

STATE OF NEW JERSEY
DEPARTMENT OF LABOR & INDUSTRY
████████████████████ Commissioner
Percy A. Miller, Jr.

INDUSTRIAL HYGIENE AND SANITATION STANDARDS

RULES AND REGULATIONS

prescribing

MAXIMUM ALLOWABLE CONCENTRATION LIMITS

of

HARMFUL VAPORS, GASES, FUMES, MISTS, DUSTS

and

RADIANT ENERGY

for

PLACES OF EMPLOYMENT

BUREAU OF ENGINEERING AND SAFETY
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Division of Labor

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FOREWORD

Under the laws of the State of New Jersey, the Department of Labor is charged with the responsibility of safeguarding the lives and limbs of the industrial workers in the State. The elimination of occupational disease hazards and the control of worker exposure to substances, materials or processes which can produce an occupational disease has long been recognized under the laws as an important function of the Department of Labor.

The great diversification of manufacturing processes and types of industrial operations in the state with the attendant important factor of making operations safe for the worker created problems which two or three decades ago had no precedent to serve as a guide. The scientific approach to the problem of maintaining a safe environment for the worker, created among other things, the concept of establishing a limit of atmospheric contamination where harmful vapors, gases, mists or dusts might exist in the breathing zone.

Accordingly, about twelve years ago, the Department of Labor, through its Bureau of Hygiene and Sanitation, listed 42 toxic substances and gave the maximum allowable concentration of each in air which, if not exceeded, was considered to be safe for worker exposure.

Since that time, the introduction of new materials, the changes in manufacturing operations and similar factors have indicated the need for extending the coverage of Maximum Allowable Concentration Limits for harmful substances.

A study was begun in 1945 for the purpose of reviewing all published data on the subject. An enlarged list was prepared based on the work of the American Standards Association, the experiences in other states, and the research of outstanding authorities in the field.

The aid of the New Jersey State Industrial Safety Committee was solicited and that group, through its committee on codes, rules, and regulations, made a very careful study of the matter and after numerous meetings and analyses of comments, recommended the adoption of rules and regulations for Maximum Allowable Concentration of harmful substances by the Commissioner of Labor. This recommendation was formally approved by the New Jersey State Industrial Safety Committee at its meeting on December 3, 1947.

With this endorsement, the Commissioner of Labor ordered the rules made effective on December 15, 1947.

1 - Purpose and Scope

- 1.1 The purpose of these rules and regulations is to prescribe the permissible concentration limits of vapors, gases, fumes, mists, dusts and radiant energy in the atmosphere of places of employment for guidance in establishing control procedures for the protection of workers.
- 1.2 The allowable average concentration limits of vapors, gases, fumes, mists, dusts and radiant energy apply to all places of employment and shall not be exceeded.

2 - Definitions

- 2.1 Approved - approved by the Commissioner of Labor or any of his authorized representatives.
- 2.2 Harmful - any mechanical or toxic action which in any way injures any part of the body or function of any part of the body due to the effect of vapors, gases, fumes, mists, dusts, radiant energy or environmental condition, arising from any industrial operation or process.
- 2.3 Place of employment - any place where persons are employed and over which the Commissioner of Labor has jurisdiction.
- 2.4 Shall - wherever used, the word "shall" indicates a mandatory requirement.
- 2.5 Should - wherever used, the word "should" indicates a recommended practice.
- 2.6 Dusts, fumes, gases, mists, vapors -
 - a. Dusts - solid particles generated by handling, crushing, grinding, rapid impact, detonation or decrepitation of organic or inorganic materials such as rock, ore, metal, coal, wood, grain.
 - b. Fumes - solid particles generated by condensation from the gaseous state generally after volatilization from metals and often accompanied by chemical reaction.
 - c. Gases - normally formless fluids which occupy the space of enclosure and which can be changed to the liquid or solid state only by the combined effect of increased pressure and decreased temperature.
 - d. Mists - suspended liquid droplets generated by condensation from the gaseous state or by breaking up a liquid into a dispersed state, such as by splashing, foaming or atomizing.
 - e. Vapors - the gaseous form of substances which are normally in the solid or liquid state and which can be changed to these states either by increasing the pressure or by decreasing the temperature.
- 2.7 Radiant energy - energy derived from radio-active substances or short-wave radiation which, upon exposure, may have a toxic and injurious effect on the body.

3 - Maximum Permissible Concentration Limits

- 3.1 The maximum allowable average concentration limits of vapors, gases, fumes, mists, dusts, or radiant energy for an exposure not to exceed eight hours daily shall be as shown in the following table:

GASES - parts per million (by volume) P.P.M. or milligrams per cubic meter (by weight) MGM. per CU.M. at 25° C. and 760 mm pressure.

