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OCCUPATIONAL HEALTH REGULATIONS
MAXIMUM PERMISSIBLE CONCENTRATIONS
OF ATMOSPHERIC CONTAMINANTS IN PLACES OF EMPLOYMENT

Effective December 1, 1957

(Supersedes American Conference of Governmental
Industrial Hygienists Threshold Limit Values for 1956-
April 1957)

CONSULT LOCAL HEALTH DEPARTMENTS AND PHYSICIANS

FOR

INFORMATION AND ADVICE

ON METHODS OF CONTROL OVER

HEALTH HAZARDS TO ALL WORKERS

AND

INDUSTRIAL DISEASES AND INJURIES



TEXAS STATE DEPARTMENT OF HEALTH
DIVISION OF OCCUPATIONAL HEALTH
Austin, Texas

Or.-12-1
September 1957

THESE STANDARDS WERE ADOPTED BY THE TEXAS STATE BOARD OF HEALTH
ON SEPTEMBER 9, 1957 IN ACCORDANCE WITH THE AUTHORITY GRANTED IN
ARTICLE 4418D OF THE REVISED CIVIL STATUTES, STATE OF TEXAS,
AND ARE PROMULGATED ALSO IN ACCORDANCE WITH ARTICLE 4477,

SECTION 19

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MAXIMUM PERMISSIBLE CONCENTRATIONS
OF ATMOSPHERIC CONTAMINANTS IN PLACES OF EMPLOYMENT

I. Scope; Purpose; Availability of Pertinent References

Scope: This regulation applies to all places of employment in Texas. It does not cover maximum permissible dose of radiation or the minimum environmental sanitation requirements, nor include measures required for control of community external air pollution or air pollution nuisances.

Purpose: The purpose of this regulation is to prescribe to employers the maximum average atmospheric concentration of contaminants to which they are permitted to expose employees during an eight-hour working day in their places of employment, including industrial establishments.

Pertinent References: Copies of related laws, regulations, opinions of the Attorney General of Texas, and Advisory Standards currently applicable will be provided to any citizen of Texas upon request.

II. Applicability of Figures Listed Herein

Individual people react differently after excessive exposures to atmospheric concentrations of contaminants in places of employment. Listed herein are weighted average concentrations generally safe in places of employment during an eight-hour working exposure. These are not maximum values which cannot be exceeded momentarily depending upon, but not limited to, such factors as nature of contaminant; frequency of occurrence of high concentration; variable durations of exposure; probability of acute poisoning from high concentration for even short periods; cumulative effects. Employers shall consider these factors prior to exceeding values listed herein.

III. Revision

Values listed herein are based upon information obtained from recent experience, experimental study reports, or a combination of the two. Regular review will result in revision as justified. The State Board of Health solicits and will consider pertinent data based upon facts and experiences received from individuals, industries, governmental agencies, or others.

IV. Definitions

1. Industrial Establishment is defined to mean an institution, a plant, building or location related to manufactures or to the product of industry or labor.
2. Place of Employment is defined to mean any place where two or more persons are directly or indirectly employed by another for direct or indirect gain or profit.

V. MAXIMUM PERMISSIBLE CONCENTRATIONS DURING ONE WORKING DAY

A. <u>Gases and Vapors</u>		<u>P.P.M.*</u>	<u>Approx. Mg. per Cu. M.+</u>
	Acetaldehyde	200	360
	Acetic acid	10	25
	Acetic anhydride	5	20
	Acetone	1,000	2,400
(c)	Acetylene tetrabromide	1	14
	Acrolein	0.5	1.2
	Acrylonitrile	20	45
	Allyl alcohol	5	12
	Allyl chloride	5	15
(c)	Allyl glycidyl ether (AGE)	10	45
	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
(c)	Boron trifluoride	1	3
	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
(c)	Butyl glycidyl ether (BGE) (n-butyl glycidyl ether)	50	270
	Butylamine	5	15
	Butyl cellosolve (2-butoxyethanol)	50	240
(c)	Butyl mercaptan	10	35
	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
(c)	Chloroacetaldehyde	1	3
	Chlorobenzene (monochlorobenzene)	75	350
(c)	Chlorobromomethane (ClBrCH ₂)	400	2,100
	Chloroform (trichloromethane)	100	490
	1-Chloro-1-nitropropane	20	100
	Chloropicrin	1	7

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

+Approximate milligrams per cubic meter of air.

(c) Toxicological information or injury reports on these items is of recent origin and most probably will require revision at an early date.

