1949 ILO

INTERNATIONAL LABOUR OFFICE

MODEL CODE OF SAFETY REGULATIONS FOR INDUSTRIAL ESTABLISHMENTS FOR THE GUIDANCE OF GOVERNMENTS AND INDUSTRY

GENEVA
1949

INTRODUCTION

The *Model Code of Safety Regulations for Industrial Establishments for the Guidance of Governments and Industry*, based on a draft prepared by experts over a period of six years, was approved by a Tripartite Technical Conference held in Geneva in the autumn of 1948 in accordance with a decision of the Governing Body of the International Labour Office.

The Conference examined and approved the Code as a guide, with the exception of certain provisions relating to electrical equipment and toxic substances, and expressed the desire that provisions on dangerous radiations should be added. These three matters were referred by the Governing Body to Committees of Experts which met in the spring of 1949, and the relevant portions of the Code were put into final form by these Committees.

The Tripartite Technical Conference proposed that the text of the Code should be accompanied by an appendix consisting of photographs, drawings and explanations of safety installations, appliances and devices, and that this appendix should be regularly brought up to date. The appendix is in preparation and will be issued later as a separate volume.

In accordance with a decision taken by the Governing Body, the Code is now placed at the disposal of Governments and industries merely for guidance. It is not an instrument involving any binding obligations, and Governments and industries are free to make such use of it as they see fit in framing or in revising their own safety regulations.

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CHAPTER X

DANGEROUS AND OBNOXIOUS SUBSTANCES

Section 1. General Provisions

Regulation 185. Definitions

In this Chapter the following terms have the meanings hereby assigned to them:

(*a*) the term "fibres" means any tough solid substance composed of threadlike tissue, whether of mineral, vegetable or animal origin;

(*b*) the term "dusts" means solid particles capable of being blown about or suspended in the air, which are generated by handling, crushing, cutting, drilling, grinding, rapid impact, spraying, detonation or disintegration of inorganic or organic materials such as coal, grain, metal, ore, rock or wood and are of a composition similar to the substance or substances from which they are derived;

(*c*) the term "fumes" means suspended solid particles which are generated by condensation from the gaseous state, generally after volatilisation from molten metals or formation of incomplete combustion products from fuel or other organic substances, and differ from the substance of their origin;

(*d*) the term "gases" means normally aeriform fluids which have neither shape nor specific volume but tend to expand indefinitely and which can be changed to the liquid or solid state by the effect of increased pressure or decreased temperature;

(*e*) the term "mists" means suspended liquid droplets generated by condensation from the gaseous to the liquid state or by breaking up of a liquid into a dispersed state, such as by atomising, foaming or splashing;

(*f*) the term "vapours" means the gaseous form of substances which are normally in the liquid or solid state, and which can be changed to these states either by increasing the pressure or decreasing the temperature alone.

Regulation 186. General Rules

Scope

1. The provisions of this Regulation shall apply to all factory premises in which harmful substances in solid, liquid or gaseous

form are manufactured, handled or used, or in which flammable, infectious, irritating, offensive or toxic dusts, fibres, fumes, gases, mists, vapours or ionising radiations are generated or released in quantities liable to injure health.

Reduction of Hazards

2. Where practicable, harmless substances shall be substituted for harmful substances.

Methods of Protection

3. Unless otherwise specifically excepted by the competent authority, processes that involve hazards should be carried on in separate rooms or buildings with a minimum number of workers and with special precautions.

4. Unless otherwise specifically excepted by the competent authority the processes shall be carried out in airtight apparatus, so as to prevent personal contact with the harmful substances and the escape of dusts, fibres, fumes, gases, mists or vapours into the air of any room in which persons work.

5. Where airtight apparatus cannot be used, harmful dusts, fibres, fumes, gases, mists or vapours shall, unless otherwise specifically excepted by the competent authority, be removed at or near their point of origin by means of fume chambers or suction hoods properly connected to efficient exhaust systems conforming to the requirements of Section 2 of Chapter XIII of this Code.

6. (1) Where necessary, the workers shall be provided with, and shall use, personal protective clothing and personal protective equipment conforming to the requirements of Chapter XIV.

(2) Personal protective equipment alone shall not be depended upon to protect workers against hazardous substances, except in connection with isolated or infrequent operations, but may be used together with positive measures to remove the risk where such measures cannot be made to ensure adequately safe conditions.

Marking, etc., of Containers

7. Containers filled with hazardous substances shall be—

(*a*) plainly painted, marked or labelled in a distinctive manner so as to be readily identifiable; and

(*b*) accompanied by instructions for safe handling of the contents.

Testing of Atmosphere

8. The atmosphere of workrooms shall be tested periodically at such intervals as may be necessary to ensure that the concentration of irritating or toxic dusts, fibres, fumes, gases, mists or vapours is kept within the limit specified by the competent

authority and periodically revised by this authority in keeping with new developments in the science of industrial pathology.[1]

Ventilation and Exhaust Systems

9. Ventilating and exhaust equipment shall be constructed, installed, operated, inspected, tested and maintained in conformity with the requirements of Section 2 of Chapter XIII of this Code.

Prevention of Dust Accumulation

10. (1) All parts of the structure and equipment of rooms in which harmful dust is liberated shall be so designed and installed that surfaces on which dust can accumulate are reduced to a minimum.

(2) All parts of such rooms and equipment shall be frequently cleaned in accordance with Regulation 193, paragraph 8, and Regulation 215 of this Code.

Floors

11. Where practicable, floors of rooms in which harmful dust is liberated shall—

(*a*) be smooth, impervious and easy to clean; and

(*b*) not be covered with loose linoleum, loose sheets of metal or other material under which the dust might accumulate.

Section 2. Flammable and Explosive Substances

Regulation 187. General Rules

Scope

1. The provisions of this Regulation, together with the provisions of Regulation 186, shall apply to premises in which—

(*a*) explosive or particularly flammable substances are manufactured; or

(*b*) explosive gases, vapours, fumes or dust may occur.

Segregation

2. (1) Operations involving an explosion risk shall be carried on in separate buildings situated at such distances as may be specified by the competent authority or in rooms separated from one another and from other rooms or compartments by approved type of fire-resisting

[1] As a guide, see Appendix III.

REGULATION 197. DRY ICE (SOLID CARBON DIOXIDE)

1. Tools for handling dry ice should be provided with wooden handles.

2. Where it is necessary to handle dry ice, or metal objects which have been in contact with dry ice, without tools, workers shall be supplied with, and shall use, suitable gloves conforming to the requirements of Regulation 233 of Chapter XIV of this Code.

3. Dry ice shall not be put in bottles or other closed containers which are not designed to withstand the pressure that may be generated.

4. No person shall enter stores containing dry ice unless adequate measures are taken to protect them from the dangers of carbon dioxide.