Substance	P. P. M.	MGM. PER. CU. M.	Substance	P.P.M.	MGM. PER. CU.M.
Ammonia	100	69.5	Hydrogen Fluoride	3	2.4
Arsine	1	3.2	Hydrogen Sulphide	20	27.0
Carbon Monoxide	100	114.5	Nitrogen Oxides (except N2O)	25	-
Chlorine	1	1.5	Ozone	1	2.00
Formaldehyde	10	25.4	Phosgene	1	4.
Hydrogen Chloride	10	14.7	Phosphine	1	1.4
Hydrogen Cyanide	20	22.1	Sulphur Dioxide	10	26.2

VAPORS - parts per million (by volume) P.P.M. or milligrams per cubic meter (by weight) MGM.PER. CU.M. at 25°C and 760 mm pressure.

Substance	P. P. M.	MGM. PER. CU. M.	Substance	P.P.M.	MGM. PER. CU.M.
Acetone	500	1186.0	Ethylene Dichloride	100	405.0
Acrolein	0.5	1.1	Gasoline	500	2330.0
Acrylonitrile	20	43.4	Hydrochloric Acid	10	14.7
Amyl Acetate	200	1064.0	Methyl Alcohol (Methanol)	200	261.8
Aniline	5	18.8	Methyl Bromide	20	77.8
Benzene (Benzol)	100	319.0	Methyl Chloride	200	417.2
Butyl Acetate	200	948.0	Methyl Ethyl Ketone	200	588.0
			Mononitrotoluene	5	28.0
			Naptha, Coal Tar	200	-
			Naptha, Petroleum Hexane	500	1760.0

Substance	P.P.M.	MGM.PER.CU.M.	SUBSTANCE	P.P.M.	MGM.PER.CU.M.
Butyl Alcohol	50	151.5	Naptha, aromatic pet. sod.	500	
Carbon Disulfide	20	62.2	Monochlorobenzene	75	343.5
Carbon Tetrachloride	50	315.0	Nitrobenzene	5	25.2
Dichlorobenzene	75	450.8	Phenyl ethylene (styrne)	200	850.0
Dichloroethylether	15	87.8	Tetrachloroethane	10	68.7
Dimethylaniline	5	25.0	Tetrachloroethylene	200	1258.0
Ethyl Ether	1000	3030.0	Toluene	200	752.0
			Trichlorethylene	200	1072.0
			Turpentine	100	556.0
			Xylene	200	868.0

FUMES, DUSTS, MISTS - milligrams per cubic meter at 25° C. and 760 mm pressure - mg. per. cu. m.

Substance	MGM.PER.CU.M	Substance	MGM.PER.CU.M.
Arsenic	0.15	Lead	0.15
Barium Peroxide	0.50	Manganese	6.00
Cadmium	0.10	Mercury	0.10
Chlorodiphenyl	1.00	Pentachloronaphthalene	0.50
Chromic Acid	0.10	Tetryl	1.50
Dinitrotoluene	1.50	Trichloronaphthalene	5.00
Fluorides	2.00	Trinitrotoluene	1.50
Hexachloronaphthalene	0.10	Zinc Oxides	15.00

DUSTS - millions of particles per cubic feet at 25° C. and 760 mm pressure - M.P.P.C.F. 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. 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.

Substance	M.P.P.C.F.	Substance	M.P.P.C.F.
Pottery - free silica over 40%	5	Silicon Dioxide - free silica over 40%	5
Pottery - free silica 20% to 40%	10	Silicon Dioxide - free silica 20% to 40%	10
Pottery - free silica 10% to 20%	20	Silicon Dioxide - free silica 10% to 20%	20
RADIANT ENERGY - roetgens per day - r.p.d.		Radiation	R.P.D.
		X-ray	0.1
		Radium	0.1

- 3.2 Any process, material or condition that either is known to be harmful or in which concentrations of harmful substances exceed the values specified in these rules and regulations shall neither be used nor permitted to be used in any place of employment except for emergency or short exposures, and then not unless methods shall be provided and used to prevent the contraction of any illness or disease incident to the work or process.
- 3.3 When strict compliance with all of the provisions of these regulations would involve undue hardship, the Commissioner of Labor may, upon application in writing, permit modification of the requirements when protection equally effective as 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.
- 4 - Sampling, Testing and Analysis
- 4.1 Sampling, Testing and Analysis of air to determine concentrations of vapors, gases, fumes, mists, dusts, or radiant energy shall be performed by technically qualified and competent persons only.
- 4.2 Sampling, testing and analytical procedure shall be in accordance with approved applicable and reliable methods.
- 4.3 The collection of the sample or testing of air shall be made under normal working conditions and in such a way that the method of operation and atmospheric conditions at the location of sampling or testing shall not be appreciably changed.
- 4.4 Except for radiation surveys, samples of air shall be taken at the breathing level, close to the mouth or nose of the worker with special attention to location near the source of contaminant and in the path of air currents carrying it toward the worker if such conditions exist.
- 4.5 At least three atmospheric samples, spaced at intervals to yield an average measurement of exposure over the entire cycle of operations under test shall be collected in the breathing zone of the worker or wherever such exposures are suspected or known to exist.
- 4.6 Samples of air should be taken wherever there is a known or suspected source of or exposure to any harmful vapor, gas, fume, mist or dust.
- 4.7 Radiation surveys should be made wherever there is a known or suspected source of or exposure to harmful radiant energy.
- 5 - Effective Date
- 5.1 These rules and regulations are effective on and after December 15, 1947.