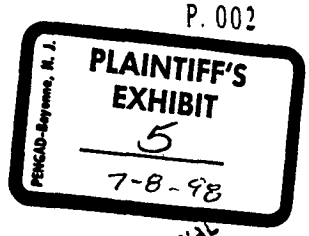
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LEGAL REQUIREMENTS FOR THE PREVENTION AND CONTROL OF INDUSTRIAL PUBLIC HEALTH HAZARDS

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Division of Industrial Hygiene
Ohio Department of Health
Columbus, Ohio
1946

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REGULATIONS FOR THE PREVENTION AND CONTROL OF DISEASES RESULTING FROM EXPOSURE TO TOXIC FUMES, VAPORS, MISTS, GASES AND DUSTS IN ORDER TO PRESERVE AND PROTECT THE PUBLIC HEALTH

Adopted by the Ohio Public Health Council February 16, 1946. Filed with the Secretary of State March 1 1946. Effective January 1, 1947

Regulation 244. (Application of Regulations.) These regulations shall apply to every place of employment and particularly to those places of employment where a work or process is carried on by which dusts, fumes, mists vapors gases or environmental conditions of a harmful nature are produced or generated, or exist independently of the work or process which may be inhaled or absorbed or in any other manner enter the body in quantities or concentrations that constitute harmful exposure as hereinafter defined.

Regulations 245 (Modifications.) When strict compliance with all of the provisions of these regulations would involve undue hardship the Ohio Department of Health may, upon application in writing, permit modification of the requirements when protection practically equivalent to that required by these regulations has been provided The application for the modification of any of these regulations in any particular case shall be accompanied by a full statement of the existing conditions and the reasons for requesting such modification Any modification granted under the provisions of this paragraph shall be limited to the particular case covered by the application for such modification.

Regulation 245. (Definitions.)

(1) A 'Gravity System of Ventilation' means one which depends wholly upon relative air density

(2) A 'Mechanical System of Ventilation' means one which depends upon the operation of power-driven equipment

(3) 'General Ventilation' means the ventilation of the general atmosphere in the place of employment.

(4) 'Dilution Ventilation' means ventilation provided to dilute the concentration of dusts fumes vapors or gases in the atmosphere of all or part of the place of employment

(5) 'Local Exhaust Ventilation' means that type of ventilation in which suction is applied at the point of generation or escape of dusts fumes mists vapors or gases

(6) 'Exhaust System' means a complete suction device including all hoods ducts fans separators, and receptacles when required and any other part necessary for the proper installation and operation thereof

(7) 'Hood' means that part of an exhaust system into which the contaminated air or dust fume mist vapor or gas first enters Ordinarily it consists of an enlargement of the end of the duct of such shape and design as to facilitate the entry of dust or other impurities to the exhaust system.

(8) 'Duct' means any pipe flume or channel forming a part of a ventilating system used to convey air dusts fumes mists vapors or gases

(9) 'Fan' means the machine which creates the movement of air in a mechanical system of ventilation'

(10) 'Separator' means that part of an exhaust system in which the contaminant or entrained material is separated from the air which conveys it

(11) 'Refuse Receptacle' means that part of the exhaust system into which dust or other material separated from the air is deposited

(12) "Approved" means approved by the Ohio Department of Health.

(13) "Dust" means particles of solid matter that have undergone comminution.

(14) "Fumes" means solid particles generated by condensation from the vapor or gaseous states, usually of metals, and often accompanied by oxidation.

(15) "Mist" means liquid droplets suspended in air.

(16) "Vapor" means the gaseous form of a substance normally in the liquid or solid state.

(17) "Gas" means a formless fluid occupying the space of enclosure.

(18) "Harmful" as applied to the effect of dusts, fumes, vapors, mists, or gases, and any environmental condition arising from industrial operations or processes means any mechanical or toxic action which in any way injures any part of the body.

(19) An "Isolated Operation" means one which is carried on in a location where, or at such time that no employee except such as actually engaged in the operation involved is subjected to the harmful exposures resulting therefrom.

(20) "Silica (free or uncombined)" is the name given to the chemical compound silicon dioxide (SiO_2).

(21) "Singular and Plural Number". Whenever in these regulations the singular is used the plural shall be implied and whenever the plural is used the singular shall be implied.

Regulation 247. (Harmful Exposure.)

(1) No employer shall use or permit to be used in the conduct of his business, manufacturing establishment or other place of employment any process, material or condition known to have an adverse effect on health, unless reasonable provisions have been made to prevent injury to the health of the employees and of the public.

