



N.J.A.C. 12:131



THRESHOLD LIMIT VALUES



Effective May 1, 1972

STATE OF NEW JERSEY
DEPARTMENT OF LABOR & INDUSTRY
BUREAU OF ENGINEERING & SAFETY
TRENTON, NEW JERSEY

NEW JERSEY ADMINISTRATIVE CODE

TITLE 12, CHAPTERS 110 TO 210

The Administrative Procedures Act of 1968 established the New Jersey Administrative Code (N.J.A.C.) effective September 1, 1969. Safety regulations previously identified by a regulation number must now be cited by N.J.A.C. citation. The citation consists of N.J.A.C., title number, and chapter number; for example N.J.A.C. 12:120. The following list shows the chapter numbers of the Administrative Code, the short titles, and effective dates of all regulations of the Bureau of Engineering and Safety as of May 1, 1972.

Part 1

WORKER HEALTH AND SAFETY ACT

- Chapter 110. Plan Filing—7/1/69. Amendment—9/1/70.
- Chapter 111. Registration—9/1/70.
- Chapter 115. Building Code—5/1/71.
- Chapter 116. Maintenance, Construction and Demolition—9/1/70.
- Chapter 120. Sanitation—12/1/69.
- Chapter 121. Heat Producing Appliances and Air Conditioning Systems—1/1/70.
- Chapter 122. Local Exhaust Systems—6/28/51.
- Chapter 130. Labeling of Hazardous Chemicals—12/1/67.
- Chapter 131. Threshold Limit Values—5/1/72.
- Chapter 132. Wet Nitrocellulose—12/1/69.
- Chapter 133. Flammable and Combustible Liquids—5/1/71.
- Chapter 134. Compressed, Liquefied and Cryogenic Gases—5/1/72.
- Chapter 140. Conveyors and Cableways—12/1/67.
- Chapter 141. Woodworking Machinery—12/1/67.
- Chapter 142. Extractors and Centrifuges—12/1/69.
- Chapter 143. Mechanical Presses—12/1/69.
- Chapter 144. Abrasive Wheels—12/1/69.
- Chapter 145. Mechanical Power Transmission Guarding—9/1/70.
- Chapter 147. Industrial Trucks—5/1/70.
- Chapter 148. Overhead and Gantry Cranes—5/1/70.
- Chapter 160. Welding and Cutting—7/1/69.
- Chapter 161. Smoking—5/1/70.
- Chapter 162. Electrical Installations—5/1/70.
- Chapter 170. Work in Confined Spaces—12/1/67.
- Chapter 173. Occupational Noise Exposure—5/1/71.

(Continued on inside back cover)

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FOREWORD

This Chapter of Title 12 of the New Jersey Administrative Code replaces N.J.A.C. 12:131, Threshold Limit Values, effective December 1, 1967, which in turn replaced Safety Regulation No. 3, Threshold Limit Values, effective August 19, 1963.

Chapter 131 establishes Threshold Limit Values for various toxic substances which may be present in the atmosphere in places of employment. This Chapter, except for Subchapter 1, is Section 1910.93 of Subpart G of Part 1910, Occupational Safety and Health Standards of Chapter XVII of Title 29 of the Code of Federal Regulations as published in the Federal Register on August 13, 1971.

Additional explanatory information on Threshold Limit Values may be obtained from Threshold Limit Values of Airborne Contaminants as published by the American Conference of Governmental Industrial Hygienists.

This Chapter is promulgated by the Commissioner of Labor and Industry of the State of New Jersey, under authority vested in him by Section 9 of the Worker Health and Safety Act, P. L. 1965, Chapter 154, N.J.S.A. 34:6A, as follows:

The commissioner shall make and promulgate rules and regulations reasonably necessary to implement the purposes of this act. Such rules and regulations shall have the force and effect of law and shall be enforced in the manner provided in this act. . . .

This same statute provides authority for the Commissioner to grant exceptions from the requirements of this Chapter in accordance with Section 23, as follows:

The commissioner shall have the power and authority to grant exceptions from the literal requirements of rules and regulations promulgated under this act. Such exception shall be granted in any particular case only where it is clearly evident that it is necessary to prevent undue hardship or where existing conditions prevent compliance. In no case shall any exception be granted unless in the opinion of the commissioner reasonable protection of the health and safety of workers and the public will be maintained hereby. An application for an exception shall

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be filed in writing with the commissioner, setting forth specifically the requirements of the rules and regulation from which an exception is desired and the reason why enforcement of the applicable provisions of the rules and regulations is unreasonable. The commissioner shall grant or deny the exception within 30 days from the date of receipt by him of the application. The commissioner shall maintain a record of all exceptions granted and shall make such record reasonably available for public examination and shall mail a copy of all rulings granting exceptions to the members of the board.

Prior to promulgation, this Chapter was submitted to the New Jersey State Industrial Safety Committee, Public Hearing, and the New Jersey Industrial Safety Board in accordance with the requirements of the Worker Health and Safety Act.

All standards and publications, other than the Chapters of Title 12, N.J.A.C. referenced in this Chapter, are available for inspection or purchase in accordance with Appendix A. Chapters 110 to 210 of Title 12, N.J.A.C. are available in accordance with the back cover of this publication.

