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# കേരള ഗസറ്റ്

# KERALA GAZETTE

## അസാധാരണം

## EXTRAORDINARY

ആധികാരികമായി പ്രസിദ്ധപ്പെടുത്തുന്നത്

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GOVERNMENT OF KERALA

**Labour and Skills (B) Department**

NOTIFICATION

G.O(P) No.19/2020/LBR

Dated, Thiruvananthapuram, 3rd February, 2020
20th Makaram, 1195

**S. R. O. No. 226/2020**

WHEREAS, the draft rules further to amend the Kerala Factories Rules, were published as required under section 115 of the Factories Act, 1948 (Central Act 63 of 1948) as per notification issued under GO(P) No.31/2019/LBR dated 9th April, 2019 in the Kerala Gazette extraordinary number 1163 dated 14th May, 2019 inviting, objection or suggestion from all persons likely to be affected thereby;

AND, WHEREAS, the objections and suggestions received from the public in respect of the said draft rules have been considered by the Government;

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NOW, THEREFORE, in exercise of the powers conferred by section 112 of the Factories Act (Central Act 63 of 1948), the Government of Kerala hereby make the following rules further to amend the Kerala Factories Rules 1957, namely:

## RULES

1. *Short title and commencement* – (1) These rules may be called the Kerala Factories (Amendment) Rules, 2020.

(2) They shall come into force at once.

2. *Amendment of the Rules – In the Kerala Factories Rules. 1957.-*

(1) in the SCHEDULE under rule 2A, after serial number 7 and the entries against it in columns 2 to 5, following serial numbers and entries shall, respectively be inserted, namely:-

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| 8. | Rule 81L- Examination and Testing of Ovens and Driers. | Bachelor's degree in Mechanical Engineering/ Electrical Engineering or its equivalent. | (i) A minimum experience of seven years in design or maintenance or operation or testing and examination of ovens and driers.<br>(ii) Knowledge of relevant codes of practices and test procedures that are current.<br>(iii) Conversant with statutory requirements regarding the safety of ovens and driers.<br>(iv) Conversant with safety devices and their proper functioning to ensure the safety of ovens and driers.<br>(v) Be able to identify defects and other causes leading to failure of ovens and driers.<br>(vi) Ability to arrive at a reliable conclusion as to the safety of ovens and driers. | (i)Relevant measuring instruments and devices duly calibrated and certified for carrying out tests and certification of safety.<br>(ii) Facilities for carrying out non-destructive testing. |
| 9. | Rule 81M- | Bachelor's degree in | A minimum experience of | Facilities for |

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| | | | | |
|---|---|---|---|---|
| | (i) sub-rule (16) Testing of thermic fluid heater coil. | Mechanical Engineering/Electrical Engineering or its equivalent. | seven years in design or maintenance or operation or testing and examination of thermic fluid heaters. | pressure testing. |
| | (ii) sub-rule (18) Testing of Thermic fluid. | Master's degree in Chemistry or Bachelor's degree in Chemical Engineering. | A minimum experience of three years in testing of thermic fluids. | Laboratory facilities to test acidity, suspended matter, ash contents, viscosity and flash point of thermic fluid. Report of such examination shall be obtained from Government approved agency. |
| 10 | Draftsman– A rule 3(2)(b) (iii) under section 6 | (i) Bachelor's degree in Civil Engineering /Architect or its equivalent; or<br>(ii) Diploma in Civil Engineering /Architect | Minimum 5 years of experience for degree holders and minimum 15 years of experience for Diploma holders in design, supervision of buildings and in the preparation of building plans and other structural drawing specifications connected with factory buildings and having the authority to sign such drawings. | |
| 11 | Draftsman – B rule3(2)(b)(iii) under section 6 | Diploma in Civil Engineering | Minimum 10 years of experience in design, supervision of buildings and in the preparation of building plans and other structural drawing specifications connected with factory buildings. (eligible for total plinth area upto 1000 sq.metres) | |

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| | | | |
|---|---|---|---|
| 12 | Draftsman – C rule 3(2)(b) (iii) under section 6 | (i) Diploma in Civil Engineering or<br>(ii) Draftsman in Civil Engineering from recognized Industrial Training Institute or Centre. | Minimum5 years of experience under an engineer for diploma holders and 10 years of experience under an engineer in design, supervision etc. for Industrial Training Centre/Industrial Training Institute holders and experience in the preparation of building plans and other structural drawing specifications connected with factory buildings. (eligible for total plinth area upto 500 sq.metres) |

(2) in sub rule (2) of rule 3, in item (ii) of clause (b), after the words "indicating all relevant details relating to" the words and symbol "fire fighting facilities" shall be inserted;

(3) in sub-rule (3) of rule 5, after the existing sentence, following sentence shall be added , namely:-

"If manufacturing process is found to be carried on in a factory without licence, five times the fee ordinarily payable shall be levied before granting licence to such a factory by the Chief Inspector or the Deputy Chief Inspector."

(4) for rule 17, the following rule shall be substituted, namely :-

"17. Disposal of trade wastes and effluents.- In every factory, effective arrangements shall be made for the treatment of wastes and effluents resulting due to the manufacturing processes carried on therein and the arrangements so made shall be in accordance with those approved by the authorities of Kerala State Pollution Control Board appointed under the Water (Prevention and Control of Pollution) Act, 1974 (Central Act 6 of 1974), and the Air (Prevention and Control of Pollution) Act,1981 (Central Act 14 of 1981), without any prejudice to Environmental Protection Act, 1986 (Central Act 29 of 1986)";

(5) in rule 30.-

(i) in sub-rule (1), for the figures and words "65 lux candles", the figures and word "100 lux" shall be substituted;

(ii) in the proviso to sub-rule (1) of rule 30, for the words and figures ""22 lux candle", the figures and word "22 lux" shall be substituted;

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(iii) in subrule (2), for figures and word "5 lux", the figures and word "20 lux" shall be substituted;

(iv) in sub-rule (3), the following sentence shall be added at the end, namely:-

"The average illumination in various interior areas of factories shall be as per the values as prescribed by IS.SP.72.2010 of National Lightning Code, 2010, Part 5-Interior illumination under section I, Industrial lighting";

*(6)* in rule 31, after sub-rule (2), the following shall be inserted as sub-rule (3), namely:-

"(3) Limiting glare Index in various interior areas of factories shall be as per the values prescribed by IS. SP.72.2010 National Lighting Code, 2010 Part 5-Interior Illumination under-Section-1, Industrial lighting".

(7). in rules 70, the following names of machines shall be added at the end, namely:-

"Primary and Secondary Metal Crusher;
Ice Crusher;
Wood chipping and Peeling machines;
Steel re-rolling mills and furnaces";

(8) in rule 74, in clause (a) of sub-rule (9) , for the words "the prescribed register", the words "the register in Form No. X" shall be substituted;

(9) in rule 75, in the SCHEDULE, against the entry "(a) Adult male", under the heading "Maximum weight of material article, tool or appliance", for the figure and word "55 kilograms", the figures and word "50 kilograms" shall be substituted;

(10). in rule 79,-

(i) sub-rule (1) shall be renumbered as "(IA)" and before sub-rule "IA" as so renumbered the following shall be inserted as sub-rule (1), namely:

"(1) Classification of building as per Code 3.1.1 part 4 of National Building Code of India. All buildings involving explosion and fire hazards are classified as follows :

1. Group G – Industrial
2. Group H – Storage
3. Group J – Hazardous

(ii) clause (b) of schedule (IA) shall be substituted, with the following, namely:-

"(b) – All industrial process involving serious fire hazard shall be carried out only in buildings or work places separated from one another by fire separating walls -

*[Fire separating wall means :- The wall that provides complete separation of one building from another or part of a building from another part of the*

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*same building and prevent any spread of fire or heat transmission that may cause or assist in the combustion of materials kept on the other side of the wall.*

*Fire separating wall so provided shall have minimum fire resistance of 4 hrs, so that combustible materials on the other side of the fire separating wall can be removed/segregated before the wall collapses and the fire enters the segregated compartment, such that the overall damage and material losses are minimal.*

*At the time of designing openings in fire separating walls, particular attention shall be paid to all likely factors that will limit fire spread through the openings and maintain fire resistance rating of the structural members intact]"*

(iii) alter clause (c) of sub-rule (1A), the following clause shall be inserted, namely:-

"(ca) Construction of building shall be as per Code 3.3 part 4 of National Building Code of India"

(iv) alter clause (b) of sub-rule (2), the following clause shall be inserted, namely:-

"(c) Buildings 15M in height or above shall be provided with fire lifts. Fire lifts shall be with a minimum capacity for 8 passengers and fully automated with emergency switch at ground level. Each fire lift shall be equipped with suitable inter-communication equipment for communicating with the control room provided at the ground floor of the building. The number and location of fire lifts in a building shall be decided after taking into consideration various factors like floor-wise building population, floor area, compartmentation, and such other factors".

(v) alter clause (b) of sub-rule (9), the following clause shall be inserted, namely:-

"(c) Smoke and Fire venting and explosion relief vents shall be provided in the various class of buildings as per Annex -D part 4 of National Building Code of India".

(vi) alter sub-rule (10), the following sub-rule shall be inserted, namely:-

"(10A) Smoke Venting.- (a) Smoke venting facilities for unobstructed use of exits in windowless buildings, underground structures, large area factories shall be automated with manual controls as back up".

(b) For natural draft aided smoke venting roof vents or vents in walls at or near the ceiling level shall be made use of provided such vents are normally kept open, or, if closed, shall be designed for automatic opening in case of fire, as and when smoke sensitive devices trigger.

(c) Where smoke venting facilities are installed for the purpose of safe exit, such facilities shall be adequate to prevent dangerous accumulation of smoke during the period of time necessary to evacuate the area served, using the available exit facilities with a margin of safety to allow for any unforeseen contingencies. It is recommended that smoke exhaust equipment should have a minimum capacity of 12 air changes per hour. Where mechanical

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venting is employed, it shall be fire safe during fire and shall be of fire-retardant construction.

(d) The discharge apertures of all natural draft smoke vents shall be so arranged as to be readily accessible for opening by fire service personnel as and when needed.

(11). in rule 81 AA of alter sub rule (3), the following shall be inserted as clause (c), namely:-

"(c) The application shall accompany with a fee of 1% of the total project cost, subject to a maximum of Rs.1,00,000/- (Rupees One Lakh only) remitted in a Government Treasury or remitted through online payment".

