मानकः पथप्रदर्शकः

COMPENDIUM OF INDIAN STANDARDS ON

FIRE SAFETY IN INDUSTRIAL BUILDINGS

Prepared By:

CIVIL ENGINEERING DEPARTMENT

BUREAU OF INDIAN STANDARDS
NEW DELHI

1 PREFACE

The Indian landscape of fire safety standards has undergone significant evolution, yet rapid urbanisation, industrial expansion, and emerging technologies present ongoing challenges. This compendium provides an overview of the current code provisions and standards in India, aimed at enhancing fire protection and safety across various INDUSTRIAL BUILDINGS. This document highlights the strengths of these standards, and a general overview on the standards available under this Sector. The compendium also helps in capacity building and forms a useful tool for regulatory authorities, industry, and safety organisations to bolster fire resilience.

2 INTRODUCTION

2.1 Fire pose a major threat to various occupancies in India. Almost every day some fires are reported by media across the country. These fires not only resulted in the loss of many precious life and injuries to many but also inflicted heavy property loss. During the last two decades there was a vibrant growth in the construction activities in India, especially in commercial infrastructure. The rapid modernisation of Indian Industry have made the scenario more complex. Awareness towards fire safety had not been quite forthcoming. The potential sources which can initiate the fire can be as simple as a fire initiated due to a short circuit in industries or complex fires involving chemicals in a manufacturing set-up. Because of various types and nature of the fire, firefighting activity has become more complex and the salvaging operations become more difficult and sometimes even resulting in many deaths and huge property losses.

2.2 Fire safety is a critical aspect of infrastructure planning and public safety in India, where rapid urbanisation, industrial growth, and increasing high-rise developments contribute to heightened fire risks. Over the years, the Bureau of Indian Standards (BIS) has established numerous standards and codes to address these challenges. Fire safety standards are formulated by BIS under the aegis of Civil Engineering Division Council, namely under the Sectional Committees, Fire Safety Sectional Committee, CED 36. The various BIS standards provide foundational guidelines that define safety protocols, construction norms, fire suppression requirements, and emergency preparedness measures.

3 CURRENT STANDARDS AND CODE PROVISIONS FOR FIRE SAFETY IN INDUSTRIAL BUILDINGS IN INDIA

3.1 India's Industrial fire safety framework is built upon the several Indian Standards and Codes developed by the BIS. These standards collectively define the design, installation, and maintenance requirements for essential fire protection and firefighting equipment for both active and passive fire suppression systems, as well as protocols for life safety. Some key standards that form the foundation of India's fire safety measures in Industrial landscape has been explained in this document below.

3.2 The code provisions and standards in India aim to protect life, property, and the environment by mitigating fire hazards across a diverse range of sectors. However, advancements in technology and new areas of risk, necessitate continuous updates to these standards to ensure their relevance and effectiveness. Depending on the feedback received from stakeholders, new standards are regularly formulated and existing standards are being reviewed periodically and revised/amended/reaffirmed depending on the developments in the field under the Fire Safety Sectional Committee, CED 36.

4 IS 2726:1988 CODE OF PRACTICE FOR FIRE SAFETY OF INDUSTRIAL BUILDINGS: COTTON GINNING AND PRESSING (INCLUDING COTTON SEED DELINTERING) FACTORIES (FIRST REVISION) (REAFFIRMED IN SEP, 2022)

4.1 This Indian Standard lays down requirements for fire safety of industrial buildings involved in cotton ginning, cotton seed delintering and pressing factories.

4.2 Fires occur quite frequently in the gin houses, delintering machines and cotton openers usually installed in press houses due to frictional heat of high speed machines and also sparks from foreign material coming in along with kapas, cotton or cotton seeds. Further, oily and greasy cotton waste and cotton seeds are subject to spontaneous heating. The other causes of fire in this type of factories are bad house-keeping, congestion and faulty electrical equipment. In order to reduce fire losses, besides installation of adequate fire-fighting equipment, it is necessary to plan carefully and layout of buildings and the arrangements for storage of kapas, cotton seeds, waste cotton, if any, and fully pressed bales. This standard has been formulated to cover all these aspects.

