RULES AND REGULATIONS
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF HEALTH

CHAPTER 4

Article 432

Regulations Establishing Threshold Limits in Places of Employment

Under the provisions of the Administrative Code Act of April 9, 1929, P.L. 177 the following Rules and Regulations of the Department of Health are hereby amended this 18th day of August, 1961.

Section 3, paragraph J, is amended to read as follows:

J. "Threshold Limit Value" shall mean the maximum average atmospheric concentration of contaminant to which workers may be exposed for an eight hour working day. (These values are set forth in Table 1 hereof, which table is a part of these regulations.)

Section 3 is amended by adding a new paragraph, "L", as follows:

L. "Short-Term Limit" shall mean the maximum atmospheric concentration of a contaminant to which a workman may be exposed for a specified short-time period. The concentration represents an upper limit of exposure for the specified time and assumes that there are sufficient recovery periods between episodes for recuperation. The daily average exposure to the contaminant, including these episodes, shall be such that the threshold limit value set forth in Table 1 shall not be exceeded. (These values are set forth in Table 2 hereof, which table is a part of these regulations.)

The title and paragraph A of Section 5 are amended to read as follows:

Section 5. Threshold Limit Values and Short-Term Limits

A. No employee shall be exposed to atmospheric concentrations of contaminants which concentrations may give rise to occupational disease. Tables 1 and 2 shall be used for the determination of permissible levels.

Table 1 (Supplement 1964)

The following Threshold Limit Values as contained in Table 1 are hereby changed to read as follows:

Substance	8-hour maximum average exposure P.P.M.[a]	Mg. per[b] Cu. M.
Dimethylformamide–Skin	10	—
Hydrogen sulfide	10	—
Methyl mercaptan	10	—
Nitric acid	2	—
Phosgene	0.1	—
Selenium compounds (as Se)	—	0.2
Yttrium	—	1

The following Threshold Limit Values are hereby added to Table 1:

Substance	8-hour maximum average exposure P.P.M.[a]	Mg. per[b] Cu. M.
tert. Butyl chromate (as CrO_3)–Skin	—	0.1
Camphor	—	2

(continued)

Table 1. *(Continued)*

Substance	8-hour maximum average exposure P.P.M.[a]	Mg. per[b] Cu. M.
DDVP (o,o-Dimethyl-2,2-dichlorovinyl phosphate)	—	1
Endrin (1,2,3,4,10,10-hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octa hydro-1,4,-endo-5,8-dimethanonaphthalene) —Skin	—	0.1
Heptachlor (1,4,5,6,7,8,8a-heptachloro-3a,4,7,7a-tetrahydro-4,7-methanoindene)	—	0.5
Oil mist (mineral)	—	5

[a]Parts of vapor or gas per million parts of air by volume at 25° C and 760 mm. Hg. pressure.
[b]Milligrams of dust, fume, or mist per cubic meter of air.

The following new Table 2 is added:

Substance	Maximum average exposure for the time period specified P.P.M.[a]	Mg. per[b] Cu. M.	Time in minutes
Acetic acid	40	—	5
Ammonia	100	—	30
Amyl acetate	200	—	30
Beryllium	—	0.025	5
Boron trifluoride	1	—	5
Bromine	0.4	—	30
Butyl acetate	300	—	30
Butylamine	5	—	5
Carbon tetrachloride	25	—	30
Chlorine	3	—	5
Chlorine trifluoride	0.1	—	5
Chloroacetaldehyde	1	—	5
Chloroform	400	—	30
Cyanide (as CN)	—	5	30
1,1-Dichloroethane	200	—	30
Dichloroethyl ether	35	—	30
Diglycidyl ether	0.5	—	5
Ethyl benzene	200	—	30
Ethylene glycol dinitrate and Nitroglycerin	0.2	—	30
Fluoride	—	10	30
Formaldehyde	5	—	5
Hexone (MIBK)	400	—	5
Hydrazine	1	—	30
Hydrogen chloride	5	—	5
Hydrogen sulfide	20	—	5
Iodine	0.1	—	5
Methyl acetate	400	—	5
Methyl chloroform (1,1,1-trichloroethane)	1,500	—	5
Methyl mercaptan	20	—	5
Nitrogen dioxide	25	—	5
Ozone	1	—	30
Perchloroethylene	200	—	30
Selenium compounds (as Se)	—	0.3	30
Sulfur dioxide	20	—	5
Sulfuric acid	—	3	5
Tolylene-2,4-diisocyanate (TDI)	0.02	—	5
Trichloroethylene	200	—	30
Vinyl chloride	500	—	5