(2) The concentration of dusts, fumes, mists, vapors, or gases, in the air breathed by employees shall not exceed the following maximum allowable concentrations for an 8-hour daily exposure:

GASES AND VAPORS	CONCENTRATION Parts per million (by volume)
Acetone	500
Acrolein	0.5
Acrylonitrile (Vinyl Cyanide)	20
Ammonia	100
Amyl Acetate	400
Butyl Acetate	400
Ethyl Acetate	400
Aniline	5
Arsine	1
Benzene (Benzol)	100
Butanone (Methyl Ethyl Ketone)	300
Butyl Alcohol	100
Carbon Disulfide	20
Carbon Monoxide	100
Carbon Tetrachloride	100
Chlorine	5
Chloroform	100
Dichlorbenzene	75
Dichlorethyl Ether	15
Dimethyl Aniline	5
Ether (Ethyl)	400
Ethylene Dichloride	100
Ethylene glycol monomethyl ether (Methyl Cellosolve")	100
Formaldenyde	10
Hydrogen Chloride	10
Hydrogen Cyanide	20
Hydrogen Fluoride (Calculated as H F)	3
Hydrogen Sulfide	20
Methyl Alcohol	200

GASES AND VAPORS	CONCENTRATION Parts per million (by volume)
Methyl Bromide	20
Methyl Chloride	200
Naphtha	
Coal Tar	200
Petroleum	1 000
Nitrobenzene	5
Nitrogen Oxides	25
Ozone	1
Phosgene	1
Phosphine	1
Styrene (Monomer)	400
Sulfur Dioxide	10
Tetrachlorethane	10
Tetrachlorethylene (Perchlorethylene)	200
Toluene (Toluol)	200
Trichlorethylene	200
Turpentine	200
Xylene (Xylol)	200

METALLIC DUSTS AND FUMES	CONCENTRATION Milligrams per cubic meter
Cadmium	0.1
Chromic Acid and Chromates (Calculated as chromic oxide CrO_3)	0.1
Lead	0.15
Manganese	6.0
Mercury	0.1
Zinc Oxide	15.0

OTHER DUSTS AND FUMES	
Chlorinated Diphenyls	1.0
Chlorinated Naphthalenes	
Trichlornaphthalene	5.0
Pentachlornaphthalene	0.5

MINERAL DUSTS		CONCENTRATION Million particles per cubic foot
Asbestos		5
Silica free or uncombined	Over 40%	5
	20 to 40%	10
	10 to 20%	20

RADIATION	
X-ray (Roentgens per day)	0.1
Radium (Roentgens per day)	0.1
Radon gas (Curie per liter)	10^{-11}

*Explanatory Note

(1) At least three atmospheric samples, spaced at intervals to yield an average measurement of exposure over the entire cycle of operation under test shall be collected in the breathing zone of the worker or wherever such exposures are suspected or known to exist.

(2) The sampling and analysis of contaminated air and the interpretation of the data in relation to the stated maximum allowable concentrations shall be done only by technically qualified and competent persons using methods approved by the Ohio Department of Health.
(3) Temporary concentrations in excess of the maximum allowable concentrations listed shall not be permitted if exposure to such concentrations for a period of one hour or less may result in an adverse effect on health as determined by the Ohio Department of Health
(4) For the purpose of the above maximum allowable concentrations for silica the free silica content shall be the percent of free silica in the fraction of the air-borne dust in the breathing zone of the worker that is smaller than 5 microns in maximum diameter.
(5) For all other dust determinations millions of dust particles per cubic foot of air by the light field microscope counting technique shall include all microscopically visible particles up to 10 microns in size "

Regulation 248 (General Ventilation) Special Requirements Wherever harmful concentration of dusts fumes mists vapors or gases exist or are produced in the course of the employment and prevention elimination or control of said harmful exposures is not practical by local exhaust, or by other means as hereinafter provided the capacity of the general ventilation system be it a gravity or mechanical means of moving air shall be augmented or sufficient dilution ventilation provided so as to provide for the elimination of said harmful exposures to a degree specified under Regulation 247.

Regulation 249. (Local Exhaust Ventilation)
(1) Where Required All equipment and processes that emit or create harmful dusts fumes mists. vapors gases or other contaminants in quantities that tend to be harmful to the health of the employees exposed thereto, and where general ventilation alone or in conjunction with other provisions of these regulations is inadequate to furnish the required protection shall be connected to an exhaust system for the removal of said hazards as far as practicable at their point of origin Wherever practicable application of local exhaust ventilation is preferred

(2) General Requirements Exhaust fans ducts hoods separators and all necessary appurtenances including refuse receptacles shall be so designed constructed maintained and operated as to insure the required protection in the production of volume and velocity of exhaust air sufficient to gather dusts fumes, mists vapors or gases from said equipment or process and to convey them to suitable points of safe disposal thereby preventing their dispersion in harmful quantities into the atmosphere of work rooms or other places where persons are employed

(3) Duration of Operation The exhaust system shall be in operation continually during all operations which it is designed to serve If the employee remains in the contaminated zone the system shall continue to operate for some time after the cessation of said operations the length of time to depend upon the individual circumstances and effectiveness of the general ventilation system

(4) Disposal of Exhaust Materials The air outlet from every dust separator and the fumes mists vapors or gases collected by an exhaust system shall discharge in such a manner that the discharged materials shall not reenter places of employment in harmful quantities or in concentrations which exceed the maximum allowable concentrations specified in Regulation 247 Dust and refuse discharged from an exhaust system shall be burned (when feasible) buried, treated or otherwise disposed of in a manner that will prevent its harmful dispersion

Regulation 250 (Dust Allaying Media) Use shall be made of water oil or chemicals in such non-injurious quantities and with such frequency as may be necessary to suppress and allay harmful dust wherever the provisions of Regulation 249 are impracticable or inadequate to prevent harmful exposure The use of dust allaying media may also be supplementary to other provisions of these regulations

Regulation 251 (Personal Protective Equipment)
(1) When to be Worn Where the removal of harmful dusts fumes mists vapors or gases at their source as provided for in Regulation 249 is impracticable the employees who may be liable to harmful exposure shall be protected by means of respiratory or other protective equipment approved

by the Ohio Department of Health for the specified employment involved

(2) Protection of Temporary Nature The use of respiratory equipment shall in general, be regarded as emergency protection against occasional and/or relatively brief exposure.