**(12) in Rule 81AJ, in sub-rule (1),-**

(i) in item (iii) of clause (b) for the words and symbols "dresser-cum-compounder" the words "Pharmacist" shall be substituted;

(ii) in item (iii) of clause (c) for the words and symbols "dresser-cum-compounder and sweeper -cum-wardboy" the words "Pharmacist" and "attender" shall be substituted respectively.

**(13) (i) in the "SCHEDULES" under the heading "PART A" of sub-rule (1) of rule 122,-**

(i) for the entries against items (xiv) (xxiv) and (xxvi), the following items and entries shall, respectively be, substituted, namely:-

"(xiv) Handling and processing of Asbestoes, manufacture of any article out of Asbestos and any other process of manufacture wherein Asbestos is used in any form".

(xxiv) Operations involving high Noise and Vibration levels.

(xxiv) Flammable Liquified or Compressed Gasses and Highly Flammable Liquids":

(ii) for schedules xiii, the following schedule shall be substituted, namely:-

## SCHEDULE – XIII

## MANIPULATION OF STONE OR ANY OTHER MATERIAL CONTAINING FREE SILICA

1. **Application** .- This schedule shall apply to all factories or parts of factories in which manipulation of stone or any other material containing free silica is carried on.

2. **Definitions**- For the purpose of this Schedule -

(a) "manipulation" means crushing, breaking, chipping, dressing, grinding, sieving, mixing, grading or handling of stone or any other material containing free silica or any other operation involving such stone or material;

(b) "stone or any other material containing free silica" means a stone or any other solid material containing not less than 5% by weight of free silica.

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## PART 1
## PROCESS RISKS IN STONE CRUSHING

1. Location and Lay out.- (1) No crusher plant shall be constructed or extended to within a distance of 200 metres from the centre of the proposed crusher unit to the periphery of the structure of any residence or public building or place of worship. Exception is allowed only for store room and office room.

(2) In cases where environmental factors such as terrain and greenery are conducive to reduce spread of pollution and where advanced technology that reduces noise and dust is employed, the minimum distance may be further reduced to 150 metres with stringent control measures such as enclosure of crushers, classifiers, screens and other noise/dust producing units with 40 cm thick solid wall (not hollow brick), false roofing and dust extraction system.

(3) There should be a minimum clear distance of 100 metres from the centre of crusher of one industry to the centre of crusher of another industry.

(4) There should be a clear distance of 200 metres from the centre of the proposed crusher to State or National Highway. For crushers fulfilling the requirements of 2nd above, the minimum distance is reduced to 150 metres.

(5) Crushers, classifiers, screens and other noise and/or dust producing units should be housed in buildings with solid wall (not hollow block) of minimum 23 centimetre thickness and with suitable roofing.

2. Electrical Installations.- (1) Keep the main switch box in good condition, protected from the weather in a separate room. An appropriately sized Earth Leakage Circuit Breakers (ELCB) in all circuits shall be installed and provide good earth or ground connection for all installations to protect the operators from electrical hazards

(2) Electrical cables should be laid into the under ground cable trench in shock-proof material or taken over head. Cables should be run in extra plastic conduits.

(3) For work on electrical equipment insulation materials such as approved Insulation/rubber mats shall be provided in front of the distribution boards and main switches.

(4) Lock out- tag out system shall be used for all installations which are under maintenance or repair, to prevent others from switching on the machines while another worker is repairing it.

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(5) All distribution points should be marked legibly in an understandable language, marking the feeding point, voltage, and identification number. This will help to Log-Out and make shutdown quicker in case of emergency.

(6) Required numbers of fire buckets filled with sand or portable-size Carbon Dioxide type fire extinguishers shall be provided for use in case of fire.

(7) Necessary personal protective equipment like shoes and rubber gloves shall be provided for those deployed in electrical work.

3. Risks at Intake hoppers, bunkers for intermediate products.- (1) Wheel chokers of adequate strength and height such as raised steel girder or bump shall be provided to prevent accidental fall of trucks into intake hoppers.

(2) Railings shall be provided for work platforms near all bunkers.

4. Risks of moving parts.- (1) Guards shall be installed around all power transmission moving parts such as shafts, couplings, pulleys and drive belts, chains and sprockets and all other moving parts.

(2) Nip and shear points of conveyors shall be provided with permanent barrier guards. Guards must extend beyond the in-running nips between the belts and rollers so as to make them inaccessible from above, below and from the ends.

(3) Provide continuously accessible conveyor belts with emergency stop cables that extend the entire length of the conveyor belt to allow access to the cable from any point along the belt.

(4) Install clearly marked, unobstructed emergency stop buttons or pull cords within easy reach of workers in the areas where they are deployed for duty.

(5) Use prominent awareness devices such as warning signs or lights to alert workers to the conveyor operation when it is not feasible to install guarding devices and such unguarded moving parts shall be located away from workers.

(6) All conveyor openings such as wall and floor openings, and chutes and hoppers have fencing when the conveyor is not in use.

(7) Electrical panel room for crushers, conveyors, vibrators and all other machines in

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crushing unit shall be kept under lock and key for unauthorised operation of these equipments or accidental operation during maintenance or emergency.

(8) All accesses and aisles that cross over or under or are adjacent to the conveyor should have adequate clearance and hand rails or other guards.

(9) Where a conveyor passes over work areas, aisles, or thoroughfares, suitable guards/ protected ceilings shall be provided to protect employees required to work below the conveyors.

(10) Post appropriate hazard warning signs at all crossovers, aisles, and passageways.

(11) Conveyors should be periodically inspected and tested for safety mechanisms, such as alarms,emergency stops, and safeguarding methods once in every month and log book shall be maintained.

(12) Screw conveyor housing should completely enclose the moving elements of the conveyor except for the loading and discharge points. If such guarding is not feasible, the entire conveyor should be fenced by railing unless it is guarded by location. Alternatively, the trough side walls should be high enough to prevent employees from reaching over falling into the trough.

5. Clothing.- No worker wearing loose clothing shall be permitted to work near moving machinery and conveyors.

6. Training.- (1) No worker shall be allowed to work in stone crushing units without attaining training on the hazards associated with stone crushing process and safe working procedures.

(2) Refresher training on the above subject shall also be attended by all the workers once in every year.

## PART 2

## RISKS DUE TO SILICA DUST

1. Preventive Control Measures.- No manipulation of stones containing silica shall be carried out in a factory or part of a factory unless the following preventive control measures are adopted, namely –

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**I. Engineering Control Measures**

(1) Wet Methods: (a) Airborne Silica Dust should be minimized or suppressed by wetting or drenching the manipulated area with water ;

(b) Machines with water drenching nozzles shall be used for drilling or cutting of concrete or masonry;

(2) Ventilation:- (a) An effective Local exhaust system should be provided and maintained to control/remove silica dust from industrial processes.

(b) Dilution/Ventilation with proper dust collection shall be used to reduce free silica dust concentration to within the permissible limits in large areas. No direct ventilation to atmosphere shall be resorted to.

(c) Dust collectors/High Efficiency Particulate Air (HEPA) filter shall be set up so that dust is removed from the source and all the transfer points to prevent contaminating work areas,

(d) Ventilation systems should be kept in good working conditions.

(3) Isolation: - (a) Effective containment methods should be used while carrying out sand blasting. Wet blasting shall be ideal.

(b) Cutting and drilling of cabins of vehicles or machinery that might contain free silica should be effectively enclosed and sealed.

(4) Dust Control:- (a) Vacuum System with High Efficiency Particulate Air (HEPA) filter shall be used to remove dust from work areas and from all transfer points;

(b) The belt conveyors transferring crushed material shall be totally enclosed throughout its length of travel:

Provided that such control measures as above are not necessary, if the process or operation being carried on, is such that, the level of dust created and prevailing is within the permissible limit of exposure specified in the Second Schedule of the Act and on which measurements are made from time to time as part of air monitoring studies and records maintained.

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**II. Medical Control Measures.-** (1) The occupier of every factory where a worker is employed in the processes specified in sub rule clause 1 of paragraph 1, shall ensure that every worker employed is examined by a Certifying Surgeon within 15 days of his first employment. Such medical examination shall include pulmonary function test and chest X Ray - Posterior Anterior (PA) view to be compared with standard ILO Radiographs in case of suspected Pneumoconiosis. No worker shall be allowed to work after 15 days of his first employment in the factory unless certified fit for such employment by a Certifying Surgeon or tested and examined by a Certifying Surgeon outside as insisted by the Occupier and advised by an Inspector.

(2) Every worker employed in the said processes shall be re-examined by a Certifying Surgeon at least once in every twelve months. Such re-examination shall, wherever the Certifying Surgeon considers appropriate, include all the tests as specified in sub-paragraph (1) above except the chest X-ray which shall be analysed by a radiologist specialized or trained in the field of analysing it with reference to ILO Radiograph specimens on Pneumoconiosis and chest X-ray in such suspected cases shall be carried out at least once in 3 years.

(3) Every worker employed in any of the aforesaid processes from the date on which the schedule has come into force, shall be radiologically examined by a qualified Radiologist at the cost of the occupier using standard size X-ray plates and with X-ray machine of capacity more than 300 milli ampere (mA). The report of such X-ray shall be submitted to the Medical Officer/ Certifying Surgeon/ Chief Inspector within three months of the said date.

(4) If at any time the Medical Officer/Certifying Surgeon is of the opinion that a worker is no longer fit for employment in the said process, on the ground that continuance therein would involve special danger to the health of the worker, then he shall make a record of his findings in the said Certificate and the Health Register. The entry of his findings shall contain the period for which he rectons the said person unfit for work in the said process/processes. The worker so removed from the process shall be provided with alternate placement facilities in the factory on job rotation basis, unless he is fully incapacitated in the opinion of the Certifying Surgeon and in that case, the person affected shall be suitably rehabilitated and compensated.

(5) No person who has been found unfit to work as stated in sub-paragraph (4) above shall be re-employed or permitted to work in the said processes unless the Certifying Surgeon, after further examination, again certifies him fit for employment in those processes.

(6) A worker already in employment and declared unfit by the Medical Inspector of Factories/Certifying Surgeon shall not be allowed to work on any of the processes specified in clause I of paragraph 1, unless he has been examined again using standard size chest |X-ray plate by a qualified Radiologist, at the cost of the occupier and certified to be fit to work on the said processes again.

