

TABLE Z-1-A.-LIMITS FOR AIR CONTAMINANTS  
Final Rule Limits Promulgated by OSHA in 1989 as changed thru 1992.

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Substance	CAS No. (f)	1989 OSHA Permissible Exposure Limits						Skin Desig- nation
		TWA		STEL (c)		CEILING		
		ppm (a)	mg/m <sup>3</sup> (b)	ppm (a)	mg/m <sup>3</sup> (b)	ppm (a)	mg/m <sup>3</sup> (b)	
Acetaldehyde	75-07-0	100	180	150	270	-	-	-
Acetic acid	64-19-7	10	25	-	-	-	-	-
Acetic anhydride	108-24-7	-	-	-	-	5	20	-
Acetone <sup>h</sup>	67-64-1	750	1800	1000 <sup>h</sup>	2400 <sup>h</sup>	-	-	-
Acetonitrile	75-05-8	40	70	60	105	-	-	-
2-Acetylaminofluorine; see 1910.1014	53-96-3							
Acetylene dichloride; see-1,2-Dichloroethylene	540-59-0							
Acetylene tetrabromide	79-27-6	1	14	-	-	-	-	-
Acetylsalicylic acid (Aspirin)	50-78-2	-	5	-	-	-	-	-
Acrolein	107-02-8	0.1	0.25	0.3	0.8	-	-	-
Acrylamide	79-06-1	-	0.03	-	-	-	-	x
Acrylic acid	79-10-7	10	30	-	-	-	-	x
Acrylonitrile; see 1910.1045	107-13-1							
Aldrin	309-00-2	-	0.25	-	-	-	-	x
Allyl alcohol	107-18-6	2	5	4	10	-	-	x
Allyl chloride	107-05-1	1	3	2	6	-	-	-
Allyl glycidyl ether (AGE)	106-92-3	5	22	10	44	-	-	-
Allyl propyl disulfide	2179-59-1	2	12	3	18	-	-	-
alpha-Alumina	1344-28-1							
Total dust		-	10	-	-	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Aluminum (as Al) Metal	7429-90-5							
Total dust		-	15	-	-	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Pyro powders		-	5	-	-	-	-	-
Welding fumes*		-	5	-	-	-	-	-
Soluble salts		-	2	-	-	-	-	-
Alkyls		-	2	-	-	-	-	-
4-Aminodiphenyl; see 1910.1011	92-67-1							
2-Aminoethanol; see Ethanolamine	141-43-5							
2-Aminopyridine	504-29-0	0.5	2	-	-	-	-	-
Amitrole	61-82-5	-	0.2	-	-	-	-	-
Ammonia	7664-41-7	-	-	35	27	-	-	-
Ammonium chloride fume	12125-02-9	-	10	-	20	-	-	-
Ammonium sulfamate	7773-06-0							
Total dust		-	10	-	-	-	-	-
Respirable fraction		-	5	-	-	-	-	-

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n-Amyl acetate	628-63-7	100	525	-	-	-	-	-
Sec-Amyl acetate	626-38-0	125	650	-	-	-	-	-
Aniline and homologs	62-53-3	2	8	-	-	-	-	x
Anisidine (o-,p-isomers)	29191-52-4	-	0.5	-	-	-	-	-
Antimony and compounds (as Sb)	7440-36-0	-	0.5	-	-	-	-	-
ANTU (Alpha naphthylthiourea)	86-88-4	-	0.3	-	-	-	-	-
Arsenic, organic compounds (as As)	7440-38-2	-	0.5	-	-	-	-	-
Arsenic, inorganic compounds (as As); see 1910.1018	7440-38-2							
Arsine	7784-42-1	0.05	0.2	-	-	-	-	-
Asbestos; see 1910.1001								
Atrazine	1912-24-9	-	5	-	-	-	-	-
Azinphos-methyl	86-50-0	-	0.2	-	-	-	-	x
Barium, soluble compounds	7440-39-3	-	0.5	-	-	-	-	-
Barium sulfate	7727-43-7							
Total dust		-	10	-	-	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Benomyl	17804-35-2							
Total dust		-	10	-	-	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Benzene; see 1910.1028. See Table Z-2 for the limits applicable in the operations or sectors excluded in 1910.1028 <sup>d</sup>	71-43-2							
Benzidine; see 1910.1010	92-87-5							
p-Benzoquinone; see Quinone	106-51-4							
Benzo(a)pyrene; see Coal tar pitch volatiles								
Benzoyl peroxide	94-36-0	-	5	-	-	-	-	-
Benzyl chloride	100-44-7	1	5	-	-	-	-	-
Beryllium and beryllium compounds (as Be); see Table Z-2	7440-41-7							
Biphenyl; see Diphenyl	92-52-4							
Bismuth telluride, undoped	1304-82-1							
Total dust		-	15	-	-	-	-	-
Respirable fraction		-	5	-	-	-	-	-

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Bismuth telluride, Se-doped		-	5	-	-	-	-	-
Borates, tetra, sodium salts								
Anhydrous	1330-43-4	-	10	-	-	-	-	-
Decahydrate	1303-96-4	-	10	-	-	-	-	-
Pentahydrate	12179-04-3	-	10	-	-	-	-	-
Boron oxide, total dust	1303-86-2	-	10	-	-	-	-	-
Boron tribromide	10294-33-4	-	-	-	-	1	10	-
Boron trifluoride	7637-07-2	-	-	-	-	1	3	-
Bromacil	314-40-9	1	10	-	-	-	-	-
Bromine	7726-95-6	0.1	0.7	0.3	2	-	-	-
Bromine pentafluoride	7789-30-2	0.1	0.7	-	-	-	-	-
Bromoform	75-25-2	0.5	5	-	-	-	-	x
Butadiene (1,3- Butadiene); see 1910.1051	106-99-0							
Butane	106-97-8	800	1900	-	-	-	-	-
Butanethiol; see Butyl mercaptan	109-79-5							
2-Butanone (Methyl ethyl ketone)	78-93-3	200	590	300	885	-	-	-
2-Butoxyethanol	111-76-2	25	120	-	-	-	-	x
n-Butyl-acetate	123-86-4	150	710	200	950	-	-	-
sec-Butyl acetate	105-46-4	200	950	-	-	-	-	-
tert-Butyl acetate	540-88-5	200	950	-	-	-	-	-
Butyl acrylate	141-32-2	10	55	-	-	-	-	-
n-Butyl alcohol	71-36-3	-	-	-	-	50	150	x
sec-Butyl alcohol	78-92-2	100	305	-	-	-	-	-
tert-Butyl alcohol	75-65-0	100	300	150	450	-	-	-
Butylamine	109-73-9	-	-	-	-	5	15	x
tert-Butyl chromate (as CrO <sub>3</sub> ); see 1910.1026. If the exposure limit in 1910.1026 is stayed or is otherwise not in effect, the exposure limit is a ceiling of 0.1 mg/m <sup>3</sup>	1189-85-1							
n-Butyl glycidyl ether (BGE)	2426-08-6	25	135	-	-	-	-	-
n-Butyl lactate	138-22-7	5	25	-	-	-	-	-
Butyl mercaptan	109-79-5	0.5	1.5	-	-	-	-	-
o-sec-Butylphenol	89-72-5	5	30	-	-	-	-	x
p-tert-Butyltoluene	98-51-1	10	60	20	120	-	-	-

