IS 3594 : 1991
(Reaffirmed 1996)

भारतीय मानक

औद्योगिक इमारतों की अग्नि-सुरक्षा की रीति-संहिता: शीतगृह सहित सामान्य भंडारगृह और गोदाम

(पहला पुनरीक्षण)

Indian Standard

CODE OF PRACTICE FOR FIRE SAFETY OF INDUSTRIAL BUILDINGS: GENERAL STORAGE AND WAREHOUSING INCLUDING COLD STORAGES

(First Revision)

UDC 669·81 : 725·355

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

March 1991

Price Group 4

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards after the draft finalized by the Fire Safety Sectional Committee had been approved by the Civil Engineering Division Council.

This standard covering essential requirements of fire safety of godowns and warehouses was first issued in 1967. Based on the experience gained during its implementation, the standard has now been revised.

Fires in storage buildings and warehouses account for a great percentage of total number of outbreaks in industrial occupancies and almost invariably assume serious proportions. If fire starts when the godown is closed, it often remains undetected for sometime and by then, it assumes serious proportions. The principal causes of outbreak of fire in a godown are careless smoking, electrical sources, spontaneous ignition, falling of sparks/embers from external source, carrying out of dangerous operations, like welding, cutting, spray painting, etc, either in the godown building or in buildings communicating with the godown, use of naked lights for cooking, faulty electrical installations, storage of different goods which would be hazardous in combination.

The three primary considerations, in providing adequate and reasonable fire protection and safeguards for storage occupancies are, the fire behaviour of stored materials, their storage arrangement, and the type of building itself. Once a fire occurs in a storage building the fire propagation and duration depend primarily on these factors. The earlier a fire is detected, controlled and extinguished, the lesser the damage will result.

Frequency of fire outbreaks and losses suffered as a result, may be considerably reduced if proper attention is paid to various aspects affecting fire safety, such as fire resistive construction, compartmentation, proper layout, size and height of the building, provision of smoke and heat ventilation, drainage arrangements, regulating the quantity and type of stocks in any particular godown, segregation of stocks having a varying fire risk, size and height of piles, provision of adequate aisles, separation of storage and process activities, minimising exposure hazards by proper layout of the building, etc. Automatic fire detection, alarm and protection arrangements are of utmost importance because warehouses are normally occupied only by comparatively less number of people during working hours and hardly any or at all during non-working hours. When the value in a fire area is extremely high, it will be desirable to sub-divide it by one or more structurally independent fire walls.

Cold storage warehouses are used primarily for extended storage of food products at low temperatures which prevent or retard spoilage. Depending on the products or processes, temperatures in cold storage range from $-5°C$ to $20°C$. Despite such low temperatures, cold storage warehouses are not immune to fire hazards. In fact, the low temperatures present unusual fire prevention and control problems which may assume serious proportions when such premises are located outside municipal limits. Combustible materials in such warehouses include cork or expanded plastic insulation, wood dunnage, pallets, boxes, fireboard and paper containers and wrappings, etc. Although fire frequency in such premises, is relatively low, considering the presence of large fire potential, the fire protection arrangements for the cold storage warehouses have to be of the same standard as for the normal storage occupancies.

Many combustible materials such as grains, sugar, starch, flour, etc, are handled and stored in bulk. These are generally stored in bulk in silos, bins, etc. Such special storage practice are not covered under this standard.

Provisions of this Code are supplementary to the relevant statutory requirements as laid down in Indian Factory Act, Petroleum Rules, Gas Cylinder Rules, etc.

Indian Standard

CODE OF PRACTICE FOR FIRE SAFETY OF INDUSTRIAL BUILDINGS: GENERAL STORAGE AND WAREHOUSING INCLUDING COLD STORAGES

(First Revision)

1 SCOPE

1.1 This code covers the essential requirements of fire safety of all godowns, warehouses and outdoor storage sites forming part of chemical process, industrial transportation and such other complexes and those rented or owned by public and private warehousing bodies or individuals.

