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RECOMMENDATIONS FOR CONTROL OF EMISSION OF ASBESTOS DUST IN PREMISES MANUFACTURING PRODUCTS CONTAINING ASBESTOS

PART 1 ASBESTOS CEMENT PRODUCTS

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BUREAU OF INDIAN STANDARDS
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PART 1 ASBESTOS CEMENT PRODUCTS

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Indian Standard

RECOMMENDATIONS FOR CONTROL OF EMISSION OF ASBESTOS DUST IN PREMISES MANUFACTURING PRODUCTS CONTAINING ASBESTOS

PART 1 ASBESTOS CEMENT PRODUCTS

0. FOREWORD

0.1 This Indian Standard was adopted by the Bureau of Indian Standards on 30 July 1987, after the draft finalized by the Cement and Concrete Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 In recent years there has been a growing awareness that exposure to asbestos dust can have harmful effects on the health of workers. In order to give guidelines on how the risk of exposure to asbestos dust can be prevented, controlled or minimized, it was felt necessary to lay down some standards regarding safe use of different products containing asbestos, improving conditions in workplaces, preventive measures, protection and supervision of the health of workers, packaging and transport of asbestos, disposal of asbestos waste, etc. This standard laying down the recommendations for control of emission of asbestos dust in premises manufacturing products containing asbestos, has been prepared in three parts. This part lays down the recommendations for control of emission of asbestos dust in premises manufacturing asbestos cement products. Recommendations for control of emission of asbestos dust in premises manufacturing friction materials containing asbestos and non-cement asbestos products other than friction materials are covered in Parts 2 and 3 respectively. The concentration of airborne asbestos dust in work environment shall be determined in accordance with the method given in IS : 11450-1986*.

0.3 In the formulation of this standard 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. This has been met by deriving assistance from 'ILO Codes of Practice: Safety in the Use of Asbestos', 1984 published by the International Labour Office, Geneva.

*Method for determination of airborne asbestos fibre concentration in work environment by light microscopy (membrane filter method).

0.4 This standard is one of a series of Indian Standards on safety in handling and use of asbestos. Other standards in the series already formulated and under preparation are as follows:

IS : 11450-1986 Method of determination of airborne asbestos fibre concentration in work environment by light microscopy (membrane filter method)

IS : 11451-1986 Recommendations for safety and health requirements relating to occupational exposure to asbestos

IS : 11767-1986 Recommendations for cleaning of premises and plants using asbestos fibres

IS : 11768-1986 Recommendations for disposal of asbestos waste material

IS : 11769 (Part 1)-1987 Guidelines for safe use of products containing asbestos: Part 1 Asbestos cement products

IS : 11769 (Part 2)-1986 Guidelines for safe use of products containing asbestos: Part 2 Friction materials

IS : 11769 (Part 3)-1986 Guidelines for safe use of products containing asbestos: Part 3 Non-cement asbestos products other than friction materials

IS : 11770 (Part 2)-1986 Recommendations for control of emission of asbestos dust in premises manufacturing products containing asbestos: Part 2 Friction materials

IS : 11770 (Part 3)-1987 Recommendations for control of emission of asbestos dust in premises manufacturing products containing asbestos: Part 3 Non-cement asbestos products other than friction materials

IS : 12078-1987 Recommendations for personal protection of workers engaged in handling asbestos

IS : 12079-1987 Recommendations for packaging, transport and storage of asbestos

IS : 12080-1987 Recommendations for local exhaust ventilation systems in premises manufacturing products containing asbestos

IS : 12081 (Part 1)-1987 Recommendations for pictorial warning signs and precautionary notices for asbestos and products containing asbestos: Part 1 Workplaces

IS : 12081 (Part 2)-1987 Recommendations for pictorial warning signs and precautionary notices for asbestos and products containing asbestos: Part 2 Asbestos and its products

IS : 12082 (Part 1)-1987 Recommendations for control of asbestos emission: Part 1 Mining of asbestos ore

IS : 12082 (Part 2) Recommendations for control of asbestos emission: Part 2 Milling of asbestos (*under preparation*)

Method for determination of asbestos concentration in water (*under preparation*)

1. SCOPE

1.1 This standard lays down the recommendations for control of emission of asbestos dust in premises used for manufacturing asbestos cement products.

2. OBJECT

2.1 The object of this standard is to recommend procedures that shall be adopted in premises used for manufacturing asbestos cement products so as to minimize and control the emission of asbestos dust in the working environment for the safety of workers.

3. GENERAL REQUIREMENTS

3.1 All appropriate and practicable measures of engineering control, work practice and administrative control shall be adopted to eliminate or to minimize the asbestos dust concentration in the working environment to the lowest possible level.

3.2 Engineering Controls — Engineering controls shall include wetting, mechanical handling, ventilation and redesign of the process to eliminate, contain or collect asbestos dust emission by the following processes:

a) Dust suppression — Use of wet methods, where appropriate;

b) Dust dilution through:
   1) modification of dust generating system;
   2) process separation, automation, etc; and
   3) general ventilation of the working areas with clean air;

c) Dust extraction by:
   1) enclosures/booths,
   2) well designed hoods, and
   3) vacuum cleaners for prevention of dust dissemination;

d) Dust conveyance by balanced ductwork and adopting appropriate air velocities;

e) Dust collection through the use of effective filters; and

f) Separate workplace for those processes with potential to generate dust levels higher than permissible exposure limit.

3.2.1 *Local Exhaust Ventilation*

3.2.1.1 Where total enclosure of the dust-producing process is not practicable, local exhaust ventilation equipment shall be provided and maintained as given in IS : 12080-1987*.

3.2.1.2 For efficient operation, the exhaust ventilation shall be located as close as possible to the source of dust emission by the use of hoods, booths or enclosures.

