

Appendix A.1 Comparison of OSHA permissible exposure limit (PEL) for common industrial materials, dusts, and fumes in 1989 and 1997^{a,s} (abstracted from US NIOSH, Dept. of Health and Human Services, 1989, 1997).

Industrial materials:

<u>substance (CAS number)</u>	<u>1989 PEL^t (PPM)</u>	<u>1997 PEL^t (PPM)</u>
acetaldehyde (75-07-0)	100	200
acetic acid (64-19-7)	10	10
acetic anhydride (108-24-1)	5 (ceiling)	5
acetone (67-64-1)	750	1000
acrolein (107-02-8)	0.1	0.1
allyl alcohol (107-18-6)	2 ^d	2
ammonia (7664-41-7)	35 (STEL)	50
aniline (62-53-3)	2 ^d	5 ^d
benzene (71-43-2)	10 (ceiling)	1, STEL=5
boron trifluoride (7637-07-2)	1 (ceiling)	1 (ceiling)
n-butyl acetate (123-86-4)	150	150
n-butyl alcohol (71-36-3)	50 (ceiling)	100
n-butyl mercaptan (109-79-5)	0.5	10
n-butylamine, butylamine (109-73-9)	5 (ceiling) ^d	5 (ceiling) ^d
carbon disulfide (75-15-0)	4 (ceiling)	20
carbon monoxide (630-08-0)	35	50, ceiling=200
carbon tetrachloride (56-23-5)	2 (ceiling)	10, ceiling=25
chlorine (7782-50-5)	0.5	1 (ceiling)
chlorobenzene (108-90-7)	75	75
chloroform (67-66-3)	2	50 (ceiling)
cyclohexane (110-82-7)	300	300
decaborane (17702-41-9)	0.05 ^d	0.05 ^d
diazomethane (334-88-3)	0.2	0.2
diborane (19287-45-7)	0.1	0.1
dichloroethyl ether (111-44-4)	5 ^d	15 ^d (ceiling)
diethylamine (109-89-7)	10	25
diisopropylamine (108-18-9)	5 ^d	5 ^d
dimethylamine (124-40-3)	10	10
dioxane (123-91-1)	25 ^d	100 ^d
diphenyl (92-52-4)	0.2	0.2
ethyl acetate (141-78-6)	400	400
ethyl acrylate (140-88-5)	5 ^d	25 ^d
ethyl alcohol (64-17-5)	1000	1000
ethyl benzene (100-41-4)	100	100
ethyl chloride (75-00-3)	1000	1000
ethyl formate (109-94-4)	100	100
ethyl mercaptan (75-08-1)	0.5	10 (ceiling)
ethylamine (75-04-7)	10	10
ethylene dibromide (106-93-4)	#	20, ceiling=30
ethylene dichloride (107-06-2)	1	50, ceiling=1000
ethylene oxide (75-21-8)	1	1
fluorine (7782-41-4)	0.1	0.1
formaldehyde (50-00-0)	3 (ceiling)	0.75, STEL=2
formic acid (64-18-6)	5	5
furfural (98-01-1)	2 ^d	5 ^d

Appendix A.1 (continued)

substance (CAS number)	1989 PEL¹ (PPM)	1997 PEL¹ (PPM)
n-heptane (142-82-5)	400	500
hexachloroethane (67-72-1)	1 ^d	1 ^d
n-hexane (110-54-3)	50	500
hydrazine (302-01-2)	0.1 ^d	1 ^d
hydrogen bromide (10035-10-6)	3 (ceiling)	3
hydrogen chloride (7647-01-0)	5 (ceiling)	5 (ceiling)
hydrogen cyanide (74-90-8)	4.7 (STEL) ^d	10 ^d
hydrogen fluoride (7664-39-3)	3	3
hydrogen peroxide (7722-84-1)	1	1
hydrogen sulfide (7783-06-4)	10	20 (ceiling)
iodine (7553-56-2)	0.1 (ceiling)	0.1 (ceiling)
isobutyl acetate (110-19-0)	150	150
isobutyl alcohol (78-83-1)	50	100
isopropyl acetate (108-21-4)	250	250
isopropyl alcohol (67-63-0)	400	400
isopropyl ether (108-21-3)	500	500
mercury, vapor (7439-97-6)	0.05 mg/m ³	0.1 mg/m ³ (ceiling)
methacrylic acid (79-41-4)	20	0, NIOSH=20 ^d
methyl acetate (79-20-9)	200	200
methyl acrylate (96-33-3)	10 ^d	10 ^d
methyl alcohol (67-56-1)	200	200
methyl bromide (74-83-9)	5 ^d	5 ^d (ceiling)
methyl chloride (74-87-3)	100	100, ceiling=200
methyl ethyl ketone, 2-butanone (78-93-3)	200	200
methyl formate (107-31-3)	100	100
methyl iodide ((74-88-4)	2 ^d	5 ^d
methyl isocyanate (624-83-9)	0.02 ^d	0.02 ^d
methyl mercaptan (74-93-1)	0.5	10 (ceiling)
methylamine (74-89-5)	10	10
methylene chloride (75-09-2)	#	25, STEL=125
naphthalene (91-20-3)	10	10
nickel carbonyl (13463-39-3)	0.001	0.001
nitric acid (7697-37-2)	2	2
nitric oxide (10102-43-9)	25	25
nitrobenzene (98-95-3)	1 ^d	1 ^d
nitroethane (79-24-3)	100	100
nitrogen dioxide (10102-44-0)	1 (STEL)	5 (ceiling)
nitromethane (75-52-5)	100	100
o-nitrotoluene (88-72-2)	2 ^d	5 ^d
octane (111-65-9)	300	500
ozone (10028-15-6)	0.1	0.1
pentaborane (19624-22-7)	0.005	0.005
perchloroethylene, tetrachloroethylene (127-18-4)	25	100, ceiling=200
phenol (108-95-2)	5 ^d	5 ^d
phosgene (75-44-5)	0.1	0.1
phosphoric acid (7664-38-2)	1 mg/m ³	1 mg/m ³
picric acid (88-89-1)	0.1 ^d mg/m ³	0.1 ^d mg/m ³
n-propyl acetate (109-50-4)	200	200