1.2 This code also covers the essential requirements of fire safety of cold storage buildings.

NOTE — The provisions of this Code are to be regarded as supplementary to the provisions laid down under Indian Petroleum Rules and Indian Explosive Rules in case of materials to which those rules are applicable.

2 REFERENCES

2.1 The Indian Standards listed in Annex A are necessary adjuncts to this standard.

3 TERMINOLOGY

3.0 For the purpose of this Code the definitions given below shall apply.

3.1 Cold Storage

Refrigerated storage building.

3.2 Hazardous and Extra-Hazardous Goods

Goods which are considered dangerous from fire, explosion and/or toxicity point of view because of their inherent properties and when involved in fires raise special problems of their control and extinguishment.

3.3 Non-hazardous Goods

Goods which neither have any hazardous property nor create any special problems when involved in a fire. No commodity shall be regarded as non-hazardous unless so ruled by the appropriate authority.

3.4 Insulation Boards

Building materials used for thermal insulation of cold storages.

3.5 Separating Walls

Walls built according to specification laid down in IS 1642 : 1989.

3.6 Smoke Vents

Openings, fitted with manually-operated shutters, used for removal of smoke from a fire.

4 LOCATION

4.1 The godowns and warehouses should be so located as to have as far as possible minimum exposure to external fires, adequate water supply for fire fighting purposes and easy access to public fire services.

4.2 Wherever possible, the buildings and open storage sites should be atleast 50 m away from a railway line, siding or yard used by locomotives.

4.3 Buildings within municipal limits of a city or town should not be used for storage of fireworks, gun powders and other explosives, nitrocellulose, vegetable fibres and flammable liquids having flash point less than 65°C without obtaining prior approval from appropriate authority.

5 COMPOUNDS

5.1 Whenever the storage building are located in its own compound the area of the compound should conform to the requirements given in **8.**

5.2 Roadways alongside the godowns should be not less than 5 m wide for manoeuvring of fire engines and the gates of the compound shall be at least 4·5 m wide, and of sufficient headroom to allow unobstructed passage of fire engines.

6 BUILDING CONSTRUCTION

6.1 General Godowns and Warehouses

Godowns used for storage of hazardous and extra-hazardous goods should conform to Type I of the fire resistance grading of buildings specified in IS 1642 : 1989, while those used for storage of non-hazardous goods shall conform to Type II.

6.1.1 *Floor Areas*

6.1.1.1 Single storey storage buildings should be divided by separating walls into compartments not exceeding 750 m^2 in floor area, and neither its length nor breadth should exceed 40 m.

6.1.1.2 Each floor of storeyed storage buildings should be compartmented as per **6.1.1.1**. In case of basement floors, however, maximum permissible compartment area should not exceed 500 m^2. The floors themselves should have a 2-hours fire resistance and an opening therein should be protected to give a fire resistance of equal degree.

6.1.2 All staircases, lift or hoist walls should be of the enclosed type, cut off from the storage compartments by brick walls of at least 20 cm thickness and any openings therein should be protected by fire check doors conforming to IS 3614 (Part 1) : 1966.

6.1.3 *Heights*

6.1.3.1 Buildings used for storage of hazardous and extra-hazardous goods should be preferably of single storeyed structure and in no case should exceed 2 storeys in height.

6.1.3.2 In no case should a storage building exceed 15 m in height.

6.1.3.3 The ceiling heights of individual storeys should be held to a minimum, dictated by both the nature of commodity stored and the material handling system in use. In no case, however, this height should exceed 7·5 m.

6.1.4 *Floor Drainage*

The floors should be of watertight construction and scuppers of not less than 20 cm^2 cross-sectional area should be provided at not more than 6·0 m intervals or as required to take care of maximum water discharge from hydrant/sprinkler system.

6.1.5 *External Drainage*

External drains of not less than 25 cm width and 30 cm depth should be provided along the side of each building and so constructed that any flow of water from the building be directed to a suitable ground tank or reservoir or public drainage system in the vicinity not leading to a natural water source.