3.2.1.3 The local exhaust system shall be designed to collect and remove all dust-laden air.

3.2.1.4 Openings in the enclosures shall be as small as possible while still allowing access to the necessary work operation.

3.2.1.5 In case of captor hoods and booths, the ventilation equipment shall be so constructed that air turbulence and eddies created by the work process or by the workers do not prevent the effective removal of dust.

3.3 Work Practices — Appropriate work practices shall be followed where materials or processes are used which may give rise to asbestos dust in the working environment. Such work practices shall include the following:

a) Requirements to use and maintain properly process machinery, installations, equipment, tools, local exhaust and ventilation system;

b) Regular cleaning of machinery and work areas by appropriate methods (*see* IS : 11767-1986†); and

c) Proper use of personal protective equipment, where required (*see* IS : 12078-1987‡).

4. RECOMMENDED CONTROL FOR DIFFERENT OPERATIONS

4.1 Fibre Handling

4.1.1 Asbestos fibre shall be supplied only in closed containers, such as impermeable plastic bags.

4.1.2 As far as practicable, palletized handling shall be arranged to avoid damage of bags while handling and to facilitate mechanized handling.

4.1.3 In case any damaged bag is found during handling, the same shall be repaired by pasting adhesive tapes or by stitching the damaged area in such a way as to avoid escape of fibre into the atmosphere.

*Recommendations for local exhaust ventilation systems in premises manufacturing products containing asbestos.

†Recommendations for cleaning of premises and plants using asbestos fibres.

‡Recommendations for personal protection of workers engaged in handling asbestos.

4.2 Milling and Fibre Preparation

4.2.1 Milling of fibre shall be done in a fibre grinding mill which is covered and connected to a dust extraction system so as to extract the dust generated during charging and milling of the fibre.

4.2.2 Milling shall be done by wetting the fibre so that emission of dust is controlled.

4.2.3 Asbestos fibre supplied in plastic bags shall be opened only in an enclosed chamber connected to a dust extraction system under negative pressure so that leakage of dust to workplace is prevented.

4.2.3.1 The bags shall be opened and emptied automatically, whenever practicable.

4.2.4 The bags shall be placed as close as possible to the hopper or feed chamber.

4.2.5 The contents of the bags shall be discharged without the bag being shaken.

4.2.6 Empty bags shall be disposed of according to the provisions given in IS : 11768-1986*.

4.2.7 In no case blending of different grades of fibre shall be carried out in open. Partially discharged bags containing dry fibre shall not be stored outside the enclosure.

4.3 Handling Finished Products

4.3.1 At the final stage of manufacturing, or wherever asbestos cement products are being handled in large quantities, mechanical handling equipment shall be used when practicable.

4.3.2 Individual boards, sheets or other products, when moved manually, shall be placed with care on the stack or other resting site.

4.3.2.1 Dropping or dragging of finished product shall be avoided.

4.3.3 All storage of asbestos cement products on site shall be within a designated area. The designated area shall be maintained in a clean condition.

4.4 Finishing Operations

4.4.1 Suitable efficient dust extraction equipment along with well designed suction hood shall be provided to all finishing machine which turn, groove, chamfer and finish to avoid escaping of generated dust, while in operation. Low-volume, high-velocity air systems are usually most suitable for this purpose.

*Recommendations for disposal of asbestos waste material.

4.4.2 It is recommended that slow-running tools with hard metal teeth shall be used.

4.4.3 The equipment shall be designed to remove loose dust and swarf from the cut edges.

4.4.4 Where appropriate, boards shall be treated with a sealing solution for the suppression of dust on surfaces and edges.

NOTE — The recommendations given in **4.4.3** and **4.4.4** are applicable for low density asbestos cement products (density less than 1·20).

4.4.5 Boards and sheets shall be cut singly when practicable.

4.4.6 The surfaces of all dry sheets, which require surface finishing, shall be vacuum cleaned before stacking, where there is a risk of airborne asbestos.

4.5 Reclamation of Materials — Reclamation of materials shall be made either by watering to suppress the generated dust while cutting or by dust extraction means.

4.6 Dry Waste Recycling — When dry waste recycling system is employed, asbestos cement dry waste shall be pulvarized in an enclosed system with suitable exhaust to avoid escape of dust into atmosphere.

4.7 Asbestos Cement Moulded Goods Manufacturing

4.7.1 In case the moulded goods need mannual finishing, the same shall be undertaken when the product is wet by using a rough rasp hand file. Alternatively, the operation shall be done under exhaust hood. Also in the dust extraction system, air shall be downwards to avoid inhalation of generated dust by the worker.

5. GENERAL VENTILATION

5.1 Where appropriate, in conjunction with local exhaust ventilation the entire work area should be supplied with clean air to replace the air as it is exhausted and to reduce airborne asbestos concentrations.

5.2 The flow rates of general ventilation shall be sufficient to change the air of the workplace according to safety and health requirements.

5.3 The exhausted air shall be efficiently filtered and shall not be recirculated back to the working environment.

6. CLEANING OF PLANT AND PREMISES

6.1 The work premises shall be maintained in a clean state and free from asbestos waste. All machinery, plant and equipment together with all external surfaces of exhaust ventilation equipment and all internal sur-

faces of the building shall be kept free from dust. Cleaning shall be done in accordance with the provisions laid down in IS : 11767-1986*.

7. DISPOSAL OF WASTE

7.1 All waste material shall be disposed of in accordance with the provisions laid down in IS : 11768-1986†.

*Recommendations for cleaning of premises and plants using asbestos fibres.
†Recommendations for disposal of asbestos waste material.

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INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	Unit	Symbol
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	Unit	Symbol
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	Unit	Symbol	Definition
Force	newton	N	1 N = 1 kg.m/s^2
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2