8. M.4	A. <u>GASES AND VAPORS</u> (Cont.)	P.P.M.*	Approx. Mg. per Cu.M. †
0	Chloroprene (2-chloro-1,3-butadiene)	25	90
0	Cresol (all isomers)	5	22
0	Cyclohexane	400	1,400
0	Cyclohexanol	100	410
0	Cyclohexanone	100	400
1.2	Cyclohexene	400	1,350
5	Cyclopropane	400	690
2	Decaborane	0.05	0.3
5	Diacetone alcohol (4-hydroxy-4-methyl- 2-pentanone)	50	240
5	Diborane	0.1	0.1
0	o-Dichlorobenzene	50	300
0	Dichlorodifluoromethane	1,000	4,950
0	1,1-Dichloroethane	100	400
9	1,2-Dichloroethane (ethylene dichloride)	100	400
0.2	1,2-Dichloroethylene	200	790
0	Dichloroethyl ether	15	90
5	Dichloromono-fluoromethane	1,000	4,200
3	1,1-Dichloro-1-nitroethane	10	60
7	Dichlorotetrafluoroethane	1,000	7,000
0	Diethylamine	25	75
	Difluorodibromomethane	100	860
	(t) Diglycidyl ether (DGE)	10	55
	Diisobutyl ketone	50	290
	Dimethylaniline (n-dimethylaniline)	5	25
	(t) Dimethyl formamide	20	60
	Dimethylsulfate	1	5
	Dioxane (diethylene dioxide)	100	360
	(t) Dipropylene glycol methylether	100	600
	Ethyl acetate	400	1,400
	Ethyl acrylate	25	100
	Ethyl alcohol (ethanol)	1,000	1,900
	(t) Ethyl mercaptan	250	640
	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

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

† Approximate milligrams per cubic meter of air.

(t) Toxicological information or injury reports on these items is of recent origin and most probably will require revision at an early date.

A. <u>CASES AND VAPORS (Cont.)</u>		P.P.M.*	Approx. Mg. Per Cu.M. †
Ethylenediamine		10	30
Ethylene dibromide (1,2-dibromoethane)		25	190
Ethylene imine		5	9
Ethylene oxide		50	90
Fluorine		0.1	0.2
Fluoro-trichloromethane		1,000	5,600
Formaldehyde		5	6
Furfural		5	20
(t) Furfuryl alcohol		50	200
Gasoline		500	2,000
(t) Glycidol		50	150
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
(t) Isopropyl glycidyl ether (IGE)		50	240
Isopropylamine		5	12
Mesityl oxide		50	200
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

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

† Approximate milligrams per cubic meter of air.

(t) Toxicological information or injury reports on these items is of recent origin and most probably will require revision at an early date.

	A. <u>CASES AND VAPORS</u> (Cont.)	<u>P.P.M.*</u>	<u>Approx. Mg.</u> <u>Per Cu.M. †</u>
30	Methyl formate	100	250
150	Methyl isobutyl carbinol (methyl amyl alcohol) . .	25	100
9	(c) Methyl mercaptan	50	100
90	(c) Methyl styrene	100	480
0.2	Methylene chloride (dichloromethane)	500	1,750
600	(c) Monomethyl aniline	2	9
6	Naphtha (coal tar)	200	800
20	Naphtha (petroleum)	500	2,000
200	Nickel carbonyl	0.001	0.007
300	Nitric acid	5	25
150	p-Nitroaniline	1	6
300	Nitrobenzene	1	5
300	Nitroethane	100	310
10	Nitrogen dioxide	5	9
110	Nitroglycerin	0.5	5
1.3	Nitromethane	100	250
17	2-Nitropropane	50	180
7	Nitrotoluene	5	30
11	Octane	500	2,350
2	Ozone	0.1	0.2
1.4	Pentane	1,000	2,950
0.2	Pentanone (methyl propyl ketone)	200	700
	Perchloroethylene (tetrachloroethylene)	200	1,350
40	(c) Perchloromethyl mercaptan	0.1	0.8
40	Phenol	5	19
12	(c) Phenyl glycidyl ether (PGE)	50	310
00	Phenylhydrazine	5	22
10	Phosgene (carbonyl chloride)	1	4
50	Phosphine	0.05	0.07
35	Phosphorus trichloride	0.5	3
50	Propyl acetate	200	840
50	Propyl alcohol (isopropyl alcohol)	400	980
20	Propyl ether (isopropyl ether)	500	2,100
	Propylene dichloride (1,2-dichloropropane)	75	350
20	Propylene imine	25	60
10	(c) Propylene oxide	100	240
70	Pyridine	10	30
40	Quinone	0.1	0.4
70	Stibine	0.1	0.5
70	Stoddard solvent	500	2,900
50	Styrene monomer (phenylethylene)	100	420
	Sulfur dioxide	5	13

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

† Approximate milligrams per cubic meter of air.

