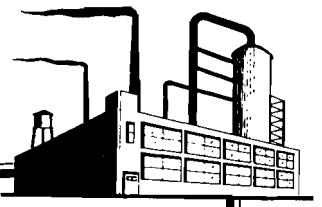
AFETY REGULATION NO. 3



Establishing

THRESHOLD LIMIT VALUES

for

Dusts, Vapors, Fumes,

Gases and Mists

Effective October 30, 1958

COPY NO. 2

BUREAU OF ENGINEERING & SAFETY
N.J. DEPARTMENT OF LABOR & INDUSTRY. Division of Labor.
Trenton, N.J.

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This Safety Regulation No. 3

Supersedes the Following:

RULES AND REGULATIONS

PRESCRIBING MAXIMUM ALLOWABLE CONCENTRATION LIMITS

FOR HARMFUL VAPORS, GASES, FUMES, MISTS, DUSTS AND RADIANT ENERGY

FOR PLACES OF EMPLOYMENT

Which Was Filed with the

Secretary of State

on

April 5, 1954

This Regulation was reviewed and approved by
Occupational Health Program of
New Jersey State Department of Health

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FOREWORD

This Regulation is promulgated to establish threshold limit values for various toxic substances which may be present in the atmosphere of the industrial work environment. These values, which are presented as an appendix to this Regulation, are taken from the Threshold Limit Values for 1958 adopted by the American Conference of Governmental Industrial Hygienists.

Threshold Limits do not represent fine lines between safety and dangerous concentrations. They represent only conditions under which it is felt that workers may repeatedly be exposed day after day without adverse effect on their health. The Limits listed in the appendix refer to weighted average concentrations of an eight hour working shift rather than a maximum which is not to be exceeded even momentarily. The amount by which these limits may be exceeded for short periods during the working day depends upon a number of factors such as the nature of the contaminant, whether very high concentrations, even for short periods, produce acute poisoning, whether the results are cumulative, the frequency with which high values occur and for what periods of time. All must be taken into consideration in determining whether a hazardous situation exists.

This Regulation is promulgated by the Commissioner of Labor and Industry of the State of New Jersey under authority vested in him by law.

> R. S. 34:1-20. The Commissioner may make and publish rules and regulations not inconsistent with law as he shall deem necessary to enforce the provisions of this title.
>
> Whenever any condition is found to exist in contravention of any provision of this title, the commissioner may by written order signed by him specifying the things to be done and the time for compliance, require such conditions to be corrected.

The specific provisions of Title 34 which are applicable to the subject matter of this Regulation are:

> R. S. 34:6-48. DUTY OF EMPLOYER IN GENERAL. Every employer shall, without cost to his employees, provide reasonably effective devices, means and methods to prevent the contraction by them of any illness or disease incident to the work or process in which they are engaged.
>
> R. S. 34:6-61. VENTILATION; ORDER; PENALTY. The owner, agent or lessee of any factory, workshop, mill or place where the manufacture of goods is carried on shall provide in each workroom proper and sufficient ventilation and means of ventilation which shall so far as practicable render harmless any excessive heat, and any steam, gases, vapors, dust or other impurities injurious to health that may be generated in any manufacturing process.

In the event of insufficient ventilation the commissioner shall order adequate means of ventilation to be provided. Whenever dust, gas, vapors or other impurities are generated by any process in such manner as to be inhaled by employees to an injurious extent and it appears to the commissioner that such condition could be substantially improved by a fan or other mechanical means he may order the installation of such fan or mechanical means of proper construction.

Prior to promulgation this Regulation was reviewed and approved by the New Jersey State Industrial Safety Committee.

SECTION 1 – PURPOSE AND SCOPE

1.1 The purpose of this Regulation is to establish threshold limit values of toxic vapors, gases, fumes, mists and dusts which may be present in the workroom atmosphere.

1.2 This Regulation is applicable to every factory, work shop, mill or place where the manufacture of goods of any kind is carried on.

1.3 In case of practical difficulty or unnecessary hardship, the Commissioner may grant exceptions from this Regulation provided that a request for such exception has been made in writing. Exceptions can only be granted when it is clearly evident that a satisfactory, safe and sanitary condition is attained, but cannot be granted in any case where conflict would be created with mandatory requirements of the law.

