

**PERMISSIBLE LEVELS OF CERTAIN CHEMICAL SUBSTANCES IN WORK ENVIRONMENT**

Sl. No.	Substance	Permissible limits of exposure			
		Time- Weighted average concentration (TWA)	(TWA)	Short-term exposure limit (15 min.)	(STEL)
				PPm	mg/m <sup>3</sup>
1	2	3	4	5	6
1	Acetaldehyde	100	180	150	270
2	Acetic Acid	10	25	15	37
3	Acetone	750	1780	1000	2375
4	Acrolein	01	0.25	0.3	0.8
5	Acrylonitrile-skin (S.C)	2	4.5	-	-
6	Aldrin-skin	-	0.25	-	-
7	Allyl Chloride	1	3	2	6
8	Ammonia	0.25	18	35	27
9	Aniline-skin	2	10	-	-
10	Anisidine (O.P.isomers)-skin	0.1	0.5	-	-
11	Arsenic & Soluble compounds (as As)	-	0.2	-	-
12	Benzene (S.C)	10	30	-	-
13	Beryllium & Compounds (as Be) (S.C)	-	0.002	-	-
14	Boron trifluoride C	1	3	-	-
15	Bromine	0.1	0.7	0.3	2
16	Butane	800	1900	-	-
17	2-Butanone (Methyle ethyle Ketone MEK)	200	590	300	885
18	N-Butyl acetate	150	710	200	950
19	N-Butyl alcohol-skin-C	50	150	-	-
20	Sce/tert, Butyl acetate	200	950	-	-
21	Butyl Mercaptan	0.5	1.5	-	-
22	Cadmium-dust and salts (as Cd)	-	0.05	-	-
23	Calcium oxide	-	2	-	-
24	Carbaryl (Sevin)	-	5	-	-
25	Carbofuran (Furadan)	-	0.1	-	-

26	Carbon disulphide-skin	10	30	-	-
27	Carbon monoxide	50	55	400	440
28	Carbon tetrachloride-skin (S.C.)	5	30	-	-
29	Chlordane-skin	-	0.5	-	2
30	Chlorine	1	3	3	9
31	Chlorobenzene (monochlorobenzene)	75	350	-	-
32	Chloroform (S.C.)	10	50	-	-
33	bis-(Chloromethyl) ether (H.C.)	0.001	0.005	-	-
34	Chromic acid and chromates (as Cr) (Water soluble)	-	0.05	-	-
35	Chromous Salts (as Cr)	-	0.5	-	-
36	Copper fume	-	0.2	-	-
37	Cotton dust, raw	-	0.2	-	-
38	Cresoal, all isomers-skin	5	22	-	-
39	Cyanides (as Cn)-skin	-	5	-	-
40	Cyanogen	10	20	-	-
41	DDT (Dichlorodiphenyl Trichloroethane)	-	1	-	-
42	Demeton-skin	0.01	0.1	-	-
43	Diazinon-skin	-	0.1	-	-
44	Dibutyl Phthalate	-	5	-	-
45	Dichlorous (DDVP)-skin	-	1	-	-
46	Dieldrin-skin	-	0.25	-	-
47	Dinitrobenzene (all isomers)-skin	0.15	1	-	-
48	Dinitrotoluene-skin	-	1.5	-	-
49	Diphenyl (Biphenyl)	0.2	1.5	-	-
50	Endosulfan (Thiodan)- skin	-	0.1	-	-
51	Endrin-skin	-	0.1	-	-
52	Ethyl acetate	400	1400	-	-
53	Ethyl alcohol	1000	1900	-	-
54	Ethylamin	10	18	-	-
55	Fluorides (as F)	-	2.5	-	-
56	Fluorine	1	2	2	4

57	Formaldehyde (S.C.)	1.0	1.5	2	3
58	Formic Acid	5	9	-	-
59	Gasoline	300	900	500	1500
60	Hydrazine-skin (S.C.)	0.1	0.1	-	-
61	Hydrogen Chloride-C	5	7		
62	Hydrogen Cyanide skin-C	10	10	-	-
63	Hydrogen Fluoride (as F)-C	3	2.5	-	-
64	Hydrogen Peroxide	1	1.5	-	-
65	Hydrogen Sulphide	10	14	15	21
66	Iodine-C	0.1	1	-	-
67	Iron Oxide Fume (F0203) (as Fe)	-	5	-	-
68	Isoamyl acetate	100	525	-	-
69	Isoamyl alcohol	100	360	125	450
70	Isobutyl alcohol	50	150	-	-
71	Lead, inorg, dusts, dusts and fumes (as Pb)	-	0.15	-	-
72	Lindane-skin	-	0.5	-	-
73	Malathion-skin	-	10	-	-
74	Manganese dust and compounds (as (Mn)-C)	-	5	-	-
75	Manganese Fume (as Mn)	-	1	-	3
76	Mercury (as Hg)-skin				
	(i) Alkyle compounds	-	0.01	-	0.03
	(ii) All forms except alkyle vapour	-	0.05	-	-
	(iii) Aryle and inorganic compounds	-	0.01	-	-
77	Methyl alcohol (Methanol)- skin	200	260	250	310
78	Methyl cellosolve (2- methoxyethanol)-skin	5	16	-	-
79	Methyl isobutyl Ketone	50	205	75	300
80	Methyl Isocyanate-skin	0.02	0.05	-	-
81	Naphthalene	10	50	15	75
82	Nickel carbonyl (as Ni)	0.05	0.35	-	-
83	Nitric acid	2	5	4	10