(7) For the purpose of medical supervision by the Medical Practitioner/Certifying Surgeon

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appointed by an occupier, a room in the factory premises shall be maintained, properly cleaned, adequately lighted/ventilated and equipped with screen, table and with office stationery, chairs and other facilities and other equipments/instruments including X-ray analysing arrangements for radiological examinations and such other equipments as may be prescribed by the Chief Inspector from time to time shall be provided. The Medical Practitioner so appointed shall perform the following duties,-

(a) maintain health register;

(b) undertake medical supervision and examination of workers employed in the factory;

(c) look after the well-being and rehabilitation of sick, injured or affected workers;

(d) carry out inspection of work rooms where dangerous operations are carried out and advise the management of the measures to be adopted for the protection of health of the workers employed therein;

(e) educate the workers of the health hazards involved and motivate them to wear proper personal protective equipments at work place.

(8) The health records of the workers exposed to silicosis, shall be kept up for a minimum period of 40 years from the beginning of the employment or for 15 years after retirement or cessation of the employment, whichever is later and shall be accessible to workers concerned or to their authorised representatives.

(9) For the record of medical examinations and appropriate tests carried out by the said Medical Practitioner, a certificate of fitness and health shall be maintained in separate register approved by the Chief Inspector of Factories, and shall be kept readily available for inspection by the Inspector on demand.

**III. Administrative Control Measures.- (1)** ***Work place/Environment Monitoring:*** The Occupier shall ensure that work place and environment monitoring are performed to determine the magnitude of exposure and evaluate the engineering controls, respiratory protections, work practices and the need for medical surveillance and take corrective control measures as and when needed.

(a) Exposure/concentration measurements shall be made in close proximity of the employee's actual breathing zone;

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(b) Total sampling time shall be at least 7 hours;

(c) Work place and environment monitoring shall be repeated quarterly;

(d) The occupier shall make available the report of dust sampling to the nearby public on demand.

(2) ***Training/ Awareness*** : Workers shall be trained in the following:-

(a) Health effects of free silica dust exposure;

(b) Operations and materials that produce free silica dust hazards;

(c) Engineering controls and way of work controls that reduce dust concentrations;

(d) The importance of good housekeeping and cleanliness;

(e) Proper use of personal protective equipment such as respirators etc;

(f) Personal hygiene practices to reduce exposure.

(3) ***House Keeping: Maintenance of floors.***- (a) All floors or places where fine dust is likely to settle and whereon any person has to work or pass occasionally shall be made of impervious material and maintained in such condition that it can be thoroughly cleaned by any wet method or any other method which would prevent dust from being airborne in the process and shall be done at least once during each shift.

(b) For removing dust Dry sweeping or Compressed air shall not be used but wet methods or vacuum system with High Efficiency Particulate Air (HEPA) filter shall be used.

(c) Dust settled over-head, over a period of time, should be removed using any wet method before it becomes air borne again due to vibration, random air currents etc..

(4) ***Change room and washing facilities.***-(a) Washing and bathing facilities shall be conveniently located sufficiently away from toilets and easily accessible to the workers,

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(b) Cloak room with individual lockers shall be provided for employees to store cleaned clothing;

(c) Workers shall take bath and change the clothings before they leave the work site;

(d) Clothings worn during work shall not be cleaned by blowing or shaking;

(e) Eateries/lunch areas shall be located away from exposed areas.

(5) ***Display of Notices:-*** (a) Warning signs/ Posters shall be displayed conspicuously in a prominent place, visited by majority of the workers;

(b) The warning signs/poster shall listern the Hazards and the Precautions to be taken;

(c) The notices shall be in the local language as well as in the language understood by the majority of the workers;

(6) ***Personal Protective Equipment.-*** The occupier of every factory to which this schedule apply shall provide the following Personal Protective Equipment (PPEs) as per relevant National Standards or International Standards and as applicable to a particular work place.

(a) Dust Respirator.
or
(b) High Efficiency Particulate Air (HEPA) filter respirator or fume respirator.
or
(c) High Efficiency Particulate Air (HEPA) filter respirator with full face piece.
or
(d) Self contained breathing apparatus (SCBA)
or
(e) Active air respirator with a full face piece, helmet or hood.
or
(f) Self contained breathing apparatus (SCBA) with full face piece.
or
(g) Powered air purifying respirator with a High Efficiency Particulate Air (HEPA) filter.

(7). **Prohibition of Young Persons**- No young person shall be employed or permitted to work in any of the operations involving manipulation of stones containing silica or at any place where such operations are carried out.

( 8). **Exemptions** - (1) If in respect of any factory, the Chief Inspector is satisfied that owing to the exceptional circumstances or the lesser frequency of the processes carried on or for any other genuine reason, may relax all or any of the provisions of this schedule necessary for protection

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of the workers, by a certificate in writing, which he may in his discretion revoke at any time and exempt any factory from all or any of such provisions subject to such conditions, as he may think fit and specify therein.

(2) The notification of Silicosis and free silica related occupational diseases shall be strictly notified by the Medical Practitioner/Certifying Surgeon and in case of any lapses in concealing or failure to notify, the Medical Practitioner/Certifying Surgeon shall be liable to be prosecuted under sub section (4) of section 89 of the Factories Act, 1948.

(iii) for Schedule XIV, the following SCHEDULE shall be substituted, namely as under:-

**SCHEDULE – XIV**

**HANDLING AND PROCESSING OF ASBESTOS, MANUFACTURE OF ANY ARTICLE OUT OF ASBESTOS AND ANY OTHER PROCESS OF MANUFACTURE WHEREIN ASBESTOS IS USED IN ANY FORM.**

1. **Application.-** (1) This schedule shall apply to all manufacturing process as defined under Section 2(k) of the Act, carried on in a factory involving exposure of workers to asbestos and/or exposure of workers to product containing Asbestos.

(2) The Government may, at any time, for the purpose of giving effect to any scientifically validated evidence for a particular disease or cause made out of any research and development by specialised institutions or experts in the field, notify in the Official Gazette and make suitable changes in the said Schedule.

(3) The provisions of this schedule shall apply to all workers exposed to asbestos in the factory and it shall be the responsibility of the occupier of the factory to comply with the provisions of the schedule in true spirit of it and in full:

(4) (a) The occupier of the factory wherein asbestos or substances containing asbestos are in use, shall modify, evolve and adopt newer work procedures and practices generated out of any scientific research and technological updations and present it for approval by the Chief Inspector and follow such approved procedures thereafter;

(b) Notwithstanding anything contained in sub-paragraph (1) above use of asbestos is prohibited in the manufacturing process as notified by the Government in this behalf;

(c) (i) spraying of all forms of asbestos is prohibited in a factory;

(ii) The prohibition in respect of spraying of asbestos referred to in sub-para (i) may be exempted by the Chief Inspector if the Occupier represents that such spraying is inevitable owing to the specific nature of the product and that he had taken adequate measures for ensuring the safety and health of workers to the satisfaction of the Chief Inspector.

2. **Definitions.-** For the purpose of this Schedule, –

(a) "asbestos" means any fibrous silicate mineral and any admixture containing actionlite, amosite, anthophyllite, chrysotile, crocidolite, tremolite or any mixture thereof, whether crude, crushed or opened;

(b) "asbestos textiles" means yarn or clothes composed of asbestos or asbestos mixed with any other materials;

(c) "approved" means approved for the time being in writing by the Chief Inspector;

(d) "breathing apparatus" means a helmet or face piece with necessary air connection by

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means of which a person using it breath air, free of dust, or any other approved apparatus of the same kind used for the same purpose;

(e) "efficient exhaust draught" means a localised ventilation by mechanical means for the removal of dust so as to prevent dust from escaping into any place where work is being carried on. No draught shall be deemed to be efficient that fails to control dust produced at the point where such dust originates;

(f) "preparing" means crushing, disintegrating and any other processes in between or incidental to the opening of asbestos;

(g) "protective clothing" means overalls and head covering, which (in either case) when worn protect the worker from harmful asbestos dust;

(h) "asbestos dust" means airborne particles of asbestos or settled particles of asbestos that may become airborne in the factory;

(i) "airborne asbestos dust", for the purposes of measurement, means dust particles measured by gravimetric assessment or other equivalent method;

(j) "respirable asbestos fibres" means asbestos fibres having diameter of less than 3 micrometre and a length to diameter ratio greater than 3:1;

(k) "exposure to asbestos" means exposure to airborne respirable asbestos fibres or asbestos dust; whether originating from asbestos or from asbestogenus minerals, materials or products containing asbestos in the factory.

3. **Demolition of Plants or Structures made of Asbestos**.– No person or firm shall carry out any demolition of plants or structures containing asbestos-insulation-material or remove asbestosgenus material from building or structures from which asbestos is likely to become air-borne, unless recognized and duly empowered by the Chief Inspector of Factories as qualified to carry out such work in accordance with the provisions of this Schedule.

4. **Tools and equipment**.- Any tools or equipment used in processes to which this schedule applies shall be such that they do not create asbestos dust above the permissible limit or they are equipped with efficient exhaust draught.

5. **Exhaust draught**.- (1) An effective exhaust draught shall be provided and maintained to control dust from the following processes/machines and structures or fixtures as per the relevant National Standards.-

(a) machines used in the manufacture and conveying, namely :-
  (i) preparing, grinding or dry mixing machines;
  (ii) carding, card waste and ring spinning machines and looms;
  (iii) machines or other plant fed with asbestos;
  (iv) machines used for the cutting, grinding, turning, drilling, abrading or polishing, in the dry state, of articles composed wholly or partly of asbestos;

(b) cleaning and grinding of the cylinders or other parts of a carding machine;

(c) chambers, hoppers or other structures into which loose asbestos is delivered or passed in between.

(d) work-benches for asbestos waste sorting or for other manipulation or where asbestos is handled manually.

(e) workplaces at which the filling or emptying of sacks, shipments or other Portable containers or weighing or other process incidental thereto are carried on manually;

(f) sack cleaning machines;

(g) mixing and blending of asbestos by hand; and

(h) any other process in which dust is given off into the work environment.

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(2) Exhaust ventilation equipment provided in accordance with sub-paragraph (1) above shall, while any work of maintenance or repair of the machinery, apparatus or other plant or equipment for which it is provided is being carried on, be provided an exhaust draught which prevents the entry of asbestos dust into the air of any work place.

(3) Arrangements shall be made to prevent asbestos dust discharged from exhaust apparatus being drawn into the air of any workroom.