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SUBCHAPTER 1
GENERAL PROVISIONS

12:131-1.1 TITLE AND CITATION.

This regulation shall be known and may be titled as Chapter 131, Threshold Limit Values of Title 12, N.J.A.C.

12:131-1.2 PURPOSE.

The purpose of this Chapter is to protect the health and safety of employees by establishing threshold limit values for toxic vapors, gases, fumes, mists and dusts which may be present in the atmosphere in a place of employment.

12:131-1.3 SCOPE.

This Chapter shall apply to places of employment included in the Worker Health and Safety Act, Public Laws of 1965, Chapter 154, New Jersey Statutes Annotated 34:6A.

12:131-1.4 EFFECTIVE DATE.

This Chapter shall take effect on May 1, 1972.

12:131-1.5 REPEAL OF PRIOR CHAPTER.

Chapter 131, Threshold Limit Values of Title 12, N.J.A.C. effective December 1, 1967 is hereby repealed.

12:131-1.6 VALIDITY.

1.6.1 Nothing in this Chapter shall be construed to prevent the enforcement of other Chapters of Title 12, N.J.A.C., which prescribe more restrictive requirements.

1.6.2 Should any section, paragraph, sentence, or word of this Chapter be declared for any reason to be invalid such decision shall not affect the remaining portions of this Chapter.

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SUBCHAPTER 2

DEFINITIONS

Bureau. Bureau of Engineering and Safety, Division of Labor Standards, Department of Labor and Industry, State of New Jersey.

Commissioner. Commissioner of Labor and Industry or his authorized representative.

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, or grain.

Employee. Any person engaged in service to an employer for wages, salary or other compensation.

Employer. Any person or corporation, partnership, individual proprietorship, joint venture, firm, company or legal entity who engages the services of an employee and who pays his wages, salary, or other compensation; and any person exercising supervision of employees on an employer's behalf.

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

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.

Mg/m³ or mg/M³. Milligrams of particulate per cubic meter of contaminated air.

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.

N.J.A.C. New Jersey Administrative Code.

Part 1910. Code of Federal Regulations, Title 29, Chapter XVII, Part 1910. Also known as the Occupational Safety and Health Standards of the U.S. Department of Labor.

Place of employment. Any building or other premises occupied by an employer in or about which an employee customarily is suffered or permitted to work.

Ppm or p.p.m. Parts of vapor or gas per million parts of contaminated air by volume at 25°C and 760 mm Hg pressure.

Qualified person. A person selected and directed by an employer to perform a specific task or duty involving threshold limit values, who has the degree of competence to accomplish the work in a safe manner.

Shall. Indicates a mandatory requirement.

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

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SUBCHAPTER 3

AIR CONTAMINANTS

12:131-3.1 VALUES.

An employee's exposure to any material listed in Tables 3.2, 3.3, or 3.4 shall be limited in accordance with the requirements of 3.2, 3.3 or 3.4.

12:131-3.2 TABLE 3.2.

3.2.1 Materials with Names Preceded by "C"—Ceiling Values: An employee's exposure to any material in Table 3.2, the name of which is preceded by a "C" (e.g., C Boron trifluoride), shall at no time exceed the ceiling value given for that material in the table.

3.2.2 Other Materials-8-Hour Time Weighted Averages: An employee's exposure to any material in Table 3.3, the name of which is not preceded by "C", in any 8-hour work shift of a 40-hour work week, shall not exceed the 8-hour time weighted average given for that material in the table.

12:131-3.3 TABLE 3.3.

3.3.1 Eight-Hour Time Weighted Averages: An employee's exposure to any material listed in Table 3.3, in any 8-hour work shift of a 40-hour work week, shall not exceed the 8-hour time weighted average limit given for that material in the table.

3.3.2 Acceptable Ceiling Concentrations: An employee's exposure to a material listed in Table 3.3 shall not exceed at any time during an 8-hour shift the acceptable ceiling concentration limit given for the material in the table, except for a time period, and up to a concentration not exceeding the maximum duration and concentration allowed in the column under "acceptable maximum peak above the acceptable ceiling concentration for an 8-hour shift."

3.3.3 Example: During an 8-hour work shift, an employee may be exposed to a concentration of Benzene above 25 p.p.m. (but never above 50 p.p.m.) only for a maximum period of 10 minutes. Such exposure shall be compensated by exposures to concentrations less than 10 p.p.m. so that the cumulative exposure for the entire 8-hour work shift does not exceed a weighted average of 10 p.p.m.

12:131-3.4 TABLE 3.4.

An employee's exposure to any material listed in Table 3.4 in any 8-hour work shift of a 40-hour work week, shall not exceed the 8-hour time weighted average limit given for that material in the table.

