(i) is structurally unsafe,

(ii) is insanitary,

(iii) is not provided with adequate means of egress,

	<p>(iv) constitutes a fire hazard,  (v) is dangerous to human life, and  (vi) in relation to its existing use constitutes a hazard to safety or health or public welfare by reasons of inadequate maintenance, dilapidation or abandonment.</p> <p><b>(i) Wholesale establishment</b>  An establishment wholly or partly engaged in wholesale trade and, manufacturer's wholesale outlets, including related storage facilities, warehouses and establishments engaged in truck transport, including truck transport booking warehouses.</p>
2.17	<p><b>Combustible Material</b>  The material which either burns itself or adds heat to a fire when tested for non-combustibility in accordance with IS: 3808-1979.</p>
2.29	<p><b>Exit</b>  A passage, channel or means of egress from any building, storey or floor area to a street or other open space of safety:</p> <p><b>2.29.1 VERTICAL EXIT:</b> A vertical Exit is a means of exit used for ascending or descending between two or more levels, including stairways, smoke-proof towers, ramps and fire escapes</p> <p><b>2.29.2 HORIZONTAL EXIT:</b> An arrangement which allows alternative egress from a floor area at or near the same level in an adjoining building or an adjoining part of the same building with adequate fire separation.</p> <p><b>2.29.3 OUTSIDE EXIT:</b> An outside Exit is an exit from the building to a public way, to an open area leading to a public way or to an enclosed fire resistant passage leading to a public way.</p>
2.33	<p><b>Fire Lift</b>  The lift installed to enable fire services personnel to reach different floors with minimum delay, having such features as required in accordance with this part.</p>
2.34	<p><b>Fire Proof Door</b>  A fire-resistive door approved for openings in fire separation walls.</p>
2.36	<p><b>Fire pump-Booster Fire Pump</b>  Means a mechanical/electrical device which boosts up the water pressure at the top level of a multi-storied/high-rise building and which is capable of delivering a pressure of 3.2 kg/cm<sup>2</sup> at the <b>highest</b> point.</p>
2.37	<p><b>Fire Resistance</b>  Fire resistance is a property of an element of building construction and is the measure of its ability to satisfy for a stated period some or all of the following criteria:</p>

	<p>a) Resistance to collapse.</p> <p>b) Resistance to penetration of flame and hot gases, and</p> <p>c) Resistance to temperature rise on the unexposed face up to a maximum of 180°C and/or average temperature of 150° C.</p>
2.38	<p><b>Fire Separation</b></p> <p>The distance in meters measured from the external wall of the building concerned to the external wall of any other building on the site or from other site, or from the opposite side of the street or other public space for the purpose of preventing the spread of fire.</p>
2.40	<p><b>Fire Tower</b></p> <p>An enclosed staircase, which can only be approached from the various floors through landings or lobbies separated from both the floor areas and the staircase by fire-resisting doors, and open to the outer air.</p>
2.47	<p><b>Height of Building</b></p> <p>The vertical distance measured in the case of flat roofs, from the average level of the ground around and contiguous to the building to the terrace of the last livable floor of the building adjacent to the external wall; and in the case of pitched roof up-to the point where the external surface of the outer wall intersects the finished surface of the sloping roof; and in the case of gables facing the road, the mid-point between the eaves level and the ridge. Architectural features serving no other function except that of decoration shall be excluded for the purpose of measuring heights. Presence of genuine stair cabins, water tanks and lift rooms shall be ignored for the purpose of this definition.</p>
2.49 and 2.79	<p><b>Ground Level/ Residential Use</b></p> <p>Delete (covered under 2.9)</p>
2.92	<p><b>Travel Distance</b></p> <p>The distance to be travelled from any point in a building to a protected escape route, external escape route or final exit.</p>
Following additional definitions should be provided:	
2.100	<p><b>Down comer</b></p> <p>An arrangement of fire fighting within the building by means of down comer pipe connected to terrace tank through terrace pump, gate valve and non return valve and having mains not less than 100 mm internal diameter with landing valves on each floor/landing. It is also fitted with inlet connections at ground level for charging with water by pumping from fire services appliances and air release valve at roof level to release trapped air inside.</p>
2.101	<p><b>Dry Riser</b></p>

	An arrangement for fire fighting within the building by means of vertical rising mains not less than 100 mm internal diameter with landing valves on each floor/landing which is normally dry but is capable of being charged with water usually by pumping from fire services appliances.
2.102	<b>Emergency Lighting</b> Lighting provided for use when the supply to the normal lighting fails.
2.103	<b>Emergency Lighting System</b> A complete but discrete emergency lighting installation from standby power source to the emergency lighting lamp(s), for example, self contained emergency luminary or a circuit from central battery generator connected through wiring to several escape luminaries.
2.104	<b>Escape Lighting</b> That part of emergency lighting which is provided to ensure that the escape route is illuminated at all material times (for example, at all times when persons are on the premises), or at times the main lighting is not available, either for the whole building or the escape routes.
2.105	<b>Fire Resistance Rating</b> The time that a material or construction will withstand the standard fire exposure as determined by fire test done in accordance with the standard methods of fire tests of material/structures.
2.106	<b>Fire Stop</b> A fire resistant material, or construction having a fire resistance rating of not less than the separating elements, installed in concealed spaces or between structural elements of a building to prevent the spread/ propagation of fire and smoke through walls, ceilings and the like as per the laid down criteria.
2.107	<b>Means of Egress</b> A continuous and unobstructed way of travel from any point in a building or structure to a place of comparative safety.
2.108	<b>Occupant Load</b> The number of persons for which the means of egress of a building or portion thereof is designed.
2.109	<b>Pressurization</b> The establishment of a pressure difference across a barrier to protect a stairway, lobby, escape route, or room of a building from smoke penetration.
2.110	<b>Refuge Area</b> An area where persons unable to use stairways can remain

	temporarily and await instructions or assistance during emergency evacuation.
2.111	<b>Roof Exits</b> A means of escape on to the roof of a building where the roof has access to it from the ground. The exit shall have adequate cut-off within the building from staircase below.
2.112	<b>Ventilation</b> Supply of outside air into, or the removal of inside air from an enclosed space.
2.113	<b>Venting Fire</b> The process of inducing heat and smoke to leave a building as quickly as possible by such paths so that lateral spread of fire and heat is checked, fire fighting operations are facilitated and minimum fire damage is caused
2.114	<b>Wet Riser.</b> An arrangement for fire fighting within the building by means of vertical rising mains of not less than 100mm diameter with landing valves on each floor/landing for fire fighting purposes and permanently charged with water from a pressurized supply.
Note	<b>For definition of other terms, reference shall be made to IS-8757:1999 &amp; IS-7673:1975</b>
3.3	<b>Forms of application</b> (V) May be replaced by following: For high rise building and for special buildings like assembly, institutional, industrial storage and hazardous occupancy the following additional information shall be furnished/indicated in the plans in addition to the items under clause 3.3: <ol style="list-style-type: none"> <li>1. Name of building</li> <li>2. Address of the building</li> <li>3. Name &amp; address of the builder/promoter</li> <li>4. Name &amp; address of the owners/occupiers of individual flats</li> <li>5. Plot area <ol style="list-style-type: none"> <li>a) Title</li> <li>b) Land use (in case of residential building indicate no of dwelling units)</li> </ol> </li> <li>6. Covered area (grade level)</li> <li>7. Height of the building</li> <li>8 Overall height (from grade level) <ol style="list-style-type: none"> <li>a) Whether Setback areas are conforming to Unified Building Bye law/ AUDA Regulations.</li> </ol> </li> <li>9. Number of basements (Please indicate level below in each case) <ol style="list-style-type: none"> <li>a) If basement extends beyond building line, please indicate the load bearing strength of the roof of the basement</li> <li>b) Area of basement</li> <li>c) Whether any Piazza is proposed? Is so, details of the level of Piazza and ramps etc be indicated.</li> </ol> </li> </ol>

	<p>10. Number of floors (including ground floor)</p> <p>11. Occupancy Use (Please mention separately for basement and floors)</p> <p>12. Covered area of typical floor</p> <p>13. Parking areas (please give details)</p> <p>14. Details of surrounding property/features</p> <p>15. Approach to proposed building, width of the Road and connecting roads if any</p> <p>16. Please give details of water supply available exclusively for fire fighting</p> <p>17. Have wet risers been provided?</p> <p>18. If yes, please indicate the number of risers and internal diameter of each</p> <p>19. Has any down comer been provided? If so, please give details</p> <p>20. Is a public or other water storage facility available nearby? If so, please give the capacity and distance from your building, also please indicate if it is readily accessible</p> <p>21. Give any other information that you can regarding availability of water supply for fire fighting.</p> <p>22. Are internal hydrants being provided? If so, please indicate:</p> <ol style="list-style-type: none"> <li>a) No. Of hydrants on each floor including basements and terrace</li> <li>b) Have these hydrants single or twin outlets?</li> </ol> <p>23. Are first aid hose reels being provided? If so Please indicate</p> <ol style="list-style-type: none"> <li>a) No of hose-reels on each floor including basements and terrace</li> <li>b) Bore and length of hose reel tubing on each reel</li> <li>c) Size (bore) and type of nozzle fitted to each hose reel.</li> <li>d) Is the hose reel connected directly to the riser or to the hydrant outlet?</li> </ol> <p>24. Are fire hoses being provided near each hydrant? If so, please indicate</p> <ol style="list-style-type: none"> <li>a) The type of hose</li> <li>b) The size (bore) of hoses</li> <li>c) The length of each hose</li> <li>d) Total no of hoses provided near each hydrant</li> </ol> <p>25. Are branch pipes being provided? (Note:- Universal Branch Pipe conforming to IS:2871-1983 is to be provided as per IS:3844-1989)</p> <p>26. Is the basement to be used for car parking or storage?</p> <ol style="list-style-type: none"> <li>a) Is it being Sprinklered?</li> <li>b) Whether any cubicles are proposed in the basement/</li> <li>c) If so, the area of each cubicle.</li> <li>d) Whether segregation/compartimentation of the basement is being provided?</li> <li>e) If so, please give details.</li> </ol>
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	<p>27. Is the building being equipped with automatic fire detection and alarm system? If so please indicate</p> <ol style="list-style-type: none"> <li>a) The type of detectors used</li> <li>b) The standard to which the detectors conform</li> <li>c) The code to which the installation conforms.</li> </ol> <p>28. Are manual call boxes being installed in the building for raising an alarm in the event of outbreak of a fire? If so, please give details.</p> <p>29. Is public address system being installed in the building with loudspeakers on each floor?</p> <p>30. Is fire control room being provided in entrance lobby of the building?</p> <p>31. Is an intercom system being provided between the different floors and the fire control room in entrance lobby?</p> <p>32. How many staircases are being provided in the building? Please indicate in each case</p> <ol style="list-style-type: none"> <li>a) Width of the stairway</li> <li>b) Width of risers</li> <li>c) Height of risers</li> <li>d) If the treads are of non- slippery type.</li> </ol> <p>33. What is the proposed average occupant load per floor?</p> <p>34. How many lifts are being installed in the building? Please indicate in each case</p> <ol style="list-style-type: none"> <li>a) The floors between which the lift runs</li> <li>b) The type of door fitted to the lift car and landing doors</li> <li>c) Fire resistance rating of the lift car</li> <li>d) Floor area of the lift car</li> <li>e) Loading capacity of the lift car</li> <li>f) Is communication system being installed in the lift car?</li> <li>g) Is a fireman's switch being installed in the lift for grounding it in the event of a fire?</li> </ol> <p>35. Are stationary fire pumps being installed for pressurizing the wet riser? If so please indicate</p> <ol style="list-style-type: none"> <li>a) The number of pumps</li> <li>b) The size of suction and delivery connection to each pump</li> <li>c) The output of each pump</li> <li>d) The maximum head against which the pump can operate at the output mentioned in C</li> <li>e) Is the pump automatic in action?</li> </ol> <p>36. Is a standby source of electric supply being provided? If it is through a generator, please indicate:</p> <ol style="list-style-type: none"> <li>a) The capacity (output)</li> <li>b) The function that can be maintained simultaneously by the use of generator Such as operating lifts, fire pumps, emergency lighting etc</li> <li>c) Will the generator be automatic in action or has to be started</li> </ol>
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	<p>manually?</p> <p>37. Are any yard hydrants being fed from the building's fire pump?</p> <p>38. Where more than one lift is being installed in a common enclosure, will individual lifts be separated by fire-resisting walls of 2 hours fire rating?</p> <p>39. Will the lift lobby or the stairway be pressurized? If so, give details.</p> <p>40. Will the lift lobbies and staircases be effectively enclosed to prevent fire/smoke entering them from outside at any floor?</p> <p>41. Will all the exits and direction of travel to each exit be sign posted with illuminated signs?</p> <p>42. Is false ceiling being provided in any portion of the building? If so please indicate the location and mention if the material being used for the false ceiling is combustible or non-combustible?</p> <p>43. Will the building be centrally air-conditioned? If so please indicate,</p> <ul style="list-style-type: none"> <li>a) The material used for construction of ducts and its fittings</li> <li>b) The type of tinning used for ducts if any</li> <li>c) The type of lagging used, if any for insulating any portion of the duct, Please also indicate how the lagging is secured.</li> <li>d) If false ceiling is being installed please give information as at 42 above.</li> <li>e) If plenum is used as return air passage, Is it being protected with fire detectors? Please give details.</li> <li>f) Is a separate AHU being provided for each floor?</li> <li>g) Whether automatic shutdown of AHU is coupled with detection system?</li> <li>h) Is the ducting for each floor effectively isolated or is it continuous on more than one floor?</li> <li>i) Will fire dampers be provided in AC ductings? If so, give details of their installation.</li> </ul> <p>44. Where are the switch-gears and transformers being located? If inside the building, please indicate</p> <ul style="list-style-type: none"> <li>a) If the switchgears and transformers have been housed in separate compartments, effectively separated from each other and from other portions of the building by a 4 hours fire resistance wall?</li> <li>b) What precautions will be taken to prevent a possible fire in the transformers from spreading?</li> </ul> <p>45.(i) Where electrical cables, telephone cables, dry/wet risers/down-comers pass through a floor or a wall, Will the spaces (apertures) around the cables/pipes be effectively Sealed/plugged with non-combustible, fire resisting material?</p>
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	<p>(ii) Ventilation</p> <p>a) Whether natural ventilation is relied upon? If so give details of vents for the stairwell, lift shaft etc</p> <p>b) Whether mechanical ventilation is being proposed? If so, give details of proposed system indicating the number of air changes for the basements and other floors.</p> <p>c) Whether mechanical ventilation is being coupled with automatic detection system?</p> <p>46. Please indicate the number and type of fire extinguishers which will be provided at various locations and the arrangement for the maintenance of the extinguishers</p> <p>47. Please indicate if the fire extinguishers bear the ISI certification mark?</p> <p>48. Whether the refuge area is being provided? If so, the floor on which it will be provided and the total area being provided floor-wise.</p> <p>49. Is the building being protected against lightning? If so does the lightning protector conform to any code? Please give details.</p> <p>50. Please confirm that the work has not been started on site and construction will be started only after final approval of the Competent Authority. Give Position of construction at site.</p>
3.6	Plans & Specifications to be prepared by Registered Architects etc.: Include "Authorized / Accredited Fire Protection Consultant" also in the list.
4.2.1	<p><b>Conformity with other Acts and Regulations</b></p> <p>Add - Reference to the <i>Gujarat Town Planning And Urban Development Act-1976</i></p> <p>(c) The reference to the Indian Oil Mines Regulations 1933 needs to be amended to the Oil Mines Regulations 1984, under the Mines Act 1952</p> <p><b>Reference to following relevant Acts / Regulations as given below have to be added</b></p> <p>a) Petroleum Rules 1976 under the Petroleum Act 1934</p> <p>b) Explosives Rules 1983 under Indian Explosives Act 1884</p> <p>c) Factories Act 1948 and Factories Rules under the Gujarat Govt.</p> <p>d) Gas Cylinders Rules 1981</p> <p>e) Environment Protection act 1986 and Environment Protection Rules 1986</p> <p>f) Manufacture, Storage &amp; Import of Hazardous Chemicals Rules 1989</p> <p>g) Public liability Insurance Act 1991</p> <p>h) Notification of Requirement of Environment Clearance of Projects, 1994 (MOEF)</p> <p>i) Building and other Construction Workers (regulation of</p>