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Cadmium (all forms, as Cd); see 1910.1027. See Table Z-2 for the exposure limits for any operations or sectors where the exposure limits in 1910.1027 are stayed or are otherwise not in effect.	7440-43-9							
Calcium carbonate	1317-65-3							
Total dust		-	15	-	-	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Calcium cyanamide	156-62-7	-	0.5	-	-	-	-	-
Calcium hydroxide <sup>i</sup>	1305-62-0	-	5 <sup>i</sup>	-	-	-	-	-
Calcium oxide <sup>j</sup>	1305-78-8	-	5 <sup>j</sup>	-	-	-	-	-
Calcium silicate	1344-95-2							
Total dust		-	15	-	-	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Calcium sulfate	7778-18-9							
Total dust		-	15	-	-	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Camphor, synthetic	76-22-2	-	2	-	-	-	-	-
Caprolactam	105-60-2							
Dust		-	1	-	3	-	-	-
Vapor		5	20	10	40	-	-	-
Captafol (Difolatan <sup>®</sup> )	2425-06-1	-	0.1	-	-	-	-	-
Captan	133-06-2	-	5	-	-	-	-	-
Carbaryl (Sevin <sup>®</sup> )	63-25-2	-	5	-	-	-	-	-
Carbofuran (Furadan <sup>®</sup> )	1563-66-2	-	0.1	-	-	-	-	-
Carbon black	1333-86-4	-	3.5	-	-	-	-	-
Carbon dioxide <sup>e</sup>	124-38-9	10,000 <sup>e</sup>	18,000	30,000	54,000	-	-	-
Carbon disulfide	75-15-0	4	12	12	36	-	-	x
Carbon monoxide <sup>m</sup>	630-08-050	35	40	-	-	200 <sup>m</sup>	229 <sup>m</sup>	-
Carbon tetrabromide	558-13-4	0.1	1.4	0.3	4	-	-	-
Carbon tetrachloride	56-23-5	2	12.6	-	-	-	-	-
Carbonyl fluoride	353-50-4	2	5	5	15	-	-	-
Catechol (Pyrocatechol)	120-80-9		5	20	-	-	-	x
Cellulose	9004-34-6							
Total dust		-	15	-	-	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Cesium hydroxide	21351-79-1	-	2	-	-	-	-	-
Chlordane	57-74-9	-	0.5	-	-	-	-	x
Chlorinated camphene	8001-35-2	-	0.5		1	-	-	x

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Chlorinated diphenyl oxide	55720-99-5	-	0.5	-	-	-	-	-
Chlorine	7782-50-5	0.5	1.5	1	3	-	-	-
Chlorine dioxide	10049-04-4	0.1	0.3	0.3	0.9	-	-	-
Chlorine trifluoride	7790-91-2	-	-	-	-	0.1	0.4	-
Chloroacetaldehyde	107-20-0	-	-	-	-	1	3	-
alpha-Chloroacetophenone (Phenacyl chloride)	532-27-4	0.05	0.3	-	-	-	-	-
Chloroacetyl chloride	79-04-9	0.05	0.2	-	-	-	-	-
Chlorobenzene	108-90-7	75	350	-	-	-	-	-
o-Chlorobenzylidene malononitrile	2698-41-1	-	-	-	-	0.05	0.4	x
Chlorobromomethane	74-97-5	200	1050	-	-	-	-	-
2-Chloro-1,3-butadiene; see beta-Chloroprene	126-99-8							
Chlorodifluoromethane	75-45-6	1000	3500	-	-	-	-	-
Chlorodiphenyl (42% Chlorine) (PCB)	53469-21-9	-	1	-	-	-	-	x
Chlorodiphenyl (54% Chlorine) (PCB)	11097-69-1	-	0.5	-	-	-	-	x
1-Chloro,2,3-epoxypropane; see Epichlorohydrin	106-89-8							
2-Chloroethanol; see Ethylene chlorohydrin	107-07-3							
Chloroethylene; see Vinyl chloride	75-01-4							
Chloroform (Trichloromethane)	67-66-3	2	9.78	-	-	-	-	-
bis(Chloromethyl) ether; see 1910.1008	542-88-1							
Chloromethyl methyl ether; see 1910.1006	107-30-2							
1-Chloro-1-nitropropane	600-25-9	2	10	-	-	-	-	-
Chloropentafluoroethane	76-15-3	1000	6320	-	-	-	-	-
Chloropicrin	76-06-2	0.1	0.7	-	-	-	-	-
beta-Chloroprene	126-99-8	10	35	-	-	-	-	x
o-Chlorostyrene	2039-87-4	50	285	75	428	-	-	-
o-Chlorotoluene	95-49-8	50	250	-	-	-	-	-
2-Chloro-6-trichloro-methyl pyridine	1929-82-4							
Total dust		-	15	-	-	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Chlorpyrifos	2921-88-2	-	0.2	-	-	-	-	x

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Chromic acid and chromates (as CrO <sub>3</sub> ); see 1910.1026. See Table Z-2 for the exposure limit for any operations or sectors where the exposure limit in 1910.1026 is stayed or are otherwise not in effect.	7440-47-3							
Chromium, soluble chromic, chromous salts (as Cr)	7440-47-3	-	0.5	-	-	-	-	-
Chromium VI compounds; see 1910.1026. See Table Z-2 for the exposure limit for any operations or sectors where the exposure limit in 1910.1026 is stayed or are otherwise not in effect.	7440-47-3 (18540-29-9)							
Chromium metal and insoluble salts	7440-47-3	-	1	-	-	-	-	-
Chrysene; see Coal tar pitch volatiles								
Clopidol	2971-90-6							
Total dust		-	15	-	-	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Coal dust (less than 5% SiO <sub>2</sub> ), quartz, respirable fraction		-	2	-	-	-	-	-
Coal dust (greater than or equal to 5% SiO <sub>2</sub> ), respirable quartz fraction		-	0.1	-	-	-	-	-
Coal tar pitch volatiles (benzene soluble fraction), anthracene, BaP, phenanthrene, acridine, chrysene, pyrene	8007-45-2	-	0.2	-	-	-	-	-
Cobalt metal, dust, and fume (as Co)	7440-48-4	-	0.05	-	-	-	-	-
Cobalt carbonyl (as Co)	10210-68-1	-	0.1	-	-	-	-	-
Cobalt hydrocarbonyl (as Co)	16842-03-8	-	0.1	-	-	-	-	-
Coke oven emissions; see 1910.1029								
Copper	7440-50-8							
Fume (as Cu)		-	0.1	-	-	-	-	-
Dusts and mists (as Cu)		-	1	-	-	-	-	-

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Cotton dust, raw This 8-hour TWA applies to respirable dust as measured by a vertical elutriator cotton dust or equivalent instrument. The time-weighted average applies to the cotton waste processing operations of waster recycling (sorting, blending, cleaning, and willowing) and garnetting. See also 1910.1043 for cotton dust limits applicable to other sectors.		-	1	-	-	-	-	-
Crag herbicide (Sesone)	136-78-7							
Total dust		-	10	-	-	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Cresol, all isomers	1319-77-3	5	22	-	-	-	-	x
Crotonaldehyde	123-73-9 4170-30-3	2	6	-	-	-	-	-
Crufomate	299-86-5	-	5	-	-	-	-	-
Cumene	98-82-8	50	245					x
Cyanamide	420-04-2	-	2	-	-	-	-	-
Cyanides (as CN)	Varies with compound	-	5	-	-	-	-	-
Cyanogen	460-19-5	10	20	-	-	-	-	-
Cyanogen chloride	506-77-4	-	-	-	-	0.3	0.6	-
Cyclohexane	110-82-7	300	1050	-	-	-	-	-
Cyclohexanol	108-93-0	50	200	-	-	-	-	x
Cyclohexanone	108-94-1	25	100	-	-	-	-	x
Cyclohexene	110-83-8	300	1015	-	-	-	-	-
Cyclohexylamine	108-91-8	10	40	-	-	-	-	-
Cyclonite	121-82-4	-	1.5	-	-	-	-	x
Cyclopentadiene	542-92-7	75	200	-	-	-	-	-
Cyclopentane	287-92-3	600	1720	-	-	-	-	-
Cyhexatin	13121-70-5	-	5	-	-	-	-	-
2,4-D (Dichlorophenoxyacetic acid)	94-75-7	-	10	-	-	-	-	-
Decaborane	17702-41-9	0.05	0.3	0.15	0.9	-	-	x
Demton-(Systox®)	8065-48-3	-	0.1	-	-	-	-	x
Dichlorodiphenyltrichloroethane (DDT)	50-29-3	-	1	-	-	-	-	x

