IS : 2726 - 1988
(Reaffirmed 1998)

Indian Standard

CODE OF PRACTICE FOR FIRE SAFETY OF INDUSTRIAL BUILDINGS: COTTON GINNING AND PRESSING (INCLUDING COTTON SEED DELINTERING) FACTORIES

(First Revision)

UDC 699·81 : 725·42 : 677·05 1·152

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

Gr 2 *August* 1988

Indian Standard

CODE OF PRACTICE FOR FIRE SAFETY OF INDUSTRIAL BUILDINGS: COTTON GINNING AND PRESSING (INCLUDING COTTON SEED DELINTERING) FACTORIES

(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards on 29 February 1988, after the draft finalized by the Fire Safety Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 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. This standard was first published in 1964. Based on the recommendations of Tariff Advisory Committee on the basis of experience gained by them in the past 24 years, this revision has been prepared.

0.3 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Rules for rounding off numerical values (*revised*).

1. SCOPE

1.1 This standard lays down the essential requirements for fire safety of cotton ginning, cotton seed delintering and pressing factories

2. TERMINOLOGY

2.0 For the purpose of this standard, the definitions of the following terms shall apply.

2.1 Kapas — Cotton with seed, that is, unginned cotton.

2.2 Cotton — Ginned *kapas* or *kapas* from which seeds have been removed.

2.3 Linters — Fibres removed from cotton seeds which are separated from *kapas* during the process of ginning.

2.4 Waste Cotton — Ginned or unginned cotton containing impurities like dust, oil, grease, etc.

2.5 Gin House — Place where seeds from *kapas* are removed by means of mechanical or electrical power.

2.6 Press House — Place where ginned cotton or linters are hydraulically pressed into fully pressed bales by means of mechanical or electrical power.

2.7 Cotton Opener — A machine designed to open-up and clean ginned cotton by the combing action of spiked or knifed beaters, the cotton to the opener being conveyed by an endless lattice.

2.8 Fully Pressed Bales (FP Bales) — Iron-bound bales hydraulically pressed by mechanical or electric power to a density of 560 kg/m^3.

2.9 Gin—A machine used for separating cotton from its seeds.

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 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 the factory compounds.

3.3 Factories should be at least 275 m away from railway sidings, yards and 30 m away from high tension electrical lines.

4. COMPOUND

4.1 The compound surrounding the factories should be of sufficient area to store all the incoming *kapas*. The area should necessarily correlate to capacity of the plants but at least two hectares are necessary when one hundred bales or an equivalent amount of *kapas* is ginned, delintered or pressed in a day in the factory. The area of the compound should be increased if the pressing capacity of the plant is more.

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

5. BUILDING CONSTRUCTION

5.1 All buildings where *kapas* is cleaned, ginned and pressed, shall be of at least Type II construction (*see* IS : 1642-1988)*.

5.2 Godowns for cotton seeds, *kapas*, ginned cotton, linters, pressed bales should be of at least Type I Construction (*see* IS : 1642-1988*).

5.3 Store godowns, engine or transformer house buildings should be of at least Type II construction (*see* IS : 1642-1988*).

5.4 There shall be at least three door openings in every working block.

6. SEPARATING WALLS

6.1 Separating walls should be constructed between fully pressed bales godowns, *kapas* godowns seed godowns, ginned cotton godowns and stores, and between gin or press houses and delintering section.

6.2 Engine houses or motor rooms and boiler houses should have similar separating walls if they adjoin the ginning, delintering and pressing sections.

7. DISTANCES

7.1 A minimum distance of 15 m should be maintained between any two buildings or between a building and storage in the open or between two different kinds of storages in the open except as specified in **7.2** to **7.5**.

7.2 *Kapas* and ginned cotton should be stored at least 30 m away from the factories and the godowns. In case pneumatic conveyors are provided in the gin house, a limited quantity of *kapas* may be stored near the gin house to feed the conveyors but in no case, the storage shall be within 6 m of the gin house.

7.3 Heaps of *kapas* or cotton or linters in boras in the compound should not exceed 10 000 kg and their height should not exceed 2 m. A minimum distance of 6 m should be maintained between any two such heaps.

7.4 Fully pressed bales should be stored at least 30 m away from the press house, gin house, or from cotton or *kapas* stored in the open.

7.5 Residences and offices should be at least 50 m away from the nearest storage of *kapas* or ginned cotton or cotton bales and the ginning and pressing houses.

