

## HESIS Recommendations to Cal/OSHA for New and Revised Permissible Exposure Limits for Workplace Chemicals—July 2007

	Chemical/ Agent	Health Hazard <sup>a</sup>	Cal/OSHA PEL	Cancer Unit Risk Value <sup>b</sup> (mg/m <sup>3</sup> ) <sup>-1</sup>	Estimated Excess Lifetime Cancer Risk <sup>c</sup>	Estimated Excess Cancer Cases Per 1,000 Workers at Cal/OSHA PEL	HESIS Proposed PEL <sup>d</sup>	NIOSH REL <sup>e</sup>	ACGIH TLV	ACGIH TLV Basis <sup>f</sup> ; Carcinogen Classification	Use / Other Info <sup>g</sup>
1	Acetaldehyde <sup>h</sup> 75-07-0	Cancer	25 ppm C 45 mg/m <sup>3</sup>	2.7 x 10 <sup>-3</sup>	2.4 x 10 <sup>-2</sup>	24	1 ppm	Ca <sup>i</sup>	25 ppm C	Eye & URT <sup>j</sup> irritation; A3 <sup>k</sup>	Flavoring chemical
2	Benzyl chloride 100-44-7	Cancer	1 ppm 5 mg/m <sup>3</sup>	4.9 x 10 <sup>-2</sup>	4.8 x 10 <sup>-2</sup>	48	0.02 ppm	1 ppm C	1 ppm	Eye, skin & URT irritation; A3	Chemical intermediate in mfg. of dyes, plasticizers, etc.
3	1-Bromopropane 106-94-5 See footnote 1	Develop; male, female repro. damage	none	NA	NA	NA	3 ppm Skin NTP CERHR QRA & NIOSH (skin notation) (basis)	none	none	NA	Solvent; HESIS Alert & PEL proposal (2003)
4	Ceramic fibers (airborne of respirable size)	Cancer	none	--	--	NA	0.5 f/cc NIOSH QRA (basis)	0.5 f/cc Ca	0.2 f/cc	Pulmonary fibrosis; pulmonary function; A2	Insulation; asbestos substitute
5	Di- <i>n</i> - butyl phthalate 84-74-2	Develop.; male, female repro. damage	5 mg/m <sup>3</sup>	NA	NA	NA	Data not yet available to calculate a PEL based on Prop 65 health hazards	5 mg/m <sup>3</sup>	5 mg/m <sup>3</sup>	Testicular damage; eye & URT irritation	Plasticizer in nail polish, cosmetics; solvent for dyes
6	<i>p</i> - Dichlorobenzene <sup>h</sup> 106-46-7	Cancer	10 ppm 60 mg/m <sup>3</sup>	1.1 x 10 <sup>-2</sup>	12.9 x 10 <sup>-2</sup>	129	0.1 ppm	Ca	10 ppm	Eye irritation; kidney damage; A3	Insecticide and fumigant
7	1,1-Dichloroethane 75-34-3	Cancer	100 ppm 400 mg/m <sup>3</sup>	1.6 x 10 <sup>-3</sup>	12.5 x 10 <sup>-2</sup>	125	1 ppm	100 ppm	100 ppm	URT & eye irritation; liver & kidney damage A4	Chemical intermediate; grain fumigant; solvent



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15	Naphthalene 91-20-3	Cancer	10 ppm 52 mg/m <sup>3</sup>	3.4 x 10 <sup>-2</sup>	3.3 x 10 <sup>-1</sup>	330	0.03 ppm	10 ppm	10 ppm Skin	Hematologic effects; URT & eye irritation; eye damage; <b>A4</b>	Production of phthalic anhydride, insecticides, other materials
16	Nickel & nickel compounds 7440-02-0 (Elemental/metal)  Nickel subsulfide 12035-72-2	Cancer	1 mg/m <sup>3</sup> (metal)  1 mg/m <sup>3</sup> (insoluble)  0.1 mg/m <sup>3</sup> (soluble)	2.6 x 10 <sup>-1</sup>	5.1 x 10 <sup>-2</sup>	51	0.019 mg/m <sup>3</sup> Nickel & all compounds <sup>3</sup>	0.015 mg/m <sup>3</sup> Nickel & all nickel cpds. <b>Ca</b>	1.5 mg/m <sup>3</sup> (metal) 0.1 mg/m <sup>3</sup> (soluble) 0.2 mg/m <sup>3</sup> (insoluble) 0.1 mg/m <sup>3</sup> (nickel subsulfide)	Dermatitis; pneumoconiosis; <b>A5</b> Lung damage; nasal cancer; <b>A4</b> Lung cancer; <b>A1</b>  Lung cancer; <b>A1</b>	Production of stainless steel, corrosion- & heat-resistant alloys; electroplating; coinage
17	1,1,2,2- Tetrachloroethane 79-34-5	Cancer	1 ppm 6.9 mg/m <sup>3</sup> Skin	5.8 x 10 <sup>-2</sup>	8.0 x 10 <sup>-2</sup>	80	0.01 ppm Skin	1 ppm Skin <b>Ca</b>	1 ppm Skin	Liver damage; <b>A3</b>	Solvent used for cleaning & extraction
18	1,1,2- Trichloroethane (Vinyl trichloride) 79-00-5	Cancer	10 ppm 45 mg/m <sup>3</sup> Skin	1.6 x 10 <sup>-2</sup>	1.4 x 10 <sup>-2</sup>	14	0.7 ppm Skin	10 ppm Skin <b>Ca</b>	10 ppm Skin	CNS impairment; liver damage	Production of vinylidene chloride; solvent
19	Trichloroethylene <sup>h</sup> 79-01-6	Cancer	25 ppm 135 mg/m <sup>3</sup>	2.0 x 10 <sup>-3</sup>	5.3 x 10 <sup>-2</sup>	53	0.50 ppm	<b>Ca</b>	10 ppm	CNS impairment; cognitive decrements; renal toxicity; <b>A2</b>	Solvent; contained in aerosol products, e.g., film cleaners, office cleaners, etc.