(4) The asbestos bearing dust removed from any workroom by the exhaust system shall be collected in suitable receptacles or filter bags and shall be isolated from all work areas.

6. **Testing and examination of ventilating systems**.- (1) All ventilating systems used for the purpose of extracting or suppressing dust as required by this Schedule shall be as per the relevant International/Indian Standards, kept examined and inspected once every week by a responsible person. It shall be thoroughly examined and tested by a competent person once in every period of 12 months. Any defects found with such examinations or test shall be rectified forthwith.

(2) A register containing particulars of such examination and tests and the state of the plant and the repairs or alternations (if any) found to be necessary shall be kept and shall be made available for inspection on demand by an Inspector.

7. **Segregation in case of certain process**.-

Mixing or blending of asbestos by hand, or making or repairing of insulating mattresses composed wholly or partly of asbestos shall not be carried on in any room in which some other work is done.

8. **Storage and distribution of loose asbestos**.- All loose asbestos shall, while not in use, be kept in suitable closed receptacles capable of preventing the escape of asbestos dust there from. Such asbestos shall not be distributed within a factory except in closed receptacles or in a totally enclosed conveyance system.

9. **Asbestos sacks**.- (1) All sacks used as receptacles for the purpose of transport of asbestos within the factory shall be constructed of impermeable materials and shall be kept in good repair.

(2) A sack is which asbestos has been kept shall not be cleaned by beating with hand. This shall be done with a machine, complying with requirements of an exhaust draught system detailed under paragraph 5.

(3) Asbestos sacks or receptacles which contain asbestos shall be disposed off in a safe manner.

10. **Maintenance of floors and workplaces**.- (1) In every room in which any of the requirements of this Schedule apply -

(a) the floors, work-benches, machinery and plant shall be kept in a clean state and free from asbestos debris. Suitable arrangements shall be made for the storage of asbestos not immediately meant for use; and

(b) the floors shall be kept free from any materials, plant or other articles not immediately required for the work carried on in the room, that would obstruct the proper cleaning of the floor.

(2) The cleaning as mentioned in sub-rule (1) shall in so far as is practicable, be

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carried out by means of vacuum cleaning equipment so designed and constructed and so used that, asbestos dust neither escape nor discharge into the air of any work place.

(3) When the cleaning is done by any method other than that mentioned in sub-paragraph (2), the persons doing cleaning work, and any other person employed in that room shall be provided with respiratory protective equipment and protective clothing.

(4) The vacuum cleaning equipment used in accordance with provisions of sub-paragraph (2), shall be properly maintained and after each cleaning kept in a clean state free from asbestos waste and dust.

(5) Asbestos waste shall not be permitted to remain on the floors or other surfaces at the work place at the end of the working shift and shall be transferred without delay to suitable receptacles. Any spillage of asbestos waste occurring during the course of the work at any time shall be removed and transferred to the receptacles maintained for the purpose without delay by proper means avoiding direct handling.

(6) (a) The occupier shall as far as possible, better replace asbestos or certain types of asbestos or products containing asbestos with other alternative materials or products or shall use alternative technology, scientifically validated as harmless or less harmful, wherever or whichever possible.

(b) The occupier should take all the measures to prevent or control the release of asbestos in to the air and ensure that the exposure limits or other exposure criteria are complied with and reduce exposure to as low to the manner

11. **Breathing Apparatus, Personnel Protective Equipment and Clothing**.-(1) The occupier of every factory to which this Schedule applies shall provide the workers with personnel protective equipment such as hand gloves, shoes, helmets, goggles, earplug, aprons, safety belt, overall suits, etc. as per the relevant National or International Standards as required. The breathing apparatus and appropriate clothing as per the relevant National or International standards shall be decided in consultation with the workers representatives and the same shall be maintained in good condition for use with immediate replacements as and when needed for use:

(a) in chambers containing loose asbestos;
(b) in cleaning, dust settling or filtering chambers of apparatus:
(c) in cleaning the cylinders, including the defer cylinders, or other parts of a carding machine by means of hand-stickles;
(d) in filling, beating, or levelling in the manufacture or repair of insulating mattresses; and
(e) in any other operation or circumstances in which it is impracticable to adopt technical means to control asbestos dust in the work environment within the permissible limit.

(2) Suitable accommodation in easily accessible location shall be provided for the use of workers for wearing breathing apparatus and protective clothing provided in accordance with this rule and for the storage of such apparatus and clothing when not in use.

(3) All breathing apparatus and protective clothing that are not in use shall be stored in the accommodation provided in accordance with sub-paragraph (2) above.

(4) All protective clothing in use shall be de-dusted under an efficient exhaust draught or by vacuum cleaning and shall be washed at suitable intervals. The cleaning schedule and procedure should be such as to ensure the efficiency of the equipments intact while in use.

(5) All breathing apparatus shall be cleaned and disinfected at suitable intervals and

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thoroughly inspected once every month by a responsible person.

(6) A record of the cleaning, maintenance and condition of the breathing apparatus shall be maintained in a register and shall be readily made available for inspection by an Inspector.

(7) No person shall be employed to perform any work specified in sub-paragraph (1) above for which breathing apparatus is to be compulsorily provided unless he has been fully instructed and is aware of the proper use of that equipment.

(8) No breathing apparatus which has been worn by a person shall be worn by another person unless it has been thoroughly cleaned and disinfected and the person has been instructed of the proper use of the equipment.

(9) No worker shall take home any work clothing or special protective clothing or personal protective equipment provided to him.

12. **Separate accommodation for personal clothing**.- A separate accommodation shall be provided in a conveniently accessible position for all persons employed in operations to which this schedule applies for storing of personal clothing. This should be separated from the accommodation provided under sub-paragraph (2) of paragraph 10 to 11 prevent contamination of personal clothing.

13. **Washing and bathing facilities**.- (1) There shall be provided and maintained in a clean state and in good repair, for the use of all workers, employed in the processes covered under the schedule, adequate washing and bathing places having sufficient supply of water ensuring privacy at the rate of one location for every 15 persons employed.

(2) The washing places shall have stand-pipes positioned at intervals of not less than one metre.

(3) Not less than one half of the total number of washing places shall be provided with bathrooms.

(4) Sufficient supply of clean towels shall be provided:

Provided that such towels shall be supplied for each worker if so ordered by the Inspector.

(5) Sufficient supply of soap and brushes shall be provided.

14. **Mess Room**.- (1) There shall be provided and maintained for the use of all workers employed in the factory covered by this schedule, remaining on the premises during the rest intervals, a suitable mess room which shall be furnished with sufficient tables and benches with back rest,

15. **Prohibition of employment of young persons**.- No young person shall be employed in any of the process covered by this schedule.

16. **Prohibition relating to Smoking**.- No person shall smoke in any area where processes covered by this schedule are carried on. A notice in the language understood by majority of the workers shall be placed in the plant prohibiting smoking in such areas.

17. **Pictorial Cautionary Notices**.- Cautionary notices in the form specified in appendix and printed in the language easily understood by majority of workers shall be displayed in prominent places in the workrooms where asbestos or substances containing asbestos are manufactured, handled or used.

18. **Air monitoring**.- To ensure the effectiveness of control measures in continuous or repetitive processes, the monitoring of asbestos fibres in air shall be carried out and monitored at least once in every shift. Individual examination of workers shall be carried out when they leave after every

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shift and the result so obtained shall be entered in a register and ensure that

(a) there is not any substantial change in the workplace conditions harmful to the workers;

(b) the results of last two consecutive measurements have not exceeded half the value of the relevant control limit; and

(c) all such factories shall adopt membrane filter test as per the relevant National Standards without fail.

19. **Medical Control Measures**.- (1) The occupier of every factory wherein a worker is employed in the processes specified in clause I of paragraph 1 shall ensure that every worker employed be examined by a Certifying Surgeon as advised by the Inspector within 15 days of his first employment. Such medical examination shall include sputum examination for asbestos, toxicity, followed with pulmonary function test and chest X Ray - Posterior -Anterior (PA) and, the X-rays shall be compared with standard ILO Radiographs on Pneumoconiosis. No worker shall be allowed to work after 15 days of his first employment in the factory unless certified fit for such employment by the Certifying Surgeon again.

(2) Every worker employed in the said processes shall be re-examined by a Certifying Surgeon at least once in every twelve months. Such re-examination shall, wherever the Certifying Surgeon considers appropriate, include all the tests as specified in sub-paragraph (1) above except chest X-ray which shall be read by a radiologist specialized/ trained in the field of reading ILO Radiographs on Pneumoconiosis and in suspected cases the chest X-ray which shall be repeated at least once in 3 years.

(3) Every worker employed in any of the aforesaid processes shall be radiologically examined by a qualified Radiologist at the cost of the occupier using standard size X-ray plates and with X-ray machine with power exceeding 300 milliampere (mA). The report of such X-ray shall be placed before the Certifying Surgeon/ Chief Inspector within three months.

(4) If at any time the Medical Officer/Certifying Surgeon is of the opinion that a worker is no longer fit for employment in the said process on the ground that continuance therein would involve special danger to the health of the worker he shall make a record of his findings in Certificate and the health register. The entry of his findings in these documents shall also include the period for which he considers the said person unfit for work in such processes. The person so suspended from the process shall be provided with alternate placement facilities unless he fully is incapacitated in the opinion of the Certifying Surgeon, in which case the person affected shall be suitably rehabilitated.

(5) No person who has been found unfit to work as said in sub-paragraph (4) above shall be re-employed or permitted to work in the said processes unless the Certifying Surgeon, after further examination, again certifies him fit for employment in those processes.

(6) A worker already in employment and declared unfit by the Medical Officer/Certifying Surgeon shall not be allowed to work on any of the processes specified in clause I of the paragraph 1, unless he has been examined again along with standard size chest X-ray plate by a qualified Radiologist, at the cost of the occupier and certified to be fit to work in the said processes again.

(7) For conducting medical examination, the Medical Officer or Certifying Surgeon appointed by the Occupier shall be provided an exclusive room in the factory premises maintained

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properly cleaned, adequately lighted ventilated and furnished with a screen, a table with office stationary, chairs and other facilities and other instruments including X-ray arrangements for such examinations and such other equipment as may be prescribed by the Chief Inspector for time to time. The medical practitioner so appointed shall perform the following duties, namely:-

(a) undertake medical supervision of persons employed in the factory;

(b) look after health and rehabilitation of sick, injured or affected workers;

(c) carry out inspection of work rooms where dangerous operations are being carried out and advise the management of the measures to be adopted for the protection of health of the workers employed therein.