4.3 Some potential aspects covered under this standard include choosing the Location of the factory along with layout of the compound, construction details pertaining to fire safety in buildings, illumination details, machinery arrangement along with various Firefighting arrangements etc.

5 IS 3034:1993 FIRE SAFETY OF INDUSTRIAL BUILDINGS: ELECTRICAL GENERATING AND DISTRIBUTING STATIONS — CODE OF PRACTICE (SECOND REVISION) (REAFFIRMED IN JAN, 2022)

5.1 This standard provides guidelines for the fire safety requirements regarding building construction, various process hazards and facilities, storage areas, etc, pertaining to electricity generating stations (where electricity is generated from conventional sources using coal, oil, gas turbines, diesel generator sets, and the distributing stations).

5.2 Importance of fire safety for the electrical generating and distributing stations has been increasingly recognised due to occurrences of several devastating fires in such premises in the recent past. Therefore, considering the fact that any fire in such occupancies may completely disrupt the life of the community, seriously hamper several industries served by them, and also may involve replacement of highly valuable equipment, it is necessary that every attempt should be made to prevent or at least minimize the occurrence of fires in these occupancies. Installation of equipment having built-in safety measures in the premises and judicial suppression or isolation of fire risks will therefore reduce both the frequency of outbreaks of fire as well as contain its spread to other areas. Further, with the adoption of suitable fire safety norms with regard to design, layout and construction of buildings and other structures, choice of materials for construction, etc, the premises can be rendered more safe from fire risk point of view.

5.3 This standard cover provisions in respect of fire protection for turbo-generator buildings, switch gear rooms, cable galleries, flammable oil storage, coal handling plants, transformer yards and such other hazardous areas. All the important fire safety and fire protection requirements for a power plant which should receive attention are given in this standard along with requirements for potential fire hazards during construction of Power Stations. Requirement of major firefighting appliances/equipment and manpower are also covered in this standard.

5.4 This standard does not deal with the fire safety requirements of nuclear power plants and hydro-electric power stations.

6 IS 3058:1990 CODE OF PRACTICE FOR FIRE SAFETY OF INDUSTRIAL BUILDINGS: VISCOSE RAYON YARN AND/OR STAPLE FIBRE PLANTS (FIRST REVISION) (REAFFIRMED IN MAR, 2021)

6.1 This Indian Standard provides guidelines for fire safety in industrial buildings/plants manufacturing viscose rayon yarn or staple fibre or both.

6.2 In the process of rayon yarn or staple fibre manufacturing the greatest hazard lies in the handling of carbon disulphide which is one of the most dangerous of the common flammable liquids because of its low auto-ignition temperature and flash point, wide explosive range and high volatility. The chances of outbreak of fire in a staple fibre plant are also very high in the processes connected with treatment of the staple fibre, that is, processes subsequent to the extrusion of the fibre. The other locations where fires are likely to occur are the polymerization sections, drier rooms, yarn packaging rooms, godowns and open storage areas. Chances of fires in these locations can be considerably reduced or even eliminated if precautions and safety measures mentioned in this Indian Standard are followed.

6.3 Some potential aspects covered under this standard include choosing the Location of the factory along with layout of the compound, construction details pertaining to fire safety in buildings, illumination details, machinery arrangement along with various Firefighting arrangements etc.

7 IS 3079:1990 CODE OF PRACTICE FOR FIRE SAFETY OF INDUSTRIAL BUILDINGS: COTTON TEXTILE MILLS (FIRST REVISION) (REAFFIRMED IN MAR, 2021)

7.1 This standard covers the essential requirements for the fire safety of textile mills using cotton, cotton waste, regenerated cellulose, man-made fibres or any grouping of these as raw materials.