[a]Parts of vapor or gas per million parts of air by volume at 25° C and 760 mm. Hg. pressure.
[b]Milligrams of particulate per cubic meter of air.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF HEALTH
DIVISION OF OCCUPATIONAL HEALTH

HYGIENIC INFORMATION GUIDE NO. 7

ASBESTOS

PROPERTIES:

Asbestos is composed of a number of different minerals which are silicates of variable composition, but basically are of a form of hydrous magnesium silicate. Their chief characteristic is a structure composed of long, parallel, flexible fibers, capable of repeated longitudinal subdivision. Many varieties are sufficiently flexible to be spun into yarn or woven on modified textile machinery. Manufacturing processes can cause this mineral to break up into many minute particles.

THRESHOLD LIMIT VALUE (acceptable atmospheric concentration for 8-hour work period):

5 million particles per cubic foot of air.

MEDICAL ASPECTS:

Long continued inhalation of asbestos dust may result in a form of pneumoconiosis known as asbestosis. The primary effect of such inhalation is a condition of pulmonary fibrosis. A characteristic finding of asbestosis is the presence of asbestos "bodies" in the lungs and sputum. Complete roentgenologic study of the chest and histopathological findings are necessar to establish the presence of this disease. The question of whether or not there is any relationship between the inhalation of asbestos dust and cancer of the lung is still under discussion but more and more evidence is accumulating that exposure to asbestos fibers may cause cancer of the lung.

PREVENTION:

a. Preplacement: Occupational history is a necessity. A complete physical examination, including a chest x-ray, should be emphasized.

b. Periodic Examination: A physical examination, together with a chest x-ray film, should be given about once a year. Cases wh pathologic lung changes have occurred should be relocated from employment in dusty operations.

EXPOSURE CONTROL:

a. All dust-producing operations should be equipped with local exhaust ventilation. Where possible, isolation or segregation of t operation should be observed, together with the use of wet meth

b. Housekeeping should be maintained with a view to preventing an accumulation of deposited dust. Vacuum methods of cleaning ar preferred, and should be performed "off-shift" or when least exposure to plant personnel would occur.

c. Where other methods of control are not feasible, dust respirato of a type approved by the U.S. Bureau of Mines for protection against pneumoconiosis-producing dusts, should be supplied to those employees subjected to the dusty atmosphere.

d. periodic determination of the dust levels of the plant atmos
uld be made to ascertain the efficiency of the control mea
in use.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF HEALTH
DIVISION OF OCCUPATIONAL HEALTH

HYGIENIC INFORMATION GUIDE NO. 77

PERSONAL RESPIRATORY PROTECTIVE EQUIPMENT

This guide is presented as a summary of general information concerning personal respiratory protective equipment.

OTHER PUBLISHED INFORMATION:

Many comprehensive publications are available on the subject of respiratory protective equipment. These include:

1. ASA Code for Head, Eye and Respiratory Protection Z 2.1-1959. American Standards Association, 10 East 40th Street, New York.

2. Respiratory Protective Equipment, Bulletin 226. U.S. Department of Labor, Bureau of Labor Standards, Washington, D.C.

3. Respiratory Protective Devices Manual. Braun and Brumfield, Inc., Box 1203, Ann Arbor, Michigan.

4. Respiratory Protective Devices Approved by the Bureau of Mines. U.S. Department of the Interior, Washington, D.C.

5. Respiratory Devices for Protection Against Inhalation of Dust, Mists, and Low Vapor Concentrations of Certain Pesticides. Agricultural Research Service, U.S. Department of Agriculture, Washington, D.C.

USE AS A CONTROL MEASURE:

Personal respiratory protective devices should never be substituted for effective engineering control of airborne contaminants. They should be considered an interim mechanism until more effective control is installed. At best, they should be used as a last resort for protection of the individual workman.