No external drainage of warehouses storing hazardous goods should be connected to public drainage system which leads directly to a natural water source.

6.1.6 *Smoke Vents*

Roofs of single storeyed godowns should be fitted with automatic or manually operated smoke vents of approved type. The sizes of the vents, their distribution, etc should be according to relevant Indian Standard.

6.1.7 *Normal Ventilation*

In addition to requirements specified in **6.1.6** arrangements should be provided for adequate normal ventilation of the godowns, which would depend on the size and construction of the buildings and should be according to relevant Indian Standard.

6.1.8 *Means of Exit*

6.1.8.1 Every storage/warehouse building should have a minimum of two exit doorways, and at the rate of one exit doorway per every 30 m length of the external walls of the building.

6.1.8.2 The means of exit as well as the exit ways, travel distances, etc, should be as per the guidelines given in IS 1641 : 1988.

6.1.8.3 No doors or other openings should be allowed in the wells separating any two godowns.

6.2 Cold Storage Buildings

6.2.1 The building used for storage of non-hazardous goods should conform to Type II of IS 1642 : 1989. If used for storage of hazardous goods, it should conform to Type I of IS 1642 : 1989.

6.2.2 The building may be of storeyed construction provided with alternate means of escape. The height of the building should not exceed 15 m.

6.2.3 The floor area of an individual compartment divided by separating walls should not exceed 750 m^2.

6.2.4 The heat insulating materials used should preferably be non-combustible. Cambustible materials, when used for walls or ceilings, should be protected by an approved thermal barrier or by a minimum 15 mm thick coat of cement plaster on metal lath attached to the building framing. For polystyrene materials the barrier may also be either 15 mm gypsum wallboard or 20 mm fire retardant plywood supported by studs attached to the framing. The thermal barrier should extend for a height of atleast 1·5 m above the level of each floor or stage. The boards if laid over floors should also be coated with minimum 15 mm thick cement plaster or covered with a wearing slab of reinforced concrete bonded with cement mortar and laid over bitumen spread evenly over insulating material.

6.2.5 Where installation of automatic sprinklers is a requirement, they should be provided below false ceilings and the voids above the false ceilings should also be similarly protected if the space exceeds 1 m in vertical height, and if less, by provision of fire stops at a distance not exceeding 20 m.

6.2.6 Where high racks are used for storage, in-rack sprinklers designed to reach the spaces between the racks should also be installed in addition to the ceiling mounted ones.

6.2.7 Where automatic sprinklers are not a requirement, a well-designed automatic fire alarm system, conforming to IS 2189 : 1988 should be installed, covering the area above false ceiling as wall.

7 SEPARATING WALLS

7.1 Separating walls should be provided between:

a) a storage godown and a packing godown,

b) a storage godown and a process building,

c) a storage godown and boiler house or where naked flames are used,

d) a non-hazardous storage godown and a harardous or extra-hazardous storage godown, and

e) a hazardous storage godown and an extra-hazardous storage godown.

7.2 Separating walls should also be constructed to form storage compartments not exceeding 750 m^2 floor area.

7.3 Separating walls should be provided between cold storage buildings and their air-conditioning plant and other machine rooms.

8 DISTANCES

8.1 No outdoor storage should be allowed within 15·0 m of a godown or warehouse unless all doorways in the facing sides are protected with either fire-resistant doors or shutters or a drencher system, and all windows or other openings protected with wired glass or a drencher system.

NOTE — Necessity of adhering to these provisions may be waived by the authority in cases where the outdoor storage is of non-combustible materials.

8.2 In no case should any outdoor storage be allowed within 6·0 m of a godown obstructing any access to the building.

8.3 No godown for storing non-hazardous goods should face a godown containing hazardous or extra-hazardous goods unless one of the following conditions are satisfied:

a) The distance between the facing godowns exceeds 15·0 m,

b) One of the facing walls be of separating wall specification and be blanked having no openings whatsoever, and

c) The openings in the facing walls be protected with fire check doors or wired glasses or both, and of approved type and with a drencher system.

