भारतीय मानक

औद्योगिक भवनों में अग्नि सुरक्षा की रीति संहिता — लकड़ी के कार्य व आरा मिलें

(पहला पुनरीक्षण)

Indian Standard

CODE OF PRACTICE FOR FIRE SAFETY OF INDUSTRIAL BUILDINGS — SAW MILLS AND WOOD WORKS

(First Revision)

ICS 91.040.20; 13.220.20

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

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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.

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 fire fighting purposes is obtainable is a great necessity.

The Committee felt that the risk of fire in organized well-engineered industries like plywood, hardboard and chipboard is comparatively less than in saw mills and wood works.

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.

This Code of practice represents a standard of good practice and, therefore, takes the form of recommendations.

In the formulation of this code due weightage has been given to international co-ordination among the standards and practices prevailing in different countries in addition to relating it to the practices in the field in this country.

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 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

CODE OF PRACTICE FOR FIRE SAFETY OF INDUSTRIAL BUILDINGS — SAW MILLS AND WOOD WORKS

(First Revision)

1 SCOPE

1.1 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.

1.2 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.

1.3 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.

2 REFERENCES

The Indian Standards listed in Annex A contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards given in Annex A.

3 TERMINOLOGY

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

3.1 Air Cleaning Equipment

Equipment for separation of wood dust entrained in the air used for dust and chip extracting system.

3.2 Dust and Chip Extraction System

A pneumatic system for removal of wood chips, dusts or wastes, from wood working, pulverizing or chipping machines.

3.3 Plywood

A board formed of three or more layers of veneer cemented or glued together, usually with the grain of adjacent veneers running at right angles to each other.

3.4 Saw Mills

Mills in which timber in the form of the tree trunks or logs is cut into pieces of convenient size and shape for use in other trades.

3.5 Timber Yard

Open spaces reserved for storage of timber.

3.6 Wood Flour

Finely pulverized wood.

3.7 Wood Work Insulation Slabs

A type of board made from long wood shaving with the help of a cementing material.

3.8 Woodworking Buildings

Buildings in which cut timber from saw mills is further sawn, cut, drilled, planned, ground, shaped or otherwise processed for manufacturing of wooden goods.

4 LOCATION

4.1 The factory or workshop shall be located at a place which is easily approachable to fire appliances.

4.2 The premises should not be located at the dead end of the road.

4.3 The width of the main gate shall not be less than 4.5 m.

4.4 Wherever possible, the factory should be located in areas where ample supply of water for fire fighting purposes is available (*see* IS 6070).

4.5 No buildings or open storage yards of the premises shall lie within 30 m of a railway line used by coal-fired locomotives.

4.6 The factory or workshop shall not be located within municipal areas of a town or a city without the knowledge and approval of appropriate authority.

5 COMPOUND

5.1 All saw mills and other wood working and wood products manufacturing factories or workshops shall

be located in their own compound as far as practicable.

5.2 The compound shall be sufficiently spacious to enclose the processing, manufacturing and storage buildings and storage yards in such a manner as to comply with the provisions of **8** of the Code.

5.3 The compound shall be kept free of all combustible materials except for stacking of timber in timber yards. All storage yards, compounds and neighbourhood of buildings shall be kept clear of dry grass, weeds or any sort of rank vegetation.

5.4 No overhead electric bare wire shall be allowed in the compound or pass through the compound.

6 BUILDING CONSTRUCTION

6.1 Constructional features of all buildings shall comply with the requirements of IS 1641.

6.2 The type of building construction for various occupancies and their maximum permissible floor area, unless divided by separating walls extending not less than 1 m above the roof and or fire-proof floors, shall conform with the requirements given in Table 1.

6.3 Timber storage, working or process buildings shall preferably be of single storeyed structure. In no case, however, the ceiling height of any individual storey shall exceed 8.0 m nor shall the highest point of such buildings be more than 12.50 m above surrounding ground level.

6.4 Buildings, where wood flour is made, shall be provided with suitable explosion vents in the form of blow-off doors or windows or roof or wall panels of light materials.

6.5 Interior surfaces of buildings, where wood flour making operations are carried out shall be as smoothly finished as possible and shall be flame retardant. They should also be designed in such a manner that as few horizontal surfaces as possible are available.