	Employment & Conditions of service) Act 1996 and Central Rules, 1998
4.5	<b>Inspection</b> <b>(4) Unauthorized Development:</b> (b) Reference to regulation no 2.77 should read as 9.3.
6	<b>Inspection.</b> <b>6.2 PROCEDURE DURING CONSTRUCTION</b> (a) Recognized stages for progress certificate and checking. 1.) V) Add at the end, "It shall be the responsibility of the Chief Fire Officer by carrying out inspections at appropriate intervals, to ensure that the means of exit as well as the fire protection requirements for such buildings are adequate and operational .He shall also satisfy himself that all elevators including fire lifts are duly tested and their test certificates are submitted to his satisfaction. If the above work is entrusted to an accredited Fire Protection Consultant his reports shall be countersigned by the Chief Fire Officer. In case of inadequacy or contravention of these regulations, he shall issue a notice to the owner or occupier of such buildings directing him to rectify the shortcomings /contraventions within a specified period. Copies of all such notices shall be endorsed to the Competent Authority also."
6.4	<b>ILLEGAL OCCUPATION OF BUILDING</b> (a) Add (iv) reading as follows 'If building is declared Unsafe'
9	<b>Registration of Architect, Engineer, Structural Designer, Clerk Of Works, Developer (Add Fire Protection Consultant)</b> Add between 9.3.4 and 9.3.5 "Qualification and Experience, Duties and Responsibilities in respect of <b>Fire Protection Consultant</b> " (Please take from Annexure D)
11	<b>Special Development Requirements For Existing Old Walled City And Gamtal Area</b> On the whole, the clauses under these Regulations indicate a liberal approach granting relaxations to the other normal regulations which is contrary to the principle of good practices in building constructions. Hence in the primary interest of Fire and Life safety, which is in overall public interest it is recommended that <b>these regulations</b> , which have anachronic significance, <b>be scrapped.</b>
12.4.1	<b>Permissible built up area in margin.</b> (c) (i) (7) (ii) Para 1 Word "Maximum" used is correct. Amendment issued in this regard wide Notification dated 30.9.2003 should be withdrawn.
15	<b>Development of low cost housing</b> <b>15.1 Planning.</b>

	<p>(i) This should be amended to read as follows          “The maximum density of dwellings should be in line with Part 3 NBC Annex D”.</p> <p><b>15.5 Structural requirements.</b>          Add a new sub clause          “The above shall be subject to approval by the Competent Authority.”</p> <p><b>Also Add another new clause 15.6</b>          Fire Protection /Fire Safety Requirements          “For Fire Protection /Fire Safety Requirements provisions contained in regulation No 17.2 may be referred to’.</p>
17	<p>GENERAL BUILDING REQUIREMENTS  <b>17.2 FIRE PROTECTION</b>          Existing Title should be amended as  <b>FIRE PROTECTION AND MEANS OF EXIT REQUIREMENTS (INCLUDING HIGH RISE BUILDINGS)</b>          All clauses under EXISTING 17.2 should be replaced by following CLAUSES:  <b>(A) General Requirements</b>  <b>(1) Types of construction</b>          The types of construction according to fire resistance shall be classified into four categories, namely, Type 1 construction, Type 2 construction, Type 3 construction and Type 4 construction as per Table 1 given under 3.3.1 Part 4 NBC-second revision. The Fire resistance test for structural elements shall be done in accordance with IS- 3808:1979. The fire resistance ratings of various building components such as walls, columns, beams and floors are given in Table2 to Table 18 part4 NBC-second revision.</p> <p><b>Steel framed constructions</b>  <b>Load bearing steel beams and columns of buildings having total covered area of 500 m2 and above shall be protected against failure/collapse of structure in case of fire. This could be achieved by covering the exposed steel supporting members by suitable fire resistance rated materials like concrete, vermiculite etc as per IS- 15103:2002.</b></p> <p><b>Electrical installations</b>  <b>Electrical installations from fire safety point of view shall comply with IS- 1646:1997.</b></p> <p>Subject to any of the above regulations every person who undertakes construction of a building and/or who designs the structural member of the building shall comply with the</p>

provisions of National Building Code prevailing at the relevant time or the provisions of the Indian Standard Specifications published from time to time.

Every person who undertakes the construction work on a building or directs or supervises such works shall be responsible and shall ensure use of sound and good quality building materials, properly put together for optimum safety. He shall be liable for all consequences arising out of breach of these regulations.

**(2) Exit Requirements:**

**(i) General Exit requirements**

- a) An exit may be a doorway, corridor; passageway(s) to an internal staircase, or external staircase, or to a verandah or terrace(s), which have access to the street, or to the roof of a building or a refuge area. An exit may also include a horizontal exit leading to an adjoining building at the same level.
- b) Lifts and escalators shall not normally be considered as exits.
- c) Every exit, exit access or exit discharge shall be continuously maintained free of all obstructions or impediments for full use in the case of fire or other emergency.
- d) Every building meant for human occupancy shall be provided with exits sufficient to permit safe escape of occupants, in case of fire or other emergency.
- e) In every building or structure, exits shall comply with the minimum requirements of this part, except those not accessible for general public use.
- f) No building shall be so altered as to reduce the number, width or protection of exits to less than that required.
- g) Exits shall be clearly visible and the route to reach the exits shall be clearly marked and signs posted to guide the occupants of the floor concerned. Signs shall be illuminated and wired to an independent electrical circuit on an alternative source of supply. The sizes and colours of the exit signs shall be in accordance with IS-9457:1980, IS-12407:1988 & IS-12349:1988. The colour of the exit signs shall be green.

Note: This provision shall not apply to residential occupancies less than 15 mts in height.

- h) The floors of areas covered for the means of exits shall be illuminated to values not less than 1 ft candle (10 lux) at floor level. In auditoriums, theatres, concert halls and such other places of assembly, the illumination of floor exit /access may be reduced

	<p>during period of performances to value not less than 1/5 ft candle (2 lux).</p> <ul style="list-style-type: none"> <li>i) Fire doors with 2 hour fire resistance shall be provided at appropriate places along the escape route and particularly at the entrance to lift lobby and stairwell where a funnel or flue effect may be created, inducing an upward spread of fire to prevent spread of fire and smoke.</li> <li>j) All exits shall provide continuous means of egress to the exterior of a building or to an exterior open space leading to a street.</li> <li>k) Exits shall be so arranged that they may be reached without passing through another occupied unit.</li> <li>l) For occupant load, capacity of exits and travel distance reference may be made to 4.3, 4.4 and 4.5 of part 4 NBC-SECOND REVISION.</li> </ul> <p><b>(ii) Fire Access Stair Cases</b></p> <p>All buildings, having area more than 500 sq meters on each floor shall have a minimum of two staircases. They shall be of enclosed type; at least one of them shall be on external walls of buildings and shall open directly to the exterior, interior open space or to an open place of safety. Further, the provision or otherwise of alternative staircases shall be subject to the requirements of travel distance being complied with.</p> <p><b>(iii) Doorways</b></p> <ul style="list-style-type: none"> <li>a) Every exit doorway shall open into an enclosed stairway or a horizontal exit of a corridor or passageway providing continuous and protected means of egress.</li> <li>b) No exit doorway shall be less than 1000 mm in width except assembly buildings where door width shall be not less than 2000 mm. Doorways shall be not less than 2000 mm in height.</li> <li>c) Exit doorways shall open outwards, that is, away from the room, but shall not obstruct the travel along any exit. No door, when opened, shall reduce the required width of stairway of landing to less than 900 mm. Overhead or sliding doors shall not be installed.</li> </ul> <p>Note- In the case of buildings where there is a central corridor, the doors of rooms shall open inwards to permit smooth flow of traffic in the corridor.</p> <ul style="list-style-type: none"> <li>d) Exit door shall not open immediately upon a flight of stairs. A-landing equal to at least the width of the door shall be provided in the stairway at each doorway. The level of landing shall be the same as</li> </ul>
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	<p>that of the floor, which it serves.</p> <p>e) Exit doorways shall be openable from the side, which they serve without the use of a key.</p> <p>f) Mirrors shall not be placed in exit doors to avoid confusion regarding the direction of exit.</p> <p><b>(iv) Corridors and Passageways</b></p> <p>a) Exit corridors and passageways shall be of width not less than the aggregate required width of exit doorways leading from them in the direction of travel to the exterior.</p> <p>b) Where stairways discharge through corridors and passageways, the height of corridors and passageways shall be not less than 2.4 m.</p> <p>c) All means of exit including staircases, lifts, lobbies and corridors shall be adequately ventilated.</p> <p><b>(v) Internal Staircases.</b></p> <p>a) Internal stairs shall be constructed of non-combustible materials throughout.</p> <p>b) Internal stairs shall be constructed as a self-contained unit with an external wall of the building constituting at least one of its sides and shall be completely enclosed.</p> <p>c) A staircase shall not be arranged round a lift shaft.</p> <p>d) Hollow combustible construction shall not be permitted.</p> <p>e) No gas piping, electrical panels or AC ducts shall be allowed in the stairway. However service shafts/ducts may be permitted. Electrical shafts/ducts shall have not less than 2h fire resistance. For other services shafts/ducts, the fire resistance shall be not less than 1h.</p> <p>f) Notwithstanding the detailed provision for exits, the following minimum width shall be provided for staircases-</p> <table style="margin-left: 40px;"> <tr> <td>Residential buildings (dwellings)</td> <td style="text-align: right;">1.0 m</td> </tr> <tr> <td>Residential hotel buildings</td> <td style="text-align: right;">1.5 m</td> </tr> <tr> <td>Assembly buildings like auditorium, Theatres and cinemas</td> <td style="text-align: right;">2.0m</td> </tr> <tr> <td>Educational buildings up to 30 m in Height</td> <td style="text-align: right;">1.5m</td> </tr> <tr> <td>Institutional buildings like hospitals</td> <td style="text-align: right;">2.0 m</td> </tr> <tr> <td>All other buildings</td> <td style="text-align: right;">1.5 m</td> </tr> </table> <p>g) The minimum width of tread without nosing shall be 250 mm for internal staircase of residential buildings. This shall be 300 mm for assembly, hotels, educational, institutional, business and other</p>	Residential buildings (dwellings)	1.0 m	Residential hotel buildings	1.5 m	Assembly buildings like auditorium, Theatres and cinemas	2.0m	Educational buildings up to 30 m in Height	1.5m	Institutional buildings like hospitals	2.0 m	All other buildings	1.5 m
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Educational buildings up to 30 m in Height	1.5m												
Institutional buildings like hospitals	2.0 m												
All other buildings	1.5 m												