Appendix A.1 (continued)

<u>substance (CAS number)</u>	<u>1989 PEL¹ (PPM)</u>	<u>1997 PEL¹ (PPM)</u>
n-propyl alcohol (71-23-8)	200	200
propylene oxide (75-56-9)	20	100
pyridine (110-86-1)	5	5
styrene, monomer (100-42-5)	50	100, ceiling=200
sulfur dioxide (7446-09-5)	2	5
sulfuric acid (7664-93-9)	1 mg/m ³	1 mg/m ³
toluene (108-88-3)	100	200, ceiling=300
trichloroethylene (79-01-6)	50	100, ceiling=200
1, 2, 3-trichloropropane (96-18-4)	10	50
turpentine (8006-64-2)	100	100
o-xylene (95-47-6)	100	100

Industrial dusts and fumes:

<u>substance (CAS number)</u>	<u>1989 PEL (mg/m³)</u>	<u>1997 PEL (mg/m³)</u>
chromium metal (7440-47-3)	1	1
coal dust, respirable fraction		
SiO ₂ <5% by mass	2	2.4/(%SiO ₂ + 2)
SiO ₂ >5% by mass	0.1	10/(%SiO ₂ + 2)
cobalt metal dust and fume (7440-48-4)	0.05	0.1
copper		
dust (7440-50-8)	1	1
fume (7440-50-8)	0.1	0.1
grain dust (oat, wheat, barley)	10	10
graphite respirable dust (7782-42-5)	2.5	2.5 (NIOSH)
gypsum, (7778-18-9)		
respirable dust	5	5
total dust	15	15
iron oxide, total dust (1309-37-1)	10	10
kaolin		
respirable dust	5	5
total dust	10	15
limestone, total respirable dust (1317-67-3)	15	15
magnesium oxide, total dust (1309-48-4)	10	15
manganese fume (7439-96-5)	1	5 (ceiling)
marble (1317-65-3)		
respirable dust	5	5
total dust	15	15
molybdenum, insoluble compounds (7439-98-7)		
respirable dust	5	-
total dust	10	15
nickel, metal dust (7440-02-0)		
insoluble compounds	1	-
soluble compounds	0.1	-
oil mist, mineral	5	5
particulates, not otherwise regulated		
respirable dust	5	5
total dust	15	15

Appendix A.1 (continued)

substance (CAS number)	1989 PEL (mg/m³)	1997 PEL (mg/m³)
platinum (7440-06-4)		
metal	1	none
soluble salts	0.002	0.002
Portland cement, (65997-15-1)		
respirable dust	5	5
total dust	10	15
rhodium (7440-16-6)		
insoluble compounds	0.1	0.1
soluble compounds	0.001	0.001
selenium (7782-49-2)	0.2	0.2
silica		
amorphous, crystalline silica < 1% (68855-54-9)	6	-
cristobalite silica, respirable quartz (14464-46-1)	0.05	5/(%SiO ₂ by mass+2)
cristobalite silica, total quartz (14464-46-1)	-	15/(%SiO ₂ by mass+2)
crystalline silica, respirable quartz (14808-60-7)	0.1	10/(%SiO ₂ by mass+2)
crystalline silica, total quartz (14808-60-7)	-	30/(%SiO ₂ by mass+2)
crystalline tripoli, respirable (1317-95-9)	0.1	-
fused (60676-86-0)	0.1	-
tridymite silica, respirable quartz (15468-32-3)	0.05	5/(%SiO ₂ by mass+2)
tridymite silica, total quartz (15468-32-3)	-	15/(%SiO ₂ by mass+2)
silicon, (7440-21-3)		
respirable dust	5	5
total dust	10	15
silver, metal (7440-22-4)	0.01	0.01
tin		
organic compounds (7440-31-5)	0.1	0.1
oxide (7440-31-5)	2	-
tungsten, soluble compounds (7440-33-1)	1	-
vanadium, respirable dust (1314-62-1)	0.05	0.5 (ceiling)
vegetable oil mist		
respirable dust	5	5
total dust	15	15
wood dust		
general	5	-
respirable dust	-	5
total dust	-	15
western red cedar	2.5	-
zinc oxide fume, (1314-13-2)		
respirable dust	5	5
total dust	10	15
zirconium compounds (7440-67-7)	5	5

^s see US Dept. of Labor (1989, 1997) for ceiling and maximum transitory values

[#] in process of rulemaking at the time

^a see Appendix A.20 for PEL of additional materials; note that PEL and TLV are reviewed on a regular basis and readers should always use currently approved values

^d denotes additional entry through the skin

^t TWA (time weighted average) PEL is assumed unless indicated otherwise