7 SEPARATING WALLS

7.1 Separating walls complying with **5.1.2** of IS 1642 shall be provided to segregate the following buildings:

a) Timber (sawn or unsawn) godowns (*see* Note);
b) Godowns, other than those storing timber;
c) Saw mills;
d) Wood working departments;
e) Wood product making departments;
f) Boiler house and furnace rooms;
g) Timber seasoning kilns;
h) Varnishing, polishing and spray painting sections;
j) Timber impregnating room, where oil-based preservative is used;
k) Upholstery making sections; and
m) Utility buildings, like pump house, engine house, etc.

NOTE — This, however, does not apply to storage of green or wet logs under water.

7.2 In case godown storage area exceeds 250 m^2, proper compartmentation shall be provided by erection of brickwall with minimum fire rating of 2 h. Any opening between the compartmentation shall be provided with steel door with fire rating of 2 h.

8 DISTANCES

8.1 No building shall be within 30.0 m of a timber yard.

8.2 No building shall be within 15.0 m of a building used for storage or processing of timber.

8.3 Boilers, either in the open or in a building shall neither be within 30.0 m of a timber yard nor within 15.0 m of a building used for storage or processing of timber.

NOTES

1 Application of the provisions mentioned in **8.1** to **8.3** may be waived, if any one of the following conditions is fulfilled:

a) The buildings form part of the same block but are segregated from each other by separating walls extending not less than 1 m above the roof-level and with all openings, if any, protected by automatic fire resistant doors;
b) The facing walls are of brick or concrete and the openings are protected with automatic fire resisting doors and shutters and wired glasses or by automatic drenchers; and
c) The buildings used for storage or processing of wood are sprinkler protected throughout.

2 A log yard of green or wet logs in a plywood factory should not be treated as a timber yard, provided the logs are stacked at a distance of not less than 6 m from the adjoining wall.

8.4 In no case shall a building be within 6.0 m of a building used for storage or processing of timber unless such buildings form part of the same block and segregated therefrom by separating walls extending not less than 1 m above the roof-level and with all openings, if any, protected by automatic fire resistant doors.

8.5 No building or open storage shall be within 6.0 m of the compound wall.

9 VENTILATION

9.1 As far as possible each section/compartment shall be independently ventilated to the atmosphere so that fire in one section may not travel to other section. The provision of lighting and ventilation shall be strictly in accordance with SP 7 (Part VIII/Sec 1).

10 EXIT REQUIREMENTS

10.1 Exit requirements shall comply with IS 1644. However, the additional provision of exit requirements shall be provided as follows:

a) Each working room shall be provided with adequate number of exits not less than two in any case.

b) No exit shall be less than 1.2 m wide and 2 m high and doors of such exits shall be so arranged that it can be opened easily from inside.

c) No staircase, lobby/corridor of passage shall be less than 1.25 m wide.

11 PROCESS AND MACHINERY

11.1 Seasoning of Timber

11.1.1 The heat required for seasoning process shall be furnished either by low pressure steam, hot water or hot air. Moist-air-kilns in which hot air is kept moist by injection of steam shall, however, be preferred.

11.1.2 The heat source for the purpose mentioned in **11.1.1** shall be located either in a separate room or in the boiler house. If in a separate room it shall comply with the requirements laid down in **8.3.**

11.1.3 If wood dust and shavings are used as fuel, the boiler furnace or heater shall be specially designed to burn this type of material.

11.1.4 Ducts and pipings of steam or hot air shall be clear of all wood work and combustible material by at least 15 cm. Where these are supported on the wood work, the filling shall be insulated in such a manner as to avoid transmission of heat to the wooden portion.

11.1.5 Where hot air system is used, the seasoning kilns shall be provided with thermostat(s) so that the blower fan of the system is automatically cut off, in the event of the temperature exceeding a pre-determined value.

11.2 Woodworking — Dust and Chip Extraction System

11.2.1 All cutting, chipping, planing, sanding and other machines which produce either finely divided wood particles or shavings shall be provided with a properly designed dust and chip extracting system.

NOTE — Factories in which not more than six wood working machines are installed shall, however, be exempted from operation of **11.2.1.**

11.2.2 The entire exhaust system, that is, hoods of enclosure, ducting and air cleaning equipment shall be of non-combustible construction. It shall be designed for minimum air resistance and shall afford greatest possible protection to the zone of wood particle generation.