	<p>buildings. The treads shall be constructed and maintained in a manner to prevent slipping.</p> <p>h) The maximum height of riser shall be 190 mm for residential buildings and 150 mm for other buildings and the number shall be limited to 15 per flight.</p> <p>i) Handrails shall be provided at a height of 1000 mm to be measured from the base of the middle of the treads to the top of the handrails. Balusters/Railing shall be provided in such a way that the width of staircase does not reduce. The maximum gap between balusters shall be 150 mm.</p> <p>j) The number of people in between floor landings in staircase shall not be less than the population on each floor for the purpose of design of staircase. The design of staircase shall also take into account the following :</p> <ol style="list-style-type: none"> <li>1 The minimum headroom in a passage under the landing of a staircase and the staircase shall be 2.2 m.</li> <li>2 No living space, store or other fire risk shall open directly into the staircase or staircases.</li> <li>3 External exit door of staircase enclosure at ground level shall open directly to the open spaces or through a draught lobby, if necessary.</li> <li>4 The main and external staircases shall be continuous from ground floor to the terrace level.</li> <li>5. Lifts shall not open in staircase.</li> <li>6. No combustible material shall be used for decoration/wall paneling in the staircase.</li> <li>7. Beams/Columns and other building features shall not reduce the head room/ width of the staircase.</li> <li>8. The exit sign with arrow indicating the way to the escape route shall be provided at a suitable height from the floor level on the wall and shall be illuminated by electric light connected to corridor circuits. All exit way marking signs should be flush with the wall and so designed that no mechanical damage shall occur to them due to moving of furniture or other heavy equipments. Further, all landings of floor shall have floor indicating boards prominently indicating the number of floor as per byelaws. The floor indication board shall be placed on the wall immediately facing the flight of stairs and nearest to the landing. It shall be of size not less</li> </ol>
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	<p>than 0.5 m x 0.5 m.</p> <p>9. Individual floors shall be prominently indicated on the wall facing the staircases.</p> <p>10. In case of single staircase, it shall terminate at the ground floor level and the access to the basement shall be by a separate staircase. The second staircase may lead to basement levels provided the same is separated at ground level by a ventilated lobby with discharge points to two different ends through enclosures.</p> <p><b>(vi) External Stairs</b></p> <p>An external staircase is desirable to be provided for high rise buildings. External stairs, when provided shall comply with the following:</p> <ol style="list-style-type: none"> <li>a) External stairs shall always be kept in sound operable conditions.</li> <li>b) All external stairs shall be directly connected to the ground.</li> <li>c) Entrance to the external stairs shall be separate and remote from the internal staircase.</li> <li>d) Care shall be taken to ensure that no wall opening or window opens on to or close to an external stairs.</li> <li>e) The route to the external stairs shall be free of obstructions at all time.</li> <li>f) The external stairs shall be constructed of non-combustible materials, and any doorway leading to it shall have the required fire resistance</li> <li>g) No external staircase, used as a fire escape, shall be inclined at an angle greater than 45° from the horizontal.</li> <li>h) External stairs shall have straight flight not less than 1250 mm wide with 250 mm treads and risers not more than 190mm. The number of risers shall be limited to 15 per flight.</li> <li>i) Handrails shall be of height not less than 1000mm and not exceeding 1200 mm. There shall be provisions of balusters with maximum gap of 150 mm.</li> <li>j) The use of spiral staircase shall be limited to low occupant load and to a building not exceeding 9 m in height.</li> </ol> <p>A spiral stair case shall be of not less than 1500 mm in diameter and shall be designed to give</p>
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	<p>adequate head room.</p> <p>k) Unprotected steel frame staircase shall not be accepted as means of escape. However, Steel Staircases in an enclosed fire rated compartment of 2h can be accepted as means of escape.</p> <p><b>(vii) Horizontal Exits</b></p> <p>a) The width of horizontal exit shall be same as for the exit doorways.</p> <p>b) A horizontal exit shall be equipped with at least one fire/smoke door of minimum one-hour fire resistance of self-closing type. Further, It should have direct connectivity to the fire escape staircase for evacuation.</p> <p>c) Where there is a difference in level between connected areas for horizontal exits, ramps, not more than 1 in 10 slope shall be provided; steps shall not be used.</p> <p>d) Doors in horizontal exits shall be openable at all times from both sides.</p> <p><b>(viii) RAMPS.</b></p> <p>a) Ramps shall comply with all the applicable requirements of stairways regarding enclosure capacity and limiting dimensions except where specified for special uses and occupancies.</p> <p>b) The slope of a ramp shall not exceed 1 in 10. In certain cases steeper slopes may be permitted but in no case greater than 1 in 8.</p> <p>c) For all slopes exceeding 1 in 10, wherever the use is such as to involve danger of slipping, the ramp shall be surfaced with approved non-slipping material.</p> <p>d) <b>Ramps for handicapped people:</b> The provision of the ramp with a handrail to every public building with ground floor only is compulsory for handicapped people, as per the revised National Building Code.</p> <p>e) <b>Ramp for basement or storied parking:</b> For parking spaces in a basement and upper at least two ramps of adequate width and slope shall be provided preferably at the opposite ends and such ramps may be permitted in the side and rear marginal open spaces, after leaving sufficient space for movement of firefighting equipments.</p> <p><b>(ix) Emergency and escape lighting</b></p> <p>a) Emergency lighting shall be powered from a</p>
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	<p>source independent of that supplying the normal lighting. Emergency lighting units shall conform to IS: 9583-1981. Escape lighting shall be capable of:</p> <ul style="list-style-type: none"> <li>i) Indicating clearly and unambiguously the escape routes</li> <li>ii) Providing adequate illumination along such routes to allow safe movement of persons towards and through the exits</li> <li>iii) Ensuring that fire alarm call points and fire fighting equipments provided along the escape routes can be readily located</li> </ul> <p>b) The horizontal luminance at floor level on the centerline of an escape route shall be not less than 10 lux. In addition, for escape routes up to 2m wide, 50% of the route width shall be lit to a minimum of 5 lux .</p> <p>c) The emergency lighting shall be provided to be put on within one second of the failure of the normal lighting supply.</p> <p>d) Escape lighting luminaries should be sited to cover the following locations:</p> <ul style="list-style-type: none"> <li>i) Near each intersection of corridors,</li> <li>ii) At each exit door,</li> <li>iii) Near each change of direction in escape route,</li> <li>iv) Near each staircase so that each flight of stairs receives direct light,</li> <li>v) Near any other change of floor level,</li> <li>vi) Outside each final exit and close to it,</li> <li>vii) Near each fire alarm call point,</li> <li>viii) Near fire fighting equipment and,</li> <li>ix) To illuminate exit and safety signs as required by the enforcing authority.</li> </ul> <p>Note: For the purpose of this clause 'near' is normally considered to be within 2m measured horizontally.</p> <ul style="list-style-type: none"> <li>e) Emergency lighting systems shall be designed to ensure that a fault or failure in any one luminaire does not further reduce the effectiveness of the system.</li> <li>f) The luminaires shall be mounted as low as possible, but atleast 2 m above the floor level.</li> <li>g) Signs are required at all exits, emergency exits and escape routes, which should comply with the graphic requirements of the relevant Indian standards.</li> </ul>
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	<p>h) Emergency lighting luminaires and their fitting shall be of non-flammable type.</p> <p>i) It is essential that the wiring and installation of the emergency lighting systems are of high quality so as to ensure their perfect serviceability at all times.</p> <p>j) The emergency lighting system shall be capable of continuous operation for a minimum duration of 1 hour and 30 minutes even for smallest premises.</p> <p>k) The emergency lighting system shall be well maintained by periodical inspections and tests so as to ensure their perfect serviceability at all times.</p> <p><b>(x) Illumination of means of Exit.</b> Staircase and corridor lights shall conform to the following.</p> <p>a) The staircase and corridor lighting shall be on separate circuits and shall be independently connected so that they could be operated by one switch installation on the ground floor easily accessible to fire fighting staff at any time irrespective of the position of the individual control of the light points, if any. It should be miniature circuit breaker type of switch so as to avoid replacement of fuse in case of crisis;</p> <p>b) Staircase and corridor lighting shall also be connected to alternative supply. The alternative source of supply may be provided by battery continuously trickle charged from the electric mains; and</p> <p>c) Suitable arrangements shall be made by installing double throw switches to ensure that the lighting installed in the staircase and the corridor does not get connected to two sources of supply continuously. Double throw switch shall be installed in the service room for terminating the stand-by supply.</p> <p><b>(xi) Fire Protection Requirements</b> <b>Water Supplies</b> <b>(a)(i) Water storage tanks</b> A satisfactory supply of water for the purpose of fire fighting shall always be available in the form of underground/terrace level static storage</p>
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	<p>tank with capacity for various buildings specified under Table 23, part 4 NBC second revision with arrangements for replenishment by means of alternative source of supply at the rate of 1000 liters per minute for underground static tank. When this is not practicable, the capacity of static storage tank(s) shall be increased proportionately in consultation with the local fire brigade.</p> <p>The static storage water supply required for the above mentioned purpose shall entirely be accessible to the fire engines of the local fire service. Provision of suitable no. of manholes shall be made available for inspection, repairs, insertion of suction hose etc. The covering slab shall be able to withstand the total vehicular load of 45 tons equally divided as a four point load when the slab forms a part of pathway/driveway.</p> <p>The domestic suction tank connected to the static water storage tank shall have an overflow capable of discharging 2250 liters per minute to a visible drain point from which by a separate conduit, the overflow shall be conveyed to a storm water drain.</p> <p>To prevent stagnation of water in the static water storage tank, the suction tank of the domestic water supply shall be fed only through an overflow arrangement to maintain the level therein at the minimum specified capacity.</p> <p>The static water storage tank shall be provided with a fire brigade collecting head with 4 no 63 mm diameter (2 no 63 mm diameter for pump with capacity 1400 l/min) instantaneous male inlets arranged in a valve box at a suitable point at street level and connected to the static tank by a suitable fixed pipe not less than 150mm in diameter to discharge water into the tank when required at the rate of 2250 liters per minute, if tank is in the basement or not approachable for the fire engines.</p>
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	<p><b>(a)(ii)</b> Requirements of wet riser /down-comer installation and capacity of fire pumps etc shall be as per Table 23 part 4 NBC. second revision. The requirements regarding size of mains/risers shall be as given in Table 24 part 4 NBC. second revision. The wet risers shall be designed for zonal distribution ensuring that unduly high pressures are not developed in risers and hose pipes.</p> <p><b>(b) Internal/ Yard hydrants, hose reels and fire service inlet</b> The requirements for the above shall be governed by Table 23 part 4 NBC second revision and the relevant Indian Standards (IS: 9668-1990,Code of Practice for Provision and Maintenance of Water Supplies for Fire fighting, IS: 3844-1989, Code of Practice for Installation and Maintenance of Internal Fire Hydrants and Hose reels on Premises; and IS: 13039-1991 Code of practice for Provision and Maintenance of External Fire Hydrant System)</p> <p><b>(c) Fire Alarm System</b> The requirements of fire detection and alarm systems (both manual as well as automatic) for each type of occupancy shall be as per Table 23 Part4 NBC second revision. The selection of various types of fire detectors for different types of occupancies and the installation and system maintenance shall be done in accordance with IS: 2189-1999, Code of Practice for Selection and Maintenance of Automatic Fire Detection and Alarm System.</p> <p><b>(d) Automatic Sprinkler System</b> The requirements of Automatic Sprinkler System for each type of occupancy shall be as per Table 23 and section 5.1.7 of Part4 NBC second revision. The design and installation of the fixed Automatic Sprinkler System shall be as per IS: 15105-2002.</p> <p><b>(e) Other automatic fire extinguishing</b></p>
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	<p><b>systems</b> For requirements for other fire extinguishing systems like Automatic Medium/High Velocity Water Spray or emulsifying System, Fixed Foam Installations, Co2 Extinguishing Systems and systems using Halon Alternatives, reference shall be made to sections 5.1.8, 5.1.9, 5.1.10 and 5.3 of Part4 NBC second revision draft.</p> <p><b>(f) Portable Fire Extinguishers.</b> Various types of fire extinguishers suitable for different classes of fires shall be provided in buildings in accordance with provisions contained in IS: 2189-1992-Code of Practice for Selection, Installation and Maintenance of Portable First aid Fire Extinguishers (Third Edition)</p> <p><b>(g) Lightning Protection.</b> The lightning protection for buildings shall be provided as given in Part 8, Building Services section 2 Electrical Installation NBC</p> <p><b>(h) Smoke and Fire Venting.</b> The provisions for smoke and fire venting for industrial buildings with large floor areas shall conform to regulations given in annex D, Part 4- NBC second revision .</p> <p><b>(i) Additional Requirements For Different Classes Of Occupancies.</b> <b>Educational Buildings:</b> These shall conform to those given in 6.2 Part 4 NBC second revision and particular attention is drawn to the following:</p> <ol style="list-style-type: none"> <li>a) Every room with a capacity of over 45 persons in area shall have at least two doorways.</li> <li>b) Storage of volatile flammable liquids shall be prohibited and the handling of such liquids shall be restricted to science laboratories only.</li> <li>c) Each laboratory building shall be provided with an approved outside gas shut off valve conspicuously marked. The detailed requirements regarding safe use of gas shall</li> </ol>
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	<p>conform to Part 9 NBC Plumbing Services, section 3 Gas supply.</p> <p><b>Business Buildings:</b> These shall conform to those given in 6.5 Part 4 NBC second revision, and particular attention is drawn to the following:</p> <p><i>Fire detection/Extinguishing systems.</i> The requirements for occupancy sub-divisions as specified in table 23 Part 4 NBC second revision shall apply, Wherever applicable, in addition to the requirements specified under 6.5.2.1 to 6.5.2.5 Part 4 NBC second revision.</p> <p><b>Mercantile Buildings:</b> These shall conform to those given in 6.6 Part 4 NBC second revision, and particular attention is drawn to the following:</p> <ul style="list-style-type: none"> <li>a) Mixed occupancy No dwelling unit shall have it's sole means of exit through any mercantile occupancy in the same building except in the case of a single family unit where the family operates the store.</li> <li>b) Hazardous areas of mercantile occupancies shall either be segregated or protected suitably.</li> <li>c) In self-service stores, no check out stand or associated railings or barriers shall obstruct exits or required aisles or approaches thereto.</li> <li>d) Any mercantile occupancy, where goods of a highly hazardous nature are predominant, shall be considered under Buildings for hazardous uses.</li> </ul> <p><b>(B) Special Requirements For High Rise Buildings</b></p> <p><b>(1) Exit Requirements</b></p> <p><b>(i) Staircase</b></p> <ul style="list-style-type: none"> <li>a) The internal wall of staircase shall be of brick or reinforced concrete with a minimum of 2 h fire rating. Access to main staircase shall be through a fire /smoke check door of a minimum 2-hour fire resistance rating. Fire resistance rating may be reduced to 1h for residential buildings (other than hotels and starred hotels)</li> <li>b) The staircase shall be ventilated to the atmosphere at each landing with a vent at the top; the vent opening</li> </ul>
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shall be of 0.5 m<sup>2</sup> in the external wall and the top. If the staircase cannot be ventilated, because of location or other reasons, a positive pressure of 50 Pa shall be maintained inside. The mechanism for pressurizing the staircase shall operate automatically with the fire alarm. The roof of the shaft shall be 1 m above the surrounding roof. Glazing or glass bricks if used in staircase shall have fire resistance rating of minimum 2 hours.

**(ii) Lifts**

General requirements of lift shall be as follows:

- a) Walls of lift shaft enclosures shall have a fire rating of 2 h; lift shafts shall have a vent at the top of area not less than 0.2 m<sup>2</sup>.
- b) Lift motor room shall be located preferably at the top of the shaft and separated from the shaft by the floor of that room.
- c) Landing doors in lift enclosures shall have fire resistance of not less than 1 h.
- d) The number of lifts in one row for a lift bank shall not exceed 4 and the total no of lifts in the bank (of two rows) shall not exceed 8. A wall of 2 h fire rating shall separate individual shafts in a bank.
- e) Lift car door shall have a fire resistance rating of half an hour.
- f) Collapsible gates shall not be permitted for lifts. They shall have solid doors with fire resistance of at least 1h.
- g) If the lift shaft and lobby is in the core of the building, a positive pressure between 25 and 30 Pa shall be maintained in the lobby and a positive pressure of 50 Pa shall be maintained in the shaft. The mechanism for pressurization shall act automatically with the fire alarm; it shall be possible to operate this mechanically also.
- h) Exit from the lift lobby, if located in the core of the building, shall be through a self-closing smoke stop door of half an hour fire resistance.
- i) Lifts shall not normally communicate with the basement. If, however, lifts are in communication, the lift lobby of the basements shall be pressurized as in (g), with self-closing door as in (h).
- j) Grounding switch, at ground floor level, shall be provided on all the lifts to enable the fire service to ground the lifts.
- k) Telephone or other communication facilities shall be

	<p>provided in lift cars for building of 30 m in height and above. Communication system for lifts shall be connected to fire control room for the building.</p> <p>l) Suitable arrangements such as providing slope in the floor of lift lobby shall be made to prevent water used during fire fighting etc, from entering the lift shafts.</p> <p>m) A sign shall be posted and maintained on every floor at or near the lift indicating that in case of fire, occupants shall use the stairs unless instructed otherwise. The sign shall also contain a plan for each floor showing the locations of the stairways.</p> <p>Alternate source of power supply shall be provided for all the lifts through a manually operated changeover switch.</p> <p><b>(iii) Fire Lifts</b></p> <p>a) To enable fire services personnel to reach the upper floors with the minimum delay, one fire lift per 1200 m<sup>2</sup> of floor area shall be provided and shall be available for the exclusive use of the firemen in an emergency.</p> <p>b) The lift shall have a floor area of not less than 1.4 m<sup>2</sup>. It shall have loading capacity of not less than 545 KG (8 persons lift) with automatic closing doors of minimum 0.8 m width.</p> <p>c) The electric supply shall be on a separate service from electric supply mains in a building and the cables run in a route safe from fire, that is, within the lift shaft. Lights and fans in the elevators having wooden paneling or sheet steel construction shall be operated on 24 volt supply.</p> <p>d) Fire fighting lift should be provided with a ceiling hatch for use in case of emergency, so that when the car gets stuck up, it shall be easily openable.</p> <p>e) In case of failure of normal electric supply, it shall automatically change over to alternate supply. For apartment houses, this changeover of supply could be done through manually operated changeover switch. Alternatively, the lift shall be so wired that in case of power failure, it comes down at the ground level and comes to stand-still with door open.</p> <p>f) The operation of fire lift should be by a simple toggle or two-button switch situated in glass-fronted box adjacent to the lift at the entrance level.</p>
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	<p>When the switch is on, landing call points will become inoperative and the lift will be on car control only or on a priority control device. When the switch is off, the lift will return to normal working, when this lift can be used by the occupants in normal times.</p> <p>g) The words 'Fire Lift' shall be conspicuously displayed in fluorescent paint on the lift landing doors at each floor level.</p> <p>h) The speed of the fire lift shall be such that it can reach the top floor from ground level within one minute.</p> <p>(iv) Refuge Area : Following provisions shall apply to all high rise buildings except multi-family dwellings where refuge area of not less than 15m<sup>2</sup> shall be provided on the external walls.</p> <p>a) In case of buildings more than 24 mts in height, refuge area of 15 sq mts or an area equivalent to 0.3 sq mts per person to accommodate the occupants of two consecutive floors, whichever is higher, shall be provided as under.</p> <p>i) For floors above 24 mt and upto 39mt - One refuge area on the floor immediately above 24 meter.</p> <p>ii) For floors above 39 meter - One refuge area on the floor immediately above 39 meter and so on after every 15 meter. Refuge area provided in excess of the requirements shall be counted towards FAR.</p> <p>The refuge area shall be provided on the periphery of the floor, preferably on a cantilever projection, open to air at least on one side, protected with suitable railings.</p> <p>Note- Residential flats in multistoried buildings with balcony, need not be provided with refuge area, however flats without balcony shall be provided with refuge area as given above.</p> <p><b>(v) Pressurization of escape routes</b></p> <p>Pressurization of escape routes must be adopted for high rise buildings and buildings having mixed occupancy/multiplexes having covered area more than 500 sq.mtrs.</p> <p>The requirements for Pressurization of protected</p>
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	<p>escape routes shall conform to section 4.10 of Part 4 NBC second revision.</p> <p><b>(vi) Compartmentation</b> The building shall be suitably compartmentalized so that fire/ smoke remain confined to the area where fire incident has occurred and does not spread to the remaining part of the building.</p> <p>All floors shall be compartmented with area not exceeding 750 m<sup>2</sup> by a separation wall with 2 h fire rating. For floors with sprinklers the area may be increased by 50 percent. In long buildings, the fire separation walls shall be at distances not exceeding 40 m. For departmental stores, shopping centers and basements, the area may be reduced to 500 m<sup>2</sup> for compartmentation. Where this is not possible, the spacing of the sprinklers shall be suitably reduced. When reducing the spacing of sprinklers, care should be taken to prevent spray from one sprinkler, impeding the performance of an adjacent sprinkler head.</p> <p><b>(vii) Minimum requirements for fire fighting Installations</b> These shall conform to those given in Table 23 Part 4 NBC second revision and the relevant IS specifications.</p> <p><b>(viii) Electrical services</b> These shall conform to those given in C- 1.12 Part 4 NBC second revision and the IS; 1646-1999 and particular attention is drawn to the following:</p> <ol style="list-style-type: none"> <li>a) The electric distribution cable/wiring shall be laid in a separate duct. The duct shall be sealed at every floor with non-combustible materials having the same fire resistance as that of the duct. Low and medium voltage wiring running in shaft and in false ceiling shall run in separate conduits.</li> <li>b) Separate circuits for fire fighting pumps, lifts, staircases, corridor lighting and blowers for pressurizing system shall be provided directly from the main switch gear panel and these circuits shall be laid in separate conduit pipes, so that fire in one circuit will not affect the others. Such circuits shall be protected at origin by an automatic circuit breaker with it's no- volt coil removed. Master switches controlling essential service circuits shall be clearly labeled.</li> <li>c) An independent and well ventilated electrical service room shall be provided on the ground level</li> </ol>
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or first basement with direct access from outside or from the corridor for the purpose of termination of electric supply from the licensees' service and alternative supply cables. The doors provided for the service room shall have fire resistance of not less than 2 hours.

