IS 13045 : 1991
(Reaffirmed 1996)

भारतीय मानक

औद्योगिक इमारतों की अग्नि-सुरक्षा की रीति संहिता : आटे की चक्कियाँ

Indian Standard

CODE OF PRACTICE FOR FIRE SAFETY OF INDUSTRIAL BUILDINGS : FLOUR MILLS

UDC 699·81 : 725·42 : 664·71

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

March 1991

Price Group 2

FOREWORD

This Indian Standard 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.

Fires occur frequently in the flour mills due to frictional heat generated in the rollers and also sparks from foreign material coming in alongwith grains. The other causes and spread of fires in this type of factories are bad house keeping, 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 fire fighting 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.

Provisions of this Code are supplimentary 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 : FLOUR MILLS

1 SCOPE

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

2 REFERENCES

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

3 LOCATION

3.1 The factories should be located in their own compound and preferably in MOFUSSIL districts or outside the limits of municipal areas in close proximity to *pucca* metalled roadways leading to towns so that the town's fire brigade can come to assistance, should a serious fire occur.

3.2 If factories are located near each other a minimum clear distance of 90 m should be maintained between factory buildings.

3.3 Factories should be located at least 300 m away from railway sidings, yards and high tension electrical lines.

4 COMPOUNDS

4.1 The compound surrounding the factories should be of sufficient area to accommodate the mills block, godowns and open storages (if any).

4.2 Areas where goods are to be stored in the open should be raised at least 25 cm above the general ground level.

4.3 The mills compound should be connected to the main road by a *pucca* metalled road for easy and free accessibility of fire tenders at the time of need.

4.4 For big flour mills with railway siding inside only diesel/electric locomotives are recommended. For coal engines to be used inside the mill spark arrestor must be fitted.

5 BUILDING CONSTRUCTION

5.1 The mills building where cleaning, roller milling, scouring, brushing, separating, sifting and riddling of grains are carried out and godown for graind, flour, bread stuff, etc, should be of type I construction (*see* IS 1642 : 1989).

5.2 Openings to rope races, motor alley ways, staircases and/or hoists may be deemed sufficiently protected if fitted with double or single fire check doors, as the case may be, of same rating.

5.3 Stores godowns, engine room, boiler house, transformer house building and fire pump house should be of Type I construction (*see* IS 1642 : 1989).

5.4 There should be at least two door openings to the outside in every working block and the location should be such that at least one staircase is approachable when any section of the working block is on fire.

5.5 Separating walls should be constructed between the mills block and the block where scouring, brushing and cleaning of grains are carried out.

5.6 Engine houses, boiler houses, motor rooms, substations, fire pump room and rope races should have similar separating walls if they adjoin the mills block and wheat cleaning block.

5.7 Buildings used for storage of grains, flour, bread stuff and hazardous goods should be separated from the mills and/or wheat cleaning premises at least by a separating wall.

5.8 Horizontal surfaces should be kept to a minimum to reduce accumulation of dust. Inaccessible horizontal surface, however, should be made inclined as steeply as possible for adequate cleaning. All surfaces, both horizontal and flat shall be made smooth to facilitate cleaning.

6 DISTANCES

6.1 A minimum distance of 6 m should be maintained between any two buildings or between a building and storage in the open or between two different kinds of storage in the open in the factory.

6.2 No oily or greasy waste should be deposited in open in the compound.

7 EXIT REQUIREMENTS

7.1 In every buildings, exists and fire escapes should comply with the requirements stipulated in IS 1644 : 1988.

7.2 Exits to the access staircases should always be kept open during working hours, During non-working hours, the exits may be locked from the staircase side only.

7.3 The landing of the exit staircases should not be less than 1·5 m × 1·5 m. The hydrant posts

of the wet riser system should be located at the staircase landings at each floor level (*see* IS 3844 : 1989).

7.4 The doorway leading to the exit staircases should not be less than 100 cm in width and 200 cm in height.

8 GODOWNS

8.1 General

8.1.1 Stacking height in the godowns should not exceed 4 m or up to a level which is not less than one metre below the roof or ceiling whichever is less. A colour band, about 15 cm wide should be painted on the inside of walls at this height to serve as a guide to the workers when stocking.

8.1.2 Passage ways should be provided between stocks of goods. These passage ways should be not less than 2 m wide and at not more than 10 m apart. The passage ways should be always kept clear by night fall.

8.1.3 Machineries for separating, sifting or riddling grains or flour dressing should not be carried out in granary godown.

8.1.4 A minimum clear distance of 100 cm should be maintained between the stocks of goods and the godown walls.

8.2 The floor levels of godowns should be at least 0·75 m above the surrounding ground level and the floor should be made sloping towards the door sills. A slope of 1 in 100 is considered adequate.

8.3 Doors and Windows

8.3.1 Door should not exceed 6·25 m^2 in area and should be close-fitting. All doors should be protected against damage by lorries, trucks and falling goods. There should be no other external windows or openings except ventilators and fireman's windows. Ventilators should be located at a height of not less than 3 m from ground level and same be protected by 6 mm thick wired glass in steel frames. Fireman's windows which are meant for exclusive use in a emergency should be of 6 mm thick wired glass in steel framework and normally kept locked. They should be placed at a height convenient for fire fighting operations and not more than 15 m apart and 7 m from a blind corner.

