

PART 5: CHEMICAL AGENTS AND BIOLOGICAL AGENTS

Definitions	5.1	In this Part: "ACGIH" means the American Conference of Governmental Industrial Hygienists publication entitled "Threshold Limit Values and Biological Exposure Indices", dated 2002, as amended from time to time, and the American Conference of Governmental Industrial Hygienists publication entitled "Documentation of the Threshold Limit Values and Biological Exposure Indices", as amended from time to time;
Designated substances	5.57	(1) If a substance identified in ACGIH or IARC by any of the following notations, abbreviations, or endnotes is present in the workplace, the employer must replace it, if practicable, with a material which reduces the risk to workers: If a substance identified as an (a) ACGIH A1 or A2, or IARC 1, 2A or 2B carcinogen; (b) reproductive critical effects; ACGIH reproductive toxin, (c) sensitization critical effect or SEN notation; ACGIH sensitizer, or (d) ACGIH L endnote, is present in the workplace, the employer must replace it, if practicable, with a material which reduces the risk to workers. (2) If it is not practicable to substitute a material which reduces the risk to workers, in accordance with subsection (1), the employer must implement an exposure control plan to maintain workers' exposure as low as reasonably achievable below the exposure limit established under section 5.48. (3) The exposure control plan must meet the requirements of section 5.48.
Protective policy	5.58	(1) At any worksite where a worker is exposed to a substance which is identified in section 5.57 (1) as having a reproductive toxin or a sensitizer critical effect, a sensitization critical effect or SEN notation, the employer must develop policy and procedures appropriate to the risk, which may include protective reassignment. (2) The policy and procedures required by subsection (1) must (a) inform workers about the reproductive toxin and identify ways to minimize exposure to the toxin for a worker who has advised the employer of pregnancy or intent to conceive a child, and (b) identify ways to eliminate or minimize exposure to a sensitizer for a worker who is or may be sensitized to that substance.

EXPLANATORY NOTE

In 2006, the American Conference of Governmental Industrial Hygienists ("ACGIH") changed the reporting system for recording critical health effects for substances, as it was listed in the annually published Threshold Limit Value ("TLV") booklet. The "Critical effects" column of the Adopted Values Table of the TLV booklet was re-titled "TLV® Basis", to reflect the change in reporting. Therefore, starting in 2006, the column lists the reproductive and sensitizing health effects only for those substances for which the TLV is specifically based on the critical health effect. Prior to the change, the column listed both TLV-based critical effects and other critical health effects.

This change has meant that the ACGIH is no longer recording the reproductive or sensitization effects of substances in their annual publication of the TLV booklet if these effects are not the basis for establishing the TLV. Given the current wording of OHSR section 5.57, many of the

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substances that were previously recorded as having reproductive or sensitizing critical effects are no longer explicitly recorded in the ACGIH TLV booklet after the change in the reporting structure.

Here is an example of a substance that was affected by the change:

Prior to the change, the ACGIH TLV booklet (2005) stated the following:

Substance	TWA	STEL	Notations	TLV Basis – Critical Effect(s)
Acrylic Acid	2 ppm	---	Skin; A4	Irritation, reproductive

After the change, the ACGIH TLV booklet (2006) stated the following:

Substance	TWA	STEL	Notations	TLV® Basis
Acrylic Acid	2 ppm	---	Skin; A4	URT Irritation

Therefore, acrylic acid is no longer listed as a reproductive toxin effective 2006 since the TLV is based on other adverse health effects, namely its irritative effects on the upper respiratory tract (URT). Note that the ACGIH still identifies this substance as having reproductive effects. This information is contained in the *Documentation of the Threshold Limit Values and Biological Exposure Indices* – the primary source publication for all ACGIH evaluated substances and on which the TLV booklet is based.

The proposal is for WorkSafeBC to maintain the mechanism of identifying substances with reproductive and/or sensitizing effects by the ACGIH identifying the substance in the “TLV® Basis” column of the TLV booklet or identifying the substance as a reproductive toxin or sensitizer in the *Documentation* publication. In essence, this means the current list of reproductive toxins and sensitizers is maintained so that employers can continue their current obligation to protect workers from these adverse health effects.