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Dichlorvos (DDVP)	62-73-78	-	1	-	-	-	-	x
Diacetone alcohol (4-Hydroxy-4-methyl-2-pentanone)	123-42-2	50	240	-	-	-	-	-
1,2-Diaminoethane; see Ethylenediamine	107-15-3							
Diazinon	333-41-5	-	0.1	-	-	-	-	x
Diazomethane	334-88-3	0.2	0.4	-	-	-	-	-
Diborane	19287-45-7	0.1	0.1	-	-	-	-	-
1,2-Dibromo-3-chloropropane; see 1910.1044	96-12-8							
2-N-Dibutylaminoethanol	102-81-8	2	14	-	-	-	-	-
Dibutyl phosphate	107-66-4	1	5	2	10	-	-	-
Dibutyl phthalate	84-74-2	-	5	-	-	-	-	-
Dichloroacetylene	7572-29-4	-	-	-	-	0.1	0.4	-
o-Dichlorobenzene	95-50-1	-	-	-	-	50	300	-
p-Dichlorobenzene	106-46-7	75	450	110	675	-	-	-
3,3'-Dichlorobenzidine; see 1910.1007	91-94-1							
Dichlorodifluoromethane	75-71-8	1000	4950	-	-	-	-	-
1,3-Dichloro-5,5-dimethyl hydantoin	118-52-5	-	0.2	-	0.4	-	-	-
1,1-Dichloroethane	75-34-3	100	400	-	-	-	-	-
1,2-Dichloroethylene	540-59-0	200	790	-	-	-	-	-
Dichloroethyl ether	111-44-4	5	30	10	60	-	-	x
Dichloromethane; see Methylene chloride	75-09-2							
Dichloromonofluoromethane	75-43-4	10	40	-	-	-	-	-
1,1-Dichloro-1-nitroethane	594-72-9	2	10	-	-	-	-	-
1,2-Dichloropropane; see Propylene dichloride	78-87-5							
1,3-Dichloropropene	542-75-6	1	5	-	-	-	-	x
2,2-Dichloropropionic acid	75-99-0	1	6	-	-	-	-	-
Dichlorotetrafluoroethane	76-14-2	1000	7000	-	-	-	-	-
Dicrotophos	141-66-2	-	0.25	-	-	-	-	x
Dicyclopentadiene	77-73-6	5	30					-
Dicyclopentadienyl iron	102-54-5							
Total dust		-	10	-	-	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Dieldrin	60-57-1	-	0.25	-	-	-	-	x
Diethanolamine	111-42-2	3	15	-	-	-	-	-
Diethylamine	109-89-7	10	30	25	75	-	-	-



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		TWA		STEL (c)		CEILING		
		ppm (a)	mg/m <sup>3</sup> (b)	ppm (a)	mg/m <sup>3</sup> (b)	ppm (a)	mg/m <sup>3</sup> (b)	
2-Diethylaminoethanol	100-37-0	10	50	-	-	-	-	x
Diethylene triamine	111-40-0	1	4	-	-	-	-	-
Diethyl ether; see Ethyl ether	60-29-7							
Diethyl ketone	96-22-0	200	705	-	-	-	-	-
Diethyl phthalate	84-66-2	-	5	-	-	-	-	-
Difluorodibromomethane	75-61-6	100	860	-	-	-	-	-
Diglycidyl ether (DGE)	2238-07-5	0.1	0.5	-	-	-	-	-
Dihydroxybenzene; see Hydroquinone	123-31-9							
Diisobutyl ketone	108-83-8	25	150	-	-	-	-	-
Diisopropylamine	108-18-9	5	20	-	-	-	-	x
4-Dimethylaminoazobenzene; see 1910.1015	60-11-7							
Dimethoxymethane; see Methylal	109-87-5							
Dimethyl acetamide	127-19-5	10	35	-	-	-	-	x
Dimethylamine	124-40-3	10	18	-	-	-	-	-
Dimethylaminobenzene; see Xylidine	1300-73-8							
Dimethylaniline (N,N-Dimethylaniline)	121-69-7	5	25	10	50	-	-	x
Dimethylbenzene; see Xylene	Varies with isomer							
Dimethyl-1,2-dibromo-2,2-dichloroethyl phosphate	300-76-5	-	3	-	-	-	-	x
Dimethylformamide	68-12-2	10	30	-	-	-	-	x
2,6-Dimethyl-4-heptanone; see Diisobutyl ketone	108-83-8							
1,1-Dimethylhydrazine	57-14-7	0.5	1	-	-	-	-	x
Dimethylphthalate	131-11-3	-	5	-	-	-	-	-
Dimethyl sulfate	77-78-1	0.1	0.5	-	-	-	-	x
Dinitolmide (3,5-Dinitro-o-toluamide)	148-01-6	-	5	-	-	-	-	-
Dinitrobenzene (all isomers)	(ortho): 528-29-0 (meta): 99-65-0 (para-): 100-25-4	-	1	-	-	-	-	x
Dinitro-o-cresol	534-52-1	-	0.2	-	-	-	-	x
Dinitrotoluene	25321-14-6	-	1.5	-	-	-	-	x
Dioxane (Diethylene dioxide)	123-91-1	25	90	-	-	-	-	x

TABLE Z-1-A.-LIMITS FOR AIR CONTAMINANTS  
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		TWA		STEL (c)		CEILING		
		ppm (a)	mg/m <sup>3</sup> (b)	ppm (a)	mg/m <sup>3</sup> (b)	ppm (a)	mg/m <sup>3</sup> (b)	
Dioxathion (Delnav)	78-34-2	-	0.2	-	-	-	-	x
Diphenyl (Biphenyl)	92-52-4	0.2	1	-	-	-	-	-
Diphenylamine	122-39-4	-	10	-	-	-	-	-
Diphenylmethane diisocyanate; see Methylene bisphenyl isocyanate	101-68-8							
Dipropylene glycol methyl ether	34590-94-8	100	600	150	900	-	-	x
Dipropyl ketone	123-19-3	50	235	-	-	-	-	-
Diquat	85-00-7	-	0.5	-	-	-	-	-
Di-sec octyl phthalate (Di-2-ethylhexyl phthalate)	117-81-7	-	5	-	10	-	-	-
Disulfiram	97-77-8	-	2	-	-	-	-	-
Disulfoton	298-04-4	-	0.1	-	-	-	-	x
2,6-Di-tert-butyl-p-cresol	128-37-0	-	10	-	-	-	-	-
Diuron	330-54-1	-	10	-	-	-	-	-
Divinyl benzene	1321-74-0	10	50	-	-	-	-	-
Emery	12415-34-8							
Total dust		-	10	-	-	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Endosulfan	115-29-7	-	0.1	-	-	-	-	x
Endrin	72-20-8	-	0.1	-	-	-	-	x
Epichlorohydrin	106-89-8	2	8	-	-	-	-	x
EPN	2104-64-5	-	0.5	-	-	-	-	x
1,2-Epoxypropane; see Propylene oxide								
2,3-Epoxy-1-propanol; see Glycidol								
Ethaneithiol; see Ethyl mercaptan								
Ethanolamine	141-43-5	3	8	6	15	-	-	-
Ethion	563-12-2	-	0.4	-	-	-	-	x
2-Ethoxyethanol	110-80-5	200	740	-	-	-	-	-
2-Ethoxyethyl acetate (Cellosolve acetate)	111-15-9	100	540	-	-	-	-	-
Ethyl acetate	141-78-6	400	1400	-	-	-	-	-
Ethyl acrylate	140-88-5	5	20	25	100	-	-	x
Ethyl alcohol (Ethanol)	64-17-5	1000	1900	-	-	-	-	-
Ethylamine	75-04-7	10	18	-	-	-	-	-
Ethyl amyl ketone (5-Methyl-3-heptanone)	541-85-5	25	130	-	-	-	-	-
Ethyl benzene	100-41-4	100	435	125	545	-	-	-