7.6 No bay fodder, grass, *bhoosa* (chaff) or other similar stocks should be stored within 90 m of any factory building, godown or storage area.

7.7 No lighting by mineral or vegetable oil should be allowed in the premises within 60 m of cotton storage areas.

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

7.9 No loose cotton should be stored in open within 30 m of stocks of *kapas* or fully pressed bales of cotton.

8. GODOWNS

8.1 General

8.1.1 Godowns should not be used for mixed storage of *kapas*, cotton, cotton seeds, linters, fully pressed bales and cotton waste.

8.1.2 No godown should have a storage capacity of more than 2 000 fully pressed cotton bales or ginned or unginned cotton or linters equivalent to 500 fully pressed bales. Stacking height in the fully pressed cotton godowns should not exceed 4 m (a height of about 8 bales) 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 stacking.

8.1.3 Passages should be provided beween stacks of bales and goods. These passages should not be less than 2 m wide and not more than 10 m apart. The passage should always be kept clear of bales by night fall.

8.1.4 A minimum clear distance of 60 cm should be maintained between stacks of fully pressed bales and the godown walls.

8.1.5 Packing materials and engineering goods including oils and lubricants should be stored in the store godown.

8.2 The floor levels of godowns should at least be 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 — Door should not exceed 6·25 m in area and should be close-fitting. All doors should be protected against damage by lorries, trucks and falling bales. There

*Code of practice for fire safety, of buildings (general): Details of construction (*first revision*).

should be no other external windows or openings except ventilators and windows. Ventilators should be located at a height of not less than 3 m from the ground level and same should be protected by 6 mm thick wired glass in steel frames. Windows which are meant for exclusive use of firemen in an 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 — Roofs should be directly supported from wall to wall without any intermediate columns or posts. If the roofs are 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 to facilitate entry through the roof for fire fighting purposes. It is advisable to leave the undersides of roofs of corrugated iron sheets unpainted but if they are painted, non-flammable paint should be used.

8.5 Ventilation — It is necessary to provide ventilator openings in corrugated iron sheet roofs. The ventilator openings should not exceed 1·2 × 0·3 m and at least one ventilator should be provided in every other bay. All ventilators should be protected by either expanded metal or wire netting having apertures of 12·5 mm size.

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 of *kapas*, cotton or cotton seeds to moving parts or the machinery not intended to receive *kapas*, cotton or cotton seeds.

9.3 Immediately before any material is introduced into any machinery for the first time in any ginning season, all the machinery should be run for at least four hours and during and at the end of this running, all bearings should be tested for over-heating.

9.4 In case of any replacement of a bearing or shaft during the season, the machinery should be run empty for two hours and the bearings tested for over-heating before any material is passed through them.

9.5 Gins should be equipped with efficient and practicable stripping arrangements.

10. ELECTRICAL INSTALLATION

10.1 The electrical installation shall be in accordance with IS : 1646-1982*.

*Code of practice for fire safety of building (general): Electrical installations.

10.1.1 All wiring shall be carried out in steel conduits (*see* IS : 1653-1972*).

10.1.2 All lighting fittings shall be of dust-tight type.

10.1.3 All electrical motors shall be of totally enclosed type (*see* IS : 1646-1982†).

10.1.4 Switchgear installed in gin house, press house, delintering rooms and godowns should be of dust-tight type.

11. ILLUMINATION

11.1 For effective fire fighting purposes, the factory shall be fully illuminated as indicated below:

	Minimum Illumination
Godowns	50 lux
Ginning, delintering and pressing sections	100 lux
Open compound	20 lux

12. FIRE FIGHTING ARRANGEMENTS

12.1 All fire fighting arrangements should be in accordance with the following.

12.1.1 The hydrant pump should be of not less than 1 800 litres per minute capacity, delivering water at a minimum pressure of 7 kgf/cm² and located at least 15 m away from all the buildings and 90 m away from any storage area.

12.1.2 Pump should draw water from a puccalined ground reservoir of not less than 180 000 litres capacity.

12.1.3 All underground hydrant mains and hydrant branches should be not less than 100 mm and 80 mm in diameter, respectively. Large size mains should be provided in case of factories which are larger than average or which have ginning seasons above normal. The mains should be so designed that a minimum pressure of 7 kgf/cm² is available at the hydraulically most remote point whilst considering full flow in the mains.