There are certain circumstances where it is neither economical nor practical to control a hazard beyond the use of personal respiratory protection. These situations are generally of an intermittent nature, however, and rarely extend throughout an entire workday. Examples include: the adjustment of valves in a contaminated atmosphere; the periodic machining of certain highly toxic materials; the cleaning of vibrating screens; and miscellaneous, infrequently recurring maintenance operations. The cost of reducing the concentration of contaminants in these operations or areas to acceptable levels would be prohibitive and the actual exposure time is generally of short duration. It is recognized also that respiratory protective equipment is an important adjunct to primary control measures.

In general, personal respiratory equipment is designed for a specific purpose and should be used only for the purpose for which it is intended. It interposes a barrier between the man and his environment insofar as air contaminants are concerned. Such equipment consists of gas masks,

mechanical filters, chemical cartridges, supplied air-line masks, self-contained air supplies, hose masks, and combinations of these. Filter, gas mask and chemical cartridge type respirators are not for use when there is a deficiency of oxygen in the air. There are also limits of contamination, above which the efficiency of a respirator is not capable of protecting the wearer. These limits are specified by the manufacturer, for example, "not be used in atmospheres containing more than 0.1 per cent contaminant by volume". Also, if a contaminant is capable of being absorbed through the skin, adequate protection of the workman may require the use of protective clothing including complete suits, in addition to respiratory protective devices.

TYPES OF EQUIPMENT:

Based on the function of the equipment, these devices may be grouped as air-purifying and atmosphere-supplying respirators.

Air-purifying respirators include:

MECHANICAL FILTERS - These units generally consist of a face-piece and a filter. They are designed to remove dispersoids from the air. Most filters may be used only once and must be discarded when particulate builds up. Some, however, may be "blown free" and reused. Detergents, soaps and solvents destroy the properties of the filter; consequently, the manufacturer's instructions concerning cleaning should be followed.

The U.S. Bureau of Mines approves filters for protection against pneumoconiosis-producing and nuisance dusts and certain fumes and mists.

CHEMICAL CARTRIDGES - These units are designed to remove gases and vapors from the air within certain limits. A small amount of sorbent is present in the cartridge. The sorbent varies with the type of gas and vapor and must be effective for the specific contaminant.

GAS MASKS - These units are equipped with a canister of sorbents fitted to a full face-piece which covers the eyes, nose and mouth. The canisters are color-coded for specific application to a particular contaminant or combination of contaminants. Surplus military gas masks are not designed for industrial use.

MOUTHPIECE RESPIRATORS - These units are single cartridges with a nose clip to prevent breathing through the nose. They are designed primarily to permit escape from a contaminated atmosphere during an emergency situation.

Atmosphere-supplying respirators include:

HOSE MASKS - These units are used for respiratory protection in any atmosphere provided that enough air is supplied to the wearer. They may be equipped with or without blowers. The blower should supply fresh, uncontaminated air, free of oil mist and toxic gases.

AIR-LINE RESPIRATORS - These units are used in any atmosphere not immediately hazardous to life. Compressed air is fed to the mask in two types of supply, continuous flow and demand flow. As with the hose mask, the compressed air supply should be uncontaminated. Abrasive blasting respirators and supplied air hoods and suits are variations of air-line respirators.

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SELF-CONTAINED BREATHING APPARATUS - Such a unit is similar to an air-line respirator except that the air or oxygen supply is from a cylinder carried by the wearer. The supply of air or oxygen is limited, and the apparatus is heavier and bulkier, but greater mobility over greater distance is possible with these units. In general, use of these units requires that the user be well trained in their operation and be in excellent physical condition.

PROGRAM:

The chief complaint concerning the use of respiratory protective devices is that of discomfort. Fit is important for two reasons. First, the device fails if a tight fit is not maintained between the face-piece and the wearer's face. Second, poorly fitting respirators become intolerable to the wearer.

The selection of the proper device should be the responsibility of a trained person who knows the extent of the hazard, the limitations of various types of respirators and the conditions under which the devices will be used.

Workmen who use respirators should receive thorough instruction including the operating principles of the devices and their limitations, adjustment and fit, and when and where they are to be used. After instruction, supervision over the use of respirators is mandatory.

All respiratory equipment should be maintained in a clean and sanitary condition. It should be periodically cleaned, sterilized and inspected. Respirators should not be passed from one man to another unless sterilization is assured. A mask fitted to one person may not fit another. Worn parts should be replaced only with parts specifically designed for the particular respirator. Equipment for exclusive use in emergencies should be inspected periodically to assure operable condition at all times.