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		TWA		STEL (c)		CEILING		Skin Designation
		ppm (a)	mg/m <sup>3</sup> (b)	ppm (a)	mg/m <sup>3</sup> (b)	ppm (a)	mg/m <sup>3</sup> (b)	
Ethyl bromide	74-96-4	200	890	250	1110	-	-	-
Ethyl butyl ketone (3-Heptanone)	106-35-4	50	230	-	-	-	-	-
Ethyl chloride	75-00-3	1000	2600	-	-	-	-	-
Ethyl ether	60-29-7	400	1200	500	1500	-	-	-
Ethyl formate	109-94-4	100	300	-	-	-	-	-
Ethyl mercaptan	75-08-1	0.5	1	-	-	-	-	-
Ethyl silicate	78-10-4	10	85	-	-	-	-	-
Ethylene chlorohydrin	107-07-3	-	-	-	-	1	3	x
Ethylenediamine	107-15-3	10	25	-	-	-	-	-
Ethylene dibromide; see Table Z-2	106-93-4							
Ethylene dichloride	107-06-2	1	4	2	8	-	-	-
Ethylene glycol	107-21-1	-	-	-	-	50	125	
Ethylene glycol dinitrate <sup>k</sup>	628-96-6	-	-	-	0.1 <sup>k</sup>	-	-	-
Ethylene glycol methyl acetate; see Methyl cellosolve acetate	110-49-6							
Ethyleneimine; see 1910.1012	151-56-4							
Ethylene oxide; see 1910.1047	75-21-8							
Ethylidene chloride; see 1,1-Dichloroethane	75-34-3							
Ethylidene norbornene	16219-75-3	-	-	-	-	5	25	-
N-Ethylmorpholine	100-74-3	5	23	-	-	-	-	x
Fenamiphos	22224-92-6	-	0.1	-	-	-	-	x
Fensulfothion (Dasanit)	115-90-2	-	0.1	-	-	-	-	-
Fenthion	55-38-9	-	0.2	-	-	-	-	x
Ferbam, total dust	14484-64-1	-	10	-	-	-	-	-
Ferrovandium dust	12604-58-9	-	1	-	3	-	-	-
Fluorides (as F)	Varies with compound		2.5	-	-	-	-	-
Fluorine	7782-41-4	0.1	0.2	-	-	-	-	-
Fluorotrichloromethane (Trichlorofluoromethane)	75-69-4	-	-	-	-	1000	5600	-
Fonofos	944-22-9	-	0.1	-	-	-	-	x
Formaldehyde; see 1910.1048	50-00-0							
Formamide	75-12-7	20	30	30	45	-	-	-
Formic acid	64-18-6	5	9	-	-	-	-	-
Furfural	98-01-1	2	8	-	-	-	-	x
Furfuryl alcohol	98-00-0	10	40	15	60	-	-	x
Gasoline	8006-61-9	300	900	500	1500	-	-	-

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		TWA		STEL (c)		CEILING		Skin Designation
		ppm (a)	mg/m <sup>3</sup> (b)	ppm (a)	mg/m <sup>3</sup> (b)	ppm (a)	mg/m <sup>3</sup> (b)	
Germanium tetrahydride	7782-65-2	0.2	0.6	-	-	-	-	-
Glutaraldehyde	111-30-8	-	-	-	-	0.2	0.8	-
Glycerin (mist)	56-81-5							
Total dust		-	10	-	-	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Glycidol	556-52-5	25	75	-	-	-	-	-
Glycol monoethyl ether; see 2-Ethoxyethanol	110-80-5							
Grain dust (oat, wheat, barley)		-	10	-	-	-	-	-
Graphite, natural respirable dust	7782-42-5	-	2.5	-	-	-	-	-
Graphite, synthetic								
Total dust		-	10	-	-	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Guthion <sup>®</sup> ; see Azinphos methyl	86-50-0							
Gypsum	13397-24-5	-	-	-	-	-	-	-
Total dust		-	15	-	-	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Hafnium	7440-58-6	-	0.5	-	-	-	-	-
Heptachlor	76-44-8	-	0.5	-	-	-	-	x
Heptane (n-Heptane)	142-82-5	400	1600	500	2000	-	-	-
Hexachlorobutadiene	87-68-3	0.02	0.24	-	-	-	-	-
Hexachlorocyclopentadiene	77-47-4	0.01	0.1	-	-	-	-	-
Hexachloroethane	67-72-1	1	10	-	-	-	-	x
Hexachloronaphthalene	1335-87-1	-	0.2	-	-	-	-	x
Hexafluoroacetone	684-16-2	0.1	0.7	-	-	-	-	x
n-Hexane	110-54-3	50	180	-	-	-	-	-
Hexane isomers	Varies with compound	500	1800	1000	3600	-	-	-
2-Hexanone (Methyl n-butyl ketone)	591-78-6	5	20	-	-	-	-	-
Hexone (Methyl isobutyl ketone)	108-10-1	50	205	75	300	-	-	-
sec-Hexyl acetate	108-84-9	50	300	-	-	-	-	-
Hexylene glycol	107-41-5	-	-	-	-	25	125	-
Hydrazine	302-01-2	0.1	0.1	-	-	-	-	x
Hydrogenated terphenyls	61788-32-7	0.5	5	-	-	-	-	-
Hydrogen bromide	10035-10-6	-	-	-	-	3	10	-
Hydrogen chloride	7647-01-0	-	-	-	-	5	7	-

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		TWA		STEL (c)		CEILING		
		ppm (a)	mg/m <sup>3</sup> (b)	ppm (a)	mg/m <sup>3</sup> (b)	ppm (a)	mg/m <sup>3</sup> (b)	
Hydrogen cyanide	74-90-8	-	-	4.7	5	-	-	x
Hydrogen fluoride (as F)	7664-39-3	3	-	6	-	-	-	-
Hydrogen peroxide	7722-84-1	1	1.4	-	-	-	-	-
Hydrogen selenide (as Se)	7783-07-5	0.05	0.2	-	-	-	-	-
Hydrogen sulfide	7783-06-4	10	14	15	21	-	-	-
Hydroquinone	123-31-9	-	2	-	-	-	-	-
2-Hydroxypropyl acrylate	999-61-1	0.5	3	-	-	-	-	x
Indene	95-13-6	10	45	-	-	-	-	-
Indium and compounds (as In)	7440-74-6	-	0.1	-	-	-	-	-
Iodine	7553-56-2	-	-	-	-	0.1	1	-
Iodoform	75-47-8	0.6	10	-	-	-	-	-
Iron oxide fume	1309-37-1	-	10	-	-	-	-	-
Iron pentacarbonyl (as Fe)	13463-40-6	0.1	0.8	0.2	1.6	-	-	-
Iron salts (soluble) (as Fe)	Varies with compound	-	1	-	-	-	-	-
Isoamyl acetate	123-92-2	100	525	-	-	-	-	-
Isoamyl alcohol (primary and secondary)	123-51-3	100	360	125	450	-	-	-
Isobutyl acetate	110-19-0	150	700	-	-	-	-	-
Isobutyl alcohol	78-83-1	50	150	-	-	-	-	-
Isooctyl alcohol	26952-21-6	50	270	-	-	-	-	x
Isophorone	78-59-1	4	23	-	-	-	-	-
Isophorone diisocyanate	4098-71-9	0.005	-	0.02	-	-	-	x
2-Isopropoxyethanol	109-59-1	25	105	-	-	-	-	-
Isopropyl acetate	108-21-4	250	950	310	1185	-	-	-
Isopropyl alcohol	67-63-0	400	980	500	1225	-	-	-
Isopropylamine	75-31-0	5	12	10	24	-	-	-
N-Isopropylaniline	768-52-5	2	10	-	-	-	-	x
Isopropyl ether	108-20-3	500	2100	-	-	-	-	-
Isopropyl glycidyl ether (IGE)	4016-14-2	50	240	75	360	-	-	-
Kaolin								
Total dust		-	10	-	-	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Ketene	463-51-4	0.5	0.9	1.5	3	-	-	-
Lead inorganic (as Pb); see 1910.1025	7439-92-1							
Limestone	1317-65-3							
Total dust		-	15	-	-	-	-	-
Respirable fraction		-	5	-	-	-	-	-