12.1.4 Hydrants should be distributed in the compound in such a way that every portion of a storage area is protected by at least two hydrants at a distance not exceeding 35 m and at least two hydrants exist within 15 m of godowns or sheds used for the storage of cotton or *kapas*. There should also be at least three hydrants within 3 m of pressing, ginning or delintering houses.

*Specification for rigid steel conduits for electrical wiring (*second revision*).

†Code of practice for fire safety of buildings (general): Electrical installations.

12.1.5 One fire bucket (*see* IS : 2546-1974*) should be provided for every two gins in the case of gin houses and for every 45 m^2 area in the case of press houses and delintering rooms. One fire extinguisher of dry powder type 10 kg capacity (*see* IS : 2171-1985†) should be provided for every 275 m^2 in both the gin and the press houses and in no case, should two extinguishers be spaced more than 15 m apart.

12.1.6 At least 2 hoses of 63·5 mm dia and 15 m length conforming to IS : 4927-1968‡ and one nozzle of 19 mm size should be provided for each hydrant installed. Half the nozzles should preferably be fog nozzles.

12.2 Each cotton ginning and pressing factory should be equipped with a warning system for fire so that the warning is clearly audible throughout the factory and the compound. The appliance or appliances for giving such warning or the means of operating the same should be located in a conspicuous position and shall be painted fire-red (*see* shade No. 536 specified in IS : 5-1978§).

*Specification for galvanized mild steel fire bucket (*first revision*).

†Specification for portable fire extinguishers, dry powder type (*third revision*).

‡Specification for unlined flax canvas hose for fire fighting.

§ Colours for ready mixed paints and enamels (*third evision*).

13. HOUSE KEEPING

13.1 All sweepings from gin houses, delintering rooms and press houses should be removed before nightfall and seed alleys in the gin houses and delintering rooms should be cleaned after every four hours of working All machinery, walls, floors, roof structures, platforms, and other parts of the buildings should be cleaned at least once a week

13.2 All buildings, 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.

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

13.5 Care should be taken to ensure that cotton, linters and cotton seeds do not fall on floor during processing, and suitable arrangements should be made for the immediate removal thereof, should this happen.

13.6 Self-closing waste bins should be provided where needed near machinery and all oily and greasy waste should be kept in them until removed from the factory premises.

13.7 Fire safety requirements and orders should be prominently displayed at conspicuous places in the factory.

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002

Telephones: 3310131, 3311375 — Telegrams : Manaksanstha (Common to all offices)

Regional Offices:	**Telephone**
Central: Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002	3310131, 3311375
*Eastern: 1/14 C.I.T. Scheme VII M, V.I.P. Road, Maniktola, CALCUTTA 700054	362499
Northern: SCO 445-446, Sector 35-C, CHANDIGARH 160036	21843, 31641
Southern: C.I.T. Campus, MADRAS 600113	412442, 412519, 412916
†Western: Manakalaya, E9 MIDC, Marol, Andheri (East), BOMBAY 400093	6329295
Branch Offices:	
'Pushpak' Nurmohamed Shaikh Marg, Khanpur, AHMADABAD 380001	26348, 26349
Peenya Industrial Area, 1st Stage, Bangalore-Tumkur Road, BANGALORE 560058	384955, 384956
Gangotri Complex, 5th Floor, Bhadbhada Road, T.T. Nagar, BHOPAL 462003	66716
Plot No. 82/83, Lewis Road, BHUBANESHWAR 751002	53627
53/5 Ward No. 29, R.G. Barua Road, 5th By-lane, GUWAHATI 781003	—
5-8-56C L. N. Gupta Marg (Nampally Station Road), HYDERABAD 500001	231083
R14 Yudhister Marg, C Scheme, JAIPUR 302005	63471, 69832
117/418 B Sarvodaya Nagar, KANPUR 208005	216876, 218292
Patliputra Industrial Estate, PATNA 800013	62305
T.C. No. 14/1421, University P.O. Palayam, TRIVANDRUM 695035	62104, 62117
Inspection Offices (With Sale Point):	
Pushpanjali, First Floor, 205A West High Court Road, Shankar Nagar Square, NAGPUR 440010	25171
Institution of Engineers (India) Building, 1332 Shivaji Nagar, PUNE 411005	52435

*Sales Office in Calcutta is at 5 Chowringhee Approach, P. O. Princep Street, Calcutta 700072 — 276800

†Sales Office in Bombay is at Novelty Chambers, Grant Road, Bombay 400097 — 896528

Printed at Saini Printers, Delhi, India