

OEHHA Acute, 8-hour and Chronic Reference Exposure

28-Jun-16

All OEHHA Acute, 8-hour and Chronic Reference Exposure Levels (chRELs) as of June 2016

[Documentation available in the Air Toxics Hot Spots Program Guidance Manual for the Preparation of Health Risk Assessments](#)

OEHHA Acute, 8-hour and Chronic Reference Exposure Level (REL) Summary ¹					
Substance	REL type ^[1]	Inhalation REL	Oral REL	Hazard Index	Species ^[2]
		(ug/m ³)	(ug/kg BW-day)	Target Organs	
Acetaldehyde (75-07-0)	A	470 ^[5]		Eyes; respiratory system (sensory irritation)	H
	8	300 ^[4,5]		Respiratory system	R
	C	140 ^[4,5]		Respiratory system	R
Acrolein (107-02-8)	A	2.5 ^[5]		Eyes, respiratory system (sensory irritation)	H
	8	0.7 ^[5]		Respiratory system	R
	C	0.35 ^[5]		Respiratory system	R
Acrylic Acid (79-10-7)	A	6,000		Respiratory system; eyes	R
Acrylonitrile (107-13-1)	C	5 ^[4]		Respiratory system	R
Ammonia (7664-41-7)	A	3200 ^[4]		Respiratory system; eyes	H
	C	200		Respiratory system	H
Arsenic (7440-38-2) & inorganic arsenic compounds (including arsine)	A	0.20 ^[5]		Development; cardiovascular system; nervous system	M
	8	0.015 ^[5]		Development; cardiovascular system; nervous system; respiratory system; skin	H
	C	0.015 ^[5]	0.0035 ^[5]	<i>Inhalation & oral:</i> Development; cardiovascular system; nervous system; respiratory system; skin	H
Benzene (71-43-2)	A	27		Developmental; Immune system; Hematologic system	M
	8	3		Hematologic system	H
	C	3		Hematologic system	H
Benzyl Chloride(100-44-7)	A	240		Respiratory system; eyes	M, R

Beryllium & beryllium compounds (7440-41-7)	C	0.007	2	Inhalation: Respiratory system; immune system Oral: Alimentary system (Gastrointestinal tract)	H
Butadiene (106-99-0)	A	660[4,5]		Development	M
	8	9[4,5]		Reproductive system	M
	C	2[4,5]		Reproductive system	M
Cadmium & cadmium compounds (7440-43-9)	C	0.02	0.5	Inhalation: Kidney; respiratory system Oral: kidney	H
Carbon disulfide (75-15-0)	A	6,200		Reproductive/ Development; nervous system	R
	C	800[4]		Nervous system; reproductive system	H
Carbon monoxide (630-08-0)	A	23,000		Cardiovascular system	H
Caprolactam (105-60-2)	A	50		Eyes (sensory irritation)	H
	8	7		Respiratory system	R
	C	2.2		Respiratory system	R
Carbon tetrachloride (56-23-5)	A	1,900		Alimentary system (liver); Reproductive/ Developmental; nervous system	R
	C	40		Alimentary and nervous systems; development	GP
Chlorinated dibenzo-p dioxins and dibenzofurans	C	0.00004	1 x 10 ⁻⁵	Inhalation and Oral.	R
Unspeciated mixtures treated as 2,3,7,8-tetrachlorodibenzo-p-dioxin (1746-01-6)				Alimentary (liver) reproductive, endocrine, respiratory	
Chlorine (7782-50-5)	A	210		Respiratory system; eyes	H
	C	0.2[4]		Respiratory system	R
Chlorine dioxide (10049-04-4)	C	0.6		Respiratory system	R
Chlorobenzene (108-90-7)	C	1,000		Alimentary system (liver); kidney; reproductive system	R
Chloroform (67-66-3)	A	150		Reproductive/ Developmental; respiratory system; nervous system	R
	C	300		Alimentary system; kidney; development	R