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		TWA		STEL (c)		CEILING		
		ppm (a)	mg/m <sup>3</sup> (b)	ppm (a)	mg/m <sup>3</sup> (b)	ppm (a)	mg/m <sup>3</sup> (b)	
Lindane	58-89-9	-	0.5	-	-	-	-	x
Lithium hydride	7580-67-8	-	0.025	-	-	-	-	-
L.P.G. (Liquefied petroleum gas)	68476-85-7	1000	1800	-	-	-	-	-
Magnesite	546-93-0							
Total dust		-	15	-	-	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Magnesium oxide fume, total particulate	1309-48-4	-	10	-	-	-	-	-
Malathion, total dust	121-75-5	-	10	-	-	-	-	x
Maleic anhydride	108-31-6	0.25	1	-	-	-	-	-
Manganese compounds (as Mn)	7439-96-5	-	-	-	-	-	5	-
Manganese fume (as Mn)	7439-96-5	-	1	-	3	-	-	-
Manganese cyclopentadienyl tricarbonyl (as Mn)	12079-65-1	-	0.1	-	-	-	-	x
Manganese tetroxide (as Mn)	1317-35-7	-	1	-	-	-	-	-
Marble	1317-65-3							
Total dust		-	15	-	-	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Mercury (aryl and inorganic) (as Hg)	7439-97-6	-	-	-	-	-	0.1	x
Mercury (organo) alkyl compounds (as Hg)	7439-97-6	-	0.01	-	0.03	-	-	x
Mercury (vapor) (as Hg)	7439-97-6	-	0.05	-	-	-	-	x
Mesityl oxide	141-79-7	15	60	25	100	-	-	-
Methacrylic acid	79-41-4	20	70	-	-	-	-	x
Methanethiol; see Methyl mercaptan	74-93-1							
Methomyl (Lannate)	16752-77-5	-	2.5	-	-	-	-	-
Methoxychlor, total dust	72-43-5	-	10	-	-	-	-	-
2-Methoxyethanol; see Methyl cellosolve	109-86-4							
4-Methoxyphenol	150-76-5	-	5	-	-	-	-	-
Methyl acetate	79-20-9	200	610	250	760	-	-	-
Methyl acetylene (Propyne)	74-99-7	1000	1650	-	-	-	-	-
Methyl acetylene-propadiene mixture (MAPP)		1000	1800	1250	2250	-	-	-
Methyl acrylate	96-33-3	10	35	-	-	-	-	x
Methylacrylonitrile	126-98-7	1	3	-	-	-	-	x
Methylal (Dimethoxy-methane)	109-87-5	1000	3100	-	-	-	-	-

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		TWA		STEL (c)		CEILING		
		ppm (a)	mg/m <sup>3</sup> (b)	ppm (a)	mg/m <sup>3</sup> (b)	ppm (a)	mg/m <sup>3</sup> (b)	
Methyl alcohol	67-56-1	200	260	250	325	-	-	x
Methylamine	74-89-5	10	12	-	-	-	-	-
Methyl amyl alcohol; see Methyl isobutyl carbinol	108-11-2							
Methyl n-amyl ketone	110-43-0	100	465	-	-	-	-	-
Methyl bromide	74-83-9	5	20	-	-	-	-	x
Methyl butyl ketone; see 2- Hexanone	591-78-6							
Methyl cellosolve (2- Methoxyethanol)	109-86-4	25	80	-	-	-	-	x
Methyl cellosolve acetate (2- Methoxyethyl acetate)	110-49-6	25	120	-	-	-	-	-
Methyl chloride	74-87-3	50	105	100	205	-	-	-
Methyl chloroform (1,1,1- Trichloroethane)	71-56-6	350	1900	450	2450	-	-	-
Methyl 2-cyanoacrylate	137-05-3	2	8	4	16	-	-	-
Methyl cyclohexane	108-87-2	400	1600	-	-	-	-	-
Methylcyclohexanol	25639-42-3	50	235	-	-	-	-	-
o-Methylcyclohexanone	583-60-8	50	230	75	345	-	-	x
Methylcyclopentadienyl manganese tricarbonyl (as Mn)	12108-13-3	-	0.2	-	-	-	-	x
Methyl demeton	8022-00-2	-	0.5	-	-	-	-	x
4,4'-Methylene bis(2- chloroaniline) (MBOCA)	101-14-4	0.02	0.22	-	-	-	-	x
Methylene bis(4-cyclo- hexylisocyanate)	5124-30-1	-	-	-	-	0.01	0.11	x
Methylene chloride; see 1910.1052	75-09-2							
Methylenedianiline; see 1910.1050	101-77-9							
Methyl ethyl ketone peroxide (MEKP)	1338-23-4	-	-	-	-	0.7	5	-
Methyl formate	107-31-3	100	250	150	375	-	-	-
Methyl hydrazine (Monomethyl hydrazine)	60-34-4	-	-	-	-	0.2	0.35	x
Methyl iodide	74-88-4	2	10	-	-	-	-	x
Methyl isoamyl ketone	110-12-3	50	240	-	-	-	-	-
Methyl isobutyl carbinol	108-11-2	25	100	40	165	-	-	x
Methyl isobutyl ketone; see Hexone	108-10-1							
Methyl isocyanate	624-83-9	0.02	0.05	-	-	-	-	x

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		TWA		STEL (c)		CEILING		
		ppm (a)	mg/m <sup>3</sup> (b)	ppm (a)	mg/m <sup>3</sup> (b)	ppm (a)	mg/m <sup>3</sup> (b)	
Methyl isopropyl ketone	563-80-4	200	705	-	-	-	-	-
Methyl mercaptan	74-93-1	0.5	1	-	-	-	-	-
Methyl methacrylate	80-62-6	100	410	-	-	-	-	-
Methyl parathion	298-00-0	-	0.2	-	-	-	-	x
Methyl propyl ketone; see 2-Pentanone	107-87-9							
Methyl silicate	681-84-5	1	6	-	-	-	-	-
Alpha-Methyl styrene	98-83-9	50	240	100	485	-	-	-
Methylene bisphenyl isocyanate (MDI)	101-68-8	-	-	-	-	0.02	0.2	-
Metribuzin	21087-64-9	-	5	-	-	-	-	-
Mica; see Silicates								
Molybdenum (as Mo)	7439-98-7							
Soluble compounds		-	5	-	-	-	-	-
Insoluble compounds, total dust		-	10	-	-	-	-	-
Monocrotophos (Azodrin®)	6923-22-4	-	0.25	-	-	-	-	-
Monomethyl aniline	100-61-8	0.5	2	-	-	-	-	x
Morpholine	110-91-8	20	70	30	105	-	-	x
Naphtha (Coal tar)	8030-30-6	100	400	-	-	-	-	-
Naphthalene	91-20-3	10	50	15	75	-	-	-
alpha-Naphthylamine; see 1910.1004	134-32-7							
beta-Naphthylamine; see 1910.1009	91-59-8							
Nickel carbonyl (as Ni)	13463-39-3	0.001	0.007	-	-	-	-	-
Nickel, metal and insoluble compounds (as Ni)	7440-02-0	-	1	-	-	-	-	-
Nickel, soluble compounds (as Ni)	7440-02-0	-	0.1	-	-	-	-	-
Nicotine	54-11-5	-	0.5	-	-	-	-	x
Nitric acid	7697-37-2	2	5	4	10	-	-	-
Nitric oxide	10102-43-9	25	30	-	-	-	-	-
p-Nitroaniline	100-01-6	-	3	-	-	-	-	x
Nitrobenzene	98-95-3	1	5	-	-	-	-	x
p-Nitrochlorobenzene	100-00-5	-	1	-	-	-	-	x
4-Nitrodiphenyl); see 1910.1003	92-93-3							
Nitroethane	79-24-3	100	310	-	-	-	-	-
Nitrogen dioxide	10102-44-0	-	-	1	1.8	-	-	-
Nitrogen trifluoride	7783-54-2	10	29	-	-	-	-	-