(d) maintain a health register of workers in the prescribed format

(8) The Health Records of the workers exposed to asbestos, shall be kept upto a minimum period of 40 years from the beginning of the employment or 15 years after retirement or cessation of the employment, whichever is later and shall be accessible to workers concerned or their representatives.

(9) For the record of medical examinations and appropriate tests carried out by the medical practitioner, a certificate of fitness and health register shall be maintained in separately approved by the Chief Inspector of Factories, and shall be kept readily available for inspection by the Inspector on demand.

20. **Exemptions**.- (1) If in respect of any factory, the Chief Inspector is satisfied that owing to the exceptional circumstances or infrequent nature of the processes or for any other reason, all or any of the provisions of this Schedule is not necessary for protection of the workers in the factory, the Chief Inspector may by a certificate in writing, which he may at his discretion revoke at any time, exempt such factory from all or any of such provisions subject to such conditions, if any, as he may specify therein.

(2) The Chief Inspector may permit temporary derogation, through a notification in an Official Gazette, from the measures prescribed in this Schedule under conditions and within limits of time determined after consultation with the representative organizations of employers and workers concerned.

## APPENDIX

## PICTORIAL CAUTIONARY NOTICE

1. Asbestos/asbestos dust which is used, handled or manipulated in the factory is highly hazardous to health.

2. Prolonged exposure to asbestos dust may lead to serious diseases like lung fibrosis (Asbestosis) and lung cancer.

3. Entry is prohibited without protective equipment.

4. Wear the protective equipment to safeguard your health.

5. No food stuffs or drinks shall be brought into this area.

6. Smoking, eating food or drinking and chewing tobacco in this area is prohibited.

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7. The area shall be maintain cleanly.

8. Dry sweeping in this area is prohibited. Any spillage of asbestos shall be cleaned by vacuum cleaning only.

9. A sack or container contaminated with asbestos shall not be cleaned by hand whilst disposed of by an appropriate method.

10. All protective equipment and clothing shall be de-dusted by vacuum cleaning and stored in appropriate place provided for the purpose.

11. Entry of unauthorized persons or authorized persons without proper protective equipment is prohibited.

12. Report for the prescribed medical examinations and tests regularly for your own health.

13. Report to your doctor immediately if you have persistent breathlessness, chest tightness, or cough.

**(iv) SCHEDULE XXIV, the following SCHEDULE shall be substituted, namely:-**

SCHEDULE XXIV

OPERATIONS INVOLVING HIGH NOISE AND VIBRATION LEVELS

**Part-A High Noise Levels:**

1. **Application**- This Part of the Schedule shall apply to operations involved in any manufacturing process where noise level is high from the permitted levels.

2. **Definitions**.- For the purpose of this schedule,-

(a) "noise" means any unwanted sound.

(b) "high noise level" means noise level measured on the A-weighted scale which is 85 dB or above.

(c) "Decibel" means one-tenth of "Bel" which is the fundamental division of a logarithmic scale used to express the ratio of two specified or implied quantities, the number of "Bels" denoting such a ratio being the logarithm to the base of 10 of this ratio. The noise level (or the sound pressure level) corresponds to a reference pressure of 20 x 10 Newton per square meter or 0.0002 dynes per square centimetre, the threshold of hearing, i.e, the lowest sound pressure level necessary to produce the sensation of hearing in average healthy listeners. The decibel in abbreviated form is dB.

(d) "frequency" is the rate of pressure variations expressed in cycles per second or hertz.

(e) "dB A" refers to sound level in decibels as measured on a sound level meter operating on the A-weighting net work with slow meter response.

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(f) "A-weighting" means making graded adjustments in the intensities of sound for various frequencies for the purpose of noise measurement, so that the sound pressure level measured by an instrument reflects the actual response of the human ear to the sound being measured.

3. **Protection against Noise**.- (1) In every factory, a suitable engineering controls or administrative measures shall be taken to ensure, in so far as is reasonably practicable, so that no worker is exposed to sound levels exceeding the maximum permissible noise exposure levels specified in Tables 1 and 2.

**TABLE 1**
**PERMISSIBLE EXPOSURE IN CASES OF CONTINUOUS NOISE**

Total time of exposure, continuous or Sound pressure level in dBA for short term exposures permissible per day in hours

| Hours | dBA |
|---|---|
| 8 | 85 |
| 6 | 87 |
| 4 | 90 |
| 3 | 92 |
| 2 | 95 |
| 1 ½ | 97 |
| 1 | 100 |
| ¾ | 102 |
| ½ | 105 |
| ¼ | 110 |

Notes : (1) Exposure in excess of 110 dBA shall not be permitted.

(2) For any period of exposure falling in between any figure and the next higher or lower figure as indicated in column 1, the permissible sound pressure level is to be determined by extrapolation on a proportionate basis.

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TABLE – 2

## PERMISSIBLE EXPOSURE LEVELS OF IMPULSIVE OR IMPACT NOISE

(1) Peak sound pressure level in dB permitted viz. the permissible number of impulses or impact per day shall be,-

| *dB* | *Nos. of impulses per day* |
|---|---|
| 140 | 100 |
| 135 | 315 |
| 130 | 1,000 |
| 125 | 3,160 |
| 120 | 10,000 |

*Notes* :- (1) Exposure in excess of 140 dB peak sound pressure level shall not be permitted.

(2) For any peak sound pressure level falling in between any figure and the next higher or lower figure as indicated in column 1, the permitted number of impulses or impacts per day is to be determined by extrapolation on a proportionate basis.

(2) For the purposes of this Schedule, if the variations in the noise level involve maximum at intervals of one second or less, the noise is to be considered as a continuous one and only the criteria given in Table 1. In other cases, the noise is to be considered as impulsive or impact noise and the criteria given in Table 2 shall apply.

(3) When the daily exposure is composed of two or more periods of noise exposure at different levels then their combined effect should be considered, rather than the individual effect. The mixed exposure is considered to have exceed the limit value if the sum of the fractions

C1/T1 +C2 /T2 +..... Cn/Tn exceeds unity,

Where the C1, C2 etc. indicate the total time of actual exposure at a specified noise level and T1, T2, etc. denote the time of exposure permissible at that level. Noise exposure of less than 90 dBA may be ignored in the above calculation.

(4) Where it is not possible to reduce the noise exposure to the levels specified in paragraph (1) above by reasonably practicable engineering control or administrative measures, the noise exposure shall be reduced to the greatest extent practically possible by such control measures. and each worker so exposed shall be provided with suitable ear protectors as per relevant

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national or international standards as to reduce the exposure to the levels specified in paragraph (1) above.

(5) The Occupier shall provide personal hearing protectors to the Workers:

(a) so as to eliminate the risk to hearing or to reduce the risk to a level as is reasonably practicable;

(b) after consultation with the workers concerned or their representatives, suitable protectors conforming to the bodily features of the workers shall be provided free of cost;

(c) ensure that hearing protectors are properly fitted, periodically checked for the effectiveness, worn and maintained in good working condition and repaired as and when needed;

(d) ensure that workers are given periodical training in the use, care and maintenance of the Personal hearing protectors;

(6) Where the ear protectors provided in accordance with sub-paragraph (3) and (4) and worn by a worker is ineffective to attenuate the noise from harming his ear, as observed when, measured by subtracting the attenuation value in dBA from the measured sound pressure level, has gone to a level not permissible under Table 1 or Table 2 as the case may be, the noise exposure period then shall be suitably reduced to correspond to the permissible noise exposures specified in sub-paragraph (1) above.

(7) (a) In all cases where the prevailing sound levels exceed the permissible levels specified in sub-paragraph (1) above there shall be administered an effective hearing conservation programme and which shall include among other things hearing conservation measures, pre-employment and periodical auditory surveys on workers exposed to noise exceeding the permissible levels, including rehabilitation of such workers either by reducing the exposure to the noise levels or by transferring them to places where noise levels are relatively less or by any other suitable means.

(b) Every worker employed in areas where the noise exceeds the maximum permissible exposure levels specified in sub-paragraph (1) above shall be subjected to auditory examination by a Certifying Surgeon within 14 days of his first employment and thereafter, shall be re-examined at least once in every 12 months. Such initial and periodical examinations shall include tests which the Certifying Surgeon may consider appropriate and shall include determination of auditory thresholds for pure tones of 125, 250, 500, 1000, 2000, 4000 and 8000 cycles per second.

**Part-B High Vibration Levels:**

(1) **Applications**.- This part of the Schedule shall apply to all operations in a manufacturing or part thereof having high undesired vibration levels.

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(2) **Definitions:**

(a) "daily exposure" means the quantity of mechanical vibration to which a worker is exposed during a working day, that also takes into account the magnitude and duration of such vibration levels;

(b) "vibration" means a mechanical phenomenon where by oscillations occur about an equilibrium point. The oscillations may be periodic or random;

(c) "high vibration" means any exposure greater than the exposure limit value and action-value specified in paragraph 3 below

(d) "exposure action value" means the level of daily exposure set out in paragraph 3 below for any worker which, if reached or exceeded, requires specified action to be taken to reduce the risk;

(e) "exposure limit value" means the level of daily exposure for any worker that shall not be exceeded, as specified in paragraph 3 below.

(f) "hand-arm vibration" means mechanical vibration which is transmitted onto the hands and arms during a work or mechanical activity;

(g) "mechanical vibration" means vibration occurring in a part of the machinery or equipment or in a vehicle consequent on its operation; and

(h) "whole-body vibration" means mechanical vibration which is transmitted to the body, when sitting or standing, during a work activity or as described in sub paragraph 3(2) below.

(3) **Exposure limit values and action values.-** (1) For hand-arm vibration,—

(a) the daily exposure limit value is 5 $m/s^2A(8)$;

(b) the daily exposure action value is 2.5 $m/s^2A(8)$, and daily exposure shall be ascertained on the basis of the values set out in the relevant national/international standards, specified in Table 1 below.