Section 4. Infectious, Irritating and Toxic Substances

REGULATION 198. GENERAL RULES

A. *Provisions Applying to All Infectious, Irritating and Toxic Substances*

Scope

1. The provisions of paragraphs 2 to 10 of this Regulation shall apply to premises of industrial establishments where infectious, irritating or toxic substances are manufactured, handled or used, or where such substances are or may be present, either during regular operations or through temporary failure of the control systems.

Warning Devices

2. In all establishments where toxic substances are manufactured, handled or used, suitable devices shall be installed wherever possible to give warning to the personnel in case of iberation of dangerous quantities of these substances.

Cleaning and Disinfection

3. (1) Floors, walls and other structural surfaces, workbenches, tables and equipment shall be thoroughly cleaned daily by means of vacuum cleaning or by wet brushing or sweeping, if possible out of working hours, and shall be washed as often as necessary and at least once a week.

(2) Where infectious substances are handled, disinfection by appropriate measures shall be carried out after each cleaning.

(3) As far as possible materials which are handled shall be disinfected before being used.

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Working Clothing

4. All personnel exposed to infectious, irritating or toxic substances shall be provided with suitable overalls or working clothing and also head coverings where needed, which—

(*a*) shall be removed before partaking of food or leaving the premises, and deposited in the places set apart for such purpose;

(*b*) shall not be taken out of the factory by the users for any purpose; and

(*c*) shall be maintained in good repair and shall be sterilised when necessary and washed, cleaned or changed for clean clothing at least once a week or more often if necessary.

Meals

5. The introduction, preparation or consumption in the workrooms of food, drink and tobacco shall be prohibited.

Personal Cleanliness

6. All personnel exposed to substances which are poisonous through ingestion shall be required to wash their faces and hands thoroughly before partaking of any food, drink or tobacco, or leaving the premises.

Instruction of Personnel

7. All personnel shall be thoroughly informed, by means of posters and by verbal instruction of the health hazards connected with their duties and the measures to be taken to protect themselves therefrom.

Medical Aid

8. All personnel exposed to infectious, irritating or toxic substances shall be required to report promptly any physical complaints. If handling any substance which may cause infection, workers shall be required to report any wound, however slight.

9. One or more first-aid kits or cabinets, containing sufficient and suitable first-aid dressings and other equipment, in charge of a specific person or persons properly trained to administer first aid in conformity with the provisions of Regulation 241 of Chapter XV of this Code shall be provided and maintained in easily accessible locations, for immediate temporary treatment in case of accident or sudden illness.

B. *Additional Provisions for Irritating or Toxic Substances*

Walls, Ceilings and Floors

10. The walls, ceilings and floors of workrooms shall be made and kept smooth and impervious so that thorough cleaning by dry or wet methods is possible.

11. Every operation or process in the manufacture, handling and use of irritating or toxic substances shall be conducted in such a manner and with such safety devices as will protect the workers as far as possible from contact with the substances.

Personal Protective Equipment

12. Where exceptional circumstances make it necessary for a person to enter places where the atmosphere is contaminated by harmful quantities of irritating or toxic dusts, fibres, fumes, gases, mists or vapours he shall be provided with and shall wear adequate respiratory protective devices and, where necessary, adequate protective clothing, the whole conforming to the requirements of Chapter XIV of this Code.

C. *Carbon Monoxide*

13. (1) Where carbon monoxide is emitted in dangerous amounts from any plant in connection with any process of manufacture—

(*a*) (i) either the plant shall be so designed or located that the gas is discharged to atmosphere in such a way as not to endanger workers; or

(ii) the escaping gas shall be burnt; or

(iii) gas escaping where anyone regularly works shall be removed by local exhaust; and

(*b*) any person who has occasionally to be where carbon monoxide is being emitted in dangerous amounts shall wear a breathing apparatus of a type that does not draw its supply of air from the immediate vicinity of the worker.

Regulation 199. Irritating or Toxic Dry Substances

A. *General Rules*

Isolation of Workrooms

1. Workrooms used for melting or treating irritating or toxic metals or other dry substances or in the manufacture or use of irritating or toxic compounds in dry form shall be separated from all rooms in which the work or process is of a non-dusty character.

Atmospheric Contamination Control

2. Every operation or process involving melting or treating of irritating or toxic metals or other dry substances, or in the manufacture or use of irritating or toxic dry compounds, including transport from one apparatus to another and the packing of the products, shall be effected by mechanical means in apparatus provided with—

(*a*) adequate enclosures; and

(*b*) hoods, so constructed and located that any dust or fumes produced will be drawn into them and carried to dust-collecting

3. All hoppers, chutes, conveyors, elevators, separators, vents from separators, screens, pulverisers and other grinding equipment, dryers and packing apparatus used for dry toxic materials in any form or combination, shall be connected to dust-collecting systems.

4. Stationary dust-collecting apparatus for irritating or toxic dry substances shall be placed outside or in isolated rooms used solely for that purpose, and no worker shall be required or permitted to enter such a room unless he is wearing adequate respiratory protective devices conforming to the requirements of Regulation 235 of Chapter XIV of this Code.

Spillage

5. Spillage of irritating or toxic dry substances shall be removed as quickly as possible, preferably by vacuum apparatus.

Time for Use of Washrooms

6. A time allowance of not less than 10 minutes, at the expense of the employer, for the use of the washroom before the lunch period shall be made to each worker employed in the manufacture or handling of—

(*a*) irritating or toxic dry mineral or organic substances, such as arsenic, chrome, lead, manganese, mercury, phosphorus and zinc, and their compounds;

(*b*) superphosphates and other mineral fertilisers;

(*c*) dust-producing coal-tar products, such as pitch and soot;

(*d*) dust-producing toxic dyestuffs and pigments; and

(*e*) radioactive substances,

during which period the worker shall remove such substances from the skin.

Time for Use of Shower Baths

7. (1) A time allowance of not less than 10 minutes at the expense of the employer, for the use of the shower baths or baths at the end of the day's work shall be made to each worker employed in the manufacture or handling of the substances referred to in the preceding paragraph.

(2) A bath register shall be kept, containing a list of all persons employed in the process and an entry of the date when each person has taken a bath.

B. *Special Precautions in the Manufacture of Lead Compounds*

Metallic Lead

8. Where metallic lead is used in the manufacture of lead compounds—

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CHAPTER XIII

HEALTH PROTECTION

Section 1. Sanitation

Regulation 214. Water Supply

Quality of Drinking Water

1. An adequate supply of clean, cool, wholesome and safe drinking water shall be provided for, and be readily accessible to, all employees in all workplaces.

2. (1) All water furnished for drinking purposes shall be from a source approved by the competent health authority and controlled in the manner prescribed by this authority.

(2) Where such water is not available the competent health authority shall furnish the necessary directions for rendering the water safe for human consumption.

Cooling of Drinking Water

3. Where water is cooled by ice the water container shall be so constructed that the ice does not come into direct contact with the water.

Salt

4. Where employees have to work in great heat for considerable periods the employer should provide salted water or salt tablets.