SECTION 2 – DEFINITIONS

2.1 *Dust* – Solid particles generated by handling, crushing, grinding, rapid impact, detonation and decrepitation of organic or inorganic materials such as rock, ore, metal, coal, wood, grain, etc. Dusts do not tend to flocculate except under electrostatic forces. They do not diffuse in air but settle under the influence of gravity.

2.2 *Fume* – Solid particles generated by condensation from the gaseous state, generally after volatilization from molten metals, etc., and often accompanied by a chemical reaction such as oxidation. Fumes flocculate and sometimes coalesce.

2.3 *Gas* – A normally formless fluid which occupies the space of enclosure and which can be changed to the liquid or solid state by the effect of increased pressure or decreased temperature or both. A gas diffuses.

2.4 *Mist* – Suspended liquid droplets generated by condensation from the gaseous to the liquid state or by breaking up a liquid into a dispersed state, such as by splashing, foaming and atomizing.

2.5 *Vapor* – The gaseous form of a substance which is normally in the solid of or liquid state. A vapor diffuses.

SECTION 3 – GENERAL REQUIREMENT

Weighted average atmospheric concentrations of dusts, fumes, gases, mists or vapors to which the worker or workers may be exposed for an eight-hour working day shall not exceed the applicable limits presented in the appendix attached hereto.

SECTION 4 — SAMPLING, TESTING AND ANALYSIS

4.1 Sampling, testing and analysis to determine the atmospheric concentration of dusts, fumes, gases, mists or vapors shall be performed only by technically qualified persons.

4.2 Sampling, testing and analysis shall be done in accordance with accepted and reliable methods.

4.3 Samples of the workroom atmosphere should be taken wherever there exists potential exposure to any toxic dust, fume, gas, mist or vapor.

APPENDIX

THRESHOLD LIMIT VALUES

(These values are taken from the "Threshold Limit Values for 1958" adopted by the American Conference of Governmental Industrial Hygienists.)

RECOMMENDED VALUES

Gases and Vapors

SUBSTANCE	PPM *	Approx. Mg. per Cu. M. **
Acetaldehyde	200	360
Acetic acid	10	25
Acetic anhydride	5	20
Acetone	1,000	2,400
Acrolein	0.5	1.2
Allyl alcohol	5	12
Allyl chloride	5	15
Allyl propyl disulfide	2	12
Ammonia	100	70
Amyl acetate	200	1,050
Amyl alcohol (isoamyl alcohol)	100	360
Aniline	5	19
Arsine	0.05	0.2
Benzene (benzol)	25	80
Benzyl chloride	1	5
Bromine	1	7
Butadiene (1,3-butadiene)	1,000	2,200
Butanone (methyl ethyl ketone)	250	740
Butyl acetate (n-butyl acetate)	200	950
Butyl alcohol (n-butanol)	100	300
Butylamine	5	15
Butyl cellosolve (2-butoxyethanol)	50	240
Carbon dioxide	5,000	9,000
Carbon disulfide	20	60
Carbon monoxide	100	110
Carbon tetrachloride	25	160
Cellosolve (2-ethoxyethanol)	200	740
Cellosolve acetate (2-ethoxyethyl acetate)	100	540
Chlorine	1	3
Chlorine trifluoride	0.1	0.4
Chlorobenzene (monochlorobenzene)	75	350
Chloroform (trichloromethane)	100	490
1-Chloro-1-nitropropane	20	100
Chloropicrin	1	7

SUBSTANCE	PPM *	Approx. Mg. per Cu. M. **
Chloroprene (2-chloro-1,3-butadiene)	25	90
Cresol (all isomers)	5	22
Cyclohexane	400	1,400
Cyclohexanol	100	410
Cyclohexanone	100	400
Cyclohexene	400	1,350
Cyclopropane	400	690
Decaborane	0.05	0.3
Diacetone alcohol (4-hydroxy-4-methyl-2-pentanone)	50	240
Diborane	0.1	0.1
o-Dichlorobenzene	50	300
Dichlorodifluoromethane	1,000	4,950
1,1-Dichloroethane	100	400
1,2-Dichloroethane (ethylene dichloride)	100	400
1,2-Dichloroethylene	200	790
Dichloroethyl ether	15	90
Dichloromonofluoromethane	1,000	4,200
1,1-Dichloro-1-nitroethane	10	60
Dichlorotetrafluoroethane	1,000	7,000
Diethylamine	25	75
Difluorodibromomethane	100	860
Diisobutyl ketone	50	290
Dimethylaniline (N-dimethylaniline)	5	25
Dimethylsulfate	1	5
Dioxane (diethylene dioxide)	100	360
Ethyl acetate	400	1,400
Ethyl acrylate	25	100
Ethyl alcohol (ethanol)	1,000	1,900
Ethylamine	25	45
Ethylbenzene	200	870
Ethyl bromide	200	890
Ethyl chloride	1,000	2,600
***Ethyl ether	400	1,200
Ethyl formate	100	300
Ethyl silicate	100	850
Ethylene chlorohydrin	5	16
Ethylenediamine	10	30
Ethylene dibromide (1,2-dibromoethane)	25	190
Ethylene imine	5	9
Ethylene oxide	50	90
Fluorine	0.1	0.2
Fluorotrichloromethane	1,000	5,600
Formaldehyde	5	6
Furfural	5	20
Gasoline	500	2,000

