THRESHOLD LIMIT VALUES FOR 1958

Values are given in the following tabulation for the maximum average atmospheric concentration of contaminants to which workers may be exposed for an eight-hour working day without injury to health.

These values are based on the best available information from industrial experience, from experimental studies, and, when possible, from a combination of the two. They are not fixed values but are reviewed annually by the Committee on Threshold Limits for changes, revisions, or additions as further information becomes available. Threshold Limits should be used as guides in the control of health hazards and should not be regarded as fine lines between safe and dangerous concentrations. They represent only conditions under which it is felt workers may be repeatedly exposed, day after day, without adverse effect on their health. The figures listed refer to 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 figures may be exceeded for short periods during the work 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 arriving at a decision as to whether a hazardous situation is deemed to exist.

These values are not intended for use, or for modification for use, in the evaluation or control of community air pollution or air pollution nuisances.

ESTABLISHED VALUES

Gases and Vapors

Substance	PPM (a)	Substance	PPM (a
Acetaldehyde	200	Cellosolve (2-ethoxyethanol)	200
Acetic Acid	10	Cellosolve acetate (2-ethoxyethyl acetate)	100
Acetic anhydride	5	Chlorine	1
Acetone	1,000	Chlorine Trifluoride	0.1
Acrolein	0.5	Chlorobenzene (monochlorobenzene)	75
Allyl alcohol	5	Chloroform (trichloromethane)	100
Allyl chloride	5	1-Chloro-1-nitropropane	20
Allyl propyl disulfide	2	Chloropicrin	1
Ammonia	100	Chloroprene (2-chloro-1,3-butadiene)	25
Amyl acetate	200	Cresol (all isomers)	5
Amyl alcohol (isoamyl alcohol)	100	Cyclohexane	400
Aniline	5	Cyclohexanol	100
Arsine	0.05	Cyclohexanone	100
Benzene (benzol)	25	Cyclohexene	400
Benzyl chloride	1	Cyclopropane	400
Bromine	1	Decaborane	0.05
Butadiene (1,3-butadiene)	1,000	Diacetone alcohol (4-hydroxy-4-methyl-2-pentanone)	50
Butanone (methyl ethyl ketone)	250	Dibromane	0.1
Butyl acetate (n-butyl acetate)	200	o-Dichlorobenzene	50
Butyl alcohol (n-butanol)	100	Dichlorodifluoromethane	1,000
Butylamine	5	1,1-Dichloroethane	100
Butyl cellosolve (2-butoxyethanol)	50	1,2-Dichloroethane (ethylene dichloride)	100
Carbon dioxide	5,000	Dichloroethyl ether	15
Carbon disulfide	20	1,2-Dichloroethylene	200
Carbon monoxide	100		
Carbon tetrachloride	25		