Table 3.2

SUBSTANCE	p.p.m. ^a	mg./M ³ ^b
Acetaldehyde	200	360
Acetic acid	10	25
Acetic anhydride	5	20
Acetone	1,000	2,400
Acetonitrile	40	70
Acetylene dichloride, see 1,2-Dichloroethylene		
Acetylene tetrabromide	1	14
Acrolein	0.1	0.25
Acrylamide—Skin		0.3
Acrylonitrile—Skin	20	45
Aldrin—Skin		0.25
Allyl alcohol—Skin	2	5
Allyl chloride	1	3
C Allyl glycidyl ether (AGE)	10	45
Allyl propyl disulfide	2	12
2-Aminoethanol, see Ethanolamine		
2-Aminopyridine	0.5	2
Ammonia	50	35
Ammonium sulfamate (Ammate)		15
n-Amyl acetate	100	525
sec-Amyl acetate	125	650
Aniline—Skin	5	19
Anisidine (o, p-isomers)—Skin		0.5
Antimony and compounds (as Sb)		0.5
ANTU (alpha naphthyl thiourea)		0.3
Arsenic and compounds (as As)		0.5
Arsine	0.05	0.2
Azinphos-methyl—Skin		0.2
Barium (soluble compounds)		0.5
p-Benzoquinone, see Quinone		
Benzoyl peroxide		5
Benzyl chloride	1	5
Biphenyl, see Diphenyl		

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SUBSTANCE	p.p.m. ^a	mg./M ^{3b}
Bisphenol A, see Diglycidyl ether		
Boron oxide		15
C Boron trifluoride	1	3
Bromine	0.1	0.7
Bromoform—Skin	0.5	5
Butadiene (1, 3-butadiene)	1,000	2,200
Butanethiol, see Butyl mercaptan		
2-Butanone	200	590
2-Butoxy ethanol (Butyl Cellosolve)—Skin	50	240
Butyl acetate (n-butyl acetate)	150	710
sec-Butyl acetate	200	950
tert-Butyl acetate	200	950
Butyl alcohol	100	300
sec-Butyl alcohol	150	450
tert-Butyl alcohol	100	300
C Butylamine—Skin	5	15
C tert-Butyl chromate (as CrO ₃)—Skin		0.1
n-Butyl glycidyl ether (BGE)	50	270
* Butyl mercaptan	10	35
p-tert-Butyltoluene	10	60
Calcium arsenate		1
Calcium oxide		5
Camphor	2	
Carbaryl (Sevin ®)		5
Carbon black		3.5
Carbon dioxide	5,000	9,000
Carbon monoxide	50	55
Chlordane—Skin		0.5
Chlorinated camphene—Skin		0.5
Chlorinated diphenyl oxide		0.5
* Chlorine	1	3
Chlorine dioxide	0.1	0.3
C Chlorine trifluoride	0.1	0.4
C Chloroacetaldehyde	1	3
^a Chloroacetophenone (phenacylchloride)	0.05	0.3
Chlorobenzene (monochlorobenzene)	75	350
o-Chlorobenzylidene malononitrile (OCBM)	0.05	0.4
Chlorobromomethane	200	1,050
2-Chloro-1,3-butadiene, see Chloroprene		
Chlorodiphenyl (42 percent Chlorine)—Skin		1

	SUBSTANCE	p.p.m. ^a	mg./M ³ ^b
8 b	Chlorodiphenyl (54 percent Chlorine)—Skin		0.5
	1-Chloro,2,3-epoxypropane, see Epichlorhydrin		
	2-Chloroethanol, see Ethylene chlorohydrin		
7	Chloroethylene, see Vinyl chloride		
	C Chloroform (trichloromethane)	50	240
	1-Chloro-1-nitropropane	20	100
	Chloropicrin	0.1	0.7
	Chloroprene (2-chloro-1,3-butadiene)—Skin	25	90
	Chromium, sol. chromic, chromous salts as Cr.		0.5
	Metal and insol. salts		1
	Coal tar pitch volatiles (benzene soluble fraction) anthracene,		
	BaP, phenanthrene, acridine, chrysene, pyrene		0.2
	Cobalt, metal fume and dust		0.1
	Copper fume		0.1
	Dusts and Mists		1
	Cotton dust (raw)		1'
	Crag ® herbicide		15
0.1	Cresol (all isomers)—Skin	5	22
0	Crotonaldehyde	2	6
5	Cumene—Skin	50	245
50	Cyanide (as CN)—Skin		5
1	Cyclohexane	300	1,050
5	Cyclohexanol	50	200
	Cyclohexanone	50	200
5	Cyclohexene	300	1,015
3.5	Cyclopentadiene	75	200
00	2, 4-D		10
55	DDT—Skin		1
0.5	DDVP, see Dichlorvos		
0.5	Decaborane—Skin	0.05	0.3
0.5	Demeton ®—Skin		0.1
3	Diacetone alcohol (4-hydroxy-4-methyl-2-		
0.3	pentanone)	50	240
0.4	1,2-diaminoethane, see Ethylenediamine		
3	Diazomethane	0.2	0.4
0.3	Diborane	0.1	0.1
350	Dibutylphthalate		5
0.4	C o-Dichlorobenzene	50	300
050	p-Dichlorobenzene	75	450
	Dichlorodifluoromethane	1,000	4,950