Note:- If service room is located at the first basement, it should have automatic fire extinguishing system

d) Suitable circuit breakers shall be provided at the appropriate points.

**(ix) Emergency Power Supply**

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

**(x) Basements**

These shall conform to those given in C-1.6 Part 4 NBC second revision and particular attention is drawn to the following:

The staircase of basements shall be of enclosed type having fire resistance of not less than 2 hours 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 storeys of the building. It shall communicate with basement through a lobby provided with fire resisting self closing doors of one hour resistance. If the travel distance exceeds the desired level, additional staircases shall be provided at proper places.

Mechanical extractors for smoke venting shall be designed to permit 30 air changes per hour in case of fire or distress call. For normal operations, air changes schedule shall be as given in part 8 NBC

	<p>Building services, section 3.</p> <p>Discharge apparatus of all natural draft smoke vents shall be so arranged as to be readily accessible for opening by fire service personnel.</p> <p>Use of basements for kitchen working on gas fuel shall not be permitted unless they are air-conditioned.</p> <p>The basement shall not be permitted below the ward block of a hospital/nursing home unless it is fully sprinklered.</p> <p>Building services such as electrical substations, boiler rooms in basements shall comply with the provisions of the IE Act/Rules.</p> <p><b>(xi) Service Ducts/Shafts</b></p> <p>a) Electrical shafts/ducts shall have not less than 2h fire resistance and for other services shafts/ducts, the fire resistance shall be not less than 1h. All such ducts/shafts shall be properly sealed and fire stopped at all floor levels.</p> <p>b) A vent opening at the top of the service shaft shall be provided having between one-fourth and one-half of the area of the shaft.</p> <p>c) Refuse chutes shall have opening at least 1 m above roof level for venting purpose and they shall have an enclosure wall of non-combustible material with fire resistance of not less than 2 hours. They shall not be located within the staircase enclosure or service shafts, or air-conditioning shafts. Inspection panel and doors shall be tight fitting with 1 hour fire resistance; the chutes should be as far away as possible from exits.</p> <p><b>xii) Air-conditioning.</b></p> <p>a) Escape routes like staircases, common corridors, lift lobbies, etc, shall not be used as return air passage.</p> <p>b) The ducting shall be constructed of substantial gauge metal as per IS: 655-1963 - Specification for Metal Air Ducts.</p> <p>c) Wherever the ducts pass through firewalls or floors, the opening around the ducts shall be sealed with materials having fire resistance rating of the compartment.</p> <p>d) The materials used for insulating the duct system (inside or outside) shall be of non-combustible material. Glass wool shall not be wrapped or secured by any material of combustible nature.</p> <p>e) The air-handling units shall be separate for each</p>
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	<p>floor and air ducts for every floor shall be separate and in no way inter connected with the ducting of any other floor.</p> <p>f) If the air-handling unit serves more than one floor, the conditions given below shall be complied in addition to the recommendations above.</p> <p>i. Proper arrangements by way of automatic fire dampers, working on fusible link/or smoke detector principle for isolating all ducting at every floor from the main riser, shall be made.</p> <p>ii. When the automatic fire alarm operates, the respective air-handling units of the air-conditioning system shall automatically be switched off.</p> <p>g) Where plenum is used for return air passage, ceiling and its fixtures shall be of non-combustible material.</p> <p><b>(xiii) Sub-Stations</b></p> <p>a)The sub-station shall have separate fire resisting walls /surroundings and shall necessarily be located at the periphery of the floor having separate access preferably from fire escape staircase. The outside walls, ceiling and floor including doors and windows to the sub-station area shall be of 2h fire rating.</p> <p>b)A sub-station or a switch-station with oil-filled equipment must not be located in the building. When housed inside the building, The transformer shall be of dry type and shall be cut-off from the other portion of premises by walls/doors/cutouts having fire resistance rating of 4h</p> <p>c)The Sub-Station area needs to be maintained at negative air pressure and area in sub-station shall not be used as storage/dump areas.</p> <p><b>(xiv) Boilers and Boiler rooms</b></p> <p>a) The boilers shall be installed in a fire resisting room of 4h fire resistance rating, and this room shall be situated on the periphery of the basement. Catch-pits shall be provided at the low level</p> <p>b) Foam inlets shall be provided on the external walls of the building near the ground level to enable the fire services to use foam in case of fire.</p> <p><b>(xv) Fire Control Room</b></p> <p>For all buildings 15m in height and above and apartment</p>
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	<p>buildings with a height of 30m and above, there shall be a control room on the entrance floor of the building with communication system (suitable public address system) to all floors and facilities for receiving the message from different floors. Details of all floor plans along with the details of fire fighting equipment and installations shall be displayed in the fire control room. The fire control room shall also have facilities to detect the fire on any floor through indicator board's connection; fire detection and alarm systems on all floors. The fire staff in charge of the fire control room shall be responsible for maintenance of the various services and the fire fighting equipment and installations in co-ordination with security, electrical and civil staff of the building.</p> <p><b>(xvi) Fire Officer</b> For hotels, business and mercantile buildings with height more than 30m, a qualified Fire Officer with experience of not less than 3 years shall be appointed who will be available on the premises.</p> <p><b>(xvii) Fire Drills</b> Fire Notices/Orders shall be prepared to fulfill the requirements of fire fighting and evacuation from the buildings in the event of fire and other emergency. The occupants shall be made thoroughly conversant with their actions in the event of emergency, by displaying fire notices at vantage points and also through regular training. Such notices should be displayed prominently in broad letters. For guidelines on fire drills and evacuation procedures reference may be made to Annex E of part 4 NBC second revision.</p> <p><b>(xviii) Materials for interior decoration.</b> Only materials conforming to class 1 flame spread classification as per Is: 12777-1989 shall be used. Materials which are combustible in nature and may spread toxic fumes / gases shall not be used for interior decoration/ furnishings etc. Glass of façade for high rise buildings shall be of 1 hour fire resistance.</p>
17.3	To be Deleted
17.8	To be deleted
17.12	To be deleted
17.13	To be deleted
17.20	<b>CONSERVATION OF ARTIFACTS, STRUCTURES AND PRECINCTS OF HISTORICAL AND/OR AESTHETICAL AND/OR ARCHITECTURAL AND/OR CULTURAL VALUE</b>

	<p><b>(Heritage Building And Heritage Precincts)</b> Add 2<sup>nd</sup> paragraph reading as follows “Whilst taking up conservation of heritage buildings, which are of national and international importance, due consideration shall be given for provision of adequate fire protection arrangements so as to ensure proper preservation of these monuments”.</p>
Add 17.22 (New)	<p><b>Fire protection requirements during construction of buildings</b> Fire and life hazards do exist even during the construction stage of buildings. In order to cope with such hazards, minimum fire protection requirements as specified in NBC Part 7, “Constructional Practices and Safety” shall be complied with.</p>
Add 17.23 (New)	<p><b>Temporary Structures and Pandals</b> Adequate fire precautionary measures shall be taken in the construction of Temporary Structures and Pandals in accordance with IS-8758:1993.</p>
18	<p><b>REGULATIONS FOR SPECIAL STRUCTURES</b> 18.1 Special structures c(ii), (e), (f), (g), (h), (l) and 18.3 (Requirements of Individual Exits at Each Floor) should be replaced by following .</p> <p>a) <b>Mixed occupancy</b> Places of assembly in buildings of other occupancy, such as ball rooms in hotels, restaurants in stores and assembly rooms in schools, shall be so located, separated or protected as to avoid any undue danger to the occupants of the place of assembly from a fire originating in the other occupancy or smoke there from.</p> <p>b) Every place of assembly, every tier of balcony, and every individual room used as a place of assembly shall have exits sufficient to provide for the total capacity therein as required under Part 4 NBC -2<sup>nd</sup> revision. Door width for assembly building shall not be less than 2000 mm.</p> <p>c) Every place of assembly shall have at least four separate exits as remote from each other as practicable.</p> <p>d) Clear aisles not less than 1.2m in width shall be formed at right angles to the line of seating in such number and manner that no seat shall be more than seven seats away from an aisle. Rows of seats opening to an aisle at one end only shall have not more than seven seats. Under the conditions, where all these aisles do not directly meet the exit doors, cross- aisles shall be provided parallel to the line of seating so as to provide direct access to the exit, provided that not less than one cross aisle for every 10 rows shall be required. The width of cross-aisles shall be minimum of 1 m. Steps shall not be placed in aisles to overcome differences in levels, unless the gradient exceeds 1 in</p>

	<p>10.</p> <p>e) The fascia of boxes, balconies and galleries shall have substantial railings not less than 1000mm high above the floor. The railings at the end of aisles extending to the fascia shall be not less than 1000mm high for the width of the aisle or 1100mm high at the foot of steps.</p> <p>f) Cross aisles except where the backs of seats on the front of the aisle project 600mm or more above the floor of the aisle shall be provided with railings not less than 900mm high.</p> <p>g) No turnstiles or other devices to restrict the movement of persons shall be installed in any place of assembly in such a manner as to interfere in any way with the required exit facilities.</p> <p>h) In theaters and similar places of public assembly where persons are admitted to the building at a time when seats are not available for them are allowed to wait in a lobby or similar place until seats are available, such use of lobby or similar space shall not encroach upon the required clear width of exits. Such waiting shall be restricted to areas separated from the exit ways by substantial permanent partitions or fixed rigid railing not less than 105cm high. Exits shall be provided for such waiting spaces on the basis of 1 person for each 0.3 m<sup>2</sup> of waiting space area. Such exits shall be in addition to exits specified for the main auditorium area and shall conform in construction and arrangement to the general rules of exits given above.</p> <p>i) No display or exhibit shall be so installed or operated as to interfere in any way with access to any required exit, or with any required exit sign.</p> <p style="padding-left: 40px;">All displays or exhibits of combustible material or construction and all booths and temporary constructions in connection therewith shall be so limited in combustibility or protected so as to avoid any undue hazard of fire which might endanger occupants before they have opportunity to use the available exits, as determined by the authority.</p> <p>j) Places of assembly in buildings of other occupancy may use exits common to the place of assembly and the other occupancy, provided the assembly area and the other occupancy are considered separately, and each has exits sufficient to meet the requirements of the code.</p> <p>k) Exits shall be sufficient for simultaneous occupancy of both the places of assembly and other parts of the building, unless authority determines that the simultaneous occupancy will not occur.</p> <p>l) At least half the required means of exit shall lead directly outdoors or through exit ways completely separated from exits serving other parts of the building.</p>
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	<p>m) The decoration of places of assembly shall be of non-flammable materials. Fabrics and papers used for such purpose shall be treated with an effective flame retardant material. Stage settings made of combustible materials shall likewise be treated with fire retardant materials of class 1 flame spread.</p> <p>n) Seats in places of public assembly, accommodating more than 300 persons, shall be securely fastened to the floor except as permitted in (o) below. All seats in balconies and galleries shall be securely fastened to the floor, except that in nailed-in enclosures like boxes with level floors and having not more than 14 seats, the seats need not be fastened.</p> <p>o) Chairs not secured to the floor may be permitted in restaurants, night clubs and other occupancies where fastening of seats to the floor may not be practicable, provided that in the area used for seating, excluding dance floor, stage, etc, there shall be not more than one seat for each 1.4m<sup>2</sup> of floor area and adequate aisles to reach exits shall be maintained at all times.</p> <p>p) Seats without dividing arms shall have their capacity determined by allowing 450 mm per person.</p> <p>q) The spacing of rows of seats from back to back shall neither be less than 850mm nor less than 700mm plus the sum of the thickness of the back and the inclination of the back. There shall be a space of not less than 350mm between the back of one seat and the front of the seat immediately behind it as measured between plumb lines.</p> <p>r) Rooms containing high-pressure boilers, refrigerating machinery other than domestic refrigerator type, large transformers or other service equipments subject to possible explosion shall not be located directly under or adjacent to required exits. All such rooms shall be effectively cut off from other parts of the building and provided with adequate vents to the outer air.</p> <p>s) All rooms or areas used for storage of any combustible material or equipment, or for painting, refinishing, repair or similar purposes shall be effectively cutoff from assembly areas or protected with a standard system of automatic sprinklers. They shall be located away from staircases.</p> <p>t) Every stage equipped with fly galleries, grid irons and rigging for movable theater type scenery shall have a system of automatic sprinklers over and under such stage areas or spaces and auxiliary spaces, such as dressing rooms, store rooms and workshops. The proscenium opening shall be provided with a fire-resisting curtain, capable of withstanding a lateral pressure of 4 KN/m<sup>2</sup> over the entire area. The curtain shall have an emergency closing device capable of causing the curtain to close without the use of power and when so closed, it shall be reasonably tight against the passage of smoke.</p>
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- u) The stage roof of every theater using movable scenery or having a motion picture screen of highly combustible construction shall have a ventilator or ventilators in or above it, openable from the stage floor by hand and also opening by fusible links or some other approved automatic heat/smoke actuated device, to give a free opening equal to at least one-eighth the area of the floor of the stage.
- v) The proscenium wall of every theater using movable scenery or decorations shall have exclusive of the proscenium opening, not more than two openings entering the stage, each not to exceed 2 m<sup>2</sup> and fitted with self-closing fire resistant doors.
- w) Automatic smoke vents actuated by smoke detectors shall be installed above the auditorium or theaters, including motion picture houses, with vent area equal to not less than 3 1/3<sup>rd</sup> percent of the floor area of the auditorium, including the floor areas of all balconies, galleries, boxes and tiers. It may be desirable to provide a large number of small vents rather than a small number of large vents.

**Additional requirements for other classes of occupancies:**

**Institutional Buildings**

These shall conform to those given in 6.3 Part 4 NBC second revision, and particular attention is drawn to the following:

- a) In buildings or sections occupied by bed-ridden patients where the floor area is over 280 m<sup>2</sup>, facilities shall be provided to move patients in hospital beds to the other side of a smoke barrier from any part of such building or section not directly served by approved horizontal exits or exits from first floor (floor 2) of a building to the outside.
  - b) Not less than two exits of one or more of the following types shall be provided for every floor, including basements, of every building or section:
    - Doors leading directly outside the building.
    - Stairways
    - Ramps.
    - Horizontal Exits and
    - Fire tower.
  - c) All required exits that serve as egress from hospital or infirmity sections including patient bedroom doors to permit transportation of patients on beds, litters or mattresses shall be not less than 2 m in clear width. The minimum width of corridors serving patients bedrooms in buildings shall be 2400 mm.
- For detailed information on recommendations for buildings

and facilities for the physically handicapped, reference may be made to IS: 4963-1987.

- d) Wherever any inmates are confined in any locked rooms or spaces, adequate guards or other personnel shall be continuously on duty or immediately available to provide for release of inmates or for such other action as may be indicated in case of fire or other emergency.
- e) No building constructed in whole or in part of combustible materials shall be used to confine inmates in cells or sleeping quarters, unless automatic sprinkler protection is provided.
- f) Bare minimum quantities of flammable materials such as chloroform, Ethyl Alcohol, spirit, etc shall be allowed to be handled or stored .The handling of such liquids shall not be permitted by unauthorized persons. Bulk storage of these items, shall be governed by relevant rules and safe practices.

#### **Industrial Buildings**

These shall conform to those given in SECTION 6.7 Part 4 NBC second revision and particular attention is drawn to the following:

- a) Exits shall be so located that it will not be necessary to travel more than 22.5 m from any point to reach the nearest exit.
- b) From every point in every floor area, there shall be at least 2 exits accessible in two different directions; where floor areas are divided into rooms, there shall be at least two ways of escape from every room, however small, except toilet rooms, so located that the points of access thereto are out of or are suitably shielded from areas of high hazard.
- c) In addition to types of exits for upper floors as specified above, slide escapes may be used as required exits for both new and existing buildings.
- d) All high hazard industrial occupancies shall have automatic sprinkler protection or such other protection as appropriate to the particular hazard, including explosion venting for any area subject to explosion hazard, designed to minimize danger to occupants in case of fire or other emergency before they have time to utilize exits to escape.
- e) Industrial buildings of high hazard are permitted only up to 15m in height.
- f) For detailed information on fire safety of certain individual industrial occupancies reference may be made to specific Indian standards listed in NBC Part 4.