"UNAPPROVED" RESPIRATORS:

Respirators are classed as "approved" by the U.S. Bureau of Mines and as "acceptable" by the U.S. Department of Agriculture with certain provisions. The U.S. Department of Agriculture states that mechanical filter and chemical cartridge respirators do not provide needed protection from inhalation of pesticide dust, mist, and vapors for use by (1) those formulating or mixing pesticides in closed or inadequately ventilated spaces, and (2) those applying pesticides, including aerosols, in greenhouses. Gas masks, hose masks with blower or self-contained air-supply units must be used in these instances.

Many commercially available respirators are neither "approved" nor "acceptable". This may be because they failed to pass testing procedures or because they were never submitted for testing.

Respirators are purchased frequently without regard to their ability to do the job. Price consideration should not be the deciding factor. For obvious reasons, a piece of sponge or gauze should not be purchased for use where there is exposure to toxic dusts; a respirator approved for dust should not be used to protect the workman from a toxic gas or for spray-painting operations. Some respirators will protect a hay fever sufferer from pollen, but will not protect a workman from the effects of industrial dust.

Use of "unapproved" or improper respirators can produce a feeling of false security, causing a workman to expose himself to a situation which

he would otherwise avoid.

PRECAUTIONS:

If a respirator is judged to be inefficient for the job, remove it and obtain the proper device for your application. Also, be careful with chemical canisters and cartridges. These have a limited shelf life.

If you have a problem or are uncertain as to the proper type of respiratory protective equipment needed, contact the Division of Occupational Health, Pennsylvania Department of Health, for consultation.

HIH-19128 P

RULES AND REGULATIONS
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF HEALTH

CHAPTER 4

Article 432

Regulations Establishing Threshold Limits in Places of Employment

(Revised Aug. 20, 1963)

PENNSYLVANIA DEPARTMENT OF HEALTH
P. O. BOX 90
HARRISBURG, PA.

Regulations Establishing Threshold Limits in Places of Employment

Under the provisions of the Administrative Code Act of April 9, 1929, P. L. 177, the following Rules and Regulations of the Department of Health adopted the 27th day of Oct., 1961.
(Revised Aug. 20, 1963)

Section 1. Purpose

The purpose of these regulations and standards is to prescribe minimum requirements and standards for the maintenance of occupational health in places of employment in Pennsylvania.

Section 2. Application

These regulations and standards shall apply to every place of employment.

Section 3. Definitions

A. "Atmospheric contaminant" shall mean a harmful substance or material in air usually occurring in the form of a dust, fume, gas, vapor, or mist.

B. "Department" shall mean the Department of Health, Commonwealth of Pennsylvania.

C. "Dust" shall mean finely divided solid particles dispersed in air and having been formed by mechanical means such as grinding, crushing, blasting, and drilling.

D. "Fume" shall mean solid particles dispersed in air resulting from some chemical or physical process that involved a change of state, such as combustion, sublimation, or evaporation and condensation.

E. "Gas" shall mean a formless fluid occupying the space of enclosure.

F. "General or dilution ventilation" shall mean ventilation provided to dilute the concentration of dusts, fumes, gases, vapors, or mists in the atmosphere of all or part of the place of employment.

G. "Local exhaust ventilation" shall mean that type of ventilation in which suction is applied at the point of generation of dusts, fumes, gases, vapors, and mists.

H. "Mist" shall mean liquid droplets suspended in air.

I. "Place of employment" shall mean a location or site where an individual possesses employment in a trade, occupation, or profession for the sake of monetary gain.

J. "Threshold Limit Value" (Maximum Allowable

average atmospheric concentration of contaminant to which workers may be exposed for an eight hour working day. (These values are set forth in Table 1 hereof, which table is a part of these regulations).

K. "Vapor" shall mean any liquid, except water, which when held in suspension in air will revert to its original liquid state after release from heat, chemical action, or pressure conditions.

Section 4. Employer's Duties

A. Every employer shall install and provide such control measures and protective equipment as is required for the protection of health.

B. Every employer shall inform and periodically instruct his employees regarding known hazards and proper methods for utilizing industrial hygiene control measures which are provided.