TABLE Z-1-A.-LIMITS FOR AIR CONTAMINANTS  
Final Rule Limits Promulgated by OSHA in 1989 as changed thru 1992

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Substance	CAS No. (f)	1989 OSHA Permissible Exposure Limits						Skin Desig- nation
		TWA		STEL (c)		CEILING		
		ppm (a)	mg/m <sup>3</sup> (b)	ppm (a)	mg/m <sup>3</sup> (b)	ppm (a)	mg/m <sup>3</sup> (b)	
Nitroglycerin <sup>1</sup>	55-63-0	-	-	-	0.1 <sup>1</sup>	-	-	x
Nitromethane	75-52-5	100	250	-	-	-	-	-
1-Nitropropane	108-03-2	25	90	-	-	-	-	-
2-Nitropropane	79-46-9	10	35	-	-	-	-	-
N-Nitrosodimethylamine; see 1910.1016	62-75-9							
Nitrotoluene	o-isomer 88-72-2 m-isomer 99-08-1 p-isomer 99-99-0	2	11	-	-	-	-	x
Nitrotrichloromethane; see Chloropicrin	76-06-2							
Nonane	111-84-2	200	1050	-	-	-	-	-
Octachloronaphthalene	2234-13-1	-	0.1	-	0.3	-	-	x
Octane	111-65-9	300	1450	375	1800	-	-	-
Oil mist, mineral	8012-95-1	-	5	-	-	-	-	-
Osmium tetroxide (as Os)	20816-12-0	0.0002	0.002	0.0006	0.006	-	-	-
Oxalic acid	144-62-7	-	1	-	2	-	-	-
Oxygen difluoride	7783-41-7	-	-	-	-	0.05	0.1	-
Ozone	10028-15-6	0.1	0.2	0.3	0.6	-	-	-
Paraffin wax fume	8002-74-2	-	2	-	-	-	-	-
Paraquat, respirable dust	1910-42-5 4685-14-7 2074-50-2	-	0.1	-	-	-	-	-
Parathion	56-38-2	-	0.1	-	-	-	-	x
Particulates not otherwise regulated								
Total dust		-	15	-	-	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Pentaborane	19624-22-7	0.005	0.01	0.015	0.03	-	-	-
Pentachloronaphthalene	1321-64-8	-	0.5	-	-	-	-	x
Pentachlorophenol	87-86-5	-	0.5	-	-	-	-	x
Pentaerythritol	115-77-5							
Total dust		-	10	-	-	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Pentane	109-66-0	600	1800	750	2250	-	-	-
2-Pentanone (Methyl propyl ketone)	107-87-9	200	700	250	875	-	-	-
Perchloroethylene (Tetrachloroethylene)	127-18-4	25	170	-	-	-	-	-

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Substance	CAS No. (f)	1989 OSHA Permissible Exposure Limits						Skin Desig- nation
		TWA		STEL (c)		CEILING		
		ppm (a)	mg/m <sup>3</sup> (b)	ppm (a)	mg/m <sup>3</sup> (b)	ppm (a)	mg/m <sup>3</sup> (b)	
Perchloromethyl mercaptan	594-42-3	0.1	0.8	-	-	-	-	-
Perchloryl fluoride	7616-94-6	3	14	6	28	-	-	-
Perlite								
Total dust		-	15	-	-	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Petroleum distillates (Naphtha) (Rubber Solvent)		400	1600	-	-	-	-	-
Phenol	108-95-2	5	19	-	-	-	-	x
Phenothiazine	92-84-2	-	5	-	-	-	-	x
p-Phenylene diamine	106-50-3	-	0.1	-	-	-	-	x
Phenyl ether, vapor	101-84-8	1	7	-	-	-	-	-
Phenyl ether-biphenyl mixture, vapor		1	7	-	-	-	-	-
Phenylethylene; see Styrene	100-42-5							
Phenyl glycidyl ether (PGE)	122-60-1	1	6	-	-	-	-	-
Phenylhydrazine	100-63-0	5	20	10	45	-	-	x
Phenyl mercaptan	108-98-5	0.5	2	-	-	-	-	-
Phenylphosphine	638-21-1	-	-	-	-	0.05	0.25	-
Phorate	298-02-2	-	0.05	-	0.2	-	-	x
Phosdrin (Mevinphos <sup>®</sup> )	7786-34-7	0.01	0.1	0.03	0.3	-	-	x
Phosgene (Carbonyl chloride)	75-44-5	0.1	0.4	-	-	-	-	-
Phosphine	7803-51-2	0.3	0.4	1	1	-	-	-
Phosphoric acid	7664-38-2	-	1	-	3	-	-	-
Phosphorus (yellow)	7723-14-0	-	0.1	-	-	-	-	-
Phosphorus oxychloride	10025-87-3	0.1	0.6	-	-	-	-	-
Phosphorus pentachloride	10026-13-8	-	1	-	-	-	-	-
Phosphorus pentasulfide	1314-80-3	-	1	-	3	-	-	-
Phosphorus trichloride	7719-12-2	0.2	1.5	0.5	3	-	-	-
Phthalic anhydride	85-44-9	1	6	-	-	-	-	-
m-Phthalodinitrile	626-17-5	-	5	-	-	-	-	-
Picloram	1918-02-1							
Total dust		-	10	-	-	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Picric acid	88-89-1	-	0.1	-	-	-	-	x
Piperazine dihydrochloride	142-64-3	-	5	-	-	-	-	-
Pindone (2-Pivalyl-1,3- indandione)	83-26-1	-	0.1	-	-	-	-	-
Plaster of Paris	26499-65-0							
Total dust		-	15	-	-	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Platinum (as Pt)	7440-06-4							

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		TWA		STEL (c)		CEILING		
		ppm (a)	mg/m <sup>3</sup> (b)	ppm (a)	mg/m <sup>3</sup> (b)	ppm (a)	mg/m <sup>3</sup> (b)	
Metal		-	1	-	-	-	-	-
Soluble salts		-	0.002	-	-	-	-	-
Portland cement	65997-15-1							
Total dust		-	10	-	-	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Potassium hydroxide	1310-58-3	-	-	-	-	-	2	-
Propane	74-98-6	1000	1800	-	-	-	-	-
Propargyl alcohol	107-19-7	1	2	-	-	-	-	x
beta-Propiolactone; see 1910.1013	57-57-8							
Propionic acid	79-09-4	10	30	-	-	-	-	-
Propoxur (Baygon)	114-26-1	-	0.5	-	-	-	-	-
n-Propyl acetate	109-60-4	200	840	250	1050	-	-	-
n-Propyl alcohol	71-23-8	200	500	250	625	-	-	-
n-Propyl nitrate	627-13-4	25	105	40	170	-	-	-
Propylene dichloride	78-87-5	75	350	110	510	-	-	-
Propylene glycol dinitrate	6423-43-4	0.05	0.3	-	-	-	-	-
Propylene glycol monomethyl ether	107-98-2	100	360	150	540	-	-	-
Propylene imine	75-55-8	2	5	-	-	-	-	x
Propylene oxide	75-56-9	20	50	-	-	-	-	-
Propyne; see Methyl acetylene	74-99-7							
Pyrethrum	8003-34-7	-	5	-	-	-	-	-
Pyridine	110-86-1	5	15	-	-	-	-	-
Quinone	106-51-4	0.1	0.4	-	-	-	-	-
Resorcinol	108-46-3	10	45	20	90	-	-	-
Rhodium (as Rh), metal fume and insoluble compounds	7440-16-6	-	0.1	-	-	-	-	-
Rhodium (as Rh), soluble compounds	7440-16-6	-	0.001	-	-	-	-	-
Ronnel	299-84-3	-	10	-	-	-	-	-
Rosin core solder pyrolysis products, as formaldehyde		-	0.1	-	-	-	-	-
Rotenone	83-79-4	-	5	-	-	-	-	-
Rouge								
Total dust		-	10	-	-	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Selenium compounds (as Se)	7782-49-2	-	0.2	-	-	-	-	-
Selenium hexafluoride (as Se)	7783-79-1	0.05	0.4	-	-	-	-	-