#### **Storage Buildings**

These shall conform to those given in section 6.8 Part 4 NBC second revision and particular attention is drawn to the following:

Every area used for the storage of hazardous commodities shall have an exit within 22.5m of any point in the area where

	<p>persons may be present. This distance may be increased to 35m where automatic sprinkler protection is provided.</p> <p><b>Buildings for Hazardous Use</b></p> <p>These shall conform to those given in 6.9 Part 4 NBC second revision and particular attention is drawn to the following:</p> <p>a) <b>Fire detection/extinguishing system:</b> In addition to requirements under Table 23 Part 4 NBC second revision Hazardous buildings shall have vapour detectors/explosion suppression system/automatic sprinklers, besides hydrant system, wet risers and automatic fire alarm system depending on the type of fire hazard involved.</p> <p>b) Each building where gas is employed for any purpose shall be provided with an approved outside gas shut-off valve conspicuously marked. The detailed requirements regarding safe use of gas shall conform to Part 9 NBC Plumbing Services, Section 3 Gas supply</p> <p>c) Equipment or machinery which generates or emits combustible or explosive dust or fibres shall be provided with an adequate dust collecting and exhaust system.</p>
18.2	<p><b>FIRE PROTECTION REQUIREMENTS</b></p> <p>These should be deleted as they are now covered elsewhere</p>
18.4	<p><b>STRUCTURAL SAFETY AND SERVICES</b></p> <p><b>1) STRUCTURAL DESIGN</b></p> <p>Reference to form 2(c) in last paragraph should read form 2(d)</p>
18.4(5)	<p><b>Structural Stability and Fire Safety of Existing Buildings</b></p> <p>This should be renumbered 18.4(4).</p>
20	<p><b>GASOLINE (MOTOR FUEL) FILLING STATIONS AND GASOLINE FILLING CUM SERVICE STATIONS</b></p> <p><b>Add 20.5 reading as follows:</b></p> <p>The use, handling, storage and sale of gasoline, fuel oil and other flammable liquids shall not be permitted unless such use, handling, storage and sale is in accordance with Petroleum Rules 1976 under the Petroleum Act 1934.</p>
25	<p><b>APPLICABILITY OF REGULATIONS</b></p> <p>25.1 This should be modified as follows:</p> <p>These Regulations except Regulation No.26 shall apply to all new constructions taken up on or after the date of their enforcement and shall also apply to any additions or alterations that may be made in any existing constructions and also in case of change of use in existing building. The Regulation No.26 shall apply to existing buildings.</p>

26	<b>MAINTENANCE OF BUILDINGS</b> <b>Amend as follows:</b>
26.2	“It shall be the duty of every owner to maintain and keep in perfect working order, at all times, all the fixed fire protection systems, installations and first-aid fire extinguishers, as well as fire lifts and escape stairs, provided in the building. At intervals of not more than 12 months, he shall submit a Certificate from the Fire Department or the/Registered/Accredited Fire Protection Consultant certifying that all the requirements as stated above are properly maintained, and are in good working condition.”
27	<b>RELAXATION</b> <b>27.1 To be deleted (for reasons given in the report).</b> <b>27.2 This should be amended to read as follows</b> “Notwithstanding anything contained in foregoing Regulations of the Development Plan in case where these regulations cause hardships to the owners because of their application to the alterations not involving addition to the existing structures erected prior to the coming into force of these regulations, the Competent Authority after considering the merits of each individual case may relax or waive, for reasons to be recorded in writing any regulation of the Development Plan <b>without causing any adverse effects on the fire and life safety requirements for the building.</b> ” provided that this relaxation shall not be made in any Regulations for high-rise building

28	TO PROVIDE FACILITIES FOR PHYSICALLY HANDICAPPED PERSONS. 28.1.1 This should be amended to read as follows These regulations shall apply to all public buildings and facilities, which are used by physically, handicapped persons also.
30	<b>PENALTIES</b> The relevant provisions of Gujarat Town Planning and Urban Development Act 1976 should be made more stringent/deterrent.
31	<b>TREE PLANTATION</b> This should be amended to read as follows: While applying for development permission, at the rate of 1 tree for every 100sq.mts of building unit, shall have to be shown on the site plan/layout plan. <b>Trees shall be planted without causing obstruction to the easy movement of fire fighting vehicles in case of fire emergency.</b> The trees shall have to be guarded by the tree guards and shall be maintained.

**Some of the editorial corrections, which are of editorial nature, are as follows:**

<b>Preamble</b>	<b>APPENDIX D In Bold Letters On The Top Should Be Deleted</b>
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1.1.1	The first letters of the title of regulations in the first line should be in capitals.
1.1.4	Insert '1987' after AUDA.
2.6	<b>Definitions-Apartment/Flats</b> 1 <sup>st</sup> line: 'means' to be corrected as 'mean'.
4	<b>General Requirements For Development</b> 4.3(a) -1 <sup>st</sup> line- substitute 'conform' for 'confirm'
5	<b>Decision Of The Authority</b> 5.1 Title -Instead of 'REFUSE' it should be 'REFUSAL'
5.3.1	(vii)- Instead of 'Fire Officer' it should be 'Chief Fire Officer'.
6	<b>6. Inspection</b> 6.2 (a) (2) - Last line, 1 <sup>st</sup> letter of 'Architect' to be in capital
16	<b>PROVISION FOR SPECIAL DEVELOPMENTS</b> 16.1(2)slum Rehabilitation : 1 <sup>ST</sup> LINE- The correct spelling of the word 'rehabilitated' to be given.
17.6	Height of floors- 3 <sup>rd</sup> paragraph 1 <sup>st</sup> line- Instead of 'slopping' it should be 'sloping'.
18.1 (n)	The title should be corrected as <b>Air Conditioning</b>
18.4 (5) v	Remove word "existing" in 1 <sup>st</sup> line.
28	<b>FACILITIES FOR PHYSICALLY HANDICAPPED PERSONS</b> 28.5.3. 1 <sup>st</sup> line - Instead of 'exist', it should be 'exit'

## ANNEXURE B

# Vadodara Urban Development Authority GENERAL DEVELOPMENT CONTROL REGULATIONS 1994

### *Proposed Amendments in Fire Related Regulations*

VUDA Reg. Ref. No.	Proposed Amendments
<b>2. DEFINITIONS</b> Following definitions should be amended as under.	
2.3	<b>AUTOMATIC SPRINKLER SYSTEM</b> A system of water pipes fitted with sprinkler heads at suitable intervals and heights, and designed to actuate by heat automatically, control and extinguish a fire by discharge of water.
2.9	<b>Combustible Material</b> The material, which either burns itself or adds heat to a fire when tested for non-combustibility in accordance with IS: 3808-1979.
2.14	<b>Fire Alarm System</b> A system or a portion of a combination system consisting of components and circuits arranged to monitor and annunciate the status of fire alarm or supervisory signal-initiating devices and to initiate the appropriate response to those signals.
2.15	<b>Fire Lift</b> The lift installed to enable fire services personnel to reach different floors with minimum delay, having such features as required in accordance with this part.
2.16	<b>Fire Proof Door</b> A fire-resistive door approved for openings in fire separation walls.
2.21	<b>HEIGHT OF BUILDING</b> The vertical distance measured in the case of flat roofs, from the average level of the ground around and contiguous to the building to the terrace of the last livable floor of the building adjacent to the external wall; and in the case of pitched roof up-to the point where the external surface of the outer wall intersects the finished surface of the sloping roof; and in the case of gables facing the road, the mid-point between the eaves level and the ridge. Architectural features serving no other function except that of decoration shall be excluded for the purpose of measuring heights. . Presence of genuine stair cabins, water tanks and lift rooms shall be ignored for the purpose of this definition.

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2.22	<b>High Rise Building</b> All buildings 15 m or above in height shall be considered as high-rise buildings.
2.26	<b>Low Rise Building</b> This definition may be deleted in view of changes in 2.22 above.
2.43	<b>Special structure</b> (i) A building solely used for the purpose of a drama or cinema theatre, motion picture a drive-in-theatre, an assembly hall or auditorium, town hall, lecture hall, an exhibition hall, theatre museum, stadium, community hall, marriage hall. (ii) A hazardous building; (iii) An Institutional Building (iv) An Industrial Building (v) A Storage Building.
<b>Following additional definitions should be provided.</b>	
2.49	<b>Buildings:</b> All buildings shall be classified according to the use or the character of the occupancy in one of the following groups: <i>(a) Residential, (b) Educational, (c) Institutional, (d) Assembly, (e) Business, (f) Mercantile, (g) Industrial, (h) Storage, and (i) Hazardous.</i> <b>Residential Buildings.</b> These shall include any building in which sleeping accommodation is provided for normal residential purposes with or without cooking or dining or both facilities, except any building classified under institutional buildings. <b>Educational Buildings</b> These shall include any building used for school, college, other training institutions or day-care purposes involving assembly for instruction, education or recreation for not less than 20 students <b>Institutional Building</b> These shall include any building or part thereof, which is used for purposes, such as medical or other treatment or care of persons suffering from physical or mental illness, disease or infirmity; care of infants, convalescents or aged persons and for penal or correctional detention in which the liberty of the inmates is restricted. Institutional buildings ordinarily provide sleeping accommodation for the occupants. <b>Assembly Buildings</b> These shall include any building or part of building, where number of persons not less than 50 congregate or gather for amusement, recreation, social, religious, patriotic, civil, travel and similar purposes, for example, theatres, motion picture houses, assembly halls, auditoria, exhibition halls, museums, skating rinks, gymnasiums, restaurants, places of worship, dance halls, club rooms, passenger stations and terminals of air, surface and marine

	<p>public transportation services, recreation piers and stadia, etc.</p> <p><b>Business Building</b>  These shall include any building or part of a building which is used for transaction of business (other than that covered by mercantile buildings) for keeping of accounts and records and similar purposes, professional establishments, service facilities, etc. city halls, town halls, court houses and libraries shall be classified in this group so far as the principal function of these transaction of public business and keeping of books and records.</p> <p><b>Mercantile Building</b>  These shall include any building, which is used as shops, stores, market, for display and sale of merchandise, either wholesale or retail.</p> <p><b>Industrial Building</b>  These shall include any building or part of a building or structure, in which products or materials of all kinds and properties are fabricated, assembled, manufactured or processed, for example, assembly plants, industrial laboratories, dry cleaning plants, power plants, generating units, pumping stations, fumigation chambers, laundries, buildings or structures in gas plant, refineries, dairies and saw-mills etc.</p> <p><b>Storage Building</b>  These shall include any building or part of a building used primarily for the storage or sheltering (including servicing, processing or repairs incidental to storage) of goods, ware or merchandise (except those that involve highly combustible or explosive products or materials) vehicles or animals , for example, warehouses, cold storage, freight depots, transit sheds, storehouses, truck and marine terminals, garages, hangers, grain elevators, barns and stables .Storage properties are characterized by the presence of relatively small number of persons in proportion to the area. Any new use which increases the number of occupants to a figure comparable with other classes of occupancy shall change the classification of the building to that of the new use, for example, hangars used for assembly purposes, warehouses used for office purposes, garage buildings used for manufacturing.</p> <p><b>Hazardous Buildings</b>  These shall include any building or part of a building which is used for the storage, handling, manufacture or processing of highly combustible or explosive materials or products which are liable to burn with extreme rapidity and or which may produce poisonous fumes or explosions on storage, handling, manufacturing or processing. These include highly corrosive, toxic or noxious alkalis, acids or other liquids or chemicals producing flame, fumes and explosive, poisonous, irritant or corrosive gases; and material producing explosive mixtures of dust which result in the division</p>
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	<p>of matter into fine particles subject to spontaneous ignition.</p> <p><b>Some other definitions relating to buildings are as follows:</b></p> <p><b>Public Building</b> A building constructed by Government, Semi-Government organizations, public sector under-takings, registered Charitable Trust or such other organisations for their non-profitable public activities</p> <p><b>Unsafe Building</b> A building which, (i) is structurally unsafe, (ii) is insanitary, (iii) is not provided with adequate means of egress, (iv) constitutes a fire hazard, (v) is dangerous to human life, and (vi) in relation to its existing use constitutes a hazard to safety or health or public welfare by reasons of inadequate maintenance, dilapidation or abandonment.</p>
2.50	<p><b>Downcomer</b> An arrangement for fire fighting within the building by means of downcomer pipe connected to terrace tank through terrace pump, gate valve and non-return valve and having mains not less than 100 mm internal diameter with landing valves on each floor/landing. It is also fitted with inlet connections at ground level for charging with water by pumping from fire services appliances and air release valve at roof level to release trapped air inside.</p>
2.51	<p><b>Dry Riser</b> An arrangement for fire fighting within the building by means of vertical rising mains not less than 100 mm internal diameter with landing valves on each floor/landing which is normally dry but is capable of being charged with water usually by pumping from fire services appliances.</p>
2.52	<p><b>Emergency Lighting</b> Lighting provided for use when the supply to the normal lighting fails.</p>
2.53	<p><b>Emergency Lighting System</b> A complete but discrete emergency lighting installation from standby power source to the emergency lighting lamp(s), for example, self contained emergency luminary or a circuit from central battery generator connected through wiring to several escape luminaries.</p>
2.54	<p><b>Escape Lighting</b> That part of emergency lighting which is provided to ensure that the escape route is illuminated at all material times (for example, at all times when persons are on the premises), or at times the main</p>

	lighting is not available, either for the whole building or the escape routes.
2.55	<p><b>Exit</b> A passage, channel or means of egress from any building, storey or floor area to a street or other open space of safety :</p> <p>2.55.1 "<b>Vertical Exit</b>":-A vertical Exit is a means of exit used for ascending or descending between two or more levels, including stairways, smoke-proof towers, ramps and fire escapes</p> <p>2.55.2 <b>HORIZONTAL EXIT</b>: An arrangement which allows alternative egress from a floor area at or near the same level in an adjoining building or an adjoining part of the same building with adequate fire separation.</p> <p>2.55.3 "<b>Outside Exit</b>":- an outside Exit is an exit from the building to a public way, to an open area leading to a public way or to an enclosed fire resistant passage leading to a public way.</p>
2.56	<p><b>Fire Resistance Rating</b> The time that a material or construction will withstand the standard fire exposure as determined by fire test done in accordance with the standard methods of fire tests of material/structures.</p>
2.57	<p><b>Fire Separation</b> The distance in meters measured from the external wall of the building concerned to the external wall of any other building on the site or from other site, or from the opposite side of the street or other public space for the purpose of preventing the spread of fire.</p>
2.58	<p><b>Fire Stop</b> A fire resistant material, or construction having a fire resistance rating of not less than the separating elements, installed in concealed spaces or between structural elements of a building to prevent the spread/ propagation of fire and smoke through walls, ceilings and the like as per the laid down criteria.</p>
2.59	<p><b>Means of Egress</b> A continuous and unobstructed way of travel from any point in a building or structure to a place of comparative safety.</p>
2.60	<p><b>Occupant Load</b> The number of persons for which the means of egress of a building or portion thereof is designed.</p>
2.61	<p><b>Pressurization</b> The establishment of a pressure difference across a barrier to protect a stairway, lobby, escape route, or room of a building from smoke penetration.</p>
2.62	<p><b>Refuge Area</b> An area where persons unable to use stairways can remain temporarily and await instructions or assistance during</p>

	emergency evacuation.
2.63	<b>Roof Exits</b> A means of escape on to the roof of a building where the roof has access to it from the ground. The exit shall have adequate cut-off within the building from staircase below.
2.64	<b>Travel Distance</b> The distance to be travelled from any point in a building to a protected escape route, external escape route or final exit.
2.65	<b>Ventilation</b> Supply of outside air into, or the removal of inside air from an enclosed space.
2.66	<b>Venting Fire</b> The process of inducing heat and smoke to leave a building as quickly as possible by such paths so that lateral spread of fire and heat is checked, fire fighting operations are facilitated and minimum fire damage is caused.
2.67	<b>Wet Riser</b> An arrangement for fire fighting within the building by means of vertical rising mains of not less than 100mm diameter with landing valves on each floor/landing for fire fighting purposes and permanently charged with water from a pressurized supply.
Note	<b>For definition of other terms, reference shall be made to IS-8757:1999 &amp; IS-7673:1975</b>
3.2	<b>Forms of application</b> <b>(VI) May be replaced by following</b> For high-rise building and for special building like assembly, institutional, industrial storage and hazardous occupancy the following additional information shall be furnished/indicated in the following plans in addition to the items under clause 3.2. <b>(Same as those given for item 3.3 of 'AUDA' Regulations)</b>
4.2	<b>Add</b> - Reference to the "Gujarat town Panning and Urban Development Act-1976" © The reference to the Indian Oil Mines Regulations 1933 needs to be amended to the Oil Mines Regulations 1984, under the Mines Act 1952 (h) & (i). The reference to the water prevention and control of pollution Act-1974 and Air Pollution Control Act- 1981 needs to be amended to Environment Protection act 1986 and Environment Protection Rules 1986  <b>Reference to following relevant Acts/Regulations as given below have to be added:</b> a) Petroleum Rules 1976 under the Petroleum Act 1934 b) Explosives Rules 1983 under Indian Explosives Act 1884 c) Factories Act 1948 and Factories Rules under the Gujarat Govt. d) Gas Cylinders Rules 1981 e) Manufacture, Storage & Import of Hazardous Chemicals Rules 1989

	<p>f) Public Liability Insurance Act 1991</p> <p>g) Notification of Requirement of Environment Clearance of Projects, 1994 (MOEF)</p> <p>h) Building and other Construction Workers (regulation of Employment &amp; Conditions of service) Act 1996 &amp; central Rules, 1998</p>
5.2(vii)	Words “Municipal fire officer” should be replaced by words “Chief Fire Officer”.