C. When it is necessary for an employer to provide protective equipment, such employer shall provide an approved means for cleaning and sterilizing such protective equipment, and the employer shall cause such equipment to be maintained in a clean and sanitary condition. Respiratory equipment shall not be passed from one man to another until such equipment is clean and sterilized. When filter or cartridge type respirators are used, such employee shall have such respirator for his own exclusive use. Respiratory equipment and replacement units shall be stored, when not in use, in approved containers.

D. When employees are exposed to compounds capable of causing occupational disease by inhalation and/or skin or mucous membrane absorption, the department may require their employer to provide physical examinations and other tests for them at periodic intervals.

Section 5. Threshold Limit Values

A. No employee shall be exposed to atmospheric concentrations of contaminants which concentrations may give rise to occupational disease. Table 1 shall be used for the determination of permissible levels.

B. Exposures to atmospheric contaminants or adverse environmental conditions not referred to in Section 5A shall be controlled when necessary to protect health.

Section 6. Air Recirculation and Discharge

A. No air from any local exhaust ventilation system may be recirculated without express approval by the Department.

shall be such that no air contamination will ente any window, door, or other openihg of any wor area in quantities sufficient to create a healt hazard to or in such area.

Section 7. Tanks and Vessels

A. No individual shall be permitted to enter a tan or closed vessel until it has been ascertained tha the atmosphere in the tank or vessel contains a adequate quantity of oxygen and that atmospher contaminants have been diluted to safe concentra tions.

B. If the oxygen content of the air and the quantit of atmospheric contamination are not determinec entry to the tank or vessel shall be prohibite unless the workman is equipped with an air lin respirator, a safety harness and safety line, an that another employee be stationed outside th tank or vessel to remove the workman in the tan or vessel should he experience difficulty.

Section 8. Housekeeping

A. The interiors, exteriors, and environs of building where hazardous materials are used, stored, o handled, shall be cleaned and maintained in suc a manner as to prevent harmful exposure t hazardous materials.

B. Employees engaged in such cleaning operation and all others who may be exposed shall wea protective equipment as is required. The cleanin operations should be done by suction apparatus.

C. Where wet processes are used, reasonable drain age should be maintained. False floors, plat forms, mats, or other means of safe footing shoul be provided.

Section 9. Labeling

Adequate identification, warning, and caution label shall be applied to all containers of hazardous chem icals.

Substance	8-hour maximum average exposure P.P.M.*	Mg. per Cu. M.
Acetaldehyde	200	—
Acetic acid	10	—
Acetic anhydride	5	—
Acetone	1,000	—
Acetonitrile	40	—
Acetylene tetrabromide	1	—
Acrolein	0.1	—
Acrylonitrile—Skin	20	—
Aldrin (1, 2, 3, 4, 10, 10-hexachloro-1, 4, 4a, 5, 8, 8a-hexahydro-1, 4, 5, 8-dimethanonaphthalene)—Skin	—	0.25
Allyl alcohol—Skin	2	—
Allyl chloride	1	—
Allyl glycidyl ether (AGE)	10	—
Allyl propyl disulfide	2	—
Ammonia	50	—
Ammonium sulfamate (Ammate)	—	15
Amyl acetate	100	—
Amyl alcohol (isoamyl alcohol)	100	—
Aniline—Skin	5	—
Antimony	—	0.5
ANTU (alpha naphthyl thiourea)	—	0.3
Arsenic	—	0.5
Arsine	0.05	—
Barium (soluble compounds)	—	0.5
Benzene (benzol)—Skin	25	—
Benzyl chloride	1	—
Beryllium	—	0.002
Boron oxide	—	15
Boron trifluoride	1	—
Bromine	0.1	—
Butadiene (1,3-butadiene)	1,000	—
2-Butanone (methyl ethyl ketone)	200	—
2-Butoxy ethanol (Butyl Cellosolve)	50	—
Butyl acetate (n-butyl acetate)	200	—
Butyl alcohol	100	—
tert. Butyl alcohol	100	—
Butylamine	5	—
n-Butyl glycidyl ether (BGE)	50	—
Butyl mercaptan	10	—
p-tert. Butyltoluene	10	—
Cadmium oxide fume	—	0.1
Calcium arsenate	—	1
Carbon dioxide	5,000	—
Carbon disulfide—Skin	20	—
Carbon monoxide	100	—