*** Tentative

SUBSTANCE	PPM *	Approx. Mg. per Cu. M. **
Heptane (n-heptane)	500	2,000
Hexane (n-hexane)	500	1,800
Hexanone (methyl butyl ketone)	100	410
Hexone (methyl isobutyl ketone)	100	410
Hydrazine	1	1.3
Hydrogen bromide	5	17
Hydrogen chloride	5	7
Hydrogen cyanide	10	11
Hydrogen fluoride	3	2
Hydrogen peroxide, 90%	1	1.4
Hydrogen selenide	0.05	0.2
Hydrogen sulfide	20	30
Iodine	0.1	1
Isophorone	25	140
Isopropylamine	5	12
Mesityl oxide	25	100
Methyl acetate	200	610
Methyl acetylene	1,000	1,650
Methyl acrylate	10	35
Methyl alcohol (methanol)	200	260
Methyl bromide	20	80
Methyl cellosolve (2-methoxyethanol)	25	80
Methyl cellosolve acetate (ethylene glycol monomethyl ether acetate)	25	120
Methyl chloride	100	210
Methylal (dimethoxymethane)	1,000	3,100
Methyl chloroform (1,1,1-trichloroethane)	500	2,700
Methylcyclohexane	500	2,000
Methylcyclohexanol	100	470
Methylcyclohexanone	100	460
Methyl formate	100	250
Methyl isobutyl carbinol (methyl amyl alcohol)	25	100
Methylene chloride (dichloromethane)	500	1,750
Naphtha (coal tar)	200	800
Naphtha (petroleum)	500	2,000
Nickel carbonyl	0.001	0.007
Nitric acid	5	25
p-Nitroaniline	1	6
Nitrobenzene	1	5
Nitroethane	100	310
Nitrogen dioxide	5	9
Nitroglycerin	0.5	5
Nitromethane	100	250
2-Nitropropane	50	180
Nitrotoluene	5	30

SUBSTANCE	PPM*	Approx. Mg. per Cu. M. **
Octane	500	2,350
Ozone	0.1	0.2
Pentane	1,000	2,950
Pentanone (methyl propyl ketone)	200	700
Perchlorethylene (tetrachloroethylene)	200	1,350
Phenol	5	19
Phenylhydrazine	5	22
Phosgene (carbonyl chloride)	1	4
Phosphine	0.05	0.07
Phosphorus trichloride	0.5	3
Propyl acetate	200	840
Propyl alcohol (isopropyl alcohol)	400	980
Propyl ether (isopropyl ether)	500	2,100
Propylene dichloride (1,2-dichloropropane)	75	350
Propylene imine	25	60
Pyridine	10	30
Quinone	0.1	0.4
Stibine	0.1	0.5
Stoddard solvent	500	2,900
Styrene monomer (phenylethylene)	100	420
Sulfur dioxide	5	13
Sulfur hexafluoride	1,000	6,000
Sulfur monochloride	1	6
Sulfur pentafluoride	0.025	0.25
p-Tertiarybutyltoluene	10	60
1,1,2,2-Tetrachloroethane	5	35
Tetrahydrofuran	200	590
Tetranitromethane	1	8
Toluene (toluol)	200	750
o-Toluidine	5	22
Trichloroethylene	200	1,050
Trifluoromonobromomethane	1,000	6,100
Turpentine	100	560
Vinyl chloride (chloroethylene)	500	1,300
Xylene (xylol)	200	870

*Parts of vapor or gas per million parts of air by volume.