7.2 Fire is fairly frequent in textile mills because textiles fibres are highly combustible. Processes preparatory to spinning have a particularly high fire frequency on account of the presence of fibres in loose form and probability of ignition by rapidly moving machinery. The main causes of fire in textile mills can be attributed to failure of electrical equipment, sparks from foreign matter in cotton stock, friction, faulty bearings, presence of excessive quantity of fly in the departments, use of flammable liquids and presence of high temperatures in the processing sections. This standard has therefore been formulated with a view to providing reliable and adequate guidance with regard to fire safety of cotton textile mills.

7.3 Some potential aspects covered under this standard include choosing the Location of the factory along with layout of the compound, construction details pertaining to fire safety in buildings, illumination details, machinery arrangement along with various Firefighting arrangements etc.

8 IS 3594:2024 FIRE SAFETY OF GENERAL STORAGE AND WAREHOUSING INCLUDING COLD STORAGES — CODE OF PRACTICE (SECOND REVISION)

8.1 This standard covers the essential requirements of fire safety of warehouses and storage

premises. Warehouse accommodation is discussed generally and includes general storage warehouses on manufacturing sites as well as retail warehouses. Also, this standard may help provide an understanding of the hazards associated with material handling operations within a warehouse. This standard also covers the essential requirements of fire safety of cold storages

8.2 Fires in storage and warehouse buildings represent a significant percentage of the total number of fire outbreaks and almost invariably escalate to serious proportions. If fire starts when the storage/warehouse building is closed, it often remains undetected for some time and by then, it assumes serious proportions. The principal causes of outbreak of fire in a storage/warehouse building 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 storage/warehouse building or in buildings communicating with the storage/warehouse buildings, use of naked lights for cooking, faulty electrical installations, storage of different goods which would be hazardous in combination. Cold storage or cold warehouse buildings are used primarily for extended storage of food products at low temperatures which prevent or retard spoilage. Depending on the products or processes, temperature in cold storage is maintained below 4 °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 where access to fire tenders and compliance to byelaws are doubtful. Combustible materials in such warehouses include cork or expanded plastic insulation, wooden dunnage, pallets, boxes, fireboard and paper containers and wrappings, etc

8.3 Some potential aspects covered under this standard include choosing the Location of the factory along with layout of the compound, construction details pertaining to fire safety in buildings, illumination details, machinery arrangement along with various Firefighting arrangements etc. Absolute fire safety is not attainable in practice. The objective of this standard is to specify measures, which shall reduce the damage to life and property to a minimum.

9 IS 3595:2002 CODE OF PRACTICE FOR FIRE SAFETY OF INDUSTRIAL BUILDINGS: COAL PULVERIZERS AND ASSOCIATED EQUIPMENTS (SECOND REVISION) (REAFFIRMED IN SEP, 2022)

9.1 This standard covers the essential fire safety requirements for the storage and handling of coal, working of coal pulverizers and their associated equipment and the buildings housing the equipment in power houses and other industries where pulverized coal fired furnaces are used.

9.2 Coal pulverizers are essentially associated with storage of coal (usually equal to 90-100 days' requirements); pre-treatment of coal. such as removal of scrap ferrous metal and rock/stones and drying; conveyance/transportation of coal to the pulverizer; collection, transportation and storage of pulverized coal; equipment for mixing the pulverized coal with air in correct proportion; and feeding the coal-air mixture in an uninterrupted flow to the fuel burning appliances. Fire/explosion hazard is present throughout these operations, which may endanger the safety of plant and buildings housing the plant and also the plant operators, unless adequate steps are taken to mitigate the hazard. These steps include proper planning in relation to the location of various machines/equipment, constructional and design aspects of the buildings, electrical installation, provision of adequate safety features in the design,

installation and working of the machines/equipment, installation of automatic fire protection devices, fire prevention measures and correct operation of the plant.