Drinking Cups

5. The use of common drinking cups shall be prohibited.

6. When individual drinking cups (to be used but once) are supplied there shall be provided—

(*a*) a suitable container for the unused cups so constructed that the cups are protected against dust and other impurities; and

(*b*) a receptacle for the used cups.

Drinking Fountains

7. Where sanitary drinking fountains are installed they shall be of a type and construction approved by the competent health authority.

Prohibition of Open Containers

8. Open barrels, pails, tanks or other containers from which the water must be dipped or poured shall not be allowed for drinking water, whether they are fitted with a cover or not.

Water Unsafe for Drinking Purposes

9. Where water unsafe for drinking purposes is provided for use in industrial processes or for fire protection—

(*a*) conspicuous notices shall be posted at the points of supply stating clearly that such water is unsafe and not to be used as drinking water;

(*b*) every reasonable effort shall be made to prevent it from being so used; and

(*c*) points of supply of safe drinking water shall be clearly marked " Drinking Water ".

10. There shall be no connections, open or potential, between a water-supply system furnishing drinking water and a system furnishing water unsafe for human consumption.

Regulation 215. Housekeeping, Cleanliness

Cleanliness

1. All workplaces, workrooms, passageways, storerooms and service rooms shall be kept in a sanitary condition.

2. Surfaces of walls and ceilings, including windows and skylights, shall always be kept in a proper state of repair and cleanliness.

3. The floor of every workroom shall be maintained in a clean and, so far as possible, dry and non-slippery condition.

Wet Work Processes

4. Where wet work processes are used—

(*a*) effective drainage shall be maintained;

(*b*) false floors, platforms, mats or other dry standing places shall be provided; and

(*c*) the employer shall, without expense to the workers, furnish them with suitable footwear for use while at work in such places.

Cleaning and Sweeping

5. Workrooms shall be cleaned as often as required by the nature of the work carried on.

6. As far as practicable, sweeping and cleaning shall be done—

(*a*) during intervals between work; and

(*b*) in such a manner as to prevent the raising of dust.

7. Where, for technical reasons, cleaning must be done during working hours, vacuum cleaners should be used and special precautions shall be taken to avoid contamination of the air with dust or other obnoxious substances.

Spitting

8. Notices explicitly forbidding spitting on the floor, walls or stairs shall be posted where necessary.

9. Where it is found necessary to provide spittoons they shall be—

(*a*) sufficient in number;

(*b*) so made as to satisfy hygienic requirements; and

(*c*) cleaned and properly disinfected at least once every working day.

Waste Disposal

10. All receptacles used for waste or refuse shall be—

(*a*) so constructed that they cannot leak and that they can be conveniently and thoroughly cleaned; and

(*b*) maintained in a sanitary condition and disinfected if necessary.

11. All sweepings, waste, refuse and residual matter shall be removed—

(*a*) if possible, outside working hours;

(*b*) in such a manner as to avoid creating a menace to health; and

(*c*) as often as necessary to maintain the workroom in a sanitary condition, and not less than once every day.

12. Adequate drains capable of ensuring effective removal of waste water, and provided with hydraulic seals or other effective devices to prevent escape of effluvia shall be provided and constantly kept in good order and repair.

Inspection of Equipment

13. Wherever mechanical equipment is used to ensure proper sanitation, such equipment shall be inspected at regular intervals to verify its efficiency.

Miscellaneous Requirements

14. (1) Every workroom or workplace shall, as far as practicable, be so constructed and maintained as to prevent the entrance or harbouring of rodents, insects and vermin of any kind.

(2) Infestation of rodents, insects and vermin shall be eliminated by suitable measures, and control measures shall be taken to prevent reinfestation.

15. In districts where malaria is endemic, all workplaces shall, as far as practicable, be adequately screened against mosquitoes.

16. The employment of persons suffering from any communicable diseases shall be governed by the regulations issued by the competent health authority.

17. No person shall be allowed to use any workroom or workplace as living or sleeping quarters.

Regulation 216. Seats and Work Benches

Seats

1. For all workers who can perform their work in the sitting posture suitable seats shall be provided which should—

(*a*) be of such shape and height as to allow a normal and healthy position, freeing the legs entirely from the weight of the body;

(*b*) be supplied with a back rest, suitably shaped and adjustable in height, so that it will conveniently support the lower part of the back of the workers, regardless of their size;

(*c*) if necessary, be fitted with special foot and arm rests;

(*d*) be so placed that the working material can be reached easily and without strain;

(*e*) not be such as to impede the exit of the workers in case of accidents; and

(*f*) wherever possible be so arranged as to allow of a voluntary change of position.

2. Where, owing to the nature of the operations, the worker has to change his position from time to time, adjustable seats should be provided.

3. Seats should also be provided for all workers obliged to work in a standing position, for use during short, occasional interruptions of their work.

Work Benches and Tables

4. Work benches and work tables shall be of convenient height and width so that the work can be carried out easily and without undue strain.

5. Where racks or shelves for tools and/or materials are installed above the work bench or table, their height and position shall be such as to enable the worker to reach all parts of them easily and without strain from his working position.

Regulation 217. Personal Service Rooms

General Provisions

1. The provisions of Sections 2 and 3 of Chapter II of this Code, respecting lighting, ventilation, temperature and humidity shall apply, *mutatis mutandis*, to all personal service rooms and other spaces allotted to employees for personal services.

2. All personal service rooms shall be—

(*a*) as far as possible so protected, either by screening or otherwise, as to prevent the entrance or harbouring of rats, insects or vermin of any kind; and

(*b*) constantly maintained in a good and sanitary condition.

3. All personal service rooms so located that they have no direct communication with the open air shall be mechanically ventilated, with all exhaust ducts discharging into the outside air.

Toilet Rooms in General

4. (1) Every factory and workshop shall be provided with adequate water closets, chemical closets or privies, separate for each sex, as well as an adequate number of urinals.

(2) Closets and urinals in the interior of the building shall be of the water-flush type.

5. An adequate supply of toilet paper and, where conditions require, water shall be provided for every toilet facility.

6. Adequate washing facilities shall be provided in each toilet room or adjacent thereto: Provided that this requirement shall not apply where the general washing facilities are on the same floor as, and in close proximity to, the toilet rooms.

7. Toilet rooms shall be readily accessible and located not more than one floor above or below the regular place of work of the persons using them: Provided that this latter requirement shall not apply if passenger elevators are available for use by persons going to and from toilet rooms.

8. There shall be at least one closet for every 25 men, and at least one for every 15 women employed at the same time; there shall be at least one urinal for every 15 men employed at the same time.

9. Special covered waste receptacles shall be installed in all toilet rooms used by women.

10. Toilet facilities shall not communicate directly with the actual workplaces, but they shall open only on to corridors, halls, landings or courtyards.

Construction of Toilet Rooms

11. Each toilet facility (closet) shall be under cover and occupy a separate compartment which shall—

(*a*) have a separate door; and

(*b*) be installed in a special, well ventilated toilet room.