8.4 In no case shall the distance between any two facing godowns be less than 12 m.

NOTE — Provisions of 8.3 and 8.4 should not be applicable to individual godowns of a range of godowns, as in this case the godowns do not face each other.

9 STORAGE ARRANGEMENTS

9.1 General

9.1.1 All materials should be handled and stacked with due regard to the materials characteristic.

9.1.2 Materials should be so stacked that:

a) internal spread of fire is minimized,

b) they are easily accessible for fire fighting and salvage operations, and

c) portions of the material which in case of fire may constitute an added hazard may be removed easily.

9.1.3 Neat stacking and good housekeeping should be maintained at all times.

9.1.4 Materials which by reason of their bulk cannot ordinarily be placed in ordinary storage buildings, namely, coal, baled cork, timber logs, grass bamboos and raw or scrap rubber, shall be stored outside.

9.1.5 Materials which are particularly susceptible to water damage should be stored on skids, pallets, elevated platforms or such other devices of at least 20 cm in height.

9.1.6 Racks, shelves and pallets should preferably be of non-combustible construction.

9.1.7 Toxic materials should be stored separately. Fire fighting water from this area which cannot be led to storm water drain without treatment shall be collected separately or led to effluent treatment pond.

9.1.8 A concrete pit on ground shall be made at a finished place to collect all the waste materials like empty packing boxes, used cotton waste, etc.

9.2 Indoor Storage

9.2.1 *Aisles and Passageways*

9.2.1.1 Aisles and passageways should be maintained at reasonable intervals to provide convenient access to all portions of storage.

9.2.1.2 These passageways or aisles should be so spaced that the total content of individual stacks do not exceed 700 m^3. In case of baled fibres or other combustible goods, however, aisles shall be placed as intervals not exceeding 15·0 m.

9.2.1.3 The passageways or aisles should be of sufficient width for the removal or transfer of material and in general shall have a minimum width of 2·0 m.

9.2.1.4 Where mechanical handling appliances are used a minimum width of 2·5 m should be provided.

9.2.1.5 As far as practicable, passageways and aisles should be located opposite doors or window openings in the exterior walls and no goods should be deposited within 2·0 m of any such opening so as not to cause difficulties in the way of effective operation of water jets from hoses connected to hydrant points or from fire engines.

9.2.1.6 Wall aisles, that is, the aisles along side walls should be of sufficient width to permit passage of an employee. In case of storage of baled fibre products and all other water absorbent materials in bales, the width of wall aisles should not be less than 1·0 m.

9.2.2 *Stack Heights*

9.2.2.1 Stack should not be piled so high as to make them unstable under fire fighting conditions and in general they should not be more than 4·50 m in height where no automatic sprinklers are installed. In high-bay storehouses where the stack heights exceed 4·5 m, automatic sprinklers should be provided. In any case, the maximum height of stacks should not exceed 12 m. In no case, however, the clearance of the top of the highest storage level from undersides of the lowest beams, girder or other ceiling projections should be less than 1·0 m. A colour band should be painted on the walls of the godown indicating the maximum height to which materials are to be stacked.

9.2.2.2 In case of having provision for sprinkler, godowns, a clearance of at least 1·0 m should be maintained between highest storage level and the sprinkler head, throughout the godown.

9.3 Outdoor Storage

9.3.1 Wherever possible goods should be stored on raised brick or concrete platforms. In case this is not possible the storage site should be kept free from accumulation of unnecessary combustible materials, weeds and grass shall be kept down and regular system provided for periodic clean up of area.

9.3.2 The storage area should be surrounded by a fence or other suitable means to prevent access of unauthorized person. Adequate number of gates should be provided to such barriers to permit ready access of fire apparatus.

9.3.3 Materials should be stacked in as low and small piles as possible in respect of the particular type of materials stored.

9.3.4 The maximum height of piles should not exceed 10·0 m.

9.3.5 The maximum quantity of material stored in a single pile will depend on the commodity stored. Whenever possible not more than 500 *t* of materials be stored in any single pile.