9.3 This standard was first formulated to provide guidance of all concerned relating to layout of the coal storage, handling and pulverizing plant, building construction, storage of raw coal, machinery and equipment, electrical equipment and installation, fire spark and temperature sensing devices and alarm system, fire extinguishing equipment/installations, fire prevention measures etc.

10 IS 3836:2000 FIRE SAFETY OF INDUSTRIAL BUILDINGS - JUTE MILLS - CODE OF PRACTICE (SECOND REVISION) (REAFFIRMED IN MAR, 2021)

10.1 This standard covers the essential requirements for the fire safety of jute spinning and weaving and processing mills; jute rope and carpet making factories. The term jute shall be deemed to include flax, hemp, sisal and similar vegetable fibre other than cotton or kapok

10.2 Frequency of the out-breaks of fire in jute mill and jute godowns would be appreciatively minimized if predetermined safety measures are adopted in the construction of mill building, installation of machinery and in the storage godown. This safety code has, therefore, been formulated with a view to given necessary guidance regarding the security measures on fire safety precautions, which if followed would safeguard the mill from fire-hazard to a large extent.

10.3 Some potential aspects covered under this standard include choosing the Location of the factory along with layout of the compound, construction details pertaining to fire safety in buildings, illumination details, machinery arrangement along with various Firefighting arrangements etc.

11 IS 4226:1988 CODE OF PRACTICE FOR FIRE SAFETY OF INDUSTRIAL BUILDINGS: ALUMINIUM (MAGNESIUM POWDER FACTORIES (FIRST REVISION) (REAFFIRMED IN SEP, 2022)

11.1 This standard lays down the essential requirements for fire safety of factories in which powders of aluminium, magnesium and their alloys are manufactured and/or stored.

11.2 The main causes of explosions and fires in production and/or storage of aluminium and magnesium powders are bad housekeeping, congestion, improper electrical equipment, spark from foreign material in the stock, friction and static electricity. In order to prevent and reduce losses due to fires and explosions, it is necessary to plan carefully the layout of the buildings and provide adequate and suitable firefighting equipment.

11.3 Some potential aspects covered under this standard include choosing the Location of the factory along with layout of the compound, construction details pertaining to fire safety in buildings, illumination details, machinery arrangement along with various Firefighting arrangements etc.

12 IS 4886:1991 FIRE SAFETY OF INDUSTRIAL BUILDINGS: TEA FACTORIES - CODE OF PRACTICE (FIRST REVISION) (REAFFIRMED IN MAR, 2021)

12.1 This standard covers the requirements with regard to fire safety aspects of tea factories.

12.2 Fires may occur in buildings involving tea manufacturing operations particularly in withering houses, where preliminary drying of houses either by natural or artificial means is carried out. The fire in such houses becomes difficult to control because of combustible hessian spread on tiers of wooden racks and which results in complete gutting of the sheds. Chances of outbreaks of fire in tea factories will be greatly reduced if predetermined safety measures are adopted in the construction of building, installation of machinery, in storage godowns and by providing adequate firefighting arrangements. Furthermore, tea factories are located in such areas which may not receive ready support for fire extinguishing purposes from public fire service. Provision of adequate water supply and adequate private protection are important aspects that need consideration from fire safety point of view. This safety code has, therefore, been formulated with a view to give necessary guidance with regard to fire

safety aspects of tea-factories which, if followed, would safeguard the factory from fire hazard to a large extent.

12.3 Some potential aspects covered under this standard include choosing the Location of the factory along with layout of the compound, construction details pertaining to fire safety in buildings, illumination details, machinery arrangement along with various Firefighting arrangements etc.

13 IS 6329:2000 CODE OF PRACTICE FOR FIRE SAFETY OF INDUSTRIAL BUILDINGS - SAW MILLS AND WOOD WORKS (FIRST REVISION) (REAFFIRMED IN MAR, 2021)

13.1 This standard covers the fire safety requirements of saw mills, furniture factories, coach and body building works, upholsteries and other wood working workshops, where various kinds of wood working operations are carried out either as a separate trade or as ancillary to any particular industry. This standard also covers fire safety requirements of factories making various varieties of wood products, namely, plywood, hardboards, wood wool, insulation boards, wood flour, etc. This standard shall be applicable in case of factories, where wood working by power is carried out or in which more than 20 persons are employed.