Chloropicrin (76-06-2)	A	29		Respiratory system; eyes	M
	C	0.4[4]		Respiratory system	M
Chromic trioxide (as chromic acid mist)	C	0.002	20	Inhalation: Respiratory system Oral: Hematologic system	H
Chromium (hexavalent) (18540-29-9) & soluble hexavalent chromium compounds (except chromic trioxide)	C	0.2[4]	20	Inhalation: Respiratory system Oral: Hematologic system	R
Copper and compounds	A	100		Respiratory system	H
Cresol mixtures (1319-77-3)	C	600		Nervous system	R
Dichlorobenzene (1,4-) (106-46-7)	C	800		Nervous and respiratory; alimentary systems (liver); kidney	R
Dichloroethylene (1,1) (75-35-4)	C	70		Alimentary system (liver)	GP
Diesel Exhaust	C	5[3]		Respiratory system	R
Diethanolamine (111-42-2)	C	3		Respiratory and hematologic systems	R
Dimethylformamide (N,N-) (68-12-2)	C	80		Alimentary (liver) and respiratory systems	H
Dioxane (1,4-) (123-91-1)	A	3,000		Respiratory system; eyes	H
	C	3,000		Alimentary system; kidney; cardiovascular system	R
Epichlorohydrin (106-89-8)	A	1,300		Respiratory system; eyes	H
	C	3		Respiratory system; eyes	R
Epoxybutane (1,2-) (106-88-7)	C	20		Respiratory system; cardiovascular system	M
Ethylbenzene(100-41-4)	C	2,000		Alimentary system (liver); kidney; endocrine system; development	M, R
Ethyl chloride (75-00-3)	C	30,000		Development; alimentary system (liver)	M
Ethylene dibromide (106-93-4)	C	0.8		Reproductive system	H
Ethylene dichloride (107-06-2)	C	400		Alimentary system (liver)	R
Ethylene glycol (107-21-1)	C	400		Respiratory system; kidney; development	H
Ethylene glycol monobutyl ether (111-76-2)	A	14,000		Respiratory system; eyes	H

Ethylene glycol monoethyl ether (110-80-5)	A	370		Reproductive/Development	R
	C	70		Reproductive system; hemotologic system	Rb
Ethylene glycol monoethyl ether acetate (111-15-9)	A	140		Reproductive/Development; nervous system	R
	C	300		Development	Rb
Ethylene glycol monomethyl ether (109-86-4)	A	93		Reproductive/Development	R
	C	60		Reproductive system	Rb
Ethylene glycol monomethyl ether acetate (110-49-6)	C	90		Reproductive system	Rb
Ethylene oxide (75-21-8)	C	30		Nervous system	R
Fluorides (except Hydrogen Fluoride - listed below separately)	C	13 ^[4]	40	Inhalation: Bone and teeth; respiratory system	H
				Oral: Bone and teeth	
Formaldehyde (50-00-0)	A	55 ^[5]		Eyes (Sensory irritation)	H
	8	9 ^[5]		Respiratory system	H
	C	9 ^[5]		Respiratory system	H
Glutaraldehyde (111-30-8)	C	0.08 ^[4]		Respiratory system	M
Hexane (n-)(110-54-3)	C	7000		Nervous system	H
Hydrazine (302-01-2)	C	0.2		Alimentary system (liver); endocrine system	Ha
Hydrogen chloride (7647-01-0)	A	2,100		Respiratory system; eyes	H
	C	9		Respiratory system	H
Hydrogen cyanide (74-90-8)	A	340		Nervous system	H
	C	9		Nervous system; endocrine system; cardiovascular system	H
Hydrogen fluoride (7664-39-3)	A	240		Respiratory system; eyes	H
	C	14 ^[4]	40	Inhalation: Bone and teeth; respiratory system (See "fluorides" summary)	H
Oral: Bone and teeth					
Hydrogen selenide (7783-07-5)	A	5		Respiratory system; eyes	GP
Hydrogen sulfide (7783-06-4)	A	42		Nervous system	H
	C	10		Respiratory system	M
Isophorone (78-59-1)	C	2,000		Development; alimentary system (liver)	R, M

Isopropanol (67-63-0)	A	3,200		Eyes; respiratory system	H
	C	7,000		Kidney; development	R, M
Maleic anhydride (108-31-6)	C	0.7 ^[4]		Respiratory system	R,Ha, Mk
Manganese (7439-96-5) & manganese compounds	8	0.17 ^[4,5]		Nervous system	H
	C	0.09 ^[4,5]		Nervous system	H
Mercury (7439-97-6) & inorganic mercury compounds	A	0.6 ^[5]		Nervous system; development	R
	8	0.06 ^[5]		Nervous system; development; kidney	H
	C	0.03 ^[5]	0.16 ^[5]	Inhalation & Oral: Nervous system; development; kidney	H
Methanol (67-56-1)	A	28,000		Nervous system	H
	C	4,000 ^[4]		Development	M
Methyl bromide (74-83-9)	A	3900		Nervous system; respiratory system; Reproductive/development	H
	C	5		Respiratory system; nervous system; development	R
Methyl chloroform (71-55-6)	A	68,000		Nervous system	H
	C	1000		Nervous system	Gb
Methylene chloride (75-09-2)	A	14,000		Cardiovascular system; Nervous system	H
	C	400		Cardiovascular system; nervous system	H
Methylene dianiline(4,4'-) (101-77-9)	C	20		Eyes; alimentary system (liver)	GP
Methylene diphenyl isocyanate (101-68-8) and polymeric methylene diphenyl diisocyanate (9016-87-9)	A	12 ^[5]		Respiratory system	R
	8	0.16 ^[5]		Respiratory system	R
	C	0.08 ^[5]		Respiratory system	R
Methyl ethyl ketone (78-93-3)	A	13,000		Respiratory system; eyes	H
Methyl isocyanate (624-83-9)	C	1		Respiratory system; reproductive system	R
Methyl t-butyl ether (1634-04-4)	C	8,000		Kidney; eyes; alimentary system (liver)	R
Naphthalene (91-20-3)	C	9		Respiratory system	H
Nickel & nickel compounds (except nickel	A	0.2 ^[5]		Immune system	M
	8	0.06 ^[5]		Respiratory, immune systems	R