12. The walls or partitions of toilet compartments may be less than the height of the room walls, but the top shall not be less than 1.8 m (6 ft.) and the bottom not more than 20 cm (8 in.) from the floor.

13. All toilet room doors shall be fitted with an effective self-closing device and so screened that the interior is not visible from outside.

14. Each compartment door shall be provided with a latch on the inside.

15. Urinals shall preferably consist of a row of stalls. If they are of a smaller type (cuvettes) they shall be adequately separated by side partitions. The width of the urinal shall not be less than 60 cm (2 ft.). Where urinals are situated outside buildings, they should be screened from view by a partition.

16. In all new toilet rooms the floors, walls and partitions including the angle formed by the floor and the walls, shall be water tight and impervious to moisture.

17. The floors, walls and ceilings of all toilet rooms shall be of a finish that can easily be cleaned.

18. The walls of every toilet room shall be of solid construction and shall extend to the ceiling, or the area shall be independently ceiled over.

19. In new installations, toilet facilities (closets) shall be of at least the following dimensions: width, 80 cm (2 ft. 8 in.); depth, 1.1 m (3 ft. 6 in.); minimum total floor space, 1.5 m² (16 sq. ft.).

20. A floor drain with water seal should be provided in each toilet room to facilitate flushing the floor.

21. Premises containing toilet rooms shall be effectively ventilated.

Toilet Fixtures

22. Toilet fixtures shall be constructed and maintained in conformity with the requirements of national building and plumbing regulations.

23. Water closet bowls shall be—

(*a*) entirely free from any enclosing woodwork; and

(*b*) so installed that the space around the fixture can be easily cleaned.

24. (1) Water closet seats should be of the open-front type and shall be of substantial construction and of non-absorbent material.

(2) If absorbent material is used, the seats shall be coated with varnish or other substances so as to make them impervious to moisture.

(3) The seats should be of light colour.

Chemical Closets and Privies

25. Chemical closets and privies shall only be permitted where the water-carriage system is impossible.

26. Where permitted, chemical closets shall be—

(*a*) of a type approved by the competent health authority; and

(*b*) constantly maintained in a sanitary condition with the contents disposed of in accordance with the requirements prescribed by the competent health authority.

27. The installation of privies shall be prohibited—

(*a*) in all establishments in which they cannot be installed without the risk of contaminating any source of drinking water; and

(*b*) in all locations within 30 m (100 ft.) of any room or place where foodstuffs are stored or handled.

28. Where permitted, privies shall be constructed and maintained in accordance with the requirements prescribed by the competent health authority.

29. In factories where there is a considerable difference between the inside and outside temperature, the toilets shall be—

(*a*) connected with the factory by means of a covered passageway so constructed that the employees are not exposed to outdoor temperature in passing to and from them; and

(*b*) kept heated during working hours to a temperature of not less than 10° C. (50° F.).

Washing Facilities

30. (1) Adequate facilities for maintaining personal cleanliness shall be provided in all industrial establishments.

(2) Such facilities shall be—

(*a*) separated from the workplaces;

(*b*) conveniently located for the employees for whom they are provided; and

(*c*) maintained in a sanitary condition.

(3) Taps of wash basins, showers, etc., as well as opening devices of closet covers should preferably be operated by pedal rather than by hand.

31. The use of common towels shall be prohibited.

32. Individual cloth or paper towels shall be provided, together with proper receptacles for disposing of used towels.

33. Other apparatus for drying the hands shall only be installed if it is approved by the competent health authority.

34. (1) At least one wash basin with adequate water supply, including hot water where necessary, shall be provided for every 7 employees, or portion thereof, ceasing work simultaneously.

(2) Twenty-four inches (60 cm) of sink or circular trough with adequate water supply shall be considered equal to one basin.

35. Suitable, non-irritating soap shall be provided, either—

(*a*) in hygienic dispensing containers with inreach of each washplace; or

(*b*) in the form of individual pieces furnished to each employee.

36. In establishments in which employees are exposed to skin contamination with poisonous, infectious or irritating substances, or oil, grease or dust, at least one wash basin supplied with hot and cold water from one tap shall be provided for every five employees ceasing work simultaneously and exposed to such contamination.

37. In establishments in which employees are exposed to excessive heat or skin contamination with poisonous, infectious, irritating or particularly dirty substances or dust, at least one shower bath or bath tub with an ample supply of hot and cold water from one fixture shall be provided for every 6 workers or portion thereof exposed to such contamination and ceasing work simultaneously.

38. Shower baths shall be under cover and enclosed in individual compartments, with the entrances suitably screened, either by location or by partitions or curtains.

39. Mixing valves for shower baths should be of such type and be so installed and adjusted that no water can be supplied at a temperature exceeding 38° C. (100° F.).

40. Shower bath equipment shall be thoroughly cleaned at least once a day, and an effective disinfectant shall be used to destroy fungi and ringworm organisms.

Dressing Rooms

41. (1) All industrial establishments shall have suitable and sufficient installations for accommodating the workers' clothes and drying them.

(2) These installations shall be placed in rooms separate from the workrooms.

42. A separate dressing room shall be made available for all employees whose working clothes are exposed to contamination with poisonous, infectious, irritating or radioactive substances and shall be provided with well separated facilities for street and working clothes.

43. When workers are engaged in processes of such a nature that their working clothes are liable to become wet or have to be washed between shifts, suitable arrangements shall be made to ensure that dry clothes are always available to each employee on his return to work.

44. Dressing rooms should be provided with—

(*a*) individual lockers of adequate size and with adequate ventilation, preferably of metal and fitted with locks, for clothing taken off during working hours; and

(*b*) benches or other suitable seating arrangements.

45. Dressing rooms and lockers shall be kept clean, and suitable arrangements shall be made for their disinfection, in conformity with the requirements laid down by the competent health authority.

Rest and Dressing Rooms for Women

46. In factories employing 10 or more women at any one time at least one rest and dressing room for their exclusive use shall be provided, separated by solid partitions from any adjoining water closets.

47. Where less than 10 women are employed and no rest room is available, some equivalent space shall be provided which can be—

(*a*) properly screened; and

(*b*) made suitable for the use of women employees.

48. The minimum floor space for a rest room for not more than 10 women shall be 9 m^2 (100 sq. ft.) with an additional space of at least 2 m^2 (20 sq. ft.) for every additional 10 or fraction of 10 women employed.

49. Beds or couches shall be provided in women's rest rooms in the following numbers:

(*a*) where not more than 40 women are employed, one bed or couch;

(*b*) where 41 to 100 women are employed, two beds or couches;

(*c*) where 101 to 250 women are employed, three beds or couches; and

(*d*) for each additional 250 women employed at least one additional bed or couch.

Use of Canteens, Washrooms and Dressing Rooms

50. (1) In all establishments where employees are permitted to take meals on the premises, a room adequate for that purpose shall be provided for the maximum number of persons who have to take their meal at one time.