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Substance	PPM (a)
Dichloromonofluoromethane	1,000
1,1-Dichloro-1-nitroethane	10
Dichlorotetrafluoroethane	1,000
Diethylamine	25
Difluorodibromomethane	100
Diisobutyl ketone	50
Dimethylaniline (N-dimethylaniline)	5
Dimethylsulfate	1
Dioxane (diethylene dioxide)	100
Ethyl acetate	400
Ethyl acrylate	25
Ethyl alcohol (ethanol)	1,000
Ethylamine	25
Ethylbenzene	200
Ethyl bromide	200
Ethyl chloride	1,000
Ethyl ether	400
Ethyl formate	100
Ethyl silicate	100
Ethylene chlorohydrin	5
Ethylene diamine	10
Ethylene dibromide (1,2-dibromo-ethane)	25
Ethylene imine	5
Ethylene oxide	50
Fluorine	0.1
Fluorotrichloromethane	1,000
Formaldehyde	5
Furfural	5
Gasoline	500
Heptane (n-heptane)	500
Hexane (n-hexane)	500
Hexanone (methyl butyl ketone)	100
Hexone (methyl isobutyl ketone)	100
Hydrazine	1
Hydrogen bromide	5
Hydrogen chloride	5
Hydrogen cyanide	10
Hydrogen fluoride	3
Hydrogen peroxide, 90%	1
Hydrogen selenide	0.05
Hydrogen sulfide	20
Iodine	0.1
Isophorone	25
Isopropylamine	5
*Mesityl oxide	25
Methyl acetate	200
Methyl acetylene	1,000
Methyl acrylate	10
Methyl alcohol (methanol)	200
Methyl bromide	20
Methyl cellosolve (2-methoxy-ethanol)	25
Methyl cellosolve acetate (ethylene glycol monomethyl ether acetate)	25
Methyl chloride	100
Methylal (dimethoxymethane)	1,000
Methyl chloroform (1,1,1, trichloroethane)	500
Methylcyclohexane	500
Methylcyclohexanol	100
Methylcyclohexanone	100
Methyl formate	100
Methyl isobutyl carbinol (methyl amyl alcohol)	25
Methylene chloride (dichloromethane)	500
Naphtha (coal tar)	200
Naphtha (petroleum)	500
Nickel carbonyl	0.001
Nitric acid	5
p-Nitroaniline	1
Nitrobenzene	1
Nitroethane	100
Nitrogen dioxide	5
Nitroglycerin	0.5
Nitromethane	100
2-Nitropropane	50
Nitrotoluene	5
Octane	500
Ozone	0.1
Pentane	1,000
Pentanone (methyl propyl Ketone)	200
Perchlorethylene (tetrachloroethylene)	200
Phenol	5
Phenylhydrazine	5
Phosgene (carbonyl chloride)	1
Phosphine	0.05
Phosphorus trichloride	0.5
Propyl acetate	200
Propyl alcohol (isopropyl alcohol)	400
Propyl ether (isopropyl ether)	500
Propylene dichloride (1,2-dichloro-propane)	75
Propylene imine	25
Pyridine	10
Quinone	0.1
Stibine	0.1
Stoddard Solvent	500
Styrene monomer (phenylethylene)	100
Sulfur dioxide	5
Sulfur hexafluoride	1,000
Sulfur monochloride	1
Sulfur pentafluoride	0.025
p-Tertiarybutytoluene	10
1,1,2,2-Tetrachloroethane	5
Tetrahydrofuran	200

*Change in threshold limit values.

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Substance	PPM (a)	Substance	PPM (a)
Tetranitromethane	1	Trifluorochlorobromomethane	1,000
Toluene (toluol)	200	Turpentine	100
o-Toluidine	5	Vinyl chloride (chloroethylene)	500
Trichloroethylene	200	Xylene (xylol)	200

TOXIC DUSTS, FUMES AND MISTS

Substance	Mg.per Cu. M(b)	Substance	Mg. per Cu. M. (b)
Aldrin (1,2,3,4,10,10-hexachloro-1,4,4a, 5,8,8a-hexahydro-1,4,5,8-dimethano-naphthalene)	0.25	Mercury	0.1
Ammate (ammonium sulfamate)	15	Mercury (organic compounds)	0.01
Antimony	0.5	Methoxychlor (2,2-di-p-methoxyphenyl-1,1,1-trichloroethane)	15
ANTU (alpha-naphthyl-thiourea)	0.3	Molybdenum	
Arsenic	0.5	(soluble compounds)	5
Barium soluble compounds	0.5	(insoluble compounds)	15
Cadmium oxide fume	0.1	Nicotine	0.5
Chlordane (1,2,4,5,6,7,8,8-octachloro-3a,4,7,7a-tetrahydro-4,7-methanoidine)	2	Parathion (0,0-diethyl O-p-nitrophenyl thiophosphate)	0.1
Chlorinated camphene, 60%	0.5	Pentachloronaphthalene	0.5
Chlorinated diphenyl oxide	0.5	Pentachlorophenol	0.5
Chlorodiphenyl (42% chlorine)	1	Phosphorus (yellow)	0.1
Chlorodiphenyl (54% chlorine)	0.5	Phosphorus pentachloride	1
Chromic acid and chromates (as CrO_3)	0.1	Phosphorus pentasulfide	1
Crag herbicide (sodium 2-(2,4-dichloro phenoxy) ethanol hydrogen sulfate)	15	Picric acid	0.1
Cyanide (as CN)	5	Pyrethrum	2
2,4-D (2,4-dichlorophenoxyacetic acid)	10	Rotenone	5
DDT (2,2-bis(p-chlorophenyl)-1,1,1-trichloroethane)	1	Selenium compounds (as Se)	0.1
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	Sodium hydroxide	2
Dinitrobenzene	1	Sodium fluoroacetate (1080)	0.1
Dinitrotoluene	1.5	Strychnine	0.15
Dinitro-o-cresol	0.2	Sulfuric acid	1
EPN (O-ethyl O--p-nitrophenyl thiono-benzenephosphonate)	0.5	TEDP (tetraethyl dithionopyrophosphate)	0.2
Ferbam (ferric dimethyl dithiocarbamate)	15	TEPP (tetraethyl pyprophosphate)	0.05
Ferrovanadium dust	1	Tellurium	0.1
Fluoride	2.5	Tetryl (2,4,6-trinitrophenylmethyl-nitramine)	1.5
Hydroquinone	2	Thiram (tetramethyl thiuram disulfide)	5
Iron Oxide Fume	15	Thallium (soluble compounds)	0.1
Lead	0.2	Titanium dioxide	15
Lead arsenate	0.15	Trichloronaphthalene	5
Lindane (hexahclorocyclohexane gamma isomer)	0.5	Trinitrotoluene	1.5
Magnetium oxide fume	15	Uranium	
Malathion (0,0-dimethyl dithiophosphate of diethyl mercaptosuccinate)	15	(soluble compounds)	0.05
Manganese	6	(insoluble compounds)	0.25
		Vanadium	
		(V_2O_5 dust)	0.5
		(V_2O_5 fume)	0.1
		Warfarin (3-(a acetonylbenzyl)-4-hydroxycoumarin)	0.5
		Zinc oxide fumes	15
		Zirconium compounds (as Zr)	5
		Calcium arsenate	0.1