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		TWA		STEL (c)		CEILING		
		ppm (a)	mg/m <sup>3</sup> (b)	ppm (a)	mg/m <sup>3</sup> (b)	ppm (a)	mg/m <sup>3</sup> (b)	
Silica, amorphous, precipitated and gel	112926-00-8	-	6	-	-	-	-	-
Silica, amorphous, diatomaceous earth, containing less than 1% crystalline silica	61790-53-2	-	6	-	-	-	-	-
Silica, crystalline cristobalite respirable dust	14464-46-1	-	0.05	-	-	-	-	-
Silica, crystalline, quartz, respirable dust	14808-60-7	-	0.1	-	-	-	-	-
Silica, crystalline tripoli as quartz), respirable dust)	1317-95-9	-	0.1	-	-	-	-	-
Silica, crystalline tridymite respirable dust	15468-32-3	-	0.05	-	-	-	-	-
Silica, fused, respirable dust	60676-86-0	-	0.1	-	-	-	-	-
Silicates (less than 1% crystalline silica)								
Mica (respirable dust)	12001-26-2	-	3	-	-	-	-	-
Soapstone, total dust		-	6	-	-	-	-	-
Soapstone, respirable dust		3	-	-	-	-	-	-
Talc (containing asbestos): Use asbestos limit; see 1910.1001								
Talc (containing no asbestos), respirable dust	14807-96-6	-	2	-	-	-	-	-
Tremolite; see 1910.1101								
Silicon	7440-21-3							
Total dust		-	10	-	-	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Silicon carbide	409-21-2							
Total dust		-	10	-	-	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Silicon tetrahydride	7803-62-5	5	7	-	-	-	-	-
Silver, metal and soluble compounds (as Ag)	7440-22-4	-	0.01	-	-	-	-	-
Soapstone; see Silicates								
Sodium azide	26628-22-8							
(as HN <sub>3</sub> )		-	-	-	-	0.1	-	x
(as NaN <sub>3</sub> )		-	-	-	-	-	0.3	x
Sodium bisulfite	7631-90-5	-	05	-	-	-	-	-
Sodium fluoroacetate	62-74-8	-	0.05	-	0.15	-	-	x

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		TWA		STEL (c)		CEILING		
		ppm (a)	mg/m <sup>3</sup> (b)	ppm (a)	mg/m <sup>3</sup> (b)	ppm (a)	mg/m <sup>3</sup> (b)	
Sodium hydroxide	1310-73-2	-	-	-	-	-	2	-
Sodium metabisulfite	7681-57-4	-	5	-	-	-	-	-
Starch	9005-25-8							
Total dust		-	15	-	-	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Stibine	7803-52-3	0.1	0.5	-	-	-	-	-
Stoddard solvent	8052-41-3	100	525	-	-	-	-	-
Strychnine	57-24-9	-	0.15	-	-	-	-	-
Styrene	100-42-5	50	215	100	425	-	-	-
Subtilisins (Proteolytic enzymes) <sup>g</sup>	9014-01-1	-	-	-	-	-	0.00006 (60 min) <sup>g</sup>	-
Sucrose	57-50-1							
Total dust		-	15	-	-	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Sulfur dioxide	7446-09-5	2	5	5	13	-	-	-
Sulfur hexafluoride	2551-62-4	1000	6000	-	-	-	-	-
Sulfuric acid	7664-93-9	-	1	-	-	-	-	-
Sulfur monochloride	10025-67-9	-	-	-	-	1	6	-
Sulfur pentafluoride	5714-22-7	-	-	-	-	0.01	0.1	-
Sulfur tetrafluoride	7783-60-0	-	-	-	-	0.1	0.4	-
Sulfonyl fluoride	2699-79-8	5	20	10	40	-	-	-
Sulprofos	35400-43-2	-	1	-	-	-	-	-
Systox®; see Demeton	8065-48-3							
2,4,5-T	93-76-5	-	10	-	-	-	-	-
Talc; see Silicates								
Tantalum, metal and oxide dust	7440-25-7	-	5	-	-	-	-	-
TEDP (Sulfotep)	3689-24-5	-	0.2	-	-	-	-	x
Tellurium and compounds (as Te)	13494-80-9	-	0.1	-	-	-	-	-
Tellurium hexafluoride (as Te)	7783-80-4	0.02	0.2	-	-	-	-	-
Temephos	3383-96-8							
Total dust		-	10	-	-	-	-	-
Respirable fraction		-	5	-	-	-	-	-
TEPP	107-49-3	-	0.05	-	-	-	-	x
Terphenyls	26140-60-3	-	-	-	-	0.5	5	-
1,1,1,2-Tetrachloro-2,2-difluoroethane	76-11-9	500	4170	-	-	-	-	-
1,1,2,2-Tetrachloro 1,2-difluoroethane	76-12-0	500	4170	-	-	-	-	-

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		TWA		STEL (c)		CEILING		
		ppm (a)	mg/m <sup>3</sup> (b)	ppm (a)	mg/m <sup>3</sup> (b)	ppm (a)	mg/m <sup>3</sup> (b)	
1,1,2,2-Tetrachloro ethane	79-34-5	1	7	-	-	-	-	x
Tetrachoroethylene; see Perchloroethylene	127-18-4							
Tetrachloromethane; see Carbon tetrachloride	56-23-5							
Tetrachloronaphthalene	1335-88-2	-	2	-	-	-	-	x
Tetraethyl lead (as Pb)	78-00-2	-	0.075	-	-	-	-	x
Tetrahydrofuran	109-99-9	200	590	250	735	-	-	-
Tetramethyl lead (as Pb)	75-74-1	-	0.075	-	-	-	-	x
Tetramethyl succinonitrile	3333-52-6	0.5	3	-	-	-	-	x
Tetranitromethane	509-14-8	1	8	-	-	-	-	-
Tetrasodium pyrophosphate	7722-88-5	-	5	-	-	-	-	-
Tetryl (2,4,6-Trinitro-phenyl-methyl-nitramine)	479-45-8	-	1.5	-	-	-	-	x
Thallium, soluble compounds (as Tl)	7440-28-0	-	0.1	-	-	-	-	x
4,4'-Thiobis (6-tert-Butyl-m-cresol)	96-69-5							
Total dust		-	10	-	-	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Thioglycolic acid	68-11-1	1	4	-	-	-	-	x
Thionyl chloride	7719-09-7	-	-	-	-	1	5	-
Thiram	137-26-8	-	5	-	-	-	-	-
Tin, inorganic compounds (except oxides) (as Sn)	7440-31-5	-	2	-	-	-	-	-
Tin, organic compounds (as Sn)	7440-31-5	-	0.1	-	-	-	-	x
Tin oxide (as Sn)	7440-31-5	-	2	-	-	-	-	-
Titanium dioxide, total dust	13463-67-7	-	10	-	-	-	-	-
Toluene	108-88-3	100	375	150	560	-	-	-
Toluene-2,4-diisocyanate (TDI)	584-84-9	0.005	0.04	0.02	0.15	-	-	-
m-Toluidine	108-44-1	2	9	-	-	-	-	x
o-Toluidine	95-53-4	5	22	-	-	-	-	x
p-Toluidine	106-49-0	2	9	-	-	-	-	x
Toxaphene; see Chlorinated camphene								
Tremolite; see Silicates								
Tributyl phosphate	126-73-8	0.2	2.5	-	-	-	-	-
Trichloroacetic acid	76-03-9	1	7	-	-	-	-	-
1,2,4-Trichlorobenzene	120-82-1	-	-	-	-	5	40	-