(2) For whole body vibration,—

(a) the daily exposure limit value is 1.15 $m/s^2A(8)$;

(b) the daily exposure action value is 0.5 $m/s^2A(8)$; and daily exposure shall be ascertained on the basis of the values set out in the relevant national/international standards

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**TABLE - 1**

The Threshold Limit Values (TLVs) for exposure of hands while using hand held/hand operated devices to vibration levels in X, Y, and Z directions shall be as given below:

| Total Daily Exposure Duration (hours) | Maximum value of frequency weighted acceleration ($m/s^2$) in any direction |
|---|---|
| 4 to less than 8 hours | 4 |
| 2 to less than 4 hours | 6 |
| 1 to less than 2 hours | 8 |
| less than 1hour | 12 |

(3) Assessment of vibration exposure shall be made for each direction (X, Y, Z) since vibration is a vector quantity having (magnitude and direction). In each direction, the magnitude of the vibration during normal operation of the power tool, machine or work piece should be expressed by the root-mean-square (RMS) value of the frequency –weighted component acceleration, in units, meter per second squared ($m/s^2$)

(4) **Assessment of risk to health due to vibration at work places**.- (a) The occupier who carries out work which is liable to expose any worker to vibration shall make a suitable and sufficient assessment with the help of a competent agency of the risk involved in that work to the health and safety of workers and the assessment so made shall identify the control measures that need to be taken.

(b) The risk assessment should be reviewed whenever it is felt that the changes in the process has made the earlier risk assessment no longer valid.

(5) **Engineering Control Measures**.- (1) The occupier shall ensure that risk from the exposure of workers to vibration is either eliminated at source or, where this is not reasonably practicable, reduced to as low a level as is reasonably practicable.

(2) Where it is not reasonably practicable to eliminate risk at source, pursuant to clause (a) of paragraph 4 an exposure-action-value is likely to be reached or exceeded, the employer shall reduce exposure to a level as is reasonably practicable by establishing and implementing a re-engineering and rehabilitation programme, which is appropriate to the type of activity that is being carried on.

(3) The occupier shall ensure that following measures are taken.-

(a) work equipment shall be of appropriate ergonomic design, taking into account, the work to be done, reducing the vibration levels to the minimum;

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(b) work equipment shall have auxiliary equipment to reduce the risk of injuries caused by vibration; supported with appropriate maintenance programmes for the equipment and the associated systems and work place;

(4) Subject to sub - rule 2, the employer shall ensure that the workers are not exposed to vibration above the exposure limit value; and if not, shall take necessary steps to identify the reasons for the limit being exceeded and reduce the exposure to vibration, to below the limit value specified:

Provided where the exposure of a worker to vibration is usually below the exposure-action-value but varies from time to time and may occasionally exceed the exposure limit value, appropriate measures shall be taken to reduce the levels to within specified limits.

Provided further, any exposure to vibration averaged over one week is less than the exposure limit value and there is evidence to show that the risk from the actual pattern of exposure is less than the corresponding risk from constant exposure at the exposure limit value; and that the risk is reduced to as low level as is reasonably practicable, taking into account the special circumstances, the pattern shall be maintained in the long run.

(6) **Medical Examination**.- (1) The occupier shall ensure that the workers who are likely to be exposed to vibration at levels above exposure action value are subjected to periodical medical examination once in a year. The medical examination shall include general and physical examination as well as special test for Reynaud's phenomenon.

(2) The health record of workers shall be maintained by the occupier for a period of 5 years from the date of last test and the same shall be produced before the Inspector of Factories on demand.

(3) If at any time, the Certifying Surgeon/Factory Medical Inspector is of the opinion that the worker is no longer fit to work in the said process on the ground that continuance therein would involve danger to the health of the worker, he shall make a record of his findings in fitness certificate and the health register. The entry of his findings in those documents shall include the period for which he considers the person unfit for work in the manufacturing process/processes. The person declared unfit in such circumstances shall be provided with alternate placement facility unless in the opinion of the Certifying Surgeon, he is fully incapacitated and in that case the person affected shall be suitably rehabilitated with sufficient compensation.

(7) **Personal Protective Equipment**.- (1) The occupier shall ensure that the workers who are likely to be exposed to high levels of vibration are provided with appropriate Personal Protective Equipment and protective clothing conforming to the National or International Standards. Such Personal Protective Equipment should include hand gloves and safety shoes. The protective clothing shall be able to protect the workers from chilly damp areas.

(2) The occupier shall ensure that workers are given periodical training in the daily use, care and maintenance of their Personal Protective Equipment.

(8) **Administrative Control Measures**.- (1) The occupier shall ensure that as far as reasonably practicable, all necessary control measures are taken to ensure that the unwanted vibrations does not affect the health of the workers employed in the process to which this part of Schedule apply.

(2) The occupier shall provide all workers with information instruction and training to limit the exposure within limit values and action values as set out in paragraph -3.

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(3) Without prejudice to the generality of paragraph (1) above, the information, instruction and training provided under that paragraph should include–

(i) the exposure limit values and action values set out in sub paragraph -3.

(ii) safe working practices to minimise exposure to vibration; and

(iii) suitable and sufficient information and training to inculcate right practises while handling work equipment to minimise the exposure to vibration, and to use the equipments safely and in the right manner.

(iv) limitation of the duration and magnitude of exposure to vibration;

(v) appropriate work schedules with adequate rest periods; and

(vi) The information, instruction and training required by sub-paragraph (2) above shall be updated to take into account the significant changes that are coming up in the type of work being carried on or the working methods used by the employer.

(4) The Occupier shall display pictorial cautionary notices/warning signs at conspicuous places more frequented by workers where there are possibilities of them being exposed to undesired levels of high vibrations.

(9) **Prohibition in employment of women, young persons and persons with disabilities**.- No women or young person or persons with disabilities shall be employed in the process covered by this part of the schedule.

(10) **Exemptions**.- If in respect of any factory, the Chief Inspector is satisfied that owing to any exceptional circumstances, or intermittent nature of the process, or for any other reason, application of all or any of the provisions of this schedule is not necessary for the protection of the persons employed in such factory, he may by an order in writing which he may at his discretion revoke, exempt such factory from all or any of the provisions on such conditions and for such period as he may specify.

**(v) for SCHEDULE XXVI, the following SCHEDULE shall be substituted, namely:-**

**SCHEDULE XXVI**

**FLAMMABLE LIQUIFIED OR COMPRESSED GASES AND HIGHLY FLAMMABLE LIQUIDS**

1. **Application**.—Provisions of this Schedule shall apply to all factories where flammable liquified or compressed gases or highly flammable liquids are manufactured, stored handled used.

2. **Definitions**.—For the purposes of this Schedule,—

(a) "bulk storage" means bullet or horton sphere or mounded vessel used for storage of flammable liquified or compressed gases or highly flammable liquids having storage capacity

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exceeding one thousand litres equivalent water holding capacity;

(b) "bullet" means a horizontal cylindrical pressure vessel with hemispherical or dished ends used for storage of flammable liquified or compressed gas;

(c) "explosive mixture" means a mixture of combustion agent (oxidising substance in gaseous, liquid or solid state) and a fuel (oxidisable substance in gaseous, liquid or solid state) in such proportions that could give rise to a very rapid and violent oxidation reaction, liberating more kinetic energy than is dissipated through conduction and convection, ultimately causing explosion;

(d) "fire proof" means a passive means of protecting a structure or equipment or vessel from exposure to direct fire or flame impingement or prolonged exposure to high intensity radiant thermal flux, by the application of a coating or cladding of certain heat-resistant substance or mixture of a specified rating;

(e) "fire safe" means a provision of dual seating to control leakage to within acceptable level, even after damage, due to fire, as applied to valves;

(f) "flammable compressed gas" means flammable compressed gas as defined in rule 2 of the Static and Mobile Pressure Vessels (Unfired) Rules, 1981 issued under the Explosives Act, 1884 (Central Act IV of 1884);

(g) "flammable liquified gas" means a flammable gas kept in liquified state by the application of pressure at normal ambient temperature, 13% (thirteen percentage) or less of which by volume with air forms a flammable mixture or which has a flammable range with air of atleast 12% (twelve percentage) by volume regardless of the lower flammable limits;

(h) "gas free" means a condition where the concentration of a flammable gas in an equipment or a vessel is well below the threshold limits (lower explosive limit), and it is safe for a man to enter into the equipment or Vessel or to conduct "hot work" there, as the case may be;

(i) "highly flammable liquid" means any liquid including its solution, emulsion or suspension which when tested in a manner specified by sections 14 and 15 of the Petroleum Act, 1934 (Central Act XXX of 1934) gives off flammable vapours at a temperature less than 32 degrees Centigrade;

(j) "horton sphere" means a spherical Pressure Vessel, supported vertically and is used for the storage of flammable liquified or compressed gas;

(k)"hot work" means an activity which may produce enough heat or spark to ignite a flammable or explosive mixture;

(l) "mounded vessel" means a pressure vessel for the storage of flammable liquified or compressed gas, which is placed above ground level and is completely covered by a mound of earth or similar inert material uncovering nozzles, manhole covers and inspection covers fitted on top of the vessel;

(m)"purging" means an act of replacing the atmosphere inside a vessel or a container with an inert gas to such an extent as to push away the traces of flammable gases as to prevent the formation of an explosive mixture;

(n) "purging into service" means the process of replacement of gas in a closed system with an inert gas and then replacing the inert gas with the desired flammable gas, vapour or liquid;

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(o) "purging out of service" means the replacement of flammable content within a closed system with an inert gas and then replacing it with air to such an extent that it is gas free and safe for the entry of any person for work;

(p) "remote operated emergency valve" means a shut-off valve capable of being remotely operated that closes automatically on loosing actuating power or in fire engulfment and which is fire-safe.

3. **Storage**.—Every highly flammable liquid, flammable liquified or compressed gas used in every factory shall be stored in bulk in suitable fixed storage tank made of adequate fire resistant construction and located in a safe position under ground or in the open.

4. **Location and spacing**.—Before deciding on the location of any storage vessel, risk analysis study shall be carried out and based on the risk analysis study, the storage vessel shall be located in the manner specified below:—

(a) the location shall not interfere with the movement of vehicles. The perceived Risk Contour should not intercept the public places such as assembly points, canteen, rest sheds and similar other locations;

(b) before locating any storage vessel, the soil condition shall be assessed as desired by the superstructure;

(c) the storage vessel shall be placed above ground in open and in a well-ventilated place;

(d) mounded vessels shall be so located that the manholes and pressure relief valves are in a well-ventilated position;

(e) the minimum set back for safety between the storage vessels and buildings, boundary or fixed ignition source shall be in accordance with the Static and Mobile Pressure Vessels (Unfired) Rules, 1981, as amended from time to time;

(f) the storage vessels shall not be installed one above the other;

(g) the bullets shall be so located that their dished ends do not point towards other vessels, vital process equipments, control rooms, loading stations, nearby buildings or storage tanks containing hazardous materials.