84	Nitric Oxide	25	30	-	-
85	Nitrobenzene-skin	1	5	-	-
86	Nitrogen dioxide	3	6	5	10
87	Oil mist mineral	-	5	-	10
88	Ozone	0.1	0.2	0.3	0.6
89	Parathion-skin	-	0.1	-	-
90	Phenol-skin	5	19		
91	Phorate (Thimet)-skin	-	0.05	0.2	-
92	Phosgene (Carbonyl Chloride)	0.1	0.4	-	-
93	Phosphine	0.3	0.4	1	1
94	Phosphoric acid	-	1	-	3
95	Phosphorus (yellow)	-	0.1	-	-
96	Phosphorus penta- chloride	0.1	1	-	-
97	Phosphorus trichloride	0.2	1.5	0.5	3
98	Picric acid-skin	-	0.1	-	0.3
99	Pyridine	5	15	-	-
100	Silans (silicon tetrahydride)	5	7	-	-
101	Sodium hydroxide-C	-	2	-	-
102	Styrene, monomer (phanylethlene)	50	215	100	425
103	Sulphur dioxide	2	5	5	10
104	Sulphur hexafluoride	1000	6000	-	-
105	Sulphuric acid	-	1	-	-
106	Tetraethyl lead (as Pb) - Skin	-	0.1	-	-
107	Toluene (Toluol)	100	375	150	560
108	O-Toluidine-skin (S.C.)	2	9	-	-
109	Tributylphosohate	0.2	2.5	-	-
110	Trichloroethylene	50	270	200	1080
111	Uranium natural (as U)	-	0.2	-	0.6
112	Vinyl Chloride (H.C.)	5	10	-	-
113	Welding fumes	-	5	-	-
114	Xylene (O-m-P-isomers)	100	435	150	655

115	Zinc oxide				
	(i) Fume	-	5.0	-	10
	(ii) Dust (Total dust)	-	10.00	-	-
116	Zirconium compounds (as Zr)	-	5	-	10

Ppm3 Parts of vapour or gas per million parts of contaminated air by volume at 25.C and 760 mm of Hg.

mg/m<sup>2</sup> milligrams of substance per cubic metre of air.

\* Not more than 4 times a day with at least 60 min. interval between successive exposures.

\*\* Molecular weight

mg/m<sup>2</sup>= ----- x ppm  
24.45

G denotes ceiling limit.

Skin denotes potential contribution to the overall exposure by the cutaneous route including mucous membranes and eye.

S.C. denotes suspected human carcinogens.

H.C. denotes confirmed human carcinogens.

Substance Permissible time-weighted average concentration (TWA) (8 hours)

Silica, SiO<sub>2</sub>

(a) Crystalline

(i) Quartz

10600

(1) In term of dusts count ----- mppcm  
% Quartz+10

(2) 10

In term of respirable dust ----- mg/m<sup>2</sup>  
respirable Quartz+2

(3) 30

In term of total dust ----- mg/m<sup>2</sup>  
% Quartz+3

(ii) Cristobalite Half the limits given against quartz

	(iii) Triovmite	Half the limits given against quartz
	(iv) Silica, fused	Same limits as for quartz
	(v) Tripoli	Same limit as in formula in item (2) given against quartz
(b)	Amorphous Silicate	10mg/m <sup>3</sup> , Total dust
	Asbestos (H.C.)	*2 fibres/ml, greater than 5 $\mu$ m in length and less than 3 $\mu$ m in breadth
	Portland cement	10 mg/m <sup>3</sup> , Total dust containing less than 1% quartz
	Coal Dust	
		2 mg/m <sup>3</sup> , respirable dust fraction containing less than 5% quartz

mppcm-Million particles per cubic metre of air based on impinger samples counted by light- field techniques.

\*As determined by the membrane-fiter method at 400---

450 x magnification (4 mm objective) phase contrast illumination.

#### Respirable Dust:

Fraction passing a size-selector with the following characteristics:

Aerodynamic Diameter (u.m.) (Unit density sphere)	%passing sector
VI 2	90
2.5	75
3.5	50
5.0	25
10	0