11.2.3 The rate of air flow shall be adequate to entrap the wood particles at their points of generation and cause them to be carried over, through the ducts to the air cleaning equipment.

11.2.4 In addition to exhaust intakes at individual machines, open connections to the exhaust system shall be provided at floor level for removal of waste accumulation around the machines.

11.2.5 Ducts shall be dust-tight throughout and no openings other than those necessary to perform the required functions of the system shall be allowed.

11.2.6 Where ducts pass through walls, floors or partitions, the space around the ducts shall be sealed with rope asbestos, mineral wood or other non-combustible material. In no case shall ducts pass through separating walls.

11.2.7 The exhaust system shall be provided with air cleaning equipment, for example, cyclones of non-combustible construction and adequate capacity. The air cleaning equipment so provided shall be located in the open and shall not be within 6 m of any unprotected building openings.

11.2.8 The exhaust fan(s) of the system shall have adequate capacity to produce required rate of air flow and if the fan is required to handle wood dust and shavings, its blades and the casing shall be of non-sparking materials.

11.2.8.1 It would be preferable, however, to locate the fan beyond the air cleaning equipment so as to handle clear air only. In no case shall the fan motor be installed inside the duct wall.

11.2.8.2 The fan (motor) shall automatically shut down by providing miniature circuit breaker/ thermostat of appropriate capacity or short circuit, etc. E.L.C.B. shall also be incorporated.

11.2.9 Ducts handling wood dust and shavings shall be separate from all other types of ductings and shall in no case be connected to a spark generating machine, namely, grinding wheels.

11.2.10 No spark generating machine unless enclosed in dust-tight enclosure shall be installed in areas, where dust is likely to be generated and remain in suspension and all machines likely to accumulate static electrical charges during operation shall be effectively earthed.

11.2.11 The use of dampers of gates or orifice blades shall not be permitted in the exhaust system unless provided for the specific performance of balancing the

air flow in the system and that they shall be riveted or permanently fastened to prevent any further manipulation.

11.2.12 Where inspection openings are required in the equipment, the openings shall be provided with mesh screen of not less than 2 meshes to a centimetre.

11.3 Wood Flour Making

11.3.1 The pulverizers shall preferably have individual drive. If not, then the transmission media (belt or chain) shall be encased in dust-tight enclosures.

11.3.2 Mills of pulverizers, conveyors, spouts, chutes and other dust producing and material handling equipment and devices shall be of metal construction and of dust-tight type.

11.3.3 Magnetic separators of approved type shall be installed in the system before the chips enter the mills or pulverizers.

11.3.4 Mills delivering directly through spouts shall be provided with devices in or underneath the discharges which retard the flow of product in such a manner as to keep a small space, immediately underneath or near the discharge, filled up with pulverized product, thus smoothering any spark which may originate in the mill. This may be done either by means of a revolving choke valve or, if the material is delivered directly into a screw conveyor, by omitting a small portion of the blade and substituting pin therefor.

11.3.5 Bearing shall be of ball or roller type and shall be of dust-tight design.

11.3.6 All mills or pulverizers, bins enclosures for chutes, spouts or conveyors, separators shall be provided with explosion vents extended to outdoors in such a manner that damage to other equipment or building or injury to personnel is avoided. For this purpose a vent area of 1 m^2 per 15 m^3 of bin volume and 1 m^2 per 10 m^3 of volume of enclosures for chutes, spouts, etc, shall be considered minimum. In the case of enclosures for chutes, spouts, etc, there shall be at least one vent per 3.0 m of length.

11.3.6.1 The explosion relief provided may be of bursting panel type or the hinged flap type. The bursting panel shall be a diaphragm of wafer, thin metal or other fragile material just capable of withstanding the normal pressure of the process. The hinge flap, when used in series with bursting vent provides the best explosion relief system. Such vents shall be situated close to the likely points of origin of explosion and adjacent to any bends in ducts. They shall also be arranged in such a manner that when they operate they do not discharge into work-rooms or into places where it may cause injury to workmen or cause fire spread and explosion.

11.3.7 All dust producing equipment shall be electrically earthed by at least two separate paths.

11.3.8 The exhaust fan for removal of dust shall preferably be located after the dust separator, where this is not possible, the blades and spider of the fan shall be of bronze or other non-sparking material or the fan casing lined with similar material.