(2) This room shall be completely separate from the workrooms and reserved exclusively for the purposes of a canteen.

51. Covered receptacles shall be provided for disposing of waste food, and employees shall use these for the disposal of all such material.

52. The size of lunch rooms shall be calculated on the basis of the maximum number of persons using them at any one time, with the following minima:

(*a*) 25 persons or less, 18.5 m^2 (200 sq. ft.);

(*b*) 26 to 74 persons, 18.5 m^2 (200 sq. ft.) plus 0.65 m^2 (7 sq. ft.) for each person above 25;

(*c*) 75 to 149 persons, 50 m² (550 sq. ft.) plus 0.55 m² (6 sq. ft.) for every person above 74;

(*d*) 150 to 499 persons, 92 m² (1,000 sq. ft.) plus 0.50 m² (5 sq. ft.) for each person above 149; and

(*e*) 500 persons and over, 255 m² (2,750 sq. ft.) plus 0.40 m² (4 sq. ft.) for each person above 499.

53. (1) Employers shall formally prohibit their personnel from—

(*a*) depositing cloths or toilet articles elsewhere than in the dressing rooms;

(*b*) depositing parcels, brief cases or vessels containing food elsewhere than in the canteens or the dressing rooms;

(*c*) taking meals in the workrooms or ancillary rooms;

(*d*) entering canteens before taking off their working clothes, at least when these clothes are impermeated with poisonous, irritating, infectious or particularly dirty substances.

(2) The personnel shall—

(*a*) use the washrooms before meals and at the close of work;

(*b*) take a bath or a shower bath at the close of the working day when bath tubs or shower baths are placed at their disposal, where these are provided in accordance with paragraph 37 of this Regulation.

Employers shall see that the provisions of (*a*) and (*b*) are complied with.

Section 2. Local Exhaust Systems

Regulation 218. General Provisions

Definitions

1. In this Code the following terms have the meanings hereby assigned to them:

(*a*) the term " exhaust system " means a system of mechanical ventilation operating by suction for the removal of dusts, fibres, fumes, gases, mists, vapours or refuse, including all hoods, ducts, exhausters, air-cleaning equipment and receptacles when required, and any other part necessary for the proper installation and operation of the system, but not including any part of the building structure;

(*b*) the term " hood " means the total or partial enclosure forming that part of an exhaust system which is nearest to the point of origin or liberation of the atmospheric contaminant or the refuse, and through which air enters the system during operation;

(*c*) the term " duct " means any duct or piping forming part of an exhaust system;

(*d*) the term " branch duct " means a duct or pipe connected directly to the hood;

(*e*) the term " main duct " means a duct or pipe to which one or more branch ducts are connected, and which connects such branch ducts to the remainder of an exhaust system;

(*f*) the term " exhauster " means the exhaust fan or other suction device which serves to move the air through an exhaust system, including its housing and source of motive power;

(*g*) the term " air-cleaning equipment " means that part of an exhaust system in which the atmospheric contaminants collected by the system are removed from the air stream before it is expelled through the discharge duct, and includes settling chambers, cyclone separators, cloth filters, oil and water air washers, electrostatic precipitators, centrifugal separators, and fan-type collectors;

(*h*) the term " refuse receptacle " means a box, chamber, vault or tank into which the dust or other refuse from the air-cleaning equipment is deposited;

(*i*) the term " fire wall " means a wall which subdivides a building or separates buildings to restrict the spread of fire and which starts at the foundation and extends continuously through all stories to and above the roof;

(*j*) the term " Pitot tube " means a velocity pressure-indicating instrument consisting of an impact tube within an outer or static pressure tube terminating in connections for attachment to a manometer gauge.

Arrangement of System

2. In order to permit the use of the shortest lengths of ducts and the least number of bends and to ensure proper proportioning of air flow from the various hoods, processes to be connected to the same exhaust system should be located close together.

3. Processes generating or liberating different kinds of dusts, fumes or vapours which might combine into explosive, flammable or toxic compounds shall not be connected to the same exhaust system.

Capacity of System

4. The capacity of exhaust systems shall be determined on the assumption that all hoods connected to the system are open, except where the system is so interlocked that only a part or parts of it can be operated at a given time, in which case the capacity may be calculated on the assumption that all the hoods which can be operated at a given time are open.

Construction

5. All parts of exhaust systems shall be as free as possible from air leakage either into or out of the system except at points where air is taken into or discharged from the system by design, and the interior of all parts should be smooth and free of obstructions.

Grounding

6. All metal parts of exhaust systems shall be effectively grounded.

Operation

7. Exhaust systems shall be kept running at all times when the process connected to them is working and for a sufficient time before the process is started and after the process has ceased.

Downward Exhaust

8. Fumes, gases and vapours that are heavier than air, and metal particles, sand and similar heavy substances, should be removed by means of a downward system of exhaust.

Corrosive Gases

9. Hoods, ducts and other parts of exhaust systems subject to contact with corrosive gases should be—

(*a*) constructed of corrosion-resisting materials; or

(*b*) coated, inside and outside, with asphalt, rubber, bitumastic paint or other corrosion-resisting substances.

Fresh-Air Supply

10. Workrooms equipped with exhaust systems shall be provided with suitable fresh-air inlets of sufficient capacity to replace the air removed by the systems and so arranged and located that the workers are not subjected to unpleasant and injurious draughts of air.

Hoods

11. Suction hoods for exhaust systems shall be so designed and located as to provide the necessary air velocity with the smallest possible volume of air flowing into the hood, either by enclosing the process as much as possible or, where it cannot be enclosed, by—

(*a*) placing the hood with the opening as close as practicable to the source of contamination;

(*b*) shaping the hood to conform to the area of contamination;

(*c*) providing flanges, vanes or baffles if necessary; and

(*d*) locating the hood opening, or part of it, so that the dusts, fibres, fumes, gases, mists, vapours or refuse will fall, be projected or be drawn into the hood in the direction of the air flow.

12. Provision shall be made to eliminate or control cross currents or other air movement which would interfere with the control air currents created by the hood and render the exhaust system ineffective.

13. Where hoppers, troughs or other receptacles beneath work tables, work benches or floors serve as suction hoods for downward exhaust of heavy particles, the connection with the branch duct should be made at the side of the hood and the bottom utilised for trapping the larger particles.

14. When suction hoods for abrasive wheels also serve as protection hoods, they shall be constructed and mounted in accordance with the requirements of paragraphs 12 to 26 of Regulation 91, relating to abrasive grinding, polishing and buffing equipment.

15. When suction hoods for factory equipment other than abrasive wheels form all or part of the protection guards for such equipment, they shall conform to the provisions for the respective machines or other equipment in Regulations 82 to 89, Regulations 92 to 107 and Regulations 121 to 151.

16. Suction hoods for exhaust systems shall be free from sharp edges and rough burrs, and suitably reinforced when necessary.