6	<b>INSPECTION</b>
6.1	<p><b>Add d)</b></p> <p>The building plans for high rise and special buildings shall be scrutinized by the Chief Fire Officer before the permit is issued by the Competent Authority</p>
6.2 (A)	<p><b>RECOGNISED STAGES FOR PROGRESS CERTIFICATE AND CHECKING.</b></p> <p><b>1.) Add iii</b></p> <p>“It shall be the responsibility of the Chief Fire Officer by carrying out inspections at appropriate intervals, to ensure that the means of exit as well as the fire protection requirements for such buildings are adequate and operational .He shall also satisfy himself that all elevators including fire lifts are duly tested and their test certificates are submitted to his satisfaction. If the above work is entrusted to an accredited Fire Protection Consultant his reports shall be countersigned by the Chief Fire Officer. In case of inadequacy or contravention of these regulations, he shall issue a notice to the owner or occupier of such buildings directing him to rectify the shortcomings /contraventions within a specified period. Copies of all such notices shall be endorsed to the Competent Authority also.”</p>
7	<p><b>Paragraphs 2 and 3 should be replaced by following:</b></p> <p>Occupancy certificate for high rise and special buildings shall be issued only after obtaining the clearance from the Chief Fire Officer that all the requirements of means of exit and fire protection as specified in these regulations have been fulfilled. In case there are any inadequacies, the applicant shall be asked in writing to rectify the same within a reasonable time. The Chief Fire Officer may take assistance of a registered/accredited Fire Protection Consultant for the work related to inspection of high-rise and special buildings before issue of NOC.</p>
9	In the title add “Fire Protection Consultant”.
9.1	Add “Fire Protection Consultant “in the list of professionals mentioned in the rule.
9.2	Add “Fire Protection Consultant “in the list of professionals mentioned in the rule.
9.2 (B)	<b>Scope of work.</b>

	2. Correct the spelling of 'registered engineer' in the seventh line.
9.2	<b>Add (5).</b> Fire Protection Consultant's (A) Qualification and Experience, (B) Scope of Work and (C) Duties and Responsibilities. (Please take from Annexure D)
10	<b>Special Development Requirements For Existing Nucleus.</b> On the whole, the clauses under these Regulations indicate a liberal approach granting relaxations to the other normal regulations, which is contrary to the principle of good practices in building constructions. Hence in the primary interest of Fire and Life safety, which is in overall public interest, it is recommended that <b>these regulations</b> which have an anachronic significance <b>be scrapped.</b>
11	<b>Special Development Requirement For The Other Area.</b> 11.3 Minimum area of a building unit. Add (d) "In the case of residential and commercial zones, one electrical sub-station shall be provided at a suitable site for areas covering more than 2 ha and upto 4 ha". Add (e) "Care has to be taken while providing essential community facilities in residential commercial and industrial zones that one fire station with staff quarters is also provided for areas exceeding 4 ha at the rate of one fire station covering 10 sq km area.
15 15.1	<b>LOW COST HOUSING PLANNING</b> <b>Planning of low cost housing;</b> (iii) Second paragraph Add at the end "use of basements for library, school and community hall shall not be permitted.
15.5	<b>Structural Requirements</b> Add A New Sub Clause (Iv). "The Above Shall Be Subject To Approval By The Competent Authority." <b>Also Add Another New Clause 15.7</b> Fire Protection /Fire Safety Requirements "For Fire Protection /Fire Safety Requirements Provisions Contained In Regulation No 17.2 May Be Referred To'.
16	<b>REGULATIONS FOR SPECIAL STRUCTURES</b> C (ii), (e), (f), (g), (h) And (l): Should Be Replaced By Following; Please copy from those given for item 18.1 c(ii), (e), (f), (g), (h) (l) and 18.3 of AUDA Regulations..

17	<p><b>General Building Requirements</b></p> <p>17.2</p> <p><b>Fire Protection</b></p> <p>Existing title should be amended as:</p> <p><b>Fire Protection And Means Of Exit Requirements (Including High Rise Buildings)</b></p> <p>All clauses under existing 17.2 should be replaced by following clauses:</p> <p>Please copy from those given for item 17.2 of AUDA Regulations</p>
17.3	To be deleted.
17.8	To be deleted.
Add 17.15 (new)	Fire protection requirements during construction of buildings Fire and life hazards do exist even during the construction stage of buildings. In order to cope with such hazards, minimum fire protection requirements as specified in NBC part 7 “Constructional Practices and Safety” shall be complied with.
Add 17.16 (New)	<b>Temporary Structures and Pandals</b> Adequate fire precautionary measures shall be taken in the construction of Temporary Structures and Pandals in accordance with IS-8758:1993.
23	<b>Applicability of Regulations</b>
23.1	<b>This should be modified as follows:</b> These Regulations except Regulation for Maintenance of Buildings shall apply to all new constructions taken up on or after the date of their enforcement and shall also apply to any additions or alterations that may be made in any existing constructions and also in case of change of use in existing building. The Regulation for Maintenance of Buildings shall apply to existing buildings.
Add a New Rule	<b>MAINTENANCE OF BUILDINGS</b> 1) For the purpose of these Regulations, the building shall be divided into the following classes: Class 1: All types of framed structures, factory buildings, cinema, auditorium and other public buildings, schools and college buildings, hostels. Class 2: Masonry walled residential buildings constructed with more than ground + two floors. 2) It shall be the duty of the owner of a building to get his building examined by a registered structural designer at the interval of time prescribed hereunder and to submit a structural inspection report to the Authority in the Form No.11. 3) The interval at which such buildings are to be examined and a report submitted to Authority shall be as under: a) Within three years from the coming into force of these

	<p>Regulations and thereafter at the interval of every fifteen years from the date of submission of the first report for Class-I buildings which are erected fifteen years earlier from the date on which these Regulations has come into force or which becomes five years old thereafter.</p> <p>b) Within five years from the coming into force of these Regulations and thereafter at the interval of every fifteen years from the date of submission of the first report for Class II buildings which are erected fifteen years earlier from the date on which these Regulations has come into force or which become fifteen years old thereafter.</p> <p>4) "It shall be the duty of every owner to maintain and keep in perfect working order, at all times, all the fixed fire protection systems, installations and first-aid fire extinguishers, as well as fire lifts and escape stairs, provided in the building. At intervals of not more than 12 months, he shall submit a Certificate from the Fire Department or the/Registered/Accredited Fire Protection Consultant certifying that all the requirements as stated above are properly maintained, and are in good working condition."</p>
24	<p><b>RELAXATION</b>  <b>Para 1 and 2 should be deleted (for reasons given in the report)</b>  <b>Para 3 and 4 should be amended to read as follows:</b>          "Notwithstanding anything contained in foregoing Regulations of the Development Plan in case where these regulations cause hardships to the owners because of their application to the alterations not involving addition to the existing structures erected prior to the coming into force of these regulations, the Competent Authority after considering the merits of each individual case may relax or waive, for reasons to be recorded in writing any regulation of the Development Plan <b>without causing any adverse effects on the fire and life safety requirements for the building.</b>          provided that this relaxation shall not be made in any regulations for high rise building"</p>
25	<p><b>PENALTIES</b>          The relevant provisions of Gujarat Town Planning and Urban Development Act should be made more stringent/deterrent</p>
26	<p><b>TREE PLANTATION</b>          This should be amended to read as follows          While applying for development permission, location of trees , at the rate of 1 tree for every 100 m<sup>2</sup> of building unit, shall have to be shown on the site plan/layout plan so as not to obstruct the clear margin requirements and <b>without causing obstruction to the easy movement of fire fighting vehicles in case of fire</b></p>

	<b>emergency.</b> The trees shall have to be guarded by the tree guards and shall be maintained.
27	<b>Appeal</b> <b>Last sentence should read as follows</b> “Decision of the secretary Urban Development and Urban Housing Department shall be final”
28	<b>Explanation</b> Definitions of 1 Light industry 3 light home workshop and 4 obnoxious and hazardous industries should be changed in line with 3.1.8, 3.1.11 and annex B of part4 NBC.
Appendix A	Word obnoxious should be deleted from the title.
Forms	A separate form should be devised for submission of certificate by Chief Fire Officer/ Fire Protection Consultant.
Page 90	<b>Light Industry: -</b> The definitions of industries should be <b>in line with 3.1.8, 3.1.11 and Annex B of Part 4 NBC.</b>
<b>Some of the other corrections to be made which are of editorial nature are as follows</b>	
Regulation No	Corrections to be made
Index 17.1	<i>should read</i> Elevators/Lifts.
Appendices	Title should be “List of Hazardous Industries”. Delete word “obnoxious’ from Title.
1.1.2	Add at the end, i.e., 25 October 1996
1.1.4	The word ‘regulations’ wherever used should start with capital letter ‘R’.
2	<b>DEFINITION</b>
2.2	Air Conditioning 2 <sup>nd</sup> line - substitute ‘requirements’ for ‘requirement’
2.8	<b>BUILT UP AREA OR FLOOR AREA</b> 3 <sup>rd</sup> line - correct ‘Garages’ as ‘garages’, and ‘privies’ as ‘privys’
2.19	<b>FLOOR SPACE INDEX</b> (i) 2 <sup>nd</sup> line - 1 <sup>st</sup> word to be changed as ‘ratio, (ii) ‘stories’ to be spelt as ‘storeys’ (iii) 3 <sup>rd</sup> line- ‘mazenine, to be spelt as ‘mezzanine’. (iv) In 1. ‘pillers’ to be spelt as ‘pillars’.
2.42	<b>SMOKE STOP DOOR</b> Insert the words ‘room/area’ between ‘one’ and ‘to’.
3.2 (v) C	3 <sup>rd</sup> line - ‘Higher’ to be corrected as ‘height’.
3.4 (c) (ii)	1 <sup>st</sup> line - instead of ‘plants’ it should be ‘plans’
3.4 (f)	(i) 1 <sup>st</sup> line - insert ‘plans’ after ‘whose’.

	(ii) 2 <sup>nd</sup> line - Amend 'plants' as 'plans'.
3.4 (h)	1 <sup>st</sup> line - Add 'of' after 'acceptance'
3.5 & 3.6	The word 'regulation' should start with capital 'R', wherever occurring.
4.2 (b)	1 <sup>st</sup> line - 'whose' should be amended as 'where'.
4.3	A) (1) 1 <sup>st</sup> line - 'comfirm' should be corrected as 'conform'.
6.1(a)	2 <sup>nd</sup> line- insert/_ after word 'sought'.
6.2 (b) (2)	2 <sup>nd</sup> line- instead of 'this', it should be 'these'.
8 2	1 <sup>st</sup> line - amend 3 <sup>rd</sup> word to 'conforming'-
8 4	1 <sup>st</sup> line -4 <sup>th</sup> line - amend 7 <sup>th</sup> word to 'conforming'-
8 8 (ii)	Delete words 'local undertaken by the' being repetition.
9.2 (c) (a)	3 <sup>rd</sup> line- instead of "the" it should be 'these'.
9.2 (c) (c) ii)	10 <sup>th</sup> line - After 'functioning' add 'and safety'
9.2 (c) (c) (v)	3 <sup>rd</sup> line - Change 'confirmation' to 'conformity'.
9.2(c) (c) (iv) & (viii)	Words 'the regulations' should be changed to 'these regulations'
9.2 (1) (B) (2) & 9.2 (2) (A) 9.2 (4) (A)	All India Board of Technical Education should read 'All India Council Of Technical Education'
11.1.1	1 <sup>st</sup> line - Amend 'development' to 'developed'
11.1.5 (iii)	4 <sup>th</sup> line-instead of 'build' it should be 'built'.
15.2 (iv) (c)	Instead of 'tilled' it should be 'tiled'
15.2 (v) (a)	'on tenth" should read 'one tenth"
24	Para 2 is to be numbered
27	1 <sup>st</sup> line- Word "agrived" should read "Aggrieved'.
28 and Appendix 'A'	Word 'obnoxious' to be deleted wherever appearing.
Page 91	3. Word 'Obnoxious' to be deleted

## ANNEXURE C

# Surat Urban Development Authority GENERAL DEVELOPMENT CONTROL REGULATIONS 2004.

### *Proposed Amendments in Fire Related Regulations*

AUDA Reg. Ref. No.	Proposed Amendments
<b>2. DEFINITIONS</b>	
Following definitions should be amended as under:	
No 2.7	<p><b>AUTOMATIC SPRINKLER SYSTEM</b> A system of water pipes fitted with sprinkler heads at suitable intervals and heights, and designed to actuate by heat automatically, control and extinguish a fire by discharge of water.</p>
2.9	<p><b>Buildings</b> All buildings shall be classified according to the use or the character of the occupancy in one of the following groups: <i>Residential, Educational, Institutional, Assembly, Business, Mercantile, Industrial, Storage and Hazardous.</i></p> <p><b>(a) Residential Buildings</b> These shall include any building in which sleeping accommodation is provided for normal residential purposes with or without cooking or dining or both facilities, except any building classified under institutional buildings.</p> <p><b>(b) Educational Buildings</b> These shall include any building used for school, college, other training institutions or day-care purposes involving assembly for instruction, education or recreation for not less than 20 students.</p> <p><b>(c) Institutional Building</b> These shall include any building or part thereof, which is used for purposes, such as medical or other treatment or care of persons suffering from physical or mental illness, disease or infirmity; care of infants, convalescents or aged persons and for penal or correctional detention in which the liberty of the inmates is restricted. Institutional buildings ordinarily provide sleeping accommodation for the occupants.</p> <p><b>(d) Assembly Buildings</b> These shall include any building or part of building, where number of persons not less than 50 congregate or gather for</p>

amusement, recreation, social, religious, patriotic, civil, travel and similar purposes, for example, theatres, motion picture houses, assembly halls, auditoria, exhibition halls, museums, skating rinks, gymnasiums, restaurants, places of worship, dance halls, club rooms, passenger stations and terminals of air, surface and marine public transportation services, recreation piers and stadia, etc.

**(e) Business Building**

These shall include any building or part of a building which is used for transaction of business (other than that covered by mercantile buildings) for keeping of accounts and records and similar purposes, professional establishments, service facilities, etc. city halls, town halls, court houses and libraries shall be classified in this group so far as the principal function of these are for transaction of public business and keeping of books and records.

**(f) Mercantile Building**

These shall include any building, which is used as shops, stores, market, for display and sale of merchandise, either wholesale or retail.