13.2 The premises wherever wood is sawn, cut, machined, ground or otherwise treated are associated with considerable fire hazards. This is not so much on account of processes, but because of the combustible nature of wood and its wastes. In certain types of factories where wood is pulverized or powdered or flammable liquids are used either for painting or polishing purposes or for preservative treatment, the possibility of explosion also exists. As fires occurring in this type of factories more often than not tend to be severe, locating the factory where ample water supply for the firefighting purposes is obtainable is a great necessity.

13.3 The frequency of outbreaks of fire in this class of risk may be reduced by observing proper care in respect of installation and maintenance of electrical machinery, housekeeping and use of apparatus and processes involving open flame and by providing an adequate dust and chip extraction system for wood working machines. In view of the combustible nature of the contents, provision of elaborate fire protection system, namely, sprinkler and hydrant system is a great necessity specially in case of large premises.

13.4 Some potential aspects covered under this standard include choosing the Location of the factory along with layout of the compound, construction details pertaining to fire safety in buildings, ventilation details, exit requirements, machinery arrangement along with various Firefighting arrangements etc.

14 IS 9109:2000 FIRE SAFETY OF INDUSTRIAL BUILDINGS - PAINT AND VARNISH FACTORIES — CODE OF PRACTICE (FIRST REVISION) (REAFFIRMED IN MAR, 2021)

14.1 This standard covers the essential requirements for the fire safety of premises, in which paints and varnishes are manufactured and/or stored.

14.2 Paint and varnish factories present considerable fire risk in most of the processes and storage areas. Presence of dense acid smoke, toxic fumes, explosion hazards, slippery floors, chances of boil over, burning liquids travelling long distances and involving other areas are some of the peculiar features of fires in such industries. The hazards of fire and explosion in factories manufacturing and storing paints and varnishes may be considerably lowered by adoption of certain pre-determined safety measures with regard to proper planning of building, choice of proper materials and components, electrical equipment and making suitable provision for firefighting arrangements, etc. This standard has therefore been formulated to give necessary guidance in this respect.

14.3 This revision incorporates clauses pertaining to process safety provisions, fire protection arrangements and outdoor storage of paint/varnish with flammable liquid base in containers and portable tanks, in addition to provisions of choosing the Location of the factory along with layout of the compound, construction details pertaining to fire safety in buildings, illumination details, ventilation details, machinery arrangement along with various Firefighting arrangements etc.

15 IS 11457 (PART 1) : 1985 CODE OF PRACTICE FOR FIRE SAFETY OF CHEMICAL INDUSTRIES: PART 1 RUBBER AND PLASTIC (REAFFIRMED IN MAR, 2021)

15.1 This standard (Part 1) covers the essential requirements for the fire safety of chemical industries covering Rubber Processing Compounding and Rubber Derivalities alongwith Resin Manufacturing, Condensation, Polymerisation, etc.

15.2 The hazards of fire and explosion in chemical industries can be considerably lowered by adoption of certain predetermined fire-safety measures with regard to proper planning of buildings, choice of proper materials and components, electrical equipment, good storage practice and making suitable provisions for fire detections and suppression. This standard has, therefore, been formulated to give necessary guidance in this respect to the rubber and plastic industries.

15.3 Some potential aspects covered under this standard include choosing the Location of the factory along with layout of the compound, construction details pertaining to fire safety in buildings, storage details, processing arrangement along with various Firefighting arrangements etc.