11.3.9 All air cleaning equipment shall be located in the open and barring the cloth type shall be constructed throughout of non-combustible material. Cloth type separators shall be provided with dust-tight enclosures.

11.3.10 No spark generating machine unless enclosed in dust-tight enclosure shall be installed in areas where dust is likely to be generated and remains in suspension and all machines likely to accumulate static electrical charges during operation should effectively be earthed.

11.4 Driers

11.4.1 Driers shall be of non-combustible construction throughout.

11.4.2 Heat for drying shall be furnished by either low pressure steam (not exceeding 1.5 kg/cm^2), hot water, hot air or resistance, induction or infra-red system or electrical heating.

11.4.3 The heating equipment for low pressure steam, hot air, or hot water shall be located in separate room or building.

11.4.4 In case of electrically heated driers, the heating elements or lamps shall be so installed that the timber undergoing the drying operation shall not come into contact with them.

11.4.5 Driers shall be provided with thermostat so that the heating source and fan shall be automatically cut off, in the event of the temperature inside the drier exceeding a pre-determined figure.

11.5 Hardboard Manufacture

11.5.1 All wood chipping machines shall be provided with dust extracting system as outlined in **11.2**. The exhaust fan of the dust extraction system shall be so interlocked with the chipper motor that the motor will not operate unless the fan is working.

11.5.2 The screw conveyor (if any) used for carrying wood chips from chipper house to chip stores, from chip stores to surge bins and from surge bins to digestors, should be fitted with safety devices whereby the power supply to the conveyor motor will be cut off in case of jamming.

11.5.3 Melting of wax shall be done in covered cylinders or pans heated by low pressure steam or hot water. Only required amount of wax shall be brought in, when required.

11.5.4 The motor driving the chip refiner machine shall be so interlocked with the motor of the blower fan supplying cooling air to the former that the machine will stop if the blower fan fails to operate.

11.5.5 The main presses where hardboards are formed shall be provided with automatic temperature and pressure control arrangement and shall incorporate a device to give an alarm in the event of the temperature or pressure exceeding their pre-determined limits.

11.6 Spray Painting, Varnish and Polishing Operations

11.6.1 Each spray painting booth and similar enclosures shall be adequately ventilated by means of a fan or fans, preferably having a free discharge to the open, without the use of a duct. An air velocity of not less than 30 m/min at the working opening is recommended.

11.6.2 If discharge from the booth is not direct to the open the exhaust duct shall be of metal, as short as possible, have no sharp bends and shall be taken through an external wall without passing through any other part of the building.

11.6.3 There shall be a separate ventilating fan for each booth, but if this is not practicable not more than 3 booths shall be connected to one ventilating duct. If more than one fan is connected to the ventilating duct the control shall be so interconnected that one fan cannot be operated without operating all fans connected to that duct.

11.6.4 Fans and ducts shall be accessible for cleaning and shall continue to run for a period of at least 5 min after spray painting operations have ceased.

11.6.5 Ovens or other heating appliances used for drying or baking purposes shall not be located in the same room or compartment as that used for applying the surface treatment except when such ovens or appliances are heated in any one of the following manners:

a) Low pressure hot water,
b) Steam at a gauge pressure of not more than 0.66 kgf/cm^2,
c) Hot air system from hot water, steam or electric heaters, all ducts being of metal, and
d) Electric heaters as described in **13.7**.

12 STORAGE CONDITIONS

12.1 Storage of material other than storage of timber in operation shall comply with IS 3594.

12.2 Storage of timber in open yards shall comply with the following conditions (*see also* Note 2 under **8.3**):

a) No stack of timber shall contain more than 1 500 t of timber. Nor shall it exceed 6.0 m in height, and
b) A clear space of 22.50 m shall be provided between individual stacks.

NOTE — In big cities due to scarcity of space, keeping a distance of 22.50 m in between the stacks is not practicable. However, to minimize spread of fire and hazard due to radiated heat, a distance of 10 m is recommended in between the stacks. In case keeping of even 10 m is not practicable, the quantity of timber and stacking height shall be restricted to 500 t and 3 m respectively with a special requirement to provide separating (fire-breaks) walls extending to a height of at least 4 m.