Table 1. *(Continued)*

Substance	8-hour maximum average exposure P.P.M.*	Mg. per* Cu. M.
Carbon tetrachloride—Skin	10	—
Chlordane (1,2,4,5,6,7,8,8-octachloro-3a,4,7,7a-tetrahydro-4,7-methanoindene)	—	0.5
Chlorinated camphene, 60%	—	0.5
Chlorinated diphenyl oxic :	—	0.5
Chlorine	1	—
Chlorine dioxide	0.1	—
Chlorine trifluoride	0.1	—
Chloroacetaldehyde	1	—
Chlorobenzene (monochlorobenzene)	75	—
Chlorobromomethane	200	—
Chlorodiphenyl (42% Chlorine) —Skin	—	1
Chlorodiphenyl (54% Chlorine) —Skin	—	0.5
Chloroform (trichloromethane)	50	—
1-Chloro-1-nitropropane	20	—
Chloropicrin	0.1	—
Chloroprene (2-chloro-1,3-butadiene)	25	—
Chromic acid and chromates (as CrO_3)	—	0.1
Cobalt	—	0.5
Crag (R) herbicide (sodium 2-[2,4-dichlorophenoxy] ethanol hydrogen sulfate)	—	15
Cresol (all isomers)—Skin	5	—
Cyanide (as CN)—Skin	—	5
Cyclohexane	400	—
Cyclohexanol	50	—
Cyclohexanone	50	—
Cyclohexene	400	—
2,4-D (2,4-dichlorophenoxyacetic acid)	—	10
DDT (2,2-bis (p-chlorophenyl)-1,1,1-trichloroethane)—Skin	—	1
Decaborane—Skin	0.05	—
Diacetone alcohol (4-hydroxy-4-methyl-2-pentanone)	50	—
Diborane	0.1	—
1,2-Dibromoethane (Ethylene dibromide)	25	—
o-Dichlorobenzene	50	—
p-Dichlorobenzene	75	—
Dichlorodifluoromethane	1,000.	—
1,1-Dichloroethane	100	—

Table 1. *(Continued)*

Substance	8-hour maximum average exposure P.P.M.*	Mg. pe Cu. M
1,2-Dichloroethane (ethylene dichloride)	50	—
1,2-Dichloroethylene	200	—
Dichloroethyl ether	15	—
Dichloromonofluoromethane	1,000	—
1,1-Dichloro-1-nitroethane	10	—
Dichlorotetrafluoroethane	1,000	—
Dieldrin (1,2,3,4,10,10-hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4,5,8-dimethanonaphthalene)—Skin	—	0.25
Diethylamine	25	—
Difluorodibromomethane	100	—
Diglycidyl ether (DGE)	0.5	—
Diisobutyl ketone	50	—
Dimethyl acetamide—Skin	10	—
Dimethylaniline (n-dimethylaniline)—Skin	5	—
Dimethylformamide	20	—
1,1-Dimethylhydrazine—Skin	0.5	—
Dimethylsulfate—Skin	1	—
Dinitrobenzene—Skin	—	1
Dinitrotoluene—Skin	—	1.5
Dinitro-o-cresol—Skin	—	0.2
Dioxane (diethylene dioxide)	100	—
Dipropylene glycol methyl ether	100	—
EPN (o-ethyl o-p-nitrophenyl thionobenzenephosphonate)—Skin	—	0.5
Ethyl acetate	400	—
Ethyl acrylate—Skin	25	—
Ethyl alcohol (ethanol)	1,000	—
Ethylamine	25	—
Ethylbenzene	200	—
Ethyl bromide	200	—
Ethyl chloride	1,000	—
Ethyl ether	400	—
Ethyl formate	100	—
Ethyl mercaptan	20	—
Ethyl silicate	100	—
Ethylene chlorohydrin—Skin	5	—
Ethylenediamine	10	—
Ethylene glycol dinitrate (Combined EGDN + NG) —Skin	0.2	—
Ethylene imine—Skin	5	—
Ethylene oxide	50	—