16 IS 13045:1991 CODE OF PRACTICE FOR FIRE SAFETY OF INDUSTRIAL BUILDINGS: FLOUR MILLS (REAFFIRMED IN MAR, 2021)

16.1 This standard lays down minimum essential requirements for fire safety of flour mills including the godowns for storage of granary and finished products.

16.2 Fires occur frequently in the flour mills due to frictional heat generated in the rollers and

also sparks from foreign material coming in along with grains. The other causes and spread of fires in this type of factories are bad housekeeping, congestion, faulty electrical equipment, height of the building and use of combustible materials in the construction of buildings including the conveying arrangement. In order to reduce fire losses, besides installation of adequate firefighting equipment, it is necessary to plan carefully the layout of the building, provision of external stair cases and the arrangements for storage of grains and finished products. This standard has been formulated to cover these aspects.

16.3 Some potential aspects covered under this standard include choosing the Location of the factory along with layout of the compound, construction details pertaining to fire safety in buildings, Godown details, machinery arrangement along with various Firefighting arrangements etc.

17 IS 13694:1993 CODE OF PRACTICE FOR FIRE SAFETY IN IRON AND STEEL INDUSTRIES (REAFFIRMED IN SEP, 2022)

17.1 This code covers the fire safety and fire protection measures of iron and steel industries required after construction of structures. This code does not cover fire safety aspects, of iron and steel industry in detail but will generally cover the major hazards and the procedures to be followed.

17.2 Fire in the iron and steel industries will jeopardise the lives of the workers and the equipment and destroy the total or partial equipment, which will represent a national wealth. Consequential loss due to iron and steel industry fire may not be assessed in terms of money. The losses are irreparable. Since the development of new iron and steel industries takes several years, the protection taken to safeguard the industry play a vital role and be done in the planning stages of the industry and in the operating stage of the existing industry. It is of utmost importance that due emphasis should be laid, at the planning stage, to analyse the fire hazard and vulnerabilities embodied in the various producing units of the iron and steel industry and its operations, when it is ongoing, and to plan and implement suitable measures

for mitigating the hazards and vulnerabilities. While full compliance with the acceptable building and fire safety codes may ensure a reasonable level of public safety in the existing construction, it should be realised that reliance upon the codes may not provide adequate protection for high value equipment and other associated instruments and adequate measures as needed be assured.

17.3 Some potential aspects covered under this standard include the requirements for blast furnace, melting shop, coke oven, reheating furnace, hot mill and various others fire detection and alarm systems and extinguishing systems etc.

18 IS 13716:1993 CODE OF PRACTICE FOR FIRE SAFETY OF HOTELS (REAFFIRMED IN SEP, 2022)

18.1 This standard covers the fire safety requirements in hotel buildings.

18.2 Fire losses in terms of life and property in hotel fires all over the world have highlighted the need for guidance on fire safety in hotel industry. Life hazard in hotel industry depends mainly on the guests being ignorant of the layout of the floor and numerous paths of fire and smoke spread inherent in~ the building design. Property loss is due to use of variety of combustible building materials, furniture, decorations. combined with high energy use. Absolute fire safety is not attainable in practice. The objective of this standard is to specify

measures, which shall reduce the damage to life and property to a minimum.

18.3 Some potential aspects covered under this standard include management responsibility, containment of smoke/fire, means of egress, emergency power sijpply and lighting, fire safety/lighting equipment, etc.

19 IS 14435:2013 FIRE SAFETY IN EDUCATIONAL INSTITUTIONS - CODE OF PRACTICE (FIRST REVISION) (REAFFIRMED IN SEP, 2023)

19.1 This standard covers fire safety requirements in educational institutions.

19.2 Functional need of educational building is different from other buildings. It therefore requires specific fire safety measures suited to such type of building. The Committee therefore decided to formulate a separate standard on fire safety requirements of school buildings. The hazards of fire in educational buildings can be considerably lowered by adoption of certain pre-determined fire safety measures with regard to proper planning of buildings, choice of proper materials and components, electrical equipment and making suitable provisions for fire detection and suppression system.