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(c) Toxicological information or injury reports on these items is of recent origin and most probably will require revision at an early date.

A. <u>GASES AND VAPORS (Cont.)</u>		<u>P.P.M.*</u>	<u>Approx. Mg.</u> <u>Per Cu.M. †</u>
	Sulfur hexafluoride	1,000	6,000
	Sulfur monochloride	1	6
	Sulfur pentafluoride	0.025	0.25
	p-Tertiary butyl toluene	10	60
(t)	Tertiary butyl alcohol	100	300
	1,1,2,2-Tetrachloroethane	5	35
	Tetrahydrofuran	200	590
	Tetranitromethane	1	8
	Toluene (toluol)	200	750
	o-Toluidine	5	22
(t)	Toluene-2,4-diisocyanate	0.1	0.7
	Trichloroethylene	200	1,050
(t)	Triethyl amine	25	100
	Trifluoromonobromomethane	1,000	6,100
	Turpentine	100	560
	Vinyl chloride (chloroethylene)	500	1,300
(t)	Vinyl toluene	100	480
	Xylene (xylol)	200	870
(t)	Xylidine	5	25
(#)(t)	Teflon decomposition products	0	0
(#)(t)	Pentaborane (B ₅ H ₉)	0	0

B. <u>TOXIC DUSTS, FUMES, AND MISTS</u>		<u>Mg. per</u> <u>Cu. M. ‡</u>
	Aldrin (1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-1,4,5,8-dimethanonaphthalene)	0.25
	Amate (ammonium sulfamate)	15
	Antimony	0.5
	ANTU (alpha naphthyl thiourea)	0.3
	Arsenic	0.5
	Barium (soluble compounds)	0.5
(t)	Beryllium	0.002
	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

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

† Approximate milligrams per cubic meter of air.

(t) Toxicological information or injury reports on these items is of recent origin and most probably will require revision at an early date.

(#) Until more data are forthcoming, it is important that atmospheric concentrations of these materials to which workers are exposed must be kept as near 0 as possible.

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

B. TOXIC DUSTS, FUMES AND MISTS (Cont.)		Mr. per Cu. M. $\frac{1}{2}$
	Chlorodiphenyl (42% chlorine)	1
	Chlorodiphenyl (54% chlorine)	0.5
	Chromic acid and chromates (as CrO_3)	0.1
0.25	Crag herbicide (sodium 2-(2,4-dichlorophenoxy) ethanol hydrogen sulfate)	15
0	Cyanide (as CN)	5
0	2,4-D(2,4-dichlorophenoxyacetic acid)	10
0	DDT (2,2-bis(p-chlorophenyl)-1,1,1-trichloroethane)	1
0	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
0.7	Dinitrobenzene	1
0	Dinitrotoluene	1.5
0	Dinitro-o-cresol	0.2
0	EPN (O-ethyl O-p-nitrophenyl thionobenzenephosphonate)	0.5
0	Perbam (ferric dimethyl dithiocarbamate)	15
0	Pervanadium dust	1
0	Fluoride	2.5
0	HATP (hexaethyl tetraphosphate)	0.1
0	Hydroquinone	2
0	Iron oxide fume	15
0	Lead	0.2
0	Lead arsenate	0.15
0	Lindane (hexachlorocyclohexane, gamma isomer)	0.5
0	(c) Lithium hydride	0.025
0	Magnesium oxide fume	15
0	Malathion (O,O-dimethyl dithiophosphate of diethyl mercaptosuccinate)	15
0.25	Manganese	6
0.5	Mercury	0.1
0.5	Mercury (organic compounds)	0.01
0.5	Methoxychlor (2,2-di-p-methoxyphenyl-1,1,1- trichloroethane)	15
0.002	Molybdenum (soluble compounds)	5
0.1	(insoluble compounds)	15
0.1	Nicotine	0.5
0	(c) Paradichlorobenzene	450
0	Parathion (O,O-diethyl O-p-nitrophenylthiophosphate)	0.1
0.5	Pentachloronaphthalene	0.5
0.5	Pentachlorophenol	0.5
0	Phosphorus (yellow)	0.1
0	Phosphorus pentachloride	1
0	Phosphorus pentasulfide	1
0	Picric acid	0.1

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

(c) Toxicological information on injury reports on these items is of recent origin and most probably will require revision in an early date.