(h) raw vegetation such as weeds, short/long grass, deciduous shrubs and trees and any combustible materials shall be removed from time to time from the storage vessel-area, covered under the licensed premises;

(i) the storage vessels shall not be located within the bunded enclosure of any heat source or other flammable liquids, gases or oxidisers;

(j) the storage vessels, pumping equipment, loading and unloading facilities and vapourisers shall be located within atleast 2 metres high fencing along the perimeter of the safety zone and the fenced compound shall have atleast two separate gates for the safe exit of persons and vehicles in case of any emergency, preferably on the upwind/crosswind side.

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(k) the number of storage vessels in one battery shall not exceed six;

(l) storage vessels within a group shall be so located that their longitudinal axes are Parallel to each other;

(m) spheres and bullets shall not be grouped together and shall be provided with separate piping manifold, so as to avoid overfilling of a vessel due to head difference with another connected vessel in the same manifold.

(n) the top surface of the storage vessels installed in a battery shall be on the same plane so that the pressure safety valve blow-out from them do not affect the other;

(o) the flooring of the bullets or spheres, shall be sloped in such a way that the spilled liquid or high density gas from any vessel will not flow towards other vessels nearby;

(p) the storage vessels shall be located in such a way that the high tension electrical cables will not cross overhead or pass nearby the licensed premises in which they are kept;

(q) storage vessels shall not be kept in places that are susceptible to frequent flooding;

(r) the level of the storage vessels shall be elevated slightly from the surrounding terrain to ensure complete drainage of water;

(s)every container, vessel or tank used for storing highly flammable liquid or flammable liquified or compressed gas shall be clearly and in bold marked "Danger-Highly Flammable Liquid" or "Danger-Flammable Liquified or Compressed Gas", as the case may be.

5. **Design of Storage vessels**.—(1) **General**—Each static vessel for the storage of flammable liquified or compressed gas shall be provided with the following fittings and instruments which are suitable for use at pressures not less than the design pressure of the vessel and for the temperatures appropriate to the worst operating conditions, namely:—

(a) at least two pressure safety valves connected independently to the vapour space:

(b) two independent liquid level indicators;

(c) a high level alarm;

(d) two independent visible pressure gauges, connected to the vapour space; on both sides and

(e) two temperature gauges for measuring the temperature of the contents of the vessel, on both sides.

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(2) **Vessel connections.**—In every flammable liquified or compressed gas storage vessel,

(i) all the connections to the vessel shall be designed and fitted in accordance with the Design Code of IS-2825 or equivalent duly approved by the Chief Controller of Explosives;

(ii) more than one nozzle shall not be provided for inlet and outlet purpose, apart from the drainage pipe;

(iii) the nozzle shall be a full -welded pipe extending upto a minimum distance of 3 metres from the normal shadow of the vessel. A combination of manual and remote- operated-shut-down-valve shall be provided on such nozzle at a distance of atleast 3 metres beyond the shadow of the vessel. The nozzle shall have a slope of 1.5 degrees to the horizontal;

(iv) the nozzle shall be stress-relieved along with the vessels;

(v) there shall not be any flange, instrument tapping or manhole on this nozzle on the upstream side before manual shut down valve and the remote operated valve; and

(vi) an excess flow valve shall be provided for the nozzle on the body of the vessel.

3. **Pressure Safety Valve**.—In every storage vessel,—

(i) the pressure safety valves provided shall be of spring-loaded type (weight-loaded safety valves shall not be used). Each of the pressure safety valves shall have 100% relieving capacity;

(ii) the pressure safety valves shall be set to discharge at a pressure not more than 110% of the design pressure of the vessel and shall have a total relieving capacity adequate for limiting the pressure build-up in the vessel beyond 120% of the design pressure;

(iii) the discharge of the pressure safety valves shall be connected to a flare system, if so available. In cases of where the flare system is not available, the discharge from the pressure safety valve shall be vented vertically upwards to atmosphere at a minimum elevation of 5 metres above the top of the vessel for effective dispersion of the discharge. A loose-fitting rain cap with a non-sparking chain extending upto the ground level and attached to the vent pipe shall be provided on top of the pressure safety valve;

(iv) an isolation valve shall be provided in between each pressure safety valve and the vessel. The arrangement of the isolation valve shall be so designed to allow full required capacity flow through atleast one of the pressure safety valves; and

(v) each pressure safety valve shall be visibly marked with the "set pressure" in $kg/cm^2$ (gauge) at which it will discharge, with its actual rate of discharge in cubic metre per minute at a pressure of 120% of the design pressure of the vessel.

(4) **Emergency shut-off valve**—In every storage vessel,—

(i) all liquid and vapour connections, except those for pressure safety valves and the drainage connections of diameter less than 25 millimetre shall have an emergency shut-off valve, such

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as an excess flow check valve or a remotely operated valve:

Provided that the emergency shut-off valve is not required in cases where the connection to a vessel is not greater than three centimetre in diameter for liquid and eight centimetre in diameter for vapour;

(ii) where the emergency shut-off valve provided is of 'excess flow check valve' type, its closing rate of flow shall not be below the resulting rate of flow that is likely due to a fracture in the line which it is protecting, in the worst condition so calculated. Excess flow check valve shall have a flow capacity sufficiently above the normal flow requirements to prevent valve chatter.

(5) **Bottom water draw-off or drain valve**.—In every storage vessel,—

(i) there shall be provided two drain valves at the bottom of the vessel between the remotely operated valve and the first isolation valve. The length of the pipeline between the two drain valves shall be atleast 0.5 metre to minimise the risk of simultaneous obstruction of both valves due to freezing of any water present in the liquified gas. The drain connections shall not be not more than 50 millimetre in diameter; The drain device shall not be insulated;

(ii) the first drain valve from the vessel shall be of gate type (throttle type), while the second drain valve shall be of quick shut-off type; and

(iii) the material of construction for the drain pipeline and the related connections shall be suitable of cryogenic material.

(6) **Sampling Valve**.— Every storage vessel shall have, two valves fitted at 0.5 metre apart in the length between the remotely operated valve and the first isolation valve, to provide for, sampling purpose. (The provision of separation is for the purpose of avoiding freeze-chocking in the valve on the upstream.)

(7) **Liquid level gauging device**.—In every storage vessel, out of two level indicators provided, one shall be of "float" type and the other shall be of "differential pressure" type especially for Horton Spheres. Magnetic float type gauge shall be used for bullets in place of "differential pressure" type. "High Level" alarm shall be set on the level indicators to operate at not more than 85% of the volumetric capacity of the vessel. An audio-visual indication with high level alarm shall be provided at or near the normal sitting place of the operator in a position visible all through the day.

(8) **Pressure gauge**.—In every storage vessel, there shall be provided at least one pressure gauge, duly calibrated, and having a dial range covering not less than 1.5 times the design pressure, that is easily visible and consistently showing the correct internal pressure at all times. It shall be provided in the vapour space at the top. A suitable stop valve shall be provided in between the vessel and the pressure gauge for the maintenance and repair.

(9) **Gas sensors**.—Every storage vessel meant for flammable liquefied or compressed gas

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storage shall be provided with gas-sensors with alarm at vulnerable areas, which, in the event of gas leakage, shall trip the compressor or pump, if in operation.

(10) **Bonding**.—Electrical continuity shall be maintained between the flanges by bonding every storage vessel and its pipe lines.

(11) **Pop off valves**.— "Pop off" valves shall be provided in between isolation valves on the pipelines carrying flammable liquified or compressed gases.

(12) **Capacity of vaporiser.**—The vaporiser, connected to the flammable liquified gas storage vessels shall have adequate capacity to meet the required flow rate of flammable liquified gas in the process.

6. **Prevention of ignition**.—In every location where highly flammable liquid or flammable liquified or compressed gas is stored, conveyed, handled or used or where there is danger of fire or explosion from accumulation of highly flammable liquid or liquified compressed gas in air, all practicable measures shall be taken to exclude the sources of ignition. Such precautions shall include the following:-

(a) all electrical apparatus shall either be isolated from the area of risk or they shall be of such construction installation and maintenance as to prevent any danger from there being a source of ignition;

(b) effective measures shall be adopted to prevent static charges accumulation beyond a dangerous limit;

(c) no person shall wear or be allowed to wear any footwear having iron or steel nails or any other exposed ferrous materials which is likely to cause sparks by friction;

(d) smoking, lighting or carrying of matches, lighters or smoking materials shall be prohibited.

(e) transmission bolts with iron fasteners shall not be used; and

(f) all other precautions, as are reasonably practicable, shall be taken to prevent initiation of ignition from all other possible sources such as open flames, frictional sparks, overheated surfaces of machinery or plant, chemical or physical-chemical reaction and radiant heat or any other hot spot what so ever.

7. **Earthing and bonding**. – (1) All electrical systems and equipments and all structures, plants and other non-current-carrying metallic parts of major electric apparatus or any major metallic object in any place where flammable liquified or compressed gases or highly flammable liquids are manufactured, stored, handled or used shall be efficiently earthed; and the resistance value of the earthing system relative to the general mass of the earth, shall not be more than-

(a) 4 ohms in the case of electrical systems and equipment for a device that ensures the operation of the protective device in the electrical circuit, whichever is lower and

(b) 10 ohms in the case of all non-current carrying metallic parts of major electric apparatus

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or any major metallic object.

(2) All joints in pipelines, valves, plants, storage tanks and associated facilities and equipments for handling flammable liquified or compressed gases or highly flammable liquids shall be made electrically continuous by bonding or otherwise; the resistance value between each joint shall not exceed 1 ohm.

(3) A piping which is not in electrical contact with the associated tank or vessel shall be efficiently connected to such tank or vessel by a flexible conductor and looped with earthing system.

8. **Enclosed system for conveying highly flammable liquids**.—Wherever it is reasonably practicable, highly flammable liquids shall be conveyed within the factory, in totally enclosed system, consisting of pipe lines, pumps and similar appliances from the storage tank or vessel to the point of use. Such enclosed system shall be so designed, installed, operated and maintained as to avoid leakage or the risk of spilling.

9. **Prohibition of smoking**.—No person shall smoke in any place where a highly flammable liquid or flammable liquefied or compressed gas is present and in similar circumstances where smoking would give rise to a risk of fire. The occupier shall take all practicable measures to ensure compliance with this requirement and he shall display a notice in a conspicuous place indicating prohibition of smoking at all places where the requirement so applies.