8.4 Roofs

8.4.1 Roofs should be directly supported from wall to wall without any intermediate columns or posts. If the roofsafe covered with corrugated iron sheets, it is necessary to insert corrugated asbestos sheets at intervals of 6 m along the lower edge of the roof for fire fighting purposes. It is advisable to use non-flammable paint to paint the underside of roofs of corrugated iron sheets.

8.5 Ventilation

8.5.1 Ventilator openings should be provided in corrugated iron sheet roofs. The ventilator openings should not exceed 1·2 m × 0·3 m and at least one ventilator openings should be provided in every other day. All ventilator openings should be protected either by expanded metal or by wire netting having apertures of 12·5 mm size. Individual ducts of ventilation air will be provided with fire smoke damper stop supply for air in case of fire. For mechanical venting a reference to IS 941 : 1985 may be made.

9 MACHINERY

9.1 All machinery and line shafts should be fitted with ball or roller bearings.

9.2 Machinery should be so installed, arranged and worked as to prevent, as far as is practicable, the access or accumulation of dust to moving parts or the machinery not intended to receive dust.

9.3 In case of any replacement of a bearing or shaft, the machinery should be run empty for two hours and the bearings tested for overheating before any material is passed through them.

9.4 Pneumatic conveyor system and metallic ducting should be used.

9.5 No heating or other process of drying except by steam be carried on the mill or in any building communicating therewith.

9.6 No stive, dust or exhaust room be contained within the mill and that no apparatus for collecting stive or dust from machineries other than rollers, purifiers and/or centrifugals be used except automatic cyclone dust collectors and/or whirl dust collectors strongly constructed of metal.

10 ELECTRICAL INSTALLATION

10.1 The electrical installation in general should be in accordance with IS 1646 : 1982.

10.2 All wiring should be carried out in steel conduits (*see* IS 1653 : 1972) or in rigid non-metallic conduit [*see* IS 9537 (Part 3) : 1973].

10.3 All lighting fittings should be of dust tight type.

10.4 No artificial light except electric light be used in the premises.

10.5 Switchgear installed in the mill house should be of dust tight type.

11 ILLUMINATION

11.1 For effective fire fighting purposes, the mill should be fully illuminated as indicated

below:

Sl No.	*Industrial building/ Processes (Occupancy)*	*Minimum Illumination (in Lux)*	*Limiting Glare Index*
i)	Roller purifier, silks and packing floors	150	25
ii)	Wetting tables	300	25
iii)	Godowns, loading bays, packing and despatch	150	25
iv)	Open compounds	50	—

11.2 Emergency lighting provision should be provided to take care of failure of normal power supply.

12 FIRE FIGHTING ARRANGEMENTS

12.1 Flour mill should be provided with first-aid fire fighting equipments according to IS 2190 : 1979. The internal hydrant system should be according to IS 3844 : 1989 and external hydrant system should be according to IS 13039 : 1991.

12.2 The first-aid fire fighting equipments should be placed as near as possible to the fire prone area like electric motor, switchboard, starters, etc, or exits or staircase landings provided it does not obstruct the passage and should be so distributed over the entire floor area that a person has to travel not more than 15 m to reach the nearest equipment.

12.3 The flour mill should be equipped with a warning system for fire so that the warning is clearly audible throughout the factory and the compound. The appliance for giving such warning of the means of operating the same shall be located in a conspicuous position and shall be painted red (*see* IS 5 : 1978 colour No. 536).

13 HOUSEKEEPING

13.1 All sweeping from the mill premises should be removed before nightfall and rope alloys should be cleaned once in a day. All machinery, walls, floors, platforms and other parts of the buildings shall be cleaned at least once a week. This may be done in a way without disturbing the dust accumulation so that no dust cloud is formed. In case of use of air blowers or vacuum cleaners for such cleaning all electric motors, switchgears, etc, shall be shut down before operating the cleaning machines.

13.1.1 Any tools/cutting gears, etc, used inside the mill area shall be non-ferrous type.

13.2 All building, machinery, electrical wiring and equipment should be carefully maintained in sound condition at all times.

13.3 Open fires, naked lights and smoking in the factory compound should be prohibited. Provision of separate smoking room may be made.

13.4 Every boiler chimney in a factory compound should be fitted with an efficient spark arrestor which should be properly maintained.

13.5 Fire safety requirements and contingency plans should be prominently displayed at conspicuous places in the factory.

13.6 No oily or greasy waste should be deposited in open in the compound.

14 FLOUR BINS AND HOPPERS

14.1 Flour bins and hoppers used inside the mill shall be non-combustible or of fire resistive material.

14.2 There shall be no opening between adjacent bins or hoppers containing dust or dust producing materials.

ANNEX A

(*Clause* 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*	*IS No.*	*Title*
5 : 1978	Colours for ready mixed paints and enamels (*third revision*)	1653 : 1972	Rigid steel conduits for electrical wiring (*second revision*)
941 : 1985	Blower and exhauster for fire fighting (*second 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): Materials and details of construction (*first revision*)	9537 (Part 3) : 1983	Conduits for electrical installations: Part 3 Rigid plain conduits of insulating materials
1644 : 1988	Code of practice for fire safety of buildings (general): Personal hazard	3844 : 1989	Code of practice for installation of internal fire hydrants in multistorey buildings
1646 : 1982	Code of practice for fire safety of buildings (general): Electrical installation (*first revision*)	13039 : 1991	Code of practice for provision and maintenance of external hydrant system.

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 (4507)

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. THIRUVANANTHAPURAM.

Printed at Swatantra Bharat Press, Delhi, India