9.3.6 The piles should be separated by aisle ways, the width of which should equal the height of the higher pile, but not less than 3·0 m.

9.4 Floor Loads

9.4.1 For any building, floor loads as originally designed should not be exceeded.

9.4.2 For water absorbent materials, normal floor loads be reduced to take this into account.

9.5 Segregation Materials

9.5.1 Hazardous and extra-hazardous materials should be segregated from each other as also from other non-hazardous materials.

9.5.2 Materials which may be hazardous in combination should be stored separately in and segregated areas.

9.5.3 Materials which emit large amount of smoke and or toxic gases should be stored in separate well-ventilated godowns.

9.5.4 For the storage of certain materials, for example, fats, waxes, sulphur, resins, bitumen, pitch and rubber which are solids at ordinary temperature but melt easily under heat of fire, precautions should be taken against propagation of fire from point to point and from floor to floor through stairs, lift wells, pipes or ducts. The same precautions should be taken with oils and spirits and flammable liquids in general.

9.5.5 Gas cylinders, which are liable to explode when exposed to a fire should be stored in detached buildings segregated from all other storages by separating walls.

9.5.6 Contaminating commodities, such as poisons, dyes, tanning extracts, gums, and soda ash shall not be stored along with or on floor above food stuff storage.

9.5.7 Fire hazard characteristics of stored materials should be ascertained beforehand. Where complete information is lacking, the materials shall be assumed to be hazardous and segregated accordingly.

NOTE — Specific safety requirements in respect of certain hazardous commodities such as rubber, gas, cylinders, acids, chemicals, flammable liquids, rolled paper, films, etc, are not dealt with here.

10 MACHINERY

10.1 Mechanical handling equipment.

10.1.1 Mobile appliances powered by petrol or diesel or petrol/diesel engines.

10.1.1.1 The fuel tanks of such equipment should be permanently attached to the appliance and so placed or guarded as to minimize risk of mechanical injury.

10.1.1.2 Induction system of all petrol motors/ engines should be provided with flame arrestors.

10.1.1.3 The exhaust system should be provided with spark arrestors and so designed and located in such a way as to prevent discharge of flame and sparks or hot gases on to combustible materials, and contact of any part of the system with such materials.

10.1.1.4 Filling or emptying of fuel tanks should not be done in any warehouse or within 6·0 m of any storage of combustible materials.

10.1.1.5 A master switch should be fitted to disconnect the battery from the electrical system.

10.1.1.6 Every appliance should carry an approved suitable extinguisher like dry powder or Halon 1211 or carbon dioxide type. These shall conform to the relevant Indian Standards.

10.1.2 *Storage Battery Driven Runabout Trucks*

Construction of electrical equipment of this type of vehicles should comply with **9.5** of IS 1646 : 1982.

10.2 Refrigerating Machinery

10.2.1 All the refrigeration equipment should conform to the specifications laid down in IS 660 : 1963 and electric wiring as laid down in IS 659 : 1964 to the extent the same may apply to the cold storage enclosures.

10.2.2 Refrigerant used should be of non-combustible nature.

11 ELECTRICAL INSTALLATIONS

11.1 The installation and maintenance of electrical wiring and equipment should comply with the provisions laid down in IS 1646 : 1982. Additional provisions as given in this Code should also be complied with wherever applicable.

11.1.1 A main switch with indicator lamp shall be provided near the entrance so that total power to warehouse could be cut off, during fire conditions, if required.

11.2 Lighting Wiring

11.2.1 The electrical wiring other than that for portable lamps should be in screwed steel conduits or should be of mineral insulated copper or aluminium sheathed cable with or without PVC serving. In case of cold storages, the wiring should be of mineral insulated copper or aluminium sheathed cables with or without PVC serving.

11.2.2 In case of godowns storing fibrous goods, flammable liquids, nitrocellulose, fireworks or explosives, all switches and control equipment should be located outside the godown. All portable lamps used shall be of 24 V with adequate protection.