SUBSTANCE	p.p.m. ^a	mg./M ³ ^b
1,3-Dichloro-5,5-dimethyl hydantoin		0.2
1,1-Dichloroethane	100	400
1,2-Dichloroethylene	200	790
C Dichloroethyl ether—Skin	15	90
Dichloromethane, see Methylenechloride		
Dichloromonofluoromethane	1,000	4,200
C 1,1-Dichloro-1-nitroethane	10	60
1,2-Dichloropropane, see Propylenedichloride		
Dichlorotetrafluoroethane	1,000	7,000
Dichlorvos (DDVP)—Skin		1
Dieldrin—Skin		0.25
Diethylamine	25	75
Diethylamino ethanol—Skin	10	50
Diethylether, see Ethyl ether		
Difluorodibromomethane	100	860
C Diglycidyl ether (DGE)	0.5	2.8
Dihydroxybenzene, see Hydroquinone		
Diisobutyl ketone	50	290
Diisopropylamine—Skin	5	20
Dimethoxymethane, see Methylal		
Dimethyl acetamide—Skin	10	35
Dimethylamine	10	18
Dimethylaminobenzene, see Xylidene		
Dimethylaniline (N-dimethylaniline)—Skin	5	25
Dimethylbenzene, see Xylene		
Dimethyl 1,2-dibromo-2,2-dichloroethyl phosphate, (Dibrom)		3
Dimethylformamide—Skin	10	30
2,6-Dimethylheptanone, see Diisobutyl ketone		
1,1-Dimethylhydrazine—Skin	0.5	1
Dimethylphthalate		5
Dimethylsulfate—Skin	1	5
Dinitrobenzene (all isomers)—Skin		1
Dinitro-o-cresol—Skin		0.2
Dinitrotoluene—Skin		1.5
Dioxane (Diethylene dioxide)—Skin	100	360
Diphenyl	0.2	1
Diphenylmethane diisocyanate (see Methylene bisphenyl isocyanate (MDI))		
Dipropylene glycol methyl ether—Skin	100	600

mg./M ^{3b}	SUBSTANCE	p.p.m. ^a	mg./M ^{3b}
0.2	Di-sec, octyl phthalate (Di-2-ethylhexylphthalate)		5
400	Endrin—Skin		0.1
790	Epichlorhydrin—Skin	5	19
90	EPN—Skin		0.5
	1,2-Epoxypropane, see Propyleneoxide		
4,200	2,3-Epoxy-1-propanol, see Glycidol		
60	Ethanethiol, see Ethylmercaptan		
	Ethanolamine	3	6
7,000	2-Ethoxyethanol—Skin	200	740
1	2-Ethoxyethylacetate (Cellosolve acetate)—Skin	100	540
0.25	Ethyl acetate	400	1,400
75	Ethyl acrylate—Skin	25	100
50	Ethyl alcohol (ethanol)	1,000	1,900
	Ethylamine	10	18
860	Ethyl sec-amyl ketone (5-methyl-3-heptanone)	25	130
2.8	Ethyl benzene	100	435
	Ethyl bromide	200	890
290	Ethyl butyl ketone (3-Heptanone)	50	230
20	Ethyl chloride	1,000	2,600
	Ethyl ether	400	1,200
35	Ethyl formate	100	300
18	C Ethyl mercaptan	10	25
	Ethyl silicate	100	850
25	Ethylene chlorohydrin—Skin	5	16
	Ethylenediamine	10	25
	Ethylene dibromide, see 1,2-Dibromoethane		
3	Ethylene dichloride, see 1,2-Dichloroethane		
30	C Ethylene glycol dinitrate and/or Nitroglycerin—		
	Skin	^d 0.2	1
1	Ethylene glycol monomethyl ether acetate, see		
5	Methyl cellosolve acetate		
5	Ethylene imine—Skin	0.5	1
1	Ethylene oxide	50	90
0.2	Ethylidene chloride, see 1,1-Dichloroethane		
1.5	N-Ethylmorpholine—Skin	20	94
360	Ferbam		15
1	Ferrovandium dust		1
	Fluoride (as F)		2.5
	Fluorine	0.1	0.2
600	Fluorotrichloromethane	1,000	5,600

SUBSTANCE	p.p.m. ^a	mg./M ^{3b}
Formic acid	5	9
Furfural—Skin	5	20
Furfuryl alcohol	50	200
Glycidol (2,3-Epoxy-1-propanol)	50	150
Glycol monoethyl ether, see 2-Ethoxyethanol		
Guthion ®, see Azinphosmethyl		
Hafnium		0.5
Heptachlor—Skin		0.5
Heptane (n-heptane)	500	2,000
Hexachloroethane—Skin	1	10
Hexachloronaphthalene—Skin		0.2
Hexane (n-hexane)	500	1,800
2-Hexanone	100	410
Hexone (Methyl isobutyl ketone)	100	410
sec-Hexyl acetate	50	300
Hydrazine—Skin	1	1.3
Hydrogen bromide	3	10
C Hydrogen chloride	5	7
Hydrogen cyanide—Skin	10	11
Hydrogen peroxide (90%)	1	1.4
Hydrogen selenide	0.05	0.2
Hydroquinone		2
C Iodine	0.1	1
Iron-oxide fume		10
Isoamyl acetate	100	525
Isoamyl alcohol	100	360
Isobutyl acetate	150	700
Isobutyl alcohol	100	300
Isophorone	25	140
Isopropyl acetate	250	950
Isophopyl alcohol	400	980
Isopropylamine	5	12
Isopropylether	500	2,100
Isopropyl glycidyl ether (IGE)	50	240
Ketene	0.5	0.9
Lead arsenate		0.15
Lindane—Skin		0.5
Lithium hydride		0.025
L.P.G. (liquefied petroleum gas)	1,000	1,800
Magnesium oxide fume		15