(3) Approval Required Respiratory protective equipment including filter, cartridge and supplied-air respirators, hose masks, canister-type gas masks supplied air-hoods and helmets, and self contained oxygen breathing apparatus shall be of a type approved by the Ohio Department of Health.

(4) Education and Use of Equipment Required Employers and employees shall familiarize themselves with the use, sanitary care and limitations of such respiratory equipment as they may have occasion to use.

(5) Provision and Care of Equipment Required: Duty of Employer and Employee: It shall be the duty of the employer to provide and replace when necessary, such respiratory and other personal protective equipment as may be required, and to maintain same in efficient and sanitary condition.

It shall be the duty of the employee to use such equipment provided for him to exercise due care to maintain same in efficient and sanitary condition. Protective devices and protective clothing shall be worn or used at all times during the period of exposure.

(6) Air Supply to Positive Pressure Equipment Air supplied to hose masks and positive-pressure air helmets shall be free from harmful dusts fumes mists vapors, or gases to the extent that the inhalation of such air shall not constitute harmful exposure as set forth in Regulation 247. The air should, preferably, be supplied by means of a blower-type fan. Whenever compressed air is used an approved filter shall be inserted in the supply line to remove any oil, sediment or condensation that it may contain. Such filter shall be maintained in efficient working condition.

(7) Wherever air is delivered to respiratory equipment, the intake to the blower-type fan, low pressure compressor or ordinary compressor shall be so located as to prevent harmful contamination of the air by carbon monoxide. Internally lubricated compressors are not recommended for supplying air to respirators and, if internally lubricated compressors are so used they must be provided with a suitable temperature regulator to prevent overheating of the compressors and with a carbon monoxide alarm device to insure adequate warning of exposure to carbon monoxide.

(8) Air Pressure to be Regulated Wherever positive-air respiratory equipment is used, an automatic pressure relief valve shall be installed in the supply line. The maximum allowable pressure shall be 10 pounds per square inch. This does not apply to self-contained oxygen breathing apparatus.

a. The standard of health protection when using positive-pressure air respiratory equipment is the maintenance of positive pressure within the equipment The minimum of air pressure to be maintained within such equipment is therefore that which will assure a steady and continuous outward flow of air from within the apparatus.

(9) Sanitation of Respiratory Equipment The employer shall provide an approved means for cleaning and sterilizing all respiratory equipment and it shall be the duty of the employer to cause such equipment to be maintained in a clean and sanitary condition. Respiratory equipment shall not be passed on from one man to another until such equipment is cleaned and sterilized When filter or cartridge type respirators are used, each 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.

Regulation 252. (Isolation of Hazardous Operations).

(1) In every place of employment where a work or process is carried on in which, or in connection with which dusts fumes, mists, vapors or gases are produced in quantities or concentrations and under conditions which may injure the health of the employees, or where environmental conditions harmful to the health of employees are produced such operations shall be isolated unless the employer elects to control said harmful exposures under other provisions of these regulations.

(2) Whenever practicable. the industrial operation or process shall be effectively controlled or enclosed to prevent harmful chemicals or injurious substances from coming in contact with the skin.

Regulation 253. (Sanitation and Cleanliness).

(1) Maintenance The interiors. exteriors and environs of buildings that contribute to a harmful exposure to which these regulations apply shall be cleaned and maintained in such conditon as will prevent harmful exposure as set forth in Regulation 247

(2) Cleaning When to be Done Cleaning shall be done at such time of day or night as will cause a minimum of exposure of employees. Employees engaged in cleaning operations and all others who may be exposed shall wear approved respiratory equipment unless such cleaning is done by means of suction apparatus capable of preventing harmful exposure.

Regulation 254. (Warning of Health Hazards). In all places of employment where harmful exposures exist from infective agents in materials used. from toxic dusts, fumes, mists, vapors or gases and from heat, radiation, humidity. radioactive material or any other injurious substance or cause, the employer shall call attention to such hazards. and shall periodically instruct all employees regarding the harmful exposures connected with their duties and the best preventive measures and methods to protect themselves therefrom.

Regulation 255. (Violation). A violation of any of the provisions of the foregoing regulations, or failure to comply with any orders made pursuant thereto by the Ohio Department of Health, shall subject the persons so violating or failing to comply to the penalties provided by law.

Regulation 256. (Interpretation). If any of the foregoing regulations shall be held to be unlawful. such holding shall not affect the validity of any other of the foregoing regulations.