13 ELECTRICAL INSTALLATIONS

13.1 The electrical installations shall conform to IS 1646.

13.2 All motors in woodworking areas shall be of totally enclosed or pipes ventilated type.

13.3 All motors installed inside buildings where manufacture of wood flour or pulverizing of wood is done shall be in dust-tight enclosure.

13.4 Electrical wiring for lighting in wood storage and process department shall be enclosed in screwed steel conduits and those for power wiring shall be enclosed either in screwed steel conduits or of mineral insulated copper sheathed type.

13.5 Lighting fixtures, switches, cut-outs, distribution boxes, etc, in buildings used for wood flour making shall be dust-tight type.

13.6 All electrical equipment and accessories in buildings where spray painting or polishing operations are carried out shall be of flame-proof type.

13.7 All electrical heaters used for drying or baking purposes shall be metal cased and be of totally enclosed immersion type or of the totally enclosed low temperature type. The temperature of the external surface of such heaters shall not exceed 92°C.

14 FIRE FIGHTING ARRANGEMENTS

14.1 All fire fighting arrangements shall fully comply with the provisions contained in IS 1648 and IS 2190.

14.2 The requirements of wet riser, down comer installations and capacity of water storage tanks and fire pumps shall be as given in Table 2.

14.3 All buildings exceeding 500 m^2 where woodworking, storage or processing are carried out

as also outdoor storage of timber shall be protected with portable appliances and a hydrant service.

14.4 All such buildings as described in **14.3** shall be protected with sprinklers also if the individual floor area exceeds the limitations specified in Table 1.

14.5 Notwithstanding anything mentioned to the contrary under **14.1** to **14.4**, all premises where sawing of bulk timber or logs is carried out as also its timber yards shall be protected with a hydrant service.

14.6 It is recommended that interiors of wood grinding mills or pulverizing dust and chip extraction systems and enclosures of conveyors carrying wood dust or chips shall be protected with a fixed fire extinguishing system of the inert gas type.

14.7 In properties, where the storage and wood working and processing buildings are not required to be sprinkled, either of the following facilities shall be provided:

a) An automatic fire alarm system according to the requirements of IS 2189; and

b) A watchman, who will go round the property at 2-hourly intervals during non-working hours.

15 GENERAL SAFETY PROVISIONS

15.1 No smoking or cooking shall be carried out in the premises, except in the buildings especially set apart for such purposes. 'No smoking' signs shall be prominently exhibited in the compound of the premises, especially in the vicinity of wood working, storage and processing buildings and timber yards.

15.2 Use of naked fires or open flames involving such work as welding and cutting operations, etc, shall not be permitted either within 22.50 m of timber yards or inside wood working, processing and storage blocks and upholsteries. Such work shall only be done in separate compartments or rooms specially set apart for such purposes.

15.3 Wood working or processing buildings and upholsteries shall be swept clean of all sawdust, wood shavings and other types of wastes at the end of each shift, and more frequently, if necessary.

15.4 Timber yards shall be kept free of grass weeds and undergrowth, as far as possible, by cutting them short and their immediate removal from the site. In no circumstances shall grass, weeds and undergrowth be burnt within the factory premises.

15.5 Use of coal-fired locomotives shall not be permitted within the compound of the factory and the end of exhaust pipes of diesel locomotives shall either be turned upwards or provided with suitable protection against emission of burning or incandescent particles.

15.6 Only daily requirements of raw materials, such as timber, kapok, coir, etc, or other hazardous materials shall be permitted inside wood working or processing buildings and upholsteries.

15.7 Upholsteries shall be provided with adequate number of non-combustible storage bins fitted with automatically closing covers for holding of kapok, coir, etc.

15.8 Not more than a day's supply of paint, varnish lacquer, etc, shall be kept in the room or compartment, where spray painting or varnishing operations are carried out.

15.9 Strict attention to cleanliness shall be observed in spray painting, varnishing department, etc. This is particularly important where nitro cellulose solutions are used in view of the flammable nature of the solid residues.