19.3 Some potential aspects covered under this standard include types of construction, occupant load, arrangement of exit, corridors and passage ways, doorways, staircase, restriction of spread of fire and smoke, electrical equipment and safety rules, fire safety measures, emergency and escape lighting, etc.

20 IS 14689:1999 CODE OF PRACTICE FOR FIRE SAFETY IN INDUSTRIAL BUILDINGS (PRINTING AND PUBLISHING INDUSTRY) (REAFFIRMED IN JAN, 2020)

20.1 This standard lays down the essential requirements for the fire safety of the printing and publishing industry.

20.2 The buildings housing these industries are prone to fire hazards due to the materials in these industries. Different materials used and operations involved pose fire risks due to different reasons. Thus electrically operated machines may cause fires due to sparking, overloading and short-circuiting, while letterpress operation produces ink mist which adheres to walls, ceilings and being a flammable substance, poses a risk of fire. Also, many volatile substances having low flash points are used in different operations such as offsetting, wetting, etc. All raw materials such as paper, ink, solvents and thinners are highly flammable materials. Considering the high fire proneness of printing and publishing industries and their ubiquitous presence in all sorts of buildings alongside other activities makes it very important that utmost preventive as well as protective fire safety measures are provided for such buildings, housing these industries. This standard has been prepared with a view to give guidance for providing adequate safety against fire hazards in buildings, housing printing and publishing industries.

20.3 For the purpose of this standard, the buildings housing these industries should be classified as group g (moderate hazard occupancy) in accordance with is 1641. Some potential aspects covered under this standard include sources of fire hazards, fire safety measures, etc.

21 IS 14850:2000 FIRE SAFETY OF MUSEUMS — CODE OF PRACTICE (REAFFIRMED IN MAR, 2021)

21.1 This standard covers the fire safety and fire protection measures of museums.

21.2 Museums are Institutions in which objects of work or art, historic?] artifacts or scientific specimens are collected, preserved, studied and exhibited. Because of their nature, they are especially vulnerable to damage by heat, fire, smoke and water. The purpose of this standard is therefore to give guidance for tire safety and prevention to the trustees of museums, and government body of Museum, who are responsible for museum collections and for the safety of the persons who visit the museum or work in them.

21.3 This standard, therefore lays down guidelines how to design fire safety measures in a new buildings and how to improve these factors in existing museums also which had come up much earlier. Possibly many of the safety factors have been overlooked while designing these buildings. This standard gives social attention to time and place in museum which increase the danger of fire and recommends measures in which the management can prevent fires or reduce fire loss.

21.4 Some potential aspects covered under this standard include protection against external exposure, type of construction, air conditioning and false ceiling, compartmentation, basement area, hazardous areas, lighting system, exit ways locked, fire protection and firefighting, etc.

22 IS 15394:2003 FIRE SAFETY IN PETROLEUM REFINERIES AND FERTILIZER PLANTS — CODE OF PRACTICE (REAFFIRMED IN SEP, 2023)

22.1 This standard covers the requirements with regard to fire safety aspects of petrochemical plants, refineries and fertilizer plants.

22.2 Despite the ever growing literature on prevention of fire and explosion hazards in petrochemicals, refineries and fertilizer plants, the occasional accident of tire or explosion is almost inevitable because there is inherent hazardous nature of the process itself. However, to prevent and reduce losses and injuries to human lives and property losses from fire and explosion emphasis are to be given on safe design and adequate tire protection measures. This safety code has, therefore, been formulated to give necessary guidance with regard to fire safety aspects of petrochemicals, refineries and fertilizer plants. Implementation of this Code would reduce the fire and explosion hazards of these plants and their associated tank farms utilities and other properties to a considerable extent.

22.3 Some potential aspects covered under this standard include plant layout, pipe racks, tankage, control rooms, blast resistant construction, pump and compressor house, utility buildings, storage tank, electrical equipment, fire protection arrangements, etc.

****