Nickel & nickel compounds (except nickel oxide for chronic inhalation exposures) (Inhalation concentrations as µg Ni/m ³ ; oral dose as µg Ni/kg-day)	C	0.014 ^[5]	11 ^[5]	Inhalation: Respiratory system; hematologic system Oral: Development	R
Nickel oxide (1313-99-1) (Inhalation concentration as µg Ni/m ³ ; oral dose as µg Ni/kg-day)	C	0.02 ^[5]	11 ^[5]	Inhalation: Respiratory system Oral: Development	M R
Nitric acid (7697-37-2)	A	86		Respiratory system	H
Nitrogen dioxide (10102-44-0)	A	470		Respiratory system	H
Ozone (10028-15-6)	A	180		Respiratory system; eyes	H
Perchloroethylene (127-18-4)	A	20,000		Nervous system; respiratory system; eyes	H
(syn. Tetrachloroethylene)[3]	C	35		Kidney; alimentary system (liver)	M
Phenol (108-95-2)	A	5,800		Respiratory system; eyes	H
	C	200		Alimentary system; cardiovascular system; kidney; nervous system	R
Phosgene (75-44-5)	A	4		Respiratory system	R
Phosphine (7803-51-2)	C	0.8		Respiratory system; alimentary system (liver); nervous system; kidney; hematologic system	M
Phosphoric acid (7664-38-2)	C	7 ^[4]		Respiratory system	R
Polychlorinated biphenyls (PCBs)	C	-	-	Inhalation & Oral: Alimentary (liver) reproductive, endocrine, respiratory, hematologic systems; development	R
Individual congeners evaluated using TEF methodology, relative to as 2,3,7,8-tetrachlorodibenzo-p-dioxin (see Appendix C in the TSD for Cancer Potency Factors)					
Phthalic anhydride (85-44-9)	C	20		Respiratory system	H
Propylene(115-07-1)	C	3,000		Respiratory system	R
Propylene glycol monomethyl ether (107-98-2)	C	7,000		Alimentary system (liver)	R
Propylene oxide (75-56-9)	A	3,100		Respiratory system; eyes; reproductive/development	H
	C	30		Respiratory system	R
Selenium and selenium compounds (other than hydrogen selenide)	C	20	5	Inhalation & oral: Alimentary system (liver); cardiovascular system; nervous system	H
Silica (crystalline, respirable)	C	3 ^[4]		Respiratory system	H
Sodium hydroxide (1310-93-2)	A	8		Respiratory system; eyes; skin	H

Styrene (100-42-5)	A	21,000		Respiratory system; eyes; reproductive/development	H
	C	900 ^[4]		Nervous system	H
Sulfates	A	120		Respiratory system	H
Sulfur dioxide (7446-09-5)	A	660		Respiratory system	H
Sulfuric acid (7664-93-9) [& oleum, acute only]	A	120		Respiratory system	H
	C	1		Respiratory system	Mk
Toluene (108-88-3)	A	37,000		Respiratory, nervous systems; eyes reproductive/development	H
	C	300		Nervous system; respiratory system; development	R
Toluene diisocyanates: 2,4- (584-84-9) and 2,6- (91-08-7) isomers and mixed isomers (26471-62)	A	2 ^[5]		Respiratory system	H
	8	0.015 ^[5]		Respiratory system	H
	C	0.008 ^[5]		Respiratory system	H
Trichloroethylene (79-01-6)	C	600		Nervous system; eyes	H
Triethylamine (121-44-8)	A	2,800		Nervous system; eyes	H
	C	200		Eyes	R
Vanadium pentoxide(1314-62-1)	A	30		Respiratory system; eyes	H
Vinyl acetate (108-05-4)	C	200		Respiratory system	R, M
Vinyl chloride (75-01-4)	A	180,000		Nervous system; respiratory system; eyes	H
Xylenes: technical mixture (1330-20-7) and o-xylene (95-47-6), m-xylene (108-38-3) and p-xylene (106-42-3) isomers.	A	22000		Nervous & respiratory systems; eyes	H
	C	700		Nervous & respiratory systems; eyes	H