10. **Fire protection**.—In every factory,—

(1) no vehicular traffic shall be permitted within the risk area of lower flammable limit of the Highly flammable liquid or flammable liquefied or compressed gas are stored. When required, only vehicles fitted with approved spark arrestors may be allowed with valid vehicle entry permit.

(2) all the vessels used for bulk storage or handling of highly flammable liquid or flammable liquified or compressed gases shall be protected against the hazards of fire as follows:—

(a) medium velocity water spray system shall be provided for all above ground level storage vessels, cylinder storage or filling or repair sheds, pump houses, bulk lorry and tank wagon gantries;

(b) for fire detection, automatically actuated medium velocity water sprinkler system shall be provided at all critical locations, such as bulk storage, tank/truck or tank wagon gantry, pump or compressor house and vaporisers;

(c) medium velocity water sprinkler system shall be based on heat or other detection signatures;

(d) Quartzoid bulb protection designed to blow at a maximum of 79$^{0}$ C shall be provided in open areas or in the sheds;

(e) medium velocity water sprinkler system shall function in such a way that the actuation of fire detectors initiate the following and:—

(i) opening of deluge valve;

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(ii) blowing of audio-visual alarm at the fire pump house or control panel;
(iii) blowing of fire siren; and
(iv) the diesel pump should get started based on the "Set pressure" to supplement or to maintain the fire water pressure in the ring main; and

(f) the medium velocity water sprinkler system shall have a minimum spray density of ten litres per minute, per square metre in the case of flammable liquified or compressed gas and in the case of highly flammable liquid, a minimum spray density of 3 litres per minute per square metre for the single largest risk area.

For the purpose of calculation of a single risk area, the following shall be taken into account :—

(i) in case of bulk storage, adjoining vessels within the distance of R+30 metre, where R is the radius of the vessel and 30 metre shall be measured from the periphery of the vessel;

(ii) in case of tank lorry gantry, a maximum of 8 bays shall be taken as a single risk area; and

(iii) in case of tank wagon gantry, a minimum of one gantry [600 Metric Tonnes] shall be taken as a single risk area.

(3) (a) a fire water ring main shall be provided all around the locations of storage and handling areas of flammable liquified or compressed gases with hydrants or monitors spaced at 30 metre apart. Fire hydrants and monitors may be installed outside the licensed premises;

(b) the fire water pressure system shall be designed to got a minimum residual pressure of 7 $kg/cm^2$ (gauge) at the remotest place of application of the plant;

(c) fire hydrant network shall be provided in closed loops to ensure multi-directional flow in the system. Isolation valves shall be provided to enable isolation of any section of the network without affecting the flow in the rest; and

(d) the fire water system in the plant shall be designed to meet the highest fire-water flow requirement for the medium velocity water sprinkler to cover a single largest risk area at a time and shall ensure 288 $metre^3$/hour of water, for operating at least two fire water monitors with supplementary hose requirements in addition.

(4) (a) water for the hydrant service shall be stored in any easily accessible, surface or underground concrete reservoir or over head tank of steel or concrete construction;

(b) the effective fire water storage capacity available for fire-fighting shall last for at least four hours; and

(c) storage tank or reservoir for water shall have two interconnected compartments to facilitate cleaning and repair;

(5) Portable fire extinguishers as approved by Bureau of Indian Standards shall be located at convenient places as indicated in the Table below:—

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TABLE

| *Area* | *Portable Fire Extinguisher* |
|---|---|
| (1) | (2) |
| 1. Flammable liquefied gas or storage vessels (each) | Two Numbers of 10 kg.DCP (Dry Chemical Powder) each |
| 2. Tank wagon loading or unloading gantries | One 10 kg. Dry Chemical Powder extinguisher for every 15/ 20 metres of gantry |
| 3. Tank truck loading or unloading gantries | One 10 kg. Dry Chemical Powder Fire Extinguisher in each Bay and 1 Number 50 Kg. Mobile DCP Unit/gantry. |

The dry chemical powder used in the extinguishers shall be Potassium or Urea based or Sodium Bicarbonate as per IS:4308.

11. **Loading and unloading facilities for flammable liquified or compressed gas**—

(1) **Loading.**—In every factory, where the loading of flammable liquified of compressed gas is carried on, the loading station shall consist of the following:—

(a) a filling line with an isolation valve and check valve;

(b) a vapour return line with a check valve and an isolation valve to return the vapour back to the storage vessel from which the loading pump is drawing flammable liquified gas;

(c) suitable loading arm or flexible hoses shall be provided at the end of filling line and vapour return line for connecting to the tank-truck-vessels or tank-wagons; and

(d) suitable thermal pressure relief valve(s) shall be provided between the Shut-off valves to protect against excessive pressure build up arising out of the thermal expansion of the trapped liquid;

(2) **Unloading.**—In every factory, where unloading of flammable liquified or compressed gas is carried on, and wherein a compressor is used for unloading the flammable liquified gases by utilizing the differential pressure between the receiving and discharging vessels, so created by withdrawing vapour from the receiving vessel and forcing it at high pressure into the discharging vessel, the factory shall have the following facilities:—

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(a) liquid unloading line; having isolation valve; and check valve in line; and

(b) vapour line with isolation valves.

(3) **Loading and unloading operations**.—In every factory, where the loading or unloading of flammable liquified or compressed gas is carried on shall have :

(a) written, operating procedures for loading or unloading operation, clearly defining the safety checks and precautions to be observed as well as the responsibilities of the personnel involved in such operation, prepared in English and in the language spoken by majority of workers and given to those concerned and displayed at a prominent place;

(b) flexible hoses used for transfer of flammable liquified or compressed gas to or from a tank truck or tank wagon shall be,—

(i) designed and constructed in accordance with the Static and Mobile Pressure Vessels (Unfired) Rules, 1981;

(ii) a means of identification; and

(iii) periodically checked for electrical and mechanical continuity and recorded in the register;

(c) provision for connecting and disconnecting hoses (only non-sparking type of tools shall be used);

(d) the tank-truck shall have a starter motor of non-sparking or flame proof type;

(e) the tank-truck shall be parked on a levelled ground and vehicle arresting shall be placed at front and rear wheels to arrest the vehicle movement;

(f) the engine of the vehicle shall be stopped and all the electrical equipment isolated, before starting the loading or unloading operation;

(g) before starting the loading or unloading operation, static charges shall be effectively discharged by bonding and earthing of the storage vessels with the road tankers or wagons and the ground;

(h) the road tanker or wagon shall be electrically bonded at marked specified points with the fixed grounding system;

(i) authorised person shall supervise the transfer operation and respond immediately in the event of an emergency;

(j) during loading operation, the pressure within the receiving tank-truck vessel shall be observed to ensure that it falls within the start-off or triggering discharge-pressure of the relief valve. Filling rate shall be regulated accordingly;

(k) the receiving vessel which is having an internal pressure of less than 1kg/cm$^2$ shall not be taken in for filling. Such vessel shall be checked for Oxygen content or explosive mixture content and purged, if necessary;

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(l) filling or transfer operation shall be done only during day time where visibility is adequate;

(m) filling or transfer operation shall be stopped immediately in the event of

(a) uncontrolled leakage occurring;

(b) a fire occurring in the vicinity;

(c) lightning and thunder-storm;

(n) the "Safe Operating Procedure" for unloading shall be displayed in English, Malayalam and Hindi and in the language understood by majority of workers in the unloading area.

12. **Maintenance and Inspection**.— In every factory where highly flammable liquid or flammable liquified or compressed gas is stored in bulk.—

(1) the storage vessels and the safety fittings and instruments shall be tested periodically as per the requirements under relevant statutes as applicable and records with such particulars of testing maintained;

(2) loading or unloading hoses shall be tested at least once in every six months;

(3) the earth pits shall be maintained well and the earth resistance measured at least once in every 12 months; and records kept in this regard;

(4) the foundation and supports of the storage vessels shall be checked once in a year for differential settlement due to any unsettling at sub-soil level or of any other cause;

(5) the cathodic protection, if provided, shall be monitored periodically and maintained well for effectiveness;

(6) the gas detection system shall be checked and calibrated periodically; and

(7) the fire water system which includes fire water pumps, fire hydrant or monitor, piping network and water sprinkler or deluge system shall be checked periodically and maintained well for its fail-safe operation in adversaries.

13. **Training**.—The occupier of every factory in which highly flammable liquid or flammable liquified or compressed gases are stored in bulk shall ensure that—

(1) the supervisory or managerial personnel are adequately trained in all aspects of safe storage and handling of highly flammable liquid or flammable liquified or compressed gas and in the disaster control, preparedness and response.

(2) regular training programmes are conducted on loading or unloading operation, draining procedure, commissioning and decommissioning procedures, "hot work" permit system, fire-fighting

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and emergency combat operation, health hazards, safe working procedures, safe behaviours at work place etc., for—

(a) regular workers;

(b) workers including daily, part-time, badli, casual or any contractual fringe of that kind, etc.; and

(c) security staff;

(3) full-scale emergency mock drills, simulating leakage of flammable gas and the consequences, are conducted in the plant atleast once in every six months and the level of preparedness, and the adequacy of combat measures, assessed and modified from time to time, and any deviations, or defects observed during such mock-drills rectified forth-with.

14. **Exemption**.—If in respect of any factory, the Chief Inspector is satisfied that owing to the exceptional circumstances or intermittent nature of the processes or for any other reason, all or any of the provisions of this Schedule is not necessary for protection of the workers in the factory, the Chief Inspector may, by a certificate in writing, which he may at his discretion, revoke at any time, exempt such factory from all or any of such provisions subject to such conditions, if any, as he may specify therein.

15. rules 135 to 206 shall be omitted.

By Order of the Governor
SATYAJEET RAJAN IAS
Additional Chief Secretary to Government

## Explanatory Note

(This does not form part of the notification but is intended to indicate its general purport)

The Director of Factories and Boilers had constituted a Rule Amending Committee for submitting proposal for amending the Kerala Factories Rules, 1957 and the Rule Amending Committee after making detailed study, references and discussions made a proposal for amending the various provisions of the Kerala Factories Rules, 1957, to incorporate technological advancements and new work practices evolved over years with a vision to inculcate the right attitude and behaviour among workers so as to keep in pace with the changing scenario. The Government of Kerala have accepted the proposal and decided to make suitable amendment in the Kerala Factories Rules, 1957.

The notification is intended to achieve the above object.

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