11.2.2.1 The electrical wiring in these cases also be installed externally as far as possible, excepting for the stretches required for connection to fittings.

11.2.3 Every lighting fitting should be affixed to the well or roof not more than 45 cm below roof of the godown. In case of sprinklered godowns each light fitting should be either above the level of the sprinkler heads or be not less than 30 cm below that level.

11.2.3.1 All light fittings should have a minimum clearance of 75 cm from highest stacking level.

11.2.4 In case of godowns storing extra hazardous goods, all switches and control equipment should be located outside godowns and shall be of flame proof construction conforming to the relevant statutory rules.

11.2.4.1 All fittings in such situations should be of approved type of flame proof construction.

11.3 Mains-Operated Electrical Stackers

11.3.1 The wirings on the stackers should be enclosed in screwed steel conduits.

11.3.2 Each wall socket should be separately switch controlled and both switch and sockets shall be enclosed in watertight iron case or cases.

11.3.2.1 The plug and socket should be of 3-pin type, the third pin being for earthing purposes. The plug should also be of head shield type, whilst the socket should be provided with screwed brass cover and the plug with a screwed brass ring to render the apparatus watertight whether the plug is inserted or not.

11.3.3 Interlocked plugs and switches may be used provided they comply with **11.3.2**.

11.3.4 The flexible connection to the stacker should be made with tough rubber compound sheathed trailing cable. The sheathing should have some additional mechanical protection, such as hard cord braiding. The trailing cable should contain an earthing core to which all iron cased apparatus on the stacker and its frame should be connected and earthed through plugs.

11.4 Overhead Electrical Travelling Cranes and Runways

11.4.1 Besides complying with **11.4** of IS 1646 : 1982, requirements of **11.4.2** to **11.4.4** of this standard shall also be complied with.

11.4.2 All switchgears and fuses should be completely enclosed in iron cases and an emergency switch provided to isolate the crane during inspection, cleaning and repairs.

11.4.3 The driving motors should be of totally enclosed type.

11.4.4 All wiring in connection with this type of equipment, other than bars, copper collectors or trolley wires should be enclosed in screwed steel conduits.

12 ILLUMINATION

12.1 All godowns should have an illumination of at least 50 lux.

13 FIRE FIGHTING ARRANGEMENTS

13.1 Fire Alarm Service

In automatic fire alarm system conforming to IS 2189 : 1988 should be provided unless the godown be protected with an automatic sprinkler installation. For large open area sites, a well designed manual fire alarm system should be provided.

13.1.1 All fire-fighting appliances should conform to relevant Indian Standard.

13.1.2 As fires in storage premises require large quantities of water for fire fighting, a well-designed water supply system consisting of fire hydrants and static water tanks conforming to IS 9668 : 1980 should be provided for all storage buildings exceeding 750 m^2 area and for outdoor storage areas exceeding 2 000 m^2 area. For smaller premises, especially those located over 8 km from the nearest public or municipal fire station, at least one self-fed static water tank of not less than 125 000 litres capacity should be provided with proper access and hardstanding for heavy fire engines.

13.2 Buckets and portable chemical fire extinguishers conforming to relevant Indian Standards should be provided in suitable locations in the vicinity of these godowns in accordance with the provisions contained in IS 2190 : 1979.

13.3 All godowns, warehouses exceeding 750 m^2 in floor area should be protected with a well designed automatic sprinkler protection.

13.4 Besides the first-aid fire fighting equipment, all fixed fire protection systems installed in the storage buildings/areas should be subjected to periodical inspections and maintenance so as to ensure their proper functioning in case of emergency, if necessary, through a maintenance contract with any approved agency.

13.5 In very large storage installations consisting of several warehouses or godowns especially involve costly or hazardous goods or stores of vital national interest, it may be necessary to provide a full time Fire Brigade with appropriate major fire-fighting equipment with the premises. The details of requirements for this full time fire fighting cover shall be worked out by according to laid works.