To accommodate these changes, it is proposed that sections 5.1 “Definitions”, 5.57 “Designated Substances”, and 5.58 “Protective Policy” of the regulation be amended so that substances with these health effects will remain identified as such.

In order to recognize the *ACGIH Documentation of the Threshold Limit Values and Biological Exposure Indices* as a primary source of information regarding reproductive and sensitizing effects of substances, it is proposed that the definition of ACGIH be amended in section 5.1 to continue its reference to the ACGIH TLV booklet and also reference the ACGIH Documentation publication related to each substance for which a TLV has been established. An occupational health and safety guideline will be developed to provide more details.

The proposed amendments will not affect the current requirement that an employer must consider substitution for designated substances. The proposed amendment to section 5.58 is simply to keep the terminology consistent with those of section 5.57. An employer is required to comply with section 5.58 Protective Policy once a substance is identified as being a reproductive toxin or a sensitizer.

Currently listed substances

The following table lists the substances that are currently identified by the ACGIH and the WorkSafeBC Table of Exposure Limits as a reproductive toxin or sensitizer. The proposed amendments will not result in any changes to this list. This applies to substances that WorkSafeBC has excluded from adopting the ACGIH TLV – these have “made in BC” exposure limits. However, while an ACGIH-based TLV has not been adopted, the ACGIH designations – sensitizer or reproductive toxin – is specifically referenced by the proposed wording of section 5.57.

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For the purposes of the consultation process and this explanatory note, the substances exhibiting reproductive or sensitizing effects and whose ACGIH TLV is not based on these effects are identified by an asterisk; i.e., R*, S* in the table below.

WorkSafeBC is currently considering mechanisms being used by other jurisdictions to identify substances with reproductive or sensitizing health effects, i.e. Workplace Hazardous Materials Information System (WHMIS) under Health Canada's Hazardous Products Act and the Controlled Products Regulations, and the Globally Harmonized System under consideration by the European Union, Canada and many other international jurisdictions.

The purpose of the proposed amendments is to serve as an interim measure until such time it is appropriate to consider other identification systems that address workplace exposures to both reproductive toxins as well as sensitizing agents.

Table 1: Substances with reproductive and/or sensitizing effects

Substance	Previous ACGIH Notation (up to 2005)	Current ACGIH Notation (since 2006)	Designation
Acrylic Acid	Reproductive	URT irritation	R*
Allyl glycidyl ether	Sensitization	URT irritation, dermatitis, eye & skin irritation	S*
Allyl propyl disulfide	Sensitizer	Sensitizer	S
Amitrole	Reproductive	Thyroid effects	R*
Tert-Amyl methyl ether (TAME)	Reproductive	Embryo/fetal damage	R
Azinphos-methyl	Sensitizer	Sensitizer	S
Benomyl	Reproductive	Eye irritation	R*
1-bromopropane	Reproductive	Embryo/fetal damage	R
n-butyl acrylate	Sensitizer	Sensitizer	S
n-butyl glycidyl ether (BGE)	Reproductive, Sensitizer	Testicular damage, Sensitizer	R, S
n-butyl mercaptan	Reproductive	URT irritation	R*
Captafol	Sensitization	Skin irritation	S*
Captan, inhalable	Sensitizer	Sensitizer	S
Carbaryl	Reproductive	Cholinesterase inhibitor	R*
Carbon monoxide**	Reproductive	COHb-emia	R*
1-chloro-2-propanol	Reproductive	Liver damage	R*
2-chloro-1-propanol	Reproductive	Liver damage	R*
2-chloroacetophenone	Sensitization	Eye, URT, skin irritation	S*
Chloroform**	Reproductive	Embryo/fetal damage	R
Beta-chloroprene	Reproductive	URT & eye irritation	R*
2-chloropropionic acid	Reproductive	Male reproductive damage	R
Demeton-S-methyl	Sensitizer	Sensitizer	S
Dibutyl phthalate	Reproductive	Testicular damage	R
Dichloroacetic acid	Male reproductive effects	Testicular damage	R
Dichlorvos (DDVP), Inhalable	Sensitizer	Sensitizer	S
Diethylene triamine	Sensitization	URT and eye irritation	S*
Diglycidyl ether (DGE)	Reproductive	URT irritation, hematologic effects	R*
N,N-dimethylacetamide	Reproductive	Embryo/fetal damage	R
Dinitrotoluene	Reproductive	Reproductive effects	R
Dodecyl mercaptan	Sensitizer	Sensitizer	S