Table 1. *(Continued)*

Substance	8-hour maximum average exposure P.P.M.[a]	Mg. per[b] Cu. M.
2-Ethoxyethanol (Cellosolve)	200	—
2-Ethoxyethylacetate (Cellosolve acetate)	100	—
Ferbam (ferric dimethyl dithiocarbamate)	—	15
Ferrovanadium dust	—	1
Fluoride	—	2.5
Fluorine	0.1	—
Fluorotrichloromethane	1,000	—
Formaldehyde	5	—
Furfural	5	—
Furfuryl alcohol	50	—
Gasoline	500	—
Glycidol (2,3-Epoxy-1-propanol)	50	—
Heptane (n-heptane)	500	—
Hexane (n-hexane)	500	—
Hexanone (methyl butyl ketone)	100	—
sec-Hexyl acetate	50	—
Hexone (methyl isobutyl ketone)	100	—
Hydrazine—Skin	1	—
Hydrogen bromide	3	—
Hydrogen chloride	5	—
Hydrogen cyanide—Skin	10	—
Hydrogen fluoride	3	—
Hydrogen peroxide, 90%	1	—
Hydrogen selenide	0.05	—
Hydrogen sulfide	20	—
Hydroquinone	—	2
Iodine	0.1	—
Iron oxide fume	—	15
Isophorone	25	—
Isopropylamine	5	—
Isopropyl glycidyl ether (IGE)	50	—
Ketene	0.5	—
Lead	—	0.2
Lead arsenate	—	0.15
Lindane (hexachlorocyclohexane, gamma isomer)	—	0.5
Lithium hydride	—	0.025
Magnesium oxide fume	—	15
Malathion (o,o-dimethyl dithiophosphate of diethyl mercaptosuccinate)—Skin	—	15
Manganese	—	5
Mercury—Skin	—	0.1
Mercury (organic compounds)—Skin	—	0.01
Mesityl oxide	25	—

Table 1. *(Continued)*

Substance	8-hour maximum average exposure P.P.M.[a]	Mg. per[b] Cu. M.
Methoxychlor (2,2-di-p-methoxy-phenyl-1,1,1-trichloroethane)	—	15
Methyl acetate	200	—
Methyl acetylene	1,000	—
Methyl acrylate—Skin	10	—
Methylal (dimethoxymethane)	1,000	—
Methyl alcohol	200	—
Methyl bromide—Skin	20	—
Methyl cellosolve (2-methoxy-ethanol)	25	—
Methyl cellosolve acetate (ethylene glycol monomethyl ether acetate)	25	—
Methyl chloride	100	—
Methyl chloroform (1,1,1-trichloroethane)	350	—
Methylcyclohexane	500	—
Methylcyclohexanol	100	—
Methylcyclohexanone	100	—
Methyl formate	100	—
Methyl isobutyl carbinol (methyl amyl alcohol)	25	—
Methyl mercaptan	20	—
αMethyl styrene	100	—
Methylene chloride (dichloro-methane)	500	—
Monomethyl aniline—Skin	2	—
Molybdenum (soluble compounds)	—	5
(insoluble compounds)	—	15
Naphtha (coal tar)	200	—
Naphtha (petroleum)	500	—
Nickel carbonyl	0.001	—
Nicotine—Skin	—	0.5
Nitric acid	10	—
p-Nitroaniline—Skin	1	—
Nitrobenzene—Skin	1	—
Nitroethane	100	—
Nitrogen dioxide	5	—
Nitroglycerin (combined EGDN + NG)—Skin	0.2	—
Nitromethane	100	—
1-Nitropropane	25	—
2-Nitropropane	25	—
Nitrotoluene—Skin	5	—
Octane	500	—
Osmium tetroxide	—	0.002
Ozone	0.1	—