**Approximate milligrams per cubic meter of air.

RECOMMENDED VALUES

Dusts, Fumes, and Mists

SUBSTANCE	Mg. per Cu. M. ::
Aldrin (1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-1,4,5,8-dimethanonaphthalene	0.25
Ammate (ammonium sulfamate)	15
Antimony	0.5
ANTU (alpha-naphthyl-thiourea)	0.3
Arsenic	0.5
Barium (soluble compounds)	0.5
Cadmium oxide fume	0.1
Calcium arsenate	0.1
Chlordane (1,2,4,5,6,7,8,8-octachloro-3a,4,7,7a-tetrahydro-4,7-methanoindane)	2
Chlorinated camphene, 60%	0.5
Chlorinated diphenyl oxide	0.5
Chlorodiphenyl (42% chlorine)	1
Chlorodiphenyl (54% chlorine)	0.5
Chromic acid and chromates (as CrO_3)	0.1
Crag herbicide (sodium 2-[2,4-dichlorophenoxy] ethanol hydrogen sulfate)	15
Cyanide (as CN)	5
2,4-D (2,4-dichlorophenoxyacetic acid)	10
DDT (2,2-bis [p-chlorophenyl] -1,1,1-trichloroethane)	1
Dieldrin (1,2,3,4,10,10-hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4,5,8-dimethano-naphthalene	0.25
Dinitrobenzene	1
Dinitrotoluene	1.5
Dinitro-o-cresol	0.2
EPN (O-ethyl O-p-nitrophenyl thionobenzenephosphonate)	0.5
Ferbam (ferric dimethyl dithiocarbamate)	15
Ferrovanadium dust	1
Fluoride	2.5
Hydroquinone	2
Iron oxide fume	15
Lead	0.2
Lead arsenate	0.15
Lindane (hexachlorocyclohexane, gamma isomer)	0.5
Magnesium oxide fume	15
Malathion (O,O-dimethyl dithiophosphate of diethyl mercaptosuccinate)	15
Manganese	6
Mercury	0.1
*** Mercury (organic compounds)	0.01

*** Tentative

SUBSTANCE	Mg. per Cu. M.::
Methoxychlor (2,2-di-p-methoxyphenyl-1,1,1-trichloroethane)	15
Molybdenum	
(soluble compounds)	5
(insoluble compounds)	15
Nicotine	0.5
Parathion (O,O-diethyl O-p-nitrophenyl thiophosphate)	0.1
Pentachloronaphthalene	0.5
Pentachlorophenol	0.5
Phosphorus (yellow)	0.1
Phosphorus pentachloride	1
Phosphorus pentasulfide	1
Picric acid	0.1
Pyrethrum	2
Rotenone	5
Selenium compounds (as Se)	0.1
Sodium hydroxide	2
Sodium fluoroacetate (1080)	0.1
Strychnine	0.15
Sulfuric acid	1
TEDP (Tetraethyl dithionopyrophosphate)	0.2
TEPP (Tetraethyl pyrophosphate)	0.05
Tellurium	0.1
Tetryl (2,4,6-trinitrophenyl-methylnitramine)	1.5
Thiram (tetramethyl thiuram disulfide)	5
Thallium (soluble compounds)	0.1
Titanium dioxide	15
Trichloronaphthalene	5
Trinitrotoluene	1.5
Uranium	
(soluble compounds)	0.05
(insoluble compounds)	0.25
Vanadium	
(V_2O_5 dust)	0.5
(V_2O_5 fume)	0.1
Warfarin (3- [α acetonylbenzyl] -4-hydroxycoumarin)	0.5
Zinc oxide fumes	15
Zirconium compounds (as Zr)	5

:: Milligrams of dust, fume, or mist per cubic meter of air.

RECOMMENDED VALUES

Mineral Dusts

SUBSTANCE	MPPCF §
Aluminum oxide	50
Asbestos	5
Dust (nuisance, no free silica)	50
Mica (below 5% free silica)	20
Portland cement	50
Talc	20
Silica	
high (above 50% free SiO_2)	5
medium (5 to 50% free SiO_2)	20
low (below 5% free SiO_2)	50
Silicon carbide	50
Soapstone (below 5% free SiO_2)	20

§ Millions of particles per cubic foot of air