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		TWA		STEL (c)		CEILING		
		ppm (a)	mg/m <sup>3</sup> (b)	ppm (a)	mg/m <sup>3</sup> (b)	ppm (a)	mg/m <sup>3</sup> (b)	
1,1,1-Trichloroethane; see Methyl chloroform	71-55-6							
1,1,2-Trichloroethane	79-00-5	10	45	-	-	-	-	-
Trichloroethylene	79-01-6	50	270	200	1080	-	-	x
Trichloromethane; see Chloroform	67-66-3							
Trichloronaphthalene	1321-65-9	-	5	-	-	-	-	x
1,2,3-Trichloropropane	96-18-4	10	60	-	-	-	-	-
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	1000	7600	1250	9500	-	-	-
Triethylamine	121-44-8	10	40	15	60	-	-	-
Trifluorobromomethane	75-63-8	1000	6100	-	-	-	-	-
Trimellitic anhydride	552-30-7	0.005	0.04	-	-	-	-	-
Trimethylamine	75-50-3	10	24	15	36	-	-	-
Trimethyl benzene	25551-13-7	25	125	-	-	-	-	-
Trimethyl phosphite	121-45-9	2	10	-	-	-	-	-
2,4,6-Trinitrophenyl; see Picric acid	88-89-1							
2,4,6-Trinitrophenylmethyl nitramine; see Tetryl	479-45-8							
2,4,6-Trinitrotoluene (TNT)	118-96-1	-	0.5	-	-	-	-	x
Triorthocresyl phosphate	78-30-8	-	0.1	-	-	-	-	x
Triphenyl amine	603-34-9-	-	5	-	-	-	-	-
Triphenyl phosphate	115-86-6-	-	3	-	-	-	-	-
Tungsten (as W)	7440-33-7							
Insoluble compounds		-	5	-	10	-	-	-
Soluble compounds		-	1	-	3	-	-	-
Turpentine	8006-64-2	100	560	-	-	-	-	-
Uranium (as U)	7440-61-1							
Soluble compounds		-	0.05	-	-	-	-	-
Insoluble compounds		-	0.2	-	0.6	-	-	-
n-Valeraldehyde	110-62-3	50	175	-	-	-	-	-
Vanadium	1314-62-1							
Respirable dust (as V <sub>2</sub> O <sub>5</sub> )			0.05					
Fume (as V <sub>2</sub> O <sub>5</sub> )		-	0.05	-	-	-	-	-
Vegetable oil mist								
Total dust		-	15	-	-	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Vinyl acetate	108-05-4	10	30	20	60	-	-	-
Vinyl benzene; see Styrene	100-42-5							
Vinyl bromide	593-60-2	5	20	-	-	-	-	-

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		TWA		STEL (c)		CEILING		
		ppm (a)	mg/m <sup>3</sup> (b)	ppm (a)	mg/m <sup>3</sup> (b)	ppm (a)	mg/m <sup>3</sup> (b)	
Vinyl chloride; see 1910.1017	75-01-4							
Vinyl cyanide; see Acrylonitrile	107-13-1							
Vinyl cyclohexene dioxide	106-87-6	10	60	-	-	-	-	x
Vinylidene chloride (1,1- Dichloroethylene)	75-35-4	1	4	-	-	-	-	-
Vinyl toluene	25013-15-4	100	480	-	-	-	-	-
VM & P Naphtha	8032-32-4	300	1350	400	1800	-	-	-
Warfarin	81-81-2	-	0.1	-	-	-	-	-
Welding fumes (total particulate)*		-	5	-	-	-	-	-
Wood dust, all soft and hard woods, except Western red cedar		-	5	-	10	-	-	-
Wood dust, western red cedar		-	2.5	-	-	-	-	-
Xylenes (o-, m-, p-isomers)	1330-20-7	100	435	150	655	-	-	-
m-Xylene alpha, alpha' diamine	1477-55-0	-	-	-	-	-	0.1	x
Xylidine	1300-73-8	2	10	-	-	-	-	x
Yttrium	7440-65-5	-	1	-	-	-	-	-
Zinc chloride fume	7646-85-7	-	1	-	2	-	-	-
Zinc chromate (as CrO <sub>3</sub> ); see 1910.1026. If the exposure limit in 1910.1026 is stayed or is otherwise not in effect, the exposure limit is a ceiling of 0.1 mg/m <sup>3</sup>	Varies with Compound							
Zinc oxide fume	1314-13-2	-	5	-	10	-	-	-
Zinc oxide	1314-13-2							
Total dust		-	10	-	-	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Zinc stearate	557-05-1							
Total dust		-	10	-	-	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Zirconium compounds (as Zr)	7440-67-7	-	5	-	10	-	-	-

\* As determined from breathing-zone air samples.

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

b. Milligrams of substance per cubic meter of air. When a numerical entry for a substance is in the mg/m<sup>3</sup> column and not in the ppm column, then the number in the mg/m<sup>3</sup> column is exact. When numerical entries for a substance are in both the



**TABLE Z-1-A.-LIMITS FOR AIR CONTAMINANTS**  
**Final Rule Limits Promulgated by OSHA in 1989 as changed thru 1992**

Where OSHA has promulgated substance specific standards since 1992,  
this table refers the user to the substance specific standard.

ppm and mg/m<sup>3</sup> columns, then the number in the ppm column is exact and the number in the m/m<sup>3</sup> column may be rounded off.

c. Duration is for 15 minutes, unless otherwise noted.

d. The final benzene standard in 1910.1028 applies to all occupational exposures to benzene except some subsegments of industry where exposures are consistently under the action level (i.e., distribution and sale of fuels, sealed containers and pipelines, coke production, oil and gas drilling and production, natural gas processing, and the percentage exclusion for liquid mixtures); for the excepted subsegments, the benzene limits in Table Z-2 apply.

e. Exposures under 10,000 ppm to be cited as *de minimus*.

f. The CAS number is for information only. Enforcement is based on the substance name. For an entry covering more than one metal compound measured as the metal, the CAS number for the metal is given—not the CAS numbers for the individual compounds.

g. Compliance with the subtilisins STEL is assessed by sampling with a high volume sampler (600-800 liters per minute) for at least 60 minutes.

h. The acetone STEL does not apply to the cellulose acetate fiber industry. It is in effect for all other sectors.

i. The TWA PEL of 5 mg/m<sup>3</sup> is not in effect as a result of reconsideration. Calcium hydroxide is covered by the exposure limits for particulates not otherwise regulated of 5 mg/m<sup>3</sup> respirable dust and 15 mg/m<sup>3</sup> total dust.

j. The TWA PEL of 5 mg/m<sup>3</sup> is not in effect as a result of reconsideration. The calcium oxide Transitional Limit of mg/m<sup>3</sup> remains in effect and employee exposures shall be kept below that level pursuant to the methods of compliance specified in 29 CFR 1910.1000(e).

k. The STEL of 0.1 mg/m<sup>3</sup> is not in effect as a result of reconsideration for the industrial sector of civilian manufacture and distribution of explosives and propellants for civilian use. The skin designation and the Transitional limits ceiling limit of 1 mg/m<sup>3</sup> remains in effect for this sector until completion of the reconsideration.

l. The STEL of 0.1 mg/m<sup>3</sup> is not in effect as a result of reconsideration for the industrial sector of civilian manufacture and distribution of explosives and propellants for civilian use. The skin designation and the Transitional limits ceiling limit of 2 mg/m<sup>3</sup> remains in effect for this sector until completion of the reconsideration.

m. Sampling for the carbon monoxide ceiling shall be averaged over 5 minutes but an instantaneous reading over 1500 ppm shall not be exceeded.