17. Movable suction hoods on exhaust systems shall be provided with convenient and rapid-action adjusting devices.

18. Dipping, electroplating and pickling tanks, and other tanks from which corrosive, irritating or toxic gases, mists or vapours are liberated shall be provided—

(*a*) on the inside of the tank near the upper edge with slot-type lateral suction hoods along—

(i) at least one of the longer sides on tanks less than 50 cm (20 in.) in width;

(ii) each of the two longer sides on tanks 50 to 120 cm (20 to 48 in.) in width; or

(iii) each of the exposed sides on tanks more than 60 cm (24 in.) in width and so located against a wall that they are inaccessible from one of the longer sides; or

(*b*) with other means of ventilation not less effective than slot-type lateral suction.

19. Slot-type lateral suction hoods for tanks shall be—

(*a*) located at least 10 cm (4 in.) but preferably 15 to 20 cm (6 to 8 in.) above the bath level;

(*b*) placed flush with the inside of the tank lining and extend along the greater length of the tank; and

(*c*) provided with a full-length exhaust slot not less than 2.5 cm (1 in.) or more than 7.5 cm (3 in.) in width.

Ducts

20. The entire duct system for removal of dusts, fibres, fumes, gases, mists, vapours or refuse shall be self-contained, and no room or other portion of a factory building shall be used as an integral part of the system unless it is of non-combustible construction and used for no other purpose.

21. Ducts for exhaust systems shall be so located as to require the minimum length of duct and a minimum number of bends or elbows.

22. Ducts for exhaust systems shall be—

(*a*) constructed entirely of non-combustible materials;

(*b*) of adequate strength and thickness to meet the conditions of service and the installation requirements; and

(*c*) protected as far as practicable from damage due to accidental contact.

23. Flexible metallic hose may be used for the connection between suction hoods and exhaust ducts where movement of the hood is required.

24. Exhaust ducts shall be so installed as to—

(*a*) be readily accessible for inspection, cleaning and repairs;

(*b*) prevent condensation of moisture, etc., within them;

(*c*) provide maximum protection against outside damage to them; and

(*d*) avoid interference with the operation of cranes, elevators, trucks, etc.

25. Where possible, exhaust ducts shall be placed so that no part is less than 15 cm (6 in.) above the floor or 15 cm (6 in.) below the ceiling.

26. Where it is necessary to pass exhaust ducts or their inlets or outlets through a fire wall, an automatic fire door or shutter shall be provided on each side of the wall.

27. Where exhaust ducts pass through floors, partitions or walls, the space around the duct shall be sealed with asbestos, mineral wool or other non-combustible material, to prevent the passage of flame or smoke.

28. All reinforcing of exhaust ducts shall be done on the outside of the duct.

29. All exhaust ducts shall be adequately supported.

30. Unless space will not permit, every bend, turn or elbow in exhaust ducts shall be made with a centre line radius at least equal to twice the diameter of the duct to which it is connected.

31. All lap joints in exhaust ducts shall be so constructed that the outlet end of one length of duct enters the inlet end of the next length in the direction of the air flow, with the length of the lap not less than 2.5 cm (1 in.).

32. Increases in size of main ducts in exhaust systems through the junction of branch ducts shall be effected by means of tapered transformation sections, each at least 12.5 cm (5 in.) in length for each 2.5 cm (1 in.) increase in diameter.

33. Branch duct junctions to main ducts in exhaust systems shall be—

(*a*) made at the side or top of the larger end of a transformation section of the main duct;

(*b*) made in the direction of the air flow at an angle of not more than 45° measured on the centre lines of the two ducts; and

(*c*) limited to a single branch duct at any one point of intersection.

34. Telescopic joints, to permit raising and lowering of suction hoods for exhaust systems, shall have the duct directly attached to the hood with a sliding fit into the larger connecting duct and extending into the outside duct at least one duct diameter but not less than 15 cm (6 in.) when the joint is fully extended.

35. The use of dampers, gates or orifice plates in exhaust ducts shall, except as provided in paragraph 26 of this Regulation, be prohibited unless provided for the purpose of balancing the air flow in the system, in which case they shall be securely fastened to prevent unauthorised manipulation.

36. Exhaust ducts shall have no openings other than those required for the proper operation and maintenance of the system.

37. Horizontal exhaust ducts shall be provided with cleaning openings—

(*a*) of a size that will permit ready access to the interior of the duct;

(*b*) as far as practicable, located not more than 3 m (10 ft.) apart; and

(*c*) equipped with tight-fitting sliding or swinging doors provided, except in the case of vertical sliding doors, with substantial latches.

38. Main exhaust ducts shall be blanked off at the tail end with removable caps, and the last branch connections shall be not more than 15 cm (6 in.) from the capped end.

39. The inside diameter of any duct or elbow connected to the collars on suction hoods shall be full branch-duct size and the collars on the hoods shall fit tightly into such connecting ducts or elbows without clearance.

40. The area of the inlet and outlet of the fan housing for exhaust systems, and the air-discharge duct throughout its entire length, shall be at least equal to the area of the main duct at the fan inlet.

Exhausters

41. Fans for exhaust systems shall be—

(*a*) of a suitable type and of non-combustible construction;

(*b*) of adequate, but not greatly excessive, capacity to maintain the designed rate of air flow when operating against the total resistance pressure of the system;

(*c*) placed on adequate foundations or firmly secured to substantial supports;

(*d*) so located and arranged as to afford ready and safe access for cleaning, inspection, lubrication and repairs; and

(*e*) in places with high fire hazards, provided with remote control in addition to any control located close to the equipment.

42. Where conditions permit, fans for exhaust systems shall be located on the clean-air side of the air-cleaning equipment.

43. Where flammable materials or vapours are passed through fans for exhaust systems, the blades or runners and the spider of the fan shall be of non-ferrous material, or the casing shall consist of or be lined with non-ferrous material.

44. Blades or runners of fans for exhaust systems shall be of sufficient strength to prevent contact with casings or distortion under conditions of deposit loading or other operating factors.

45. Housings or casings of fans for exhaust systems shall be so constructed as to prevent distortion and loss of alignment under operating conditions.

46. Exposed openings into housings of fans for exhaust systems shall be protected by substantial metal screens to prevent accidents or the entry of foreign materials.

47. Bearings of fans for exhaust systems shall be self-lubricating, dust-tight and located outside casings and ducts.

48. Ready access to fans for exhaust systems should be provided by installation, at the point where the duct connects to the suction side of the fan, of a detachable sleeve at least 45 cm (18 in.) in length.

49. Fans for exhaust systems shall be operated at a speed sufficient to maintain the air flow into the system at such velocity that there will be no exposure in the workrooms to concentrations of harmful substances in excess of the limits tabulated in Appendix III to this Code.

50. Motors employed in exhaust systems shall be of a type designed and constructed for the particular conditions or hazards, or shall be located outside rooms in which flammable dusts or vapours are being generated or removed.