**(g) Industrial Building**

These shall include any building or part of a building or structure, in which products or materials of all kinds and properties are fabricated, assembled, manufactured or processed, for example, assembly plants, industrial laboratories, dry cleaning plants, power plants, generating units, pumping stations, fumigation chambers, laundries, buildings or structures in gas plant, refineries, dairies and saw-mills etc.

**(h) Storage Building**

These shall include any building or part of a building used primarily for the storage or sheltering (including servicing, processing or repairs incidental to storage) of goods, ware or merchandise (except those that involve highly combustible or explosive products or materials) vehicles or animals, for example, warehouses, cold storage, freight depots, transit sheds, storehouses, truck and marine terminals, garages, hangers, grain elevators, barns and stables. Storage properties are characterized by the presence of relatively small number of persons in proportion to the area. Any new use which increases the number of occupants to a figure comparable with other classes of occupancy shall change the classification of the building to that of the new use, for example, hangars used for assembly purposes, warehouses used for office purposes, garage buildings used for manufacturing.

**(i) Hazardous Buildings**

These shall include any building or part of a building which is used for the storage, handling, manufacture or processing of highly combustible or explosive materials or products which are liable to burn with extreme rapidity and or which may produce

poisonous fumes or explosions on storage, handling, manufacturing or processing. These include highly corrosive, toxic or noxious alkalis, acids or other liquids or chemicals producing flame, fumes and explosive, poisonous, irritant or corrosive gases; and material producing explosive mixtures of dust which result in the division of matter into fine particles subject to spontaneous ignition.

**Some other definitions relating to buildings are as follows:**

**(a) Detached building**

A building with walls and roofs independent of any other building and with open spaces on all sides.

**(b) Semi-Detached Building**

A building having one or more sides attached with wall and roof with other building.

**(c) High Rise Building**

All buildings 15 m or above in height shall be considered as high rise buildings.

**(d) Office Building**

A building or premises or part thereof whose sole or principle use is for an office or for office purposes or clerical work .Office purposes includes the purpose of administration , clerical work , handling money, telephone, telegraph and computer operation; and clerical work includes writing, book-keeping, sorting papers, typing, filing, duplicating, punching cards or tapes, machine calculations, drawing of matter for publication and editorial preparation of matter of publication.

**(f ) Public Building**

A building constructed by Government, Semi-Government organizations, public sector under-takings, registered Charitable Trust or such other organizations for their non-profitable public activities

**(g) Special Building**

(i) A building solely used for the purpose of a drama or cinema theatre, motion picture a drive-in-theatre, an assembly hall or auditorium, town hall, lecture hall, an exhibition hall, theatre museum, stadium, community hall, marriage hall.

(ii) A hazardous building;

(iii) An Institutional Building

(iv) An Industrial Building

(v) A Storage Building.

**(h) Unsafe Building**

A building which,

(i) is structurally unsafe,

(ii) is insanitary,

(iii) is not provided with adequate means of egress,

	<p>(iv) constitutes a fire hazard,  (v) is dangerous to human life, and  (vi) in relation to its existing use constitutes a hazard to safety or health or public welfare by reasons of inadequate maintenance, dilapidation or abandonment.</p> <p><b>(i) Wholesale establishment</b>  An establishment wholly or partly engaged in wholesale trade and, manufacturer's wholesale outlets, including related storage facilities, warehouses and establishments engaged in truck transport, including truck transport booking warehouses.</p>
2.17	<p><b>Combustible Material</b>  The material which either burns itself or adds heat to a fire when tested for non-combustibility in accordance with IS: 3808-1979.</p>
2.29	<p><b>Exit</b>  A passage, channel or means of egress from any building, storey or floor area to a street or other open space of safety:</p> <p><b>2.29.1 VERTICAL EXIT:</b> A vertical Exit is a means of exit used for ascending or descending between two or more levels, including stairways, smoke-proof towers, ramps and fire escapes</p> <p><b>2.29.2 HORIZONTAL EXIT:</b> An arrangement which allows alternative egress from a floor area at or near the same level in an adjoining building or an adjoining part of the same building with adequate fire separation.</p> <p><b>2.29.3 OUTSIDE EXIT:</b> An outside Exit is an exit from the building to a public way, to an open area leading to a public way or to an enclosed fire resistant passage leading to a public way.</p>
2.33	<p><b>Fire Lift</b>  The lift installed to enable fire services personnel to reach different floors with minimum delay, having such features as required in accordance with this part.</p>
2.34	<p><b>Fire Proof Door</b>  A fire-resistive door approved for openings in fire separation walls.</p>
2.36	<p><b>Fire pump-Booster Fire Pump</b>  Means a mechanical/electrical device which boosts up the water pressure at the top level of a multi-storied/high-rise building and which is capable of delivering a pressure of 3.2 kg/cm<sup>2</sup> at the <b>highest point</b>.</p>
2.37	<p><b>Fire Resistance</b>  Fire resistance is a property of an element of building construction and is the measure of its ability to satisfy for a stated period some or all of the following criteria:  a) Resistance to collapse.</p>

	<p>b) Resistance to penetration of flame and hot gases, and</p> <p>c) Resistance to temperature rise on the unexposed face up to a maximum of 180°C and/or average temperature of 150° C.</p>
2.38	<p><b>Fire Separation</b></p> <p>The distance in meters measured from the external wall of the building concerned to the external wall of any other building on the site or from other site, or from the opposite side of the street or other public space for the purpose of preventing the spread of fire.</p>
2.40	<p><b>Fire Tower</b></p> <p>An enclosed staircase, which can only be approached from the various floors through landings or lobbies separated from both the floor areas and the staircase by fire-resisting doors, and open to the outer air.</p>
2.47	<p><b>Height of Building</b></p> <p>The vertical distance measured in the case of flat roofs, from the average level of the ground around and contiguous to the building to the terrace of the last livable floor of the building adjacent to the external wall; and in the case of pitched roof up-to the point where the external surface of the outer wall intersects the finished surface of the sloping roof; and in the case of gables facing the road, the mid-point between the eaves level and the ridge. Architectural features serving no other function except that of decoration shall be excluded for the purpose of measuring heights. Presence of genuine stair cabins, water tanks and lift rooms shall be ignored for the purpose of this definition.</p>
2.49 and 2.79	<p><b>Ground Level/ Residential Use</b></p> <p>Delete (covered under 2.9)</p>
2.92	<p><b>Travel Distance</b></p> <p>The distance to be travelled from any point in a building to a protected escape route, external escape route or final exit.</p>
Following additional definitions should be provided:	
2.100	<p><b>Down comer</b></p> <p>An arrangement of fire fighting within the building by means of down comer pipe connected to terrace tank through terrace pump, gate valve and non return valve and having mains not less than 100 mm internal diameter with landing valves on each floor/landing. It is also fitted with inlet connections at ground level for charging with water by pumping from fire services appliances and air release valve at roof level to release trapped air inside.</p>
2.101	<p><b>Dry Riser</b></p> <p>An arrangement for fire fighting within the building by means of</p>

	vertical rising mains not less than 100 mm internal diameter with landing valves on each floor/landing which is normally dry but is capable of being charged with water usually by pumping from fire services appliances.
2.102	<b>Emergency Lighting</b> Lighting provided for use when the supply to the normal lighting fails.
2.103	<b>Emergency Lighting System</b> A complete but discrete emergency lighting installation from standby power source to the emergency lighting lamp(s), for example, self contained emergency luminary or a circuit from central battery generator connected through wiring to several escape luminaries.
2.104	<b>Escape Lighting</b> That part of emergency lighting which is provided to ensure that the escape route is illuminated at all material times (for example, at all times when persons are on the premises), or at times the main lighting is not available, either for the whole building or the escape routes.
2.105	<b>Fire Resistance Rating</b> The time that a material or construction will withstand the standard fire exposure as determined by fire test done in accordance with the standard methods of fire tests of material/structures.
2.106	<b>Fire Stop</b> A fire resistant material, or construction having a fire resistance rating of not less than the separating elements, installed in concealed spaces or between structural elements of a building to prevent the spread/ propagation of fire and smoke through walls, ceilings and the like as per the laid down criteria.
2.107	<b>Means of Egress</b> A continuous and unobstructed way of travel from any point in a building or structure to a place of comparative safety.
2.108	<b>Occupant Load</b> The number of persons for which the means of egress of a building or portion thereof is designed.
2.109	<b>Pressurization</b> The establishment of a pressure difference across a barrier to protect a stairway, lobby, escape route, or room of a building from smoke penetration.
2.110	<b>Refuge Area</b> An area where persons unable to use stairways can remain temporarily and await instructions or assistance during emergency evacuation.

2.111	<p><b>Roof Exits</b> A means of escape on to the roof of a building where the roof has access to it from the ground. The exit shall have adequate cut-off within the building from staircase below.</p>
2.112	<p><b>Ventilation</b> Supply of outside air into, or the removal of inside air from an enclosed space</p>
2.113	<p><b>Venting Fire</b> The process of inducing heat and smoke to leave a building as quickly as possible by such paths so that lateral spread of fire and heat is checked, fire fighting operations are facilitated and minimum fire damage is caused.</p>
2.114	<p><b>Wet Riser</b> An arrangement for fire fighting within the building by means of vertical rising mains of not less than 100mm diameter with landing valves on each floor/landing for fire fighting purposes and permanently charged with water from a pressurized supply.</p>
Note	<p><b>For definition of other terms, reference shall be made to IS-8757:1999</b></p>
3.3	<p><b>Forms of application</b> (V) May be replaced by following: For high rise building and for special buildings like assembly, institutional, industrial storage and hazardous occupancy the following additional information shall be furnished/indicated in the plans in addition to the items under clause 3.3:</p> <ol style="list-style-type: none"> <li>1. Name of building</li> <li>2. Address of the building</li> <li>3. Name &amp; address of the builder/promoter</li> <li>4. Name &amp; address of the owners/occupiers of individual flats</li> <li>5. Plot area       <ol style="list-style-type: none"> <li>a) Title</li> <li>b) Land use (in case of residential building indicate no of dwelling units)</li> </ol> </li> <li>6. Covered area (grade level)</li> <li>7. Height of the building</li> <li>8 Overall height (from grade level)       <ol style="list-style-type: none"> <li>a) Whether Setback areas are conforming to Unified Building Bye law/ AUDA Regulations.</li> </ol> </li> <li>9. Number of basements (Please indicate level below in each case)       <ol style="list-style-type: none"> <li>a) If basement extends beyond building line, please indicate the load bearing strength of the roof of the basement</li> <li>b) Area of basement</li> <li>c) Whether any Piazza is proposed? Is so, details of the level of Piazza and ramps etc be indicated.</li> </ol> </li> <li>10. Number of floors (including ground floor)</li> <li>11. Occupancy Use (Please mention separately for basement and</li> </ol>

	<p>floors</p> <p>12 Covered area of typical floor</p> <p>13. Parking areas (please give details)</p> <p>14. Details of surrounding property/features</p> <p>15 Approach to proposed building, width of the Road and connecting roads if any</p> <p>16. Please give details of water supply available exclusively for fire fighting</p> <p>17. Have wet risers been provided?</p> <p>18. If yes, please indicate the number of risers and internal diameter of each</p> <p>19. Has any down comer been provided? If so, please give details</p> <p>20. Is a public or other water storage facility available nearby? If so, please give the capacity and distance from your building, also please indicate if it is readily accessible</p> <p>21. Give any other information that you can regarding availability of water supply for fire fighting.</p> <p>22. Are internal hydrants being provided? If so, please indicate:</p> <ol style="list-style-type: none"> <li>a) No. Of hydrants on each floor including basements and terrace</li> <li>b) Have these hydrants single or twin outlets?</li> </ol> <p>23. Are first aid hose reels being provided? If so Please indicate</p> <ol style="list-style-type: none"> <li>a) No of hose-reels on each floor including basements and terrace</li> <li>b) Bore and length of hose reel tubing on each reel</li> <li>c) Size (bore) and type of nozzle fitted to each hose reel.</li> <li>d) Is the hose reel connected directly to the riser or to the hydrant outlet?</li> </ol> <p>24. Are fire hoses being provided near each hydrant? If so, please indicate</p> <ol style="list-style-type: none"> <li>a) The type of hose</li> <li>b) The size (bore) of hoses</li> <li>c) The length of each hose</li> <li>d) Total no of hoses provided near each hydrant</li> </ol> <p>25. Are branch pipes being provided? (Note:- Universal Branch Pipe conforming to IS:2871-1983 is to be provided as per IS:3844-1989)</p> <p>26. Is the basement to be used for car parking or storage?</p> <ol style="list-style-type: none"> <li>a) Is it being Sprinklered?</li> <li>b) Whether any cubicles are proposed in the basement/</li> <li>c) If so, the area of each cubicle.</li> <li>d) Whether segregation/compartimentation of the basement is being provided?</li> <li>e) If so, please give details.</li> </ol> <p>27. Is the building being equipped with automatic fire detection and alarm system? If so please indicate</p>
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	<p>a) The type of detectors used</p> <p>b) The standard to which the detectors conform</p> <p>c) The code to which the installation conforms.</p> <p>28. Are manual call boxes being installed in the building for raising an alarm in the event of outbreak of a fire? If so, please give details.</p> <p>29. Is public address system being installed in the building with loudspeakers on each floor?</p> <p>30. Is fire control room being provided in entrance lobby of the building?</p> <p>31. Is an intercom system being provided between the different floors and the fire control room in entrance lobby?</p> <p>32. How many staircases are being provided in the building? Please indicate in each case</p> <p>a) Width of the stairway</p> <p>b) Width of risers</p> <p>c) Height of risers</p> <p>d) If the treads are of non- slippery type.</p> <p>33. What is the proposed average occupant load per floor?</p> <p>34. How many lifts are being installed in the building? Please indicate in each case</p> <p>a) The floors between which the lift runs</p> <p>b) The type of door fitted to the lift car and landing doors</p> <p>c) Fire resistance rating of the lift car</p> <p>d) Floor area of the lift car</p> <p>e) Loading capacity of the lift car</p> <p>f) Is communication system being installed in the lift car?</p> <p>g) Is a fireman's switch being installed in the lift for grounding it in the event of a fire?</p> <p>35. Are stationary fire pumps being installed for pressurizing the wet riser? If so please indicate</p> <p>a) The number of pumps</p> <p>b) The size of suction and delivery connection to each pump</p> <p>c) The output of each pump</p> <p>d) The maximum head against which the pump can operate at the output mentioned in C</p> <p>e) Is the pump automatic in action?</p> <p>36. Is a standby source of electric supply being provided? If it is through a generator, please indicate:</p> <p>a) The capacity (output)</p> <p>b) The function that can be maintained simultaneously by the use of generator Such as operating lifts, fire pumps, emergency lighting etc</p> <p>c) Will the generator be automatic in action or has to be started manually?</p> <p>37. Are any yard hydrants being fed from the building's fire</p>
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	<p>pump?</p> <p>38. Where more than one lift is being installed in a common enclosure, will individual lifts be separated by fire- resisting walls of 2 hours fire rating?</p> <p>39. Will the lift lobby or the stairway be pressurized? If so, give details.</p> <p>40. Will the lift lobbies and staircases be effectively enclosed to prevent fire/smoke entering them from outside at any floor?</p> <p>41. Will all the exits and direction of travel to each exit be sign posted with illuminated signs?</p> <p>42. Is false ceiling being provided in any portion of the building? If so please indicate the location and mention if the material being used for the false ceiling is combustible or non-combustible?</p> <p>43. Will the building be centrally air -conditioned? If so please indicate,</p> <ul style="list-style-type: none"> <li>a) The material used for construction of ducts and its fittings</li> <li>b) The type of tinning used for ducts if any</li> <li>c) The type of lagging used, if any for insulating any portion of the duct, Please also indicate how the lagging is secured.</li> <li>d) If false ceiling is being installed please give information as at 42 above.</li> <li>e) If plenum is used as return air passage, Is it being protected with fire detectors? Please give details.</li> <li>f) Is a separate AHU being provided for each floor?</li> <li>g) Whether automatic shutdown of AHU is coupled with detection system?</li> <li>h) Is the ducting for each floor effectively isolated or is it continuous on more than one floor?</li> <li>i) Will fire dampers be provided in AC ductings ? If so, give details of their installation.</li> </ul> <p>44. Where are the switch -gears and transformers being located? If inside the building, please indicate</p> <ul style="list-style-type: none"> <li>a) If the switchgears and transformers have been housed in separate compartments, effectively separated from each other and from other portions of the building by a 4 hours fire resistance wall?</li> <li>b) What precautions will be taken to prevent a possible fire in the transformers from spreading?</li> </ul> <p>45.(i) Where electrical cables, telephone cables, dry/wet risers/down-comers pass through a floor or a wall, Will the spaces (apertures) around the cables/pipes be effectively Sealed/ plugged with non-combustible, fire resisting material?</p> <p>(ii) Ventilation</p> <ul style="list-style-type: none"> <li>a) Whether natural ventilation is relied upon?</li> </ul>
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	<p>If so give details of vents for the stairwell, lift shaft etc</p> <p>b) Whether mechanical ventilation is being proposed? If so, give details of proposed system indicating the number of air changes for the basements and other floors.</p> <p>c) Whether mechanical ventilation is being coupled with automatic detection system?</p> <p>46. Please indicate the number and type of fire extinguishers which will be provided at various locations and the arrangement for the maintenance of the extinguishers</p> <p>47. Please indicate if the fire extinguishers bear the ISI certification mark?</p> <p>48. Whether the refuge area is being provided? If so, the floor on which it will be provided and the total area being provided floor-wise.</p> <p>49. Is the building being protected against lightning? If so does the lightning protector conform to any code? Please give details.</p> <p>50. Please confirm that the work has not been started on site and construction will be started only after final approval of the Competent Authority. Give Position of construction at site.</p>
4.2.1	<p><b>Conformity with other Acts and Regulations</b></p> <p>Add - Reference to the Gujarat Town Planning And Urban Development Act-1976</p> <p>(c) The reference to the Indian Oil Mines Regulations 1933 needs to be amended to the Oil Mines Regulations 1984, under the Mines Act 1952</p> <p><b>Reference to following relevant Acts / Regulations as given below have to be added</b></p> <p>a) Petroleum Rules 1976 under the Petroleum Act 1934</p> <p>b) Explosives Rules 1983 under Indian Explosives Act 1884</p> <p>c) Factories Act 1948 and Factories Rules under the Gujarat Govt.</p> <p>d) Gas Cylinders Rules 1981</p> <p>e) Environment Protection act 1986 and Environment Protection Rules 1986</p> <p>f) Manufacture, Storage &amp; Import of Hazardous Chemicals Rules 1989</p> <p>g) Public liability Insurance Act 1991</p> <p>h) Notification of Requirement of Environment Clearance of Projects, 1994 (MOEF)</p> <p>i) Building and other Construction Workers (regulation of Employment &amp; Conditions of service) Act 1996 and Central Rules, 1998</p>
4.5	<p><b>Inspection</b></p> <p><b>(4) Unauthorized Development:</b></p> <p>(b) Reference to regulation no 2.77 should read as 9.3.</p>