mg./M ^{3b}	SUBSTANCE	p.p.m. ^a	mg./M ^{3b}
9	Malathion—Skin		15
20	Maleic anhydride	0.25	1
200	C Manganese		5
150	Mesityl oxide	25	100
	Methanethiol, see Methyl mercaptan		
	Methoxychlor		15
0.5	2-Methoxyethanol, see Methyl cellosolve		
0.5	Methyl acetate	200	610
2,000	Methyl acetylene (propyne)	1,000	1,650
10	Methyl acetylene-propadiene mixture (MAPP)	1,000	1,800
0.2	Methyl acrylate—Skin	10	35
1,800	Methylal (dimethoxymethane)	1,000	3,100
410	Methyl alcohol (methanol)	200	260
410	Methylamine	10	12
300	Methyl amyl alcohol, see Methyl isobutyl carbinol		
1.3	Methyl (n-amyl) ketone (2-Heptanone)	100	465
10	C Methyl bromide—Skin	20	80
7	Methyl butyl ketone, see 2-Hexanone		
11	Methyl cellosolve—Skin	25	80
1.4	Methyl cellosolve acetate—Skin	25	120
0.2	Methyl chloroform	350	1,900
2	Methylcyclohexane	500	2,000
1	Methylcyclohexanol	100	470
10	o-Methylcyclohexanone—Skin	100	460
525	Methyl ethyl ketone (MEK), see 2-Butanone		
360	Methyl formate	100	250
700	Methyl iodide—Skin	5	28
300	Methyl isobutyl carbinol—Skin	25	100
140	Methyl isobutyl ketone, see Hexone		
950	Methyl isocyanate—Skin	0.02	0.05
980	C Methylmercaptan	10	20
12	Methyl methacrylate	100	410
2,100	Methyl propyl ketone, see 2-Pentanone		
240	C α Methyl styrene	100	480
0.5	C Methylene bisphenyl isocyanate (MDI)	0.02	0.2
	Molybdenum:		
	Soluble compounds		5
	Insoluble compounds		15
0	Monomethyl aniline—Skin	2	9

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SUBSTANCE	p.p.m. ^a	mg./M ³ ^b
C Monomethyl hydrazine—Skin	0.2	0.35
Morpholine—Skin	20	70
Naphtha (coaltar)	100	400
Naphthalene	10	50
Nickel carbonyl	0.001	0.007
Nickel, metal and soluble cmpds, as Ni		1
Nicotine—Skin		0.5
Nitric acid	2	5
Nitric oxide	25	30
p-Nitroaniline—Skin	1	6
Nitrobenzene—Skin	1	5
p-Nitrochlorobenzene—Skin		1
Nitroethane	100	310
Nitrogen dioxide	5	9
Nitrogen trifluoride	10	29
Nitroglycerin—Skin	0.2	2
Nitromethane	100	250
1-Nitropropane	25	90
2-Nitropropane	25	90
Nitrotoluene—Skin	5	30
Nitrotrichloromethane, see Chloropicrin		
Octachloronaphthalene—Skin		0.1
* Octane	500	2,350
* Oil mist, mineral		^a 5
Osmium tetroxide		0.002
Oxalic acid		1
Oxygen difluoride	0.05	0.1
Ozone	0.1	0.2
Paraquat—Skin		0.5
Petroleum distillates (naptha)	500	2,000
Propane	1,000	1,800
Silver, metal and soluble compounds		0.01
C Sodium fluoroacetate (1080)—Skin		0.05
Sodium hydroxide		2
Stibine	0.1	0.5
* Stoddard solvent	500	2,950
Strychnine		0.15
Sulfur dioxide	5	13
Sulfur hexafluoride	1,000	6,000
Sulfuric acid		1

mg./M ^{3b}	SUBSTANCE	p.p.m. ^a	mg./M ^{3b}
0.35	Sulfur monochloride	1	6
70	Sulfur pentafluoride	0.025	0.25
400	Sulfuryl fluoride	5	20
50	Systox, see Demeton ®		
0.007	2,4,5T		10
1	Tantalum		5
0.5	TEDP—Skin		0.2
5	Tellurium		0.1
30	Tellurium hexafluoride	0.02	0.2
6	TEPP—Skin		0.05
5	C Terphenyls	1	9
1	1,1,1,2-Tetrachloro-2,2-difluoroethane	500	4,170
310	1,1,2,2-Tetrachloro-1,2-difluoroethane	500	4,170
9	1,1,2,2-Tetrachloroethane—Skin	5	35
29	Tetrachloroethylene, see Perchloroethylene		
2	Tetrachloromethane, see Carbon tetrachloride		
250	Tetrachloronaphthalene—Skin		2
90	Tetraethyl lead (as Pb)—Skin		0.075
90	Tetraphydrofuran	200	590
30	Tetramethyl lead (as Pb)—Skin		0.075
	Tetramethyl succinonitrile—Skin	0.5	3
	Tetranitromethane	1	8
0.1	Tetryl (2,4,6-trinitrophenyl-methyinitramine)—Skin		1.5
2,350	Thallium (soluble compounds)—Skin as TI		0.1
^a 5	Thiram		5
0.002	Tin (inorganic cmpds, except oxides)		2
1	Tin (organic cmpds)		0.1
0.1	C Toluene-2,4-diisocyanate	0.02	0.14
0.2	o-Toluidine—Skin	5	22
0.5	Toxaphene, see Chlorinated camphene		
2,000	Tributyl phosphate		5
1,800	1,1,1-Trichloroethane, see Methyl Chloroform		
0.01	1,1,2-Trichloroethane—Skin	10	45
0.05	Parathion—Skin		0.11
2	Pentaborane	0.005	0.0
0.5	Pentachloronaphthalene—Skin		0.5
2,950	Pentachlorophenol—Skin		0.5
0.15	* Pentane	1,000	2,950
13	2-Pentanone	200	700
6,000	Perchloromethyl mercaptan	0.1	0.8
1			