Air-Cleaning Equipment

51. Air-cleaning equipment for exhaust systems shall be of such capacity and operating characteristics as to ensure steady and continuous operation from the beginning to the end of a continuous working period.

52. Air-cleaning equipment for exhaust systems shall be so designed and installed as to permit—

(*a*) removal of dust or other extracted contaminants from the equipment without creating a hazard; and

(*b*) cleaning and repairing the equipment without recontaminating the air in the factory.

Exhaust Discharge

53. Exhaust systems should discharge to the outside atmosphere with the point of outlet at least 1.8 m (6 ft.) above the roof and 7.6 m (25 ft.) from the nearest door, window or other opening of any occupied building.

54. (1) Air discharged from exhaust systems shall not be recirculated unless it has been passed through suitable and efficient air-cleaning equipment which has removed all dirt, dust or fume contamination.

(2) Air discharged from any air-cleaning equipment used for the removal of lead dust, lead fumes or other highly toxic substances shall in no case be discharged into any workroom.

(3) Air exhausted from any process where silica dust is present shall in no case be returned to any workroom or discharged outside the factory in a manner which will create a health hazard.

55. Air discharge ducts for exhaust systems shall be provided with suitable canopies for protection against the weather but shall otherwise be unobstructed.

Inspection

56. Exhaust systems shall be inspected regularly, at intervals not exceeding three months, for leaks and deposits of dust or residues, and all worn or damaged parts shall be repaired or replaced without delay: Provided that exhaust systems on plant used for spray painting shall be cleaned in accordance with the provisions of paragraph 8 (*b*) of Regulation 193 of this Code.

57. Unless a flow meter has been provided in the main duct of an exhaust system, the routine inspection of the system should include measurement of the velocity pressure of the air flow in the branch ducts, by means of a Pitot tube or other reliable instruments, to determine whether the system is working in accordance with the original design.

58. All tests for air velocity of exhaust systems shall be made with all suction hoods that can be operated at a given time open and in operation.

59. The routine inspection of exhaust systems should from time to time also include measurement of the concentrations of contaminants in the atmosphere of the workrooms served by the systems by suitable methods of sampling and testing, supplemented

REGULATION 220. ADDITIONAL PRECAUTIONS FOR SYSTEMS FOR REMOVAL OF DUSTS, FIBRES, STOCK OR REFUSE

Ducts

1. Except as provided in paragraph 2 of this Regulation, circular exhaust ducts for removal of dusts, fibres, stock or refuse shall be constructed of steel or other metal equal in strength to steel plate of a thickness not less than—

(*a*) 0.6 mm (0.02 in.) for ducts 20 cm (8 in.) or less in greatest dimension;

(*b*) 0.8 mm (0.03 in.) for ducts over 20 cm (8 in.) up to 50 cm (20 in.) in greatest dimension;

(*c*) 1 mm (0.04 in.) for ducts 50 cm (20 in.) and less than 75 cm (30 in.) in greatest dimension; or

(*d*) 1.25 mm (0.05 in.) for ducts 75 cm (30 in.) or more in greatest dimension.

2. Stationary circular exhaust ducts for removal of granite dust or other dust with marked abrasive or erosive characteristics shall be constructed of steel or other metal equal in strength to steel plate of a thickness not less than—

(*a*) 1.25 mm (0.05 in.) for ducts 14 to 45 cm (5½ to 18 in.) in greatest dimension;

(*b*) 1.5 mm (0.06 in.) for ducts over 45 and up to 75 cm (18 and up to 30 in.) in greatest dimension; or

(*c*) 2 mm (0.08 in.) for ducts over 75 cm (30 in.) in greatest dimension.

3. The area of the main duct in an exhaust system for removal of dusts, fibres, stock or refuse shall be at any point at least 20 per cent. greater than the combined area of the branch ducts joining it between such point and the tail end of the system.

4. Ducts for removal of dusts, fibres, stock or refuse shall be kept open and unobstructed throughout their length, and free from screens.

5. Exhaust ducts for removal of dusts, fibres, stock and refuse shall be provided near bends, junctions or dead ends in horizontal runs, and at the bottom of all long vertical runs, with special additional cleaning openings.

6. Sweep-up ducts for removal of dusts, fibres, stock or refuse shall be so installed or protected as not to admit material which would cause obstructions in the ducts.

Dust Traps

7. Dust traps for collecting large particles of dust may be installed in exhaust ducts for removal of dust.

8. Material collected in any dust trap of an exhaust system shall discharge into an enclosed container, which shall be readily removable for disposal of the accumulated material.

Air-Cleaning Equipment

9. Exhaust systems for the removal of dust shall be provided with dust collectors or other air-cleaning equipment of a type determined by the fineness, toxicity and weight of the dust to be removed.

10. Separators for flammable dusts shall be installed outdoors or in detached rooms with adequate explosion vents for both apparatus and rooms.

11. Separators for flammable dusts shall not serve several separated processes, and individual collectors should be used for progressive stages in any one process.

12. Where conditions permit, cyclone separators for exhaust systems shall be installed outdoors, and when so located shall be—

(*a*) substantially supported by rigid framework; and

(*b*) protected, where necessary, against wind pressure by means of wire guy ropes of adequate strength.

13. Cyclone separators for exhaust systems shall be made of steel at least 0.8 mm (0.03 in.) in thickness.

14. The hopper discharge opening on cyclone separators for exhaust systems shall be not less than 45° from the horizontal.

15. Suitable means shall be provided for access to the body of cyclone separators for exhaust systems for the purpose of cleaning the separators and examination of the interior.

16. Cloth-screen dust arresters for exhaust systems shall be provided with—

(*a*) means for shaking or otherwise removing the dust mat from the cloth; and

(*b*) a damper in the duct just ahead of the arrester to prevent the dust from drifting back into the exhaust system during the process when the fan is shut down.

17. Bag-type collectors for exhaust systems shall be enclosed in substantial metal housings, provided inside with automatic sprinkler protection.

Vents

18. Exhaust systems for removal of refuse or stock shall be vented to the outside of the building, either directly by means of flues or separators or indirectly by means of the bins, vaults or other receptacles into which they discharge.

19. Exhaust systems for removal of combustible refuse or stock of an explosive nature shall be provided with safety relief or explosion vents—

(*a*) of at least the same area as the ducts they serve;

(*b*) leading in as nearly a vertical direction as possible and by the most direct route practicable to the outside of the building, but not through adjoining buildings;

(*c*) deviating not more than 22.5° from the direction of the ducts from which they lead;

(*d*) not connected to chimneys, pipes, vents or flues used for any other purpose; and

(*e*) terminating in an outlet provided with a cowl, or, where non-escape of materials is essential, with counter-balanced relief valves or covers.