Table 1. *(Continued)*

Substance	8-hour maximum average exposure P.P.M.[a]	Mg. per Cu. M.
Parathion (o,o, diethyl-o-p-nitrophenyl thiophosphate)—Skin	—	0.1
Pentaborane	0.005	—
Pentachloronaphthalene—Skin	—	0.5
Pentachlorophenol—Skin	—	0.5
Pentanone (methyl propyl ketone)	200	—
Pentane	1,000	—
Perchloroethylene (tetrachloroethylene)	100	—
Perchloromethyl mercaptan	0.1	—
Perchloryl fluoride	3	—
Phenol—Skin	5	—
Phenyl glycidyl ether (PGE)	50	—
Phenylhydrazine—Skin	5	—
Phosdrin (2-carbomethoxy-1-methyl vinyl dimethyl phosphate)	—	0.1
Phosgene (carbonyl chloride)	1	—
Phosphine	0.3	—
Phosphoric acid	—	1
Phosphorus (yellow)	—	0.1
Phosphorus pentachloride	—	1
Phosphorus pentasulfide	—	1
Phosphorus trichloride	0.5	—
Picric acid—Skin	—	0.1
Platinum (soluble salts)	—	0.002
Propyl acetate	200	—
Propyl alcohol (isopropyl alcohol)	400	—
Propyl ether (isopropyl ether)	500	—
n-Propyl nitrate	25	—
Propylene dichloride (1, 2-dichloropropane)	75	—
Propylene imine—Skin	25	—
Propylene oxide	100	—
Pyrethrum	—	5
Pyridine	5	—
Quinone	0.1	—
Rotenone (commercial)	—	5
Selenium compounds (as Se)	—	0.1
Sodium fluoroacetate (1080)—Skin	—	0.05
Sodium hydroxide	—	2
Stibine	0.1	—
Stoddard solvent	500	—
Strychnine	—	0.15
Styrene monomer (phenylethylene)	100	—

Table 1. *(Continued)*

Substance	8-hour maximum average exposure P.P.M.[a]	Mg. per Cu. M
Sulfur dioxide	5	—
Sulfur hexafluoride	1,000	—
Sulfuric acid	—	1
Sulfur monochloride	1	—
Sulfur pentafluoride	0.025	—
Sulfuryl fluoride	5	—
2, 4, 5T (2, 4, 5-Trichlorophenoxy-acetic acid)	—	10
TEDP (tetraethyl dithionopyrophosphate)—Skin	—	0.2
TEPP (tetraethyl pyrophosphate)—Skin	—	0.05
Tellurium	—	0.1
1, 1, 2, 2-Tetrachloroethane—Skin	5	—
Tetrahydrofuran	200	—
Tetranitromethane	1	—
Tetryl (2, 4, 6-trinitrophenyl—methylnitramine)—Skin	—	1.5
Thallium (soluble compounds)—Skin	—	0.1
Thiram (tetramethyl thiuram disulfide)	—	5
Titanium dioxide	—	15
Toluene (toluol)	200	—
o-Toluidine—Skin	5	—
Tolylene-2, 4-diisocyanate	0.02	—
Trichloroethylene	100	—
Trichloronaphthalene—Skin	—	5
1, 2, 3-Trichloropropane	50	—
1, 1, 2-Trichloro 1, 2, 2-trifluoroethane	1,000	—
Triethylamine	25	—
Trifluoromonobromomethane	1,000	—
Trinitrotoluene—Skin	—	1.5
Triorthocresyl phosphate	—	0.1
Triphenyl phosphate	—	3
Turpentine	100	—
Uranium (soluble compounds)	—	0.0
(insoluble compounds)	—	0.2
Vanadium (V_2O_5 dust)	—	0.5
(V_2O_5 fume)	—	0.1
Vinyl chloride (chloroethylene)	500	—
Vinyl toluene	100	—
Warfarin (3-[α acetonylbenzyl]-4-hydroxycoumarin)	—	0.

Substance	8-hour maximum average exposure P.P.M.[a]	Mg. per[b] Cu. M.
Xylene (xylol)	200	—
Xylidine—Skin	5	—
Yttrium	—	5
Zinc oxide fume	—	5
Zirconium compounds (as Zr)	—	5

NOTE: The word "Skin" following a substance's name indicates that the substance can penetrate the skin to cause systemic effects.

[a]Parts of vapor or gas per million parts of air by volume at 25° C and 760 mm Hg pressure.
[b]Milligrams of particulate per cubic meter of air.

Mineral Dusts

Substance	M.P.P.C.F.[a]
Silica	
Crystalline	
Quartz (threshold limit calculated from the formula)	$\frac{250}{\%SiO_2+5}$
Cristobalite (same)	
Amorphous, including natural diatomaceous earth	20
Silicates (less than 1% crystalline silica)	
Asbestos	5
Mica	20
Soapstone	20
Talc	20
Portland cement	50
Miscellaneous (less than 1% crystalline silica)	50

[a]Millions of particles per cubic foot of air based on impinger samples counted by light-field techniques.