SUBSTANCE	p.p.m. ^a	mg./M ³ ^b
Perchloryl fluoride	3	13.5
Phenol—Skin	5	19
p-Phenylene diamine—Skin		0.1
Phenyl ether (vapor)	1	7
Phenyl ether-biphenyl mixture (vapor)	1	7
Phenylethylene, see Styrene		
Phenyl glycidyl ether (PGE)	10	60
Phenylhydrazine—Skin	5	22
Phosdrin (Mevinphos ®)—Skin		0.1
Phosgene (carbonyl chloride)	0.1	0.4
Phosphine	0.3	0.4
Phosphoric acid		1
Phosphorus (yellow)		0.1
Phosphorus pentachloride		1
Phosphorus pentasulfide		1
Phosphorus trichloride	0.5	3
Phthalic anhydride	2	12
Picric acid—Skin		0.1
Pival ® (2-Pivalyl-1,3-indandione)		0.1
Platinum (Soluble Salts) as Pt.		0.002
Propargyl alcohol—Skin	1	
n-Propyl acetate	200	840
Propyl alcohol	200	500
n-Propyl nitrate	25	110
Propylene dichloride	75	350
Propylene imine—Skin	2	5
Propylene oxide	100	240
Propyne, see Methylacetylene		
Pyrethrum		5
Pyridine	5	15
Quinone	0.1	0.4
RDX—Skin		1.5
Rhodium, Metal fume and dusts, as Rh		0.1
Soluble salts		0.001
Ronnel		10
Rotenone (commercial)		5
Selenium compounds (as Se)		0.2
Selenium hexafluoride	0.05	0.4
Titaniumdioxide		15
Trichloromethane, see Chloroform		

mg./M ^{3b}	SUBSTANCE	p.p.m. ^a	mg./M ^{3b}
13.5	Trichloronaphthalene—Skin		5
19	1,2,3-Trichloropropane	50	300
0.1	1,1,2-Trichloro 1,2,2-trifluoroethane	1,000	7,600
7	Triethylamine	25	100
7	Trifluoromonobromomethane	1,000	6,100
60	2,4,6-Trinitrophenol, see Picric acid		
22	2,4,6-Trinitrophenylmethylnitramine, see Tetryl		
0.1	Trinitrotoluene—Skin		1.5
0.4	Triorthocresyl phosphate		0.1
0.4	Triphenyl phosphate		3
1	Turpentine	100	560
0.1	Uranium (soluble compounds)		0.05
1	Uranium (insoluble compounds)		0.25
1	C Vanadium:		
1	V ₂ O ₅ dust		0.5
3	V ₂ O ₅ fume		0.1
12	Vinyl benzene, see Styrene		
0.1	C Vinyl chloride	500	1,300
0.1	Vinylcyanide, see Acrylonitrile		
0.002	Vinyl toluene	100	480
840	Warfarin		0.1
500	Xylene (xylol)	100	435
110	Xylidine—Skin	5	25
350	Yttrium		1
5	Zinc chloride fume		1
240	Zinc oxide fume		5
	Zirconium compounds (as Zr)		5

Notes to Table 3.2

a. Parts of vapor or gas per million parts of contaminated air by volume at 25° C. and 760 mm. Hg pressure.

b. Approximate milligrams of particulate per cubic meter of air.

c. (No footnote "c" is used to avoid confusion with ceiling value notations.)

d. An atmospheric concentration of not more than 0.02 p.p.m., or personal protection may be necessary to avoid headache.

e. As sampled by method that does not collect vapor.

f. For control of general room air, biologic monitoring is essential for personnel control.

* 1970 addition.