Refuse Receptacles

20. Suitable refuse receptacles devoid of air under pressure shall be provided for the refuse discharge from separators.

21. Vaults for combustible refuse or stock delivered by gravity from separators for exhaust systems—

(*a*) should be located outside the factory building;

(*b*) shall be of substantial brick or reinforced concrete construction throughout;

(*c*) should not be used for receiving refuse or stock by other methods of conveying or by hand;

(*d*) shall be provided with screened ventilating roof openings of an area at least equal to the total area of the inlet openings; and

(*e*) if containing combustible material of an explosive nature, shall be provided with explosion relief vents of 1 m^2 per 24 m^3 (1 sq. ft./80 cu. ft.) of vault volume.

22. Where dust or refuse is discharged only in small quantities by separators from exhaust systems it may be discharged into instead of a vault—

(*a*) a substantial metal dust box, located outside the factory building and provided with a self-closing door or cover which will readily open and vent a fire or explosion within; or

7. Footwear for workers handling corrosive liquids, such as acids and caustics, should be made of rubber, specially treated leather, wood or other suitable corrosion-resisting material.

8. Footwear for workers handling molten metals or hot or corrosive liquids shall—

(*a*) fit the feet and ankles closely, so that the material handled cannot penetrate between the ankle and the footwear; and

(*b*) have no lace openings which will admit liquids or molten metals.

9. Safety boots shall have toe boxes made of steel or other metal conforming to standards of strength accepted by the competent authority.

10. Footwear for electrical workers should be free from metal fittings and have wooden pegged or sewn soles and heels.

11. Footwear for workers employed in operations where a spark might be hazardous shall not have any iron or steel nails or any other exposed ferrous material.

Regulation 235. Respiratory Protection

General Provisions

1. All respiratory protective equipment shall be of a type suitable for the conditions in which it is to be used and accepted by the competent authority for use in such conditions.

2. In selecting respiratory equipment, the following considerations should be taken into account:

(*a*) the process and conditions that create the exposure;

(*b*) the chemical, physical, toxic or other hazardous properties of the substance from which protection is required;

(*c*) the nature of the duties to be performed by the persons who wear the equipment and the encumbrance or restriction of movement in the working area; and

(*d*) the facilities for maintenance, upkeep and supervision of use

3. Respiratory protective equipment shall be capable of fitting various types of facial contours without leaking.

Filter Respirators

4. Mechanical filter respirators shall not be used for protection against solvent vapours, injurious gases or in atmospheres deficient in oxygen.

5. Filters shall be changed when breathing resistance becomes uncomfortable.

Chemical Cartridge Respirators and Canister Masks

6. Cartridge respirators and canister masks shall not be worn in any confined space or in any other place that is poorly ventilated, or in atmospheres deficient in oxygen.

7. Cartridges and canisters shall be marked in conformity with an identification code accepted by the competent authority.

8. Cartridges and canisters shall be replaced after each use and, if not used, at intervals not exceeding one year or such other period as may have been specified by the manufacturer.

9. Canisters shall be replaced at the first detection of leakage.

10. Body harness for canister masks should be comfortable and shall allow free movement of the wearer.

Breathing Apparatus

11. Supplied-air respirators or hose masks—

(*a*) should be used for work in dangerous atmospheres in all cases where the work is of such nature and carried out in such places that the fresh air supply can be safely maintained; and

(*b*) shall be used for non-emergency operations in atmospheres in which the content of dangerous gas or fumes is too high for the safe use of canister or cartridge respirators.

12. The supply of air to a mask or a respirator shall not be at a pressure exceeding 1.75 kg/cm^2 (25 lb./sq. in.).

13. When compressed air is supplied for a mask or a respirator at a pressure higher than that prescribed in paragraph 12—

(*a*) a pressure-reducing valve shall be installed near the point where the mask or respirator hose is attached to the compressed-air line; and

(*b*) as a further precaution against high pressure, in case the reducing valve fails to function, a relief valve shall be installed, pre-set to release at a pressure slightly above the setting of the pressure-reducing valve.

14. (1) Compressed air should not be supplied directly to a mask or respirator without first being filtered by air-line filters to ensure that it is clean and dry.

(2) Compressed air for masks and respirators should preferably be supplied by blowers rather than by compressors.

15. The compressor air intake should be so situated and the compressors or blower so maintained as to ensure a supply of clean and pure air.

16. (1) The distance between the source of air and any supplied-air respirator shall not exceed 45 m (150 ft.).

(2) The distance between the source of air and any hose mask shall not exceed 7.5 m (25 ft.).

17. For hose masks, the inside diameter of the hose shall be not less than 2.5 cm (1 in.) and the hose shall be of the non-collapsible type.

18. All component parts of body harness shall withstand a pull of at least 115 kg (250 lb.).

Oxygen Breathing Apparatus

19. Oxygen breathing apparatus of a type approved by the competent authority shall be carried by—

(*a*) workers engaged in fire fighting, rescue or repair work in atmospheres containing high concentrations of gases or deficient in oxygen;

(*b*) workers whose respiratory organs must be protected and who are situated at more than 45 m (150 ft.) from the closest possible source of sufficiently pure air, provided, however, that in such case, the use of filter respirators is not permitted.

20. Oxygen breathing apparatus shall be worn only by specially trained persons.

21. The oxygen cylinders shall be charged at a pressure not exceeding 150 atmospheres and a visible pressure gauge should indicate continuously the amount of oxygen remaining in the cylinder.

22. In every breathing apparatus designed to give a uniform oxygen delivery, the reducing valve shall be so adjusted as to supply not less than 2 l (½ gal.) of oxygen per minute.

Inspection, Maintenance and Use

23. At intervals not exceeding one month, every breathing apparatus shall be—

(*a*) carefully examined by a competent and authorised person, with respect to its general condition and with particular attention to any delicate and perishable parts; and

(*b*) tested for leakage.

24. The pressure at which any automatic relief valve of an oxygen breathing apparatus discharges shall be measured at intervals not exceeding one month.

25. Flow-meters on oxygen breathing apparatus shall be tested for accuracy at least once in every six months.

26. Suitable provision shall be made to ensure that the oxygen supplied for use in oxygen breathing apparatus contains no harmful substances.

27. Every person who may have to use an oxygen breathing apparatus shall be trained—

(*a*) in the proper method of putting the mask or facepiece on and rapidly adjusting it to the face; and

(*b*) in the proper use of the apparatus under emergency conditions.

28. Workers shall immediately report to the competent supervisor any broken or otherwise defective breathing apparatus assigned to them.

29. Breathing apparatus shall be—

(*a*) under the direct supervision of a competent and authorised person responsible for its proper maintenance; and

(*b*) stored in a clean, cool and dry place that is conveniently situated and readily accessible.

30. Cartridge respirators and canister masks shall be cleaned and their facepieces sterilised after each use.

31. Facepieces and air lines or hoses should be washed with soap and water, rinsed in clean water and dried before being put away.

32. Breathing apparatus used by one person shall not be used by another before it has been washed with soap and lukewarm water and then sterilised.