6	<p><b>Inspection.</b>  <b>6.2 PROCEDURE DURING CONSTRUCTION</b>  (a) Recognized stages for progress certificate and checking.  1.) V) Add at the end, "It shall be the responsibility of the Chief Fire Officer by carrying out inspections at appropriate intervals, to ensure that the means of exit as well as the fire protection requirements for such buildings are adequate and operational .He shall also satisfy himself that all elevators including fire lifts are duly tested and their test certificates are submitted to his satisfaction. If the above work is entrusted to an accredited Fire Protection Consultant his reports shall be countersigned by the Chief Fire Officer. In case of inadequacy or contravention of these regulations, he shall issue a notice to the owner or occupier of such buildings directing him to rectify the shortcomings /contraventions within a specified period. Copies of all such notices shall be endorsed to the Competent Authority also."</p>
6.4	<p><b>ILLEGAL OCCUPATION OF BUILDING</b>  (a) Add (iv) reading as follows 'If building is declared Unsafe'</p>
9	<p><b>Registration of Architect, Engineer, Structural Designer, Clerk Of Works, Developer (Add Fire Protection Consultant)</b>  Add between 9.3.4 and 9.3.5  "Qualification and Experience, Duties and Responsibilities in respect of <b>Fire Protection Consultant</b>" (Please take from Annexure D)</p>
11	<p><b>Special Development Requirements For Gamtal Area</b>  On the whole, the clauses under these Regulations indicate a liberal approach granting relaxations to the other normal regulations which is contrary to the principle of good practices in building constructions. Hence in the primary interest of Fire and Life safety, which is in overall public interest it is recommended that <b>these regulations</b>, which have anachronic significance, <b>be scrapped.</b></p>
15	<p><b>Development of low cost housing</b>  <b>15.1 Planning.</b>  (i) This should be amended to read as follows  "The maximum density of dwellings should be in line with Part 3 NBC Annex D".</p> <p><b>15.5 Structural requirements.</b>  Add a new sub clause  "The above shall be subject to approval by the Competent Authority."</p> <p><b>Also Add another new clause 15.6</b>  Fire Protection /Fire Safety Requirements  "For Fire Protection /Fire Safety Requirements provisions</p>

	contained in regulation No 16.2 may be referred to.
16	<p><b>GENERAL BUILDING REQUIREMENTS</b>  <b>16.2 FIRE PROTECTION</b>  Existing Title should be amended as  <b>FIRE PROTECTION AND MEANS OF EXIT REQUIREMENTS (INCLUDING HIGH RISE BUILDINGS)</b>  All clauses under EXISTING 16.2 should be replaced by following CLAUSES:  Please copy from those given for item 17.2 of AUDA Regulations.</p>
16.3	To be Deleted
16.8	To be deleted
16.12	To be deleted
16.13	To be deleted
16.20	<p><b>CONSERVATION OF ARTIFACTS, STRUCTURES AND PRECINCTS OF HISTORICAL AND/OR AESTHETICAL AND/OR ARCHITECTURAL AND/OR CULTURAL VALUE (Heritage Building And Heritage Precincts)</b>  Add 2<sup>nd</sup> paragraph reading as follows  “Whilst taking up conservation of heritage buildings, which are of national and international importance, due consideration shall be given for provision of adequate fire protection arrangements so as to ensure proper preservation of these monuments”.</p>
Add 16.23 (New)	<p><b>Fire protection requirements during construction of buildings</b>  Fire and life hazards do exist even during the construction stage of buildings. In order to cope with such hazards, minimum fire protection requirements as specified in NBC Part 7, “Constructional Practices and Safety” shall be complied with.</p>
Add 17.23 (New)	<p><b>Temporary Structures and Pandals</b>  Adequate fire precautionary measures shall be taken in the construction of Temporary Structures and Pandals in accordance with IS-8758:1993.</p>
17	<p><b>REGULATIONS FOR SPECIAL STRUCTURES</b>  17.1 Special structures c(ii), (e), (f), (g), (h), (l) and 17.3 (Requirements of Individual Exits at Each Floor) should be replaced by following .  Please copy from those given for item 18.1 c(ii), (e), (f), (g), (h), (l) and 18.3 of AUDA Regulations</p>
17.2	<p><b>FIRE PROTECTION REQUIREMENTS</b>  These should be deleted as they are now covered elsewhere</p>
17.4	<p><b>STRUCTURAL SAFETY AND SERVICES</b>  <b>1) STRUCTURAL DESIGN</b>  Reference to form 2(c) in last paragraph should read form 2(d)</p>
17.4(5)	<b>Structural Stability and Fire Safety of Existing Buildings</b>

	This should be renumbered 17.4(4).
19	<p><b>GASOLINE (MOTOR FUEL) FILLING STATIONS AND GASOLINE FILLING CUM SERVICE STATIONS</b></p> <p><b>Add 19.5 reading as follows:</b></p> <p>The use, handling, storage and sale of gasoline, fuel oil and other flammable liquids shall not be permitted unless such use, handling, storage and sale is in accordance with Petroleum Rules 1976 under the Petroleum Act 1934.</p>
24	<p><b>APPLICABILITY OF REGULATIONS</b></p> <p>24.1 This should be modified as follows:</p> <p>These Regulations except Regulation No.25 shall apply to all new constructions taken up on or after the date of their enforcement and shall also apply to any additions or alterations that may be made in any existing constructions and also in case of change of use in existing building. The Regulation No.25 shall apply to existing buildings.</p>
25	<p><b>MAINTENANCE OF BUILDINGS</b></p> <p><b>Amend 25.2 as follows:</b></p> <p>"It shall be the duty of every owner to maintain and keep in perfect working order, at all times, all the fixed fire protection systems, installations and first-aid fire extinguishers, as well as fire lifts and escape stairs, provided in the building. At intervals of not more than 12 months, he shall submit a Certificate from the Fire Department or the/Registered/Accredited Fire Protection Consultant certifying that all the requirements as stated above are properly maintained, and are in good working condition."</p>
26	<p><b>RELAXATION</b></p> <p><b>26.1 To be deleted (for reasons given in the report).</b></p> <p><b>26.2 This should be amended to read as follows</b></p> <p>"Notwithstanding anything contained in foregoing Regulations of the Development Plan in case where these regulations cause hardships to the owners because of their application to the alterations not involving addition to the existing structures erected prior to the coming into force of these regulations, the Competent Authority after considering the merits of each individual case may relax or waive, for reasons to be recorded in writing any regulation of the Development Plan <b>without causing any adverse effects on the fire and life safety requirements for the building.</b>"</p> <p>provided that this relaxation shall not be made in any Regulations for high-rise building</p>
27	<p><b>ACCESS FOR PHYSICALLY HANDICAPPED PERSONS.</b></p> <p>27.1 This should be amended to read as follows</p> <p>These regulations shall apply to all public buildings and facilities, which are used by physically, handicapped persons also.</p>
29	<b>PENALTIES</b>

	The relevant provisions of Gujarat Town Planning and Urban Development Act 1976 should be made more stringent/deterrent.
30	<p><b>TREE PLANTATION</b></p> <p>This should be amended to read as follows:</p> <p>While applying for development permission, at the rate of 1 tree for every 100sq.mts of building unit, shall have to be shown on the site plan/layout plan. <b>Trees shall be planted without causing obstruction to the easy movement of fire fighting vehicles in case of fire emergency.</b></p> <p>The trees shall have to be guarded by the tree guards and shall be maintained.</p>

**Some of the editorial corrections, which are of editorial nature, are as follows:**

1.1.1	The first letters of the title of regulations at 2 places in the first line should be in capitals.
1.1.4	Insert '1986' after SUDA.
2.6	<p><b>Definitions-Apartment/Flats</b></p> <p>1<sup>st</sup> line: 'means' to be corrected as 'mean'.</p>
4	<p><b>General Requirements For Development</b></p> <p>4.3(a) -1<sup>st</sup> line- substitute 'conform' for 'confirm'</p>
5	<p><b>Decision Of The Authority</b></p> <p>5.1 Title -Instead of 'REFUSE' it should be 'REFUSAL'</p>
5.3.1	(vii)- Instead of 'Fire Officer' it should be 'Chief Fire Officer'.
6	<p><b>6. Inspection</b></p> <p>6.2 (a) (2) - Last line, 1<sup>st</sup> letter of 'Architect' to be in capital</p>
16.6	<p>Height of floors- 3<sup>rd</sup> paragraph</p> <p>1<sup>st</sup> line- Instead of 'slopping' it should be 'sloping'.</p>
17.1 (n)	The title should be corrected as <b>Air Conditioning</b>
17.4 (5) v	Remove word "existing" in 1 <sup>st</sup> line.

## ANNEXURE D

### Registration /Accreditation of Fire Protection Consultant

#### D1. QUALIFICATIONS AND EXPERIENCE

Any of the following sets of qualifications and experience may be considered:

1. A Degree in Fire Engineering, like B.E (Fire), from a recognized Institution, approved by the Government/All India Council of Technical Education like National Fire Service College, Govt. of India, Nagpur.
2. A pass in the Membership Examination of the Institution of Fire Engineers, England (M. I. Fire E of IFE, UK)

**Experience:** Persons with any of above qualification should have a minimum of 15 years' professional experience in any Government/ Local Body/Major Public Sector Fire Service, with special experience in Design/Inspection/ Survey/Installation/ Consultancy/Maintenance pertaining to various types of fire protection systems and fire fighting equipment normally provided in various classes of occupancies.

3. A pass in the Graduate ship Examination of the Institution of Fire Engineers, England (Grad I Fire E, of IFE, UK).
4. A pass in the Graduateship Examination of the Institution of Fire Engineers India (G.I.F.E., of IFE, India)
5. A pass in the Divisional Officers' Course/Advanced Diploma of the National Fire Service College, Govt. of India, Nagpur.

**Experience:** Persons with any of the qualifications mentioned at (3), (4) or (5) above, should have a minimum of 20 years' professional experience in any Governmental/Local Body/major Public Sector Fire Service, with special experience in Design/ Inspection/ Survey/ Installation/ Consultancy/ Maintenance pertaining to various types of fire protection systems and fire fighting equipment normally provided in various classes of occupancies

6. A Degree in Engineering, or its equivalent qualifications recognized by the All India Council of Technical Education or Associate Member of the Institute of Engineers.

**Experience:** Persons with any of the qualifications mentioned at (6) above should have minimum of 20 years' professional experience in any Governmental/major Public Sector/well established Organization like Tariff Advisory Committee, Tata Consultancy Services, Engineers India Limited, etc., with special experience in Design/Inspection/Survey/ Installation/ Consultancy/ Maintenance of various types of fire protection systems and fire fighting equipment normally provided in various classes of occupancies.

7. Retired persons with the qualifications and experience prescribed above will also be eligible for consideration.

## **D2. APPOINTMENT AND SERVICE CONDITIONS**

1. Selection to the Panel of Fire Protection Consultants (Panel of 4 to 5 Consultants), as well as the letter of appointment, shall be issued by the Competent Authority, in consultation with the Chief Fire Officer.
2. Conditions of Service shall also be notified by the Competent Authority
3. On acceptance of the appointment, the Fire Protection Consultant shall give an undertaking in writing that he will abide by the instructions issued by the Competent Authority/Chief Fire Officer in respect of his conditions of service and duties and responsibilities.

## **D3. SCOPE OF WORK & COMPETENCE**

1. Scrutiny of all Plans and Specifications received along with the Application for Development Permission or subsequent Application for Modifications /Alterations, as passed on to him by the Chief Fire Officer, in respect of means of exit and fire protection requirements for high rise and special types of buildings/occupancies, so as to ensure conformity with the relevant Standards & Regulations.
2. Inspection of the construction work at various stages of progress of the work as well as on completion, as directed by the CFO and rendering reports to him
3. Conduct periodical/random surveys of the adequacy as well as serviceability of the fire protection systems and equipment and means of exit requirements provided in the existing high rise and special buildings or any other hazardous premises, as directed by CFO and render report to him (Not more than four such surveys to be entrusted to one Fire Protection Consultant in a month).

## **D4. DUTIES & RESPONSIBILITIES**

1. He shall be responsible for satisfactory execution of his work to the Competent Authority through the Chief Fire Officer, who will be allotting various items of work shown in (D3) above.
2. After completion of the allotted work, he shall render a report (in writing, as required) to the Chief Fire Officer
3. In case he comes across any violation/non-compliance/discrepancy in the execution of the developmental work in respect of fire and life safety requirements, he shall immediately bring the same to the notice of the CFO.
4. Whatever work is allotted to him by the Chief Fire Officer as a member of the Panel of Fire Consultants, he shall carry out the same promptly and diligently, and shall render a report to the CFO. He shall seek from the CFO, any clarifications required with regard to the execution of his work
5. He shall be well conversant with all the relevant Regulations, Codes and Standards pertaining to his work, including NBC Part 4 and all relevant Indian Standards, and also shall keep abreast of all modern trends in his

field.

6. While carrying out his inspections of the developmental work and also while assessing the fire and life safety requirements of buildings, he shall be quite impartial, objective and shall display high standard of technical skill and competence commensurate with his position.
7. During construction stage of the building / development work, he shall carry-out occasional inspections, as directed by the CFO, for ensuring that all fire safety measures are being observed by the contractors' employees and all others at site.
8. After carrying out the scheduled inspections, he shall affix his signature at the appropriate places in the concerned documents.
9. In case of any difference of opinion between him and the CFO on any technical or other issues, the matter shall be referred to the Competent Authority for a decision.