Table 3.3

MATERIAL	8-HOUR TIME WEIGHTED AVERAGE	ACCEPTABLE CEILING CONCENTRATION	ACCEPTABLE MAXIMUM PEAK ABOVE THE ACCEPTABLE CEILING CONCENTRATION FOR AN 8-HOUR SHIFT	
			CONCENTRATION	MAXIMUM DURATION
Benzene	10 ppm	25 ppm	50 ppm	10 minutes
Beryllium and beryllium compounds.....	2 $\mu\text{g}/\text{M}^3$	5 $\mu\text{g}/\text{M}^3$	25 $\mu\text{g}/\text{M}^3$	30 minutes
Cadmium dust	0.2 mg/ M^3	0.6 mg/ M^3		
Cadmium fume	0.1 mg/ M^3	3 mg/ M^3		
Carbon disulfide	20 ppm	30 ppm	100 ppm	30 minutes
Carbon tetrachloride	10 ppm	25 ppm	200 ppm	5 minutes in any 4 hours
Chromic acid and chromates		1 mg/ 10M^3		
Ethylene dibromide	20 ppm	30 ppm	50 ppm	5 minutes
Ethylene dichloride	50 ppm	100 ppm	200 ppm	5 minutes in any 3 hours
Fluoride as dust	2.5 mg/ M^3			
Formaldehyde	3 ppm	5 ppm	10 ppm	30 minutes
Hydrogen fluoride	3 ppm			
Hydrogen sulfide		20 ppm	50 ppm	10 minutes once only if no other measurable expo- sure occurs

Table 3.3—Continued

MATERIAL	8-Hour Time Weighted Average	Acceptable Ceiling Concentration	Acceptable Maximum Peak Above the Acceptable Ceiling Concen- tration for an 8-Hour Shift	
			Concentration	Maximum Duration
Lead and its inorganic compounds	0.2 mg/M ³			
Mercury		1 mg/10M ³		
Methyl chloride	100 ppm	200 ppm	300 ppm	5 minutes in any 3 hours
Methylene chloride	500 ppm	1000 ppm	2000 ppm	5 minutes in any 2 hours
Organo (alkyl) mercury	0.01 mg/M ³	0.04 mg/M ³		
Styrene	100 ppm	200 ppm	600 ppm	5 minutes in any 3 hours
Tetrachloroethylene	100 ppm	200 ppm	300 ppm	5 minutes in any 3 hours
Toluene	200 ppm	300 ppm	500 ppm	10 minutes
Trichloroethylene	100 ppm	200 ppm	300 ppm	5 minutes in any 2 hours

Table 3.4

SUBSTANCE	mppcf*	mg/M ³
Silica:		
Crystalline:		
Quartz (respirable)	250 ^f	10mg/M ³ m
	%SiO ₂ +5	%SiO ₂ +2
Quartz (total dust)		30mg/M ³
		%SiO ₂ +2
Cristobalite: Use 1/2 the value calculated from the count or mass formulae for quartz.		
Tridymite: Use 1/2 the value calculated from the formulae for quartz.		
Amorphous, including natural diatomaceous earth	20	80mg M ³
		%SiO ₂
Tremolite	5	20mg/M ³
		%SiO ₂
Silicates (less than 1% crystalline silica):		
Asbestos—12 fibers per milliliter greater than 5 microns in length ^j or	2	
Mica	20	
Soapstone	20	
Talc	20	
Portland cement	50	
Graphite (natural)	15	
Coal dust (respirable fraction less than 5% SiO ₂)		2.4mg/M ³
		or
For more than 5% SiO ₂		10mg/M ³
		%SiO ₂ +2
Inert or Nuisance Dust:		
Respirable fraction	15	5mg/M ³
Total dust	50	15mg/M ³

Notes to Table 3.4

NOTE: Conversion factors— $\text{mppcf} \times 35.3 = \text{million particles per cubic meter} = \text{particles per c.c.}$

* Millions of particles per cubic foot of air, based on impinger samples counted by light-field technics.

f. The percentage of crystalline silica in the formula is the amount determined from air-borne samples, except in those instances in which other methods have been shown to be applicable.

j. As determined by the membrane filter method at $430 \times$ phase contrast magnification.

m. Both concentration and percent quartz for the application of this limit are to be determined from the fraction passing a size-selector with the following characteristics:

Aerodynamic diameter (unit density sphere)		Percent passing selector
2		90
2.5		75
3.5		50
5.0		25
10		0

The measurements under this note refer to the use of an AEC instrument. If the respirable fraction of coal dust is determined with a MRE the figure corresponding to that of 2.4 mg/M^3 in the table for coal dust is 4.5 mg/M^3 .

12:131-3.5 COMPUTATIVE FORMULAE.

3.5.1 The cumulative exposure for an 8-hour work shift shall be computed as follows:

$$E = \frac{C_a T_a + C_b T_b + \dots + C_n T_n}{8}$$

where:

E is the equivalent exposure for the working shift.

C is the concentration during any period of time T where the concentration remains constant.

T is the duration in hours of the exposure at the concentration C.

The value of E shall not exceed the 8-hour time weighted average limit in Tables 3.2, 3.3, or 3.4 for the material involved.

3.5.2 To illustrate the formula prescribed in 3.5.1, note that isoamyl acetate has an 8-hour time weighted average limit of 100 p.p.m. (Table 3.2). Assume that an employee is subject to the following exposure:

Two hours exposure at 150 p.p.m.

Two hours exposure at 75 p.p.m.

Four hours exposure at 50 p.p.m.

Substituting this information in the formula, we have

$$\frac{2 \times 150 + 2 \times 75 + 4 \times 50}{8} = 81 \text{ p.p.m.}$$

Since 81 p.p.m. is less than 100 p.p.m., the 8-hour time weighted average limit, the exposure is acceptable.