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MINERAL DUSTS

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

TENTATIVE VALUES

Substance	PPM(f)	Approx.Mg. Per Cu. M.(e)
Acetylene Tetrabromide	1	14
Allyl glycidyl ether (AGE)	10	45
Beryllium		2y/m3
Boron trifluoride	1	3
n-Butyl glycidyl ether (BGE)	50	270
Butyl mercaptan	10	35
Chlorine dioxide	0.1	
Chloroacetaldehyde	1	3
Chlorobromomethane ($ClBrCH_2$)	400	2,100
Diglycidyl ether (DGE)	10	55
Dimethyl formamide	20	60
1 - 1 dimethylhydrazine	0.5	1
Dipropyleneglycolmethylether	100	600
Epichlorohydrin	25	90
Ethyl mercaptan	250	640
Furfuryl alcohol	50	200
Glycidol	50	150
sec-Hexyl acetate	100	590
Isopropyl glycidyl ether (IGE)	50	240
Lithium hydride		25y/m3
Methyl mercaptan	50	100
a Methyl styrene	100	480
Monomethyl aniline	2	9
Paradichlorobenzene	75	450
Perchloromethyl mercaptan	0.1	0.8
Phenyl glycidyl ether (PGE)	50	310
Phosphoric acid		1
Propylene oxide	100	240
n-Propyl nitrate	25	110
Tertiary butyl alcohol	100	300
Tolylene-2,4-diisocyanate	0.1	0.7
Trichloropropane	50	300
Triethyl amine	25	100
Triorthocresyl phosphate		0.1
Vinyl toluene	100	480
Yttrium and inorganic compounds		5
Xylidine	5	25
Teflon decomposition products	0	0
Pentaborane (B_5H_9)	0	0

Adopted at the 20th Annual Meeting of the American Conference of Governmental Industrial Hygienists, St. Louis, April 25, 1958.

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NOISE THRESHOLD LIMIT

J-M standard is 95 decibels in each octave band between 300 and 10,000 cycles per second.

Radioactivity: For permissible concentration of radioisotopes in air, see "Maximum Permissible Amounts of Radioisotopes in the Human Body and Maximum Permissible Concentrations in Air and Water", Handbook 52, U. S. Department of Commerce, National Bureau of Standards, March 1953. In addition, see "Permissible Dose from External Sources of Ionizing Radiation", Handbook 59, U. S. Department of Commerce, National Bureau of Standards, September 24, 1954.

(a) Parts of vapor or gas per million parts of air by volume.
(b) Milligrams of dust, fume or mist per cubic meter of air.
(c) Millions of particles per cubic foot of air.
(d) J-M standard applied to asbestos exposure is 1 million fibres per cubic foot.
(e) Approximate milligrams per cubic foot of air.
(f) Parts of substance per million parts of air by volume.

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