13.6 Location of all fighting equipments like hydrant valve, landing valve, hand appliances etc, shall be indicated on the building plot plan and displayed prominently at the entrance of the godowns.

14 GENERAL SAFETY PROVISIONS AND HOUSEKEEPING

14.1 Following notices should be displayed in prominent places:

a) Instruction to the staff

  i) How to call the nearest fire brigade, and

  ii) What to do in case of a fire breaking-out in the premises.

b) Prohibition of smoking except in selected buildings.

14.2 Use of naked flames, welding, cutting and spray painting operations, should not be allowed excepting in detached buildings specifically set apart for those purposes.

14.3 Fuel tanks for mobile material handling appliances should not be filled anywhere excepting separate building for that purpose.

14.4 Road vehicles should not be allowed to stand inside the godowns or in the vicinity of outdoor storage sites with engines running.

14.5 All godowns and compounds should be swept clean everyday and systematic removal of weeds from the compound shall be enforced.

14.6 Every godown should be thoroughly inspected before it is closed. If possible, all such godowns which were opened during the day should be reopened and reinspected one hour after their closure after that they should be finally closed.

14.7 All fire check doors should be kept shut when not needed and after the end of day's work. Vision slits may be provided (with proper security safeguards) in the external doors to enable the security staff on patrolling duty to promptly detect any outbreak of fire within the building.

14.8 Shutters of door and window openings should be made reasonably secure against entry of unauthorized persons.

14.9 Even temporary storage of commodity in the open should not be allowed if such storage obstructs access to godown doors, hydrant points and sprinkler valves.

14.10 In all bulk storage premises, it should be necessary to formulate a fire emergency plan laying out in detail the method of alerting and actions to be taken by different personnel of the premises in case of a fire outbreak, and also the procedure for getting outside assistance.

ANNEX A

(*Clause* 2.1)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*	*IS No.*	*Title*
659 : 1964	Safety code for air conditioning (*revised*)	2189 : 1988	Code of practice for selection, installation and maintenance of automatic fire detection and alarm system (*second revision*)
660 : 1963	Safety code for mechanical refrigeration (*revised*)		
1641 : 1988	Code of practice for safety of buildings (general) : General principles of fire grading and classification (*first revision*)	2190 : 1979	Code of practice for selection, installation and maintenance of portable first-aid fire extinguisher (*second revision*)
1642 : 1989	Code of practice for fire safety of buildings (general) : Details of consturction (*first revision*)	3614 (Part 1) : 1966	Specification for fire check doors: Part 1 Plate, metal covered and rolling type
1646 : 1982	Code of practice for fire safety of buildings (general): Electrical installations (*first revision*)	9668 : 1980	Code of practice for provision and maintenance of water supplies for fire fighting

Standard Mark

The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act, 1986* to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Revision of Indian Standards

Indian Standards are reviewed periodically and revised, when necessary and amendments, if any, are issued from time to time. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition. Comments on this Indian Standard may be sent to BIS giving the following reference:

Doc : No. CED 36 (4535)

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones : 331 01 31, 331 13 75

Telegrams : Manaksanstha
(Common to all Offices)

Regional Offices:	Telephone
Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002	331 01 31 331 13 75
Eastern : 1/14 C. I. T. Scheme VII M, V. I. P. Road, Maniktola, CALCUTTA 700054	37 86 62
Northern : SCO 445-446, Sector 35-C, CHANDIGARH 160036	53 38 43
Southern : C. I. T. Campus, IV Cross Road, MADRAS 600113	41 29 16
Western : Manakalaya, E9 MIDC, Marol, Andheri (East), BOMBAY 400093	6 32 92 95

Branches : AHMADABAD. BANGALORE. BHOPAL. BHUBANESHWAR. COIMBATORE. FARIDABAD. GHAZIABAD. GUWAHATI. HYDERABAD. JAIPUR. KANPUR. PATNA. SRINAGAR. THIRUVANANTHAPURAM.

Printed at Printrade, New Delhi, India