3.5.3. In case of a mixture of air contaminants an employer shall compute the equivalent exposure as follows:

$$Em = \frac{C_1}{L_1} + \frac{C_2}{L_2} + \dots + \frac{C_n}{L_n}$$

where:

Em is the equivalent exposure for the mixture.

C is the concentration of a particular contaminant.

L is the exposure limit for that contaminant, from Table 3.2, 3.3, or 3.4.

The value of Em shall not exceed unity (1).

3.5.4 To illustrate the formula prescribed in 3.5.3 consider the following exposures of Table 3.5.4.

Table 3.5.4

MATERIAL	ACTUAL CONCENTRATION OF 8-HOUR EXPOSURE p.p.m.	8-HOUR TIME WEIGHTED AVERAGE EXPOSURE LIMIT p.p.m.
Acetone (Table 3.2)	500	1,000
2-Butanone (Table 3.2)	45	200
Toluene (Table 3.3)	40	200

that isoamyl
Table 3.2).

Substituting in the formula, we have:

$$Em = \frac{500}{1,000} + \frac{45}{200} + \frac{40}{200}$$

$$Em = .0500 + .0225 + .0200$$

$$Em = .0925$$

Since Em is less than unity (1), the exposure combination is within acceptable limits.

12:131-3.6 ADMINISTRATIVE OR ENGINEERING CONTROLS.

3.6.1. To achieve compliance with 3.1 through 3.5 administrative or engineering controls shall first be determined and implemented whenever feasible.

3.6.2 When such controls are not feasible to achieve full compliance, protective equipment or any other protective measures shall be used to keep the exposure of employees to air contaminants within the limits prescribed in Subchapter 3.

3.6.3 Any equipment and technical measure use for this purpose shall be approved for each particular use by a competent industrial hygienist or other technically qualified person.

3.6.4 Whenever respirators are used, their use shall comply with Section 1910.134 of Part 1910, Occupational Safety and Health Standards of Title 29, Code of Federal Regulations.

ated average

employer shall

ible 3.2, 3.3,

consider the

HOUR TIME WEIGHTED AVERAGE EXPOSURE LIMIT p.p.m.
1,000
200
200

APPENDIX A

AVAILABILITY OF REFERENCED STANDARDS AND PUBLICATIONS

A.1 AVAILABILITY FOR INSPECTION.

A copy of the publication referenced in this chapter is on file and may be inspected at the following office of the Bureau of Engineering and Safety between the hours of 9:00 A. M. and 4:00 P. M. on normal working days:

State of New Jersey
Department of Labor and Industry
Bureau of Engineering and Safety, Room 1103
Trenton, New Jersey

A.2 AVAILABILITY BY PURCHASE.

Copies of the referenced publications may be purchased from the organizations listed below. The abbreviations preceding the publications have the following meaning and are the organizations issuing the publications listed.

ACGIH American Conference of Governmental Industrial Hygienists
1014 Broadway
Cincinnati, Ohio 45202

CFR United States Department of Labor (N. J. Area Office)
Occupational Safety and Health Administration
970 Broad Street
Newark, New Jersey 07102

No. and Edition	Title	Price/Copy
ACHIH—1971	Threshold Limit Values of Airborne Contaminants	\$0.50
29 CFR Part 1910	Section 1910.93 of Subpart G of Part 1910, Occupational Safety and Health Standards of Chapter XVII of Title 29 of the Code of Federal Regulations as published in the Federal Register on August 13, 1971	No charge

Part 2

CONSTRUCTION SAFETY ACT

Chapter 180. Construction Safety Code—7/1/68.

Part 3

MINE SAFETY ACT

Chapter 185. Pits and Quarries—2/15/60.

Part 4

EXPLOSIVES ACT

- Chapter 190. Explosives Permits and Fees—1/15/62.*
Chapter 191. Transportation of Explosives—12/14/62.*
Chapter 192. Storage of Explosives—8/20/65.*
Chapter 193. Use of Explosives—8/20/65.*
Chapter 194. Rocket Experimentation by Amateurs—11/1/63.*

Part 5

LIQUEFIED PETROLEUM GAS ACT

Chapter 200. Liquefied Petroleum Gas—8/15/69.

Part 6

TRANSPORTATION OF DANGEROUS ARTICLES ACT

Chapter 205. Transportation by Motor Carrier of Dangerous Articles—9/11/50.

Note to List

* Chapters 190, 191, 192 and 193 are published as one bound document.

(Continued on back cover)

LAW REPRINTS

Construction Safety Act—P. L. 1962, c. 45.
Explosives Act—P. L. 1960, c. 55.
Fireworks Regulation Law—P. L. 1930, c. 42 and P. L. 1937, c. 51.
High Voltage Proximity Act—P. L. 1948, c. 249 and P. L. 1966, c. 261.
Liquorfield Petroleum Gas Act—P. L. 1958, c. 43.
Mine Safety Act—P. L. 1954, c. 197.
Railroad and Airline Sanitation—P. L. 1966, c. 112.
Railroad Diesel Locomotive Ventilation—P. L. 1966, c. 119.
Transportation of Dangerous Articles—P. L. 1950, c. 128.
Worker Health and Safety Act—P. L. 1965, c. 154.

OTHER PUBLICATIONS

Annual Analysis of Work Injuries in New Jersey

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