15.10 All places where dry deposits of flammable or

Table 1 Type of Building Construction and Maximum Floor Area (for Various Occupancies)
(*Clauses* 6.2 *and* 14.4)

Sl No.	Nature of Occupancy	Maximum Permissible Floor Area for Type of Construction			
		I	II	III	IV
		m^2	m^2	m^2	
(1)	(2)	(3)	(4)	(5)	(6)
i)	Saw mills wood working; plywood making; hard-board making; and upholstery	3 000	750	650	Not permitted
ii)	Plywood making; hard-board making; and chipboard making	9 000	2 250	1 950	Not permitted
iii)	Wood floor making; spray painting; varnishing and impregnating	1 100	450	Not permitted	Not permitted
iv)	Timber godowns	2 400	600	490	Not permitted

NOTE — The above maximum permissible floor areas may be tripled in case of single storey buildings and doubled in case of multiple storey buildings, provided the buildings are protected throughout with the sprinkler installation.

Table 2 Minimum Requirements for Fire Fighting Installations
(Clause 14.2)

Sl No.	Type of Building	Type of Installations							Water Supply, l		Pump Capacity, l	
		Hose Reel	Wet Riser	Down Comer	Yard Hydrant	Auto-matic Sprink-ler System	Man-ually Operated Electric Fire Alarm System	Auto-matic Detec-tion and Alarm System	Under-ground Static Water Storage Tank	Terrace Tank	Near the U/G Static Tank (Fire Pump) with minimum Pressure of $0.3N/mm^2$ ($3kg/cm^2$) at Terrace Level	At the Terrace Level with a Pressure of $0.3N/mm^2$ ($3kg/cm^2$)
i)	Plot area up to 250 m^2	P	P (for more than one storey)	P (for more than one storey)	P	P	P	NP	25 000	10 000	One electric pump and one diesel pump of capcatiy 1 620 l/min and one electric pump of capacity 180 l/min	900 l/min (if more than one storey)
ii)	Plot area 251 m^2 to 500 m^2	P	do	do	P	P	P	NP	50 000	10 000	do	do
iii)	Plot area 501 to 1 000 m^2	P	do	do	P	P	P	P	1 00 000	20 000	One electric pump and one diesel 2 280 l/min and one electric pump of capacity 180 l/min	do
iv)	Plot area 1 001 m^2 and above	P	P	P	P	P	P	P	As per IS 3844	30 000	One electric pump and one diesel pump of capacity of 2 850 l/min and one electric pump of capa-city 180 l/min or 4 500 l/min depending upon water requirements	900 l/min

NOTES

1 P indicates 'Provided'.
2 NP indicates 'Not to be Provided'.
3 he requirements given above are for small scale industry units in Metropolitan Cities.
For industries located in other areas the requirement will have to be worked out on the basis of relevant Indian Standard and also in consultation with local fire authority.
4 Building above 15 m in height not to be permitted.

varnish may accumulate shall be cleaned as frequently as possible, but not less than once a week. If brushes or scrapers are used they shall be of stiff fibre or non-ferrous material. Flammable liquids shall not be used for cleaning purposes. All scrapings and sweepings shall be placed immediately in metal receptacles, wetted down and removed from the building.

15.11 All oily or dirty wastes and greasy cleaning clothes shall be deposited in metal receptacles with lids and shall be removed from the building daily.

15.12 Spray painting booths used for nitrocellulose finishes shall not be used for vegetable oil paint and varnish processes unless the booths and ventilating trunks are cleaned before each changeover.

ANNEX A

(*Clause* 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*	*IS No.*	*Title*
1641 : 1988	Code of practice for fire safety of buildings (general): General principles of fire grading and classification (*first revision*)	2190 : 1992	Selection, installation and maintenance of first-aid fire extinguishers — Code of practice (*second revision*)
1642 : 1989	Code of practice for fire safety of buildings (general): Details of construction (*first revision*)	3594 : 1991	Code of practice for fire safety of industrial buildings: General storage and warehousing including cold storages (*first revision*)
1646 : 1982	Code of practice for fire safety of buildings (general): Electrical installations (*first revision*)	6070 : 1983	Code of practice for selection, operation and maintenance of trailer fire pumps, portable pumps, water tenders and motor fire engines (*first revision*)
1648 : 1961	Code of practice for fire safety of buildings (general): Fire fighting equipment and its maintenance	SP 7 (Part VIII/ Sec 1) : 1983	National Building Code of India: Part VIII Building Services, Section 1 Listing and ventilation
2189 : 1988	Code of practice for selection, installation and maintenance of automatic fire detection and alarm system (*second revision*)		

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Review of Indian Standards

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