- a. Identified health hazards for the substance on the Cal/EPA Office of Environmental Health Hazard Assessment (OEHHA) Proposition 65 List at [http://www.oehha.ca.gov/prop65/prop65\\_list/files/060107LST.pdf](http://www.oehha.ca.gov/prop65/prop65_list/files/060107LST.pdf)
- b. Except as noted (#12), unit risk values are from Cal/EPA OEHHA Air Toxics Hot Spots Program Risk Assessment Guidelines, May 2005 at [http://www.oehha.ca.gov/air/hot\\_spots/pdf/May2005Hotspots.pdf](http://www.oehha.ca.gov/air/hot_spots/pdf/May2005Hotspots.pdf)

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- c. Estimated excess lifetime cancer risk = PEL x 10/20 x 250/365 x 40/70 x unit risk value to adjust for differences between occupational and environmental exposures. Workers inhale 10 m<sup>3</sup> instead of 20 m<sup>3</sup>/day of a chemical, are exposed 250 days instead of 365 days, and work for approximately 40 years.
- d. HESIS Proposed PEL = Cal/OSHA PEL ÷ estimated excess cancer cases per 1,000 workers (1/1,000 cancer risk)
- e. National Institute for Occupational Safety and Health (NIOSH) Reference Exposure Levels (RELs) taken from the NIOSH Pocket Guide to Chemical Hazards, 2005 at <http://www.cdc.gov/niosh/npg/>
- f. ACGIH 2007 TLVs® and BEIs® Signature Publications
- g. Taken primarily from ACGIH Documentation of TLVs and National Toxicology Program (NTP) 11<sup>th</sup> Report on Carcinogens at <http://ntp.niehs.nih.gov/ntp/roc/toc11.html>.
- h. Chemicals reviewed by a 1997 Cal/OSHA 5155 Advisory Committee for which the Committee issued a “Carcinogen Position Statement” available at [www.dir.ca.gov/oshsb/aircontaminant2.html](http://www.dir.ca.gov/oshsb/aircontaminant2.html). The Committee recognized that the chemical had been identified as a carcinogen by NTP and /or the International Agency for Research on Cancer (IARC), but recommended PELs based on non-cancer health endpoints due, in part, to lack of resources to conduct quantitative risk assessments.
- i. “Ca”= Any substance that NIOSH considers a potential carcinogen. Under the “old” NIOSH carcinogen policy, “lowest feasible concentration” was recommended for carcinogens instead of numerical RELs. A “new” carcinogen policy was adopted in 1995 which specifies adoption of numerical RELs, however the 2005 Pocket Guide still reflects the “old” policy. See <http://www.cdc.gov/niosh/npg/> for additional information.
- j. Abbreviations: **URT**=upper respiratory tract; **mfg.**=manufacture; **develop.**=developmental; **repro.**=reproductive; **CERHR**=Center for Evaluation of Risks to Human Reproduction; **QRA**=quantitative risk assessment; **HESIS**=Hazard Evaluation System & Information Service; **OEL**=occupational exposure limit; **CNS**=central nervous system; **MeCl**=methylene chloride.
- k. ACGIH Carcinogen Designations: A1=*Confirmed Human Carcinogen*; A2=*Suspected Human Carcinogen*; A3=*Confirmed Animal Carcinogen with Unknown Relevance to Humans*; A4=*Not Classifiable as a Human Carcinogen*; A5=*Not Suspected as a Human Carcinogen*. See ACGIH 2007 TLVs® and BEIs® Signature Publications for additional information on the carcinogen classifications.
- l. Green shading denotes substances that are developmental and reproductive toxicants.
- m. Calculated by multiplying the OEHHA cancer potency in (mg/kg-day)<sup>-1</sup> by the human breathing rate divided by body weight (20 m<sup>3</sup>/70 kg).