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Substance	Previous ACGIH Notation (up to 2005)	Current ACGIH Notation (since 2006)	Designation
1,3-dioxolane	Reproductive	Hematologic effects	R*
Epichlorohydrin	Irritation, liver, kidney	Male reproductive effects	R
2-ethoxyethanol (EGEE)	Reproductive	Male reproductive damage, embryo/fetal damage	R
2-ethoxyethyl acetate (EGEEA)	Reproductive	Male reproductive damage	R
Ethyl acrylate	Sensitization	Sensitizer	S
Ethyl tert-butyl ether (ETBE)	Reproductive	Testicular damage	R
Ethylenediamine	Sensitization	---	S*
Ethylene oxide**	Reproductive	Cancer, CNS impairment	R*
2-ethylhexanoic acid	Reproductive	Teratogenic effects	R
Flour Dust, Inhalable	Sensitizer	Sensitizer	S
Formaldehyde**	Sensitizer	Sensitizer	S
Glutaraldehyde	Sensitizer	Sensitizer	S
Glyoxal	Sensitizer	Sensitizer	S
Halothane**	Reproductive	Liver damage, CNS impairment, vasodilation	R*
Hexafluoroacetone	Reproductive	Testicular damage	R
Hexahydrophthalic anhydride, all isomers	Sensitizer	Sensitizer	S
Hexamethylene diisocyanate (HDI)**	Sensitization	Sensitizer	S
1-hexene	Reproductive	CNS impairment	R*
2-hydroxypropyl acrylate	Sensitizer	Sensitizer	S
Isophorone diisocyanate**	Sensitization	Respiratory sensitizer	S
Lead, elemental & inorganic compounds	Reproductive	CNS & PNS impairment, hematologic effects	R*
Lead arsenate	Reproductive	GI damage, CNS impairment, kidney damage, hematologic effects	R*
Lead chromate, as Cr	Reproductive	Male reproductive damage	R
Lead chromate, as Pb	Reproductive	Male reproductive damage	R
Maleic anhydride	Sensitizer	Sensitizer	S
Manganese, elemental & inorganic compounds	Reproductive	CNS impairment	R*
Mercury – elemental, as Hg	Reproductive	CNS impairment, kidney damage	R*
Mercury – inorganic compounds	Reproductive	CNS impairment, kidney damage	R*
2-methoxyethanol (EGME)	Reproductive	Reproductive effect	R
2-methoxyethyl acetate (EGMEA)	Reproductive	Reproductive effect	R
Methyl acrylate	Sensitizer	Sensitizer	S
Methyl chloride	Reproductive	Testicular damage, teratogenic effects	R
Methyl isocyanate	Sensitizer	Skin, URT irritation	S*
Methyl methacrylate	Sensitizer	Sensitizer	S
Methyl tert-butyl ether (MTBE)	Reproductive	URT irritation, kidney damage	R*

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Substance	Previous ACGIH Notation (up to 2005)	Current ACGIH Notation (since 2006)	Designation
Methyl n-butyl ketone	Neuropathy	Testicular damage	R
Methyl vinyl ketone	Sensitizer	Sensitizer	S
Methylene bisphenyl isocyanate (MDI) **	Sensitization	Respiratory sensitizer	S
Naled, Inhalable	Sensitizer	Sensitizer	S
Natural rubber latex	Sensitizer	Sensitizer	S
Nitrous oxide**	Reproductive	Embryo/fetal damage	R
p,p'-oxybis(benzenesulfonyl hydrazide), inhalable	Irritation	Teratogenic effects	R
p-phenylenediamine	Sensitization	Skin sensitizer	S
Phenyl glycidyl ether (PGE)	Sensitizer, irritation, dermatitis	Sensitizer, testicular damage	S, R
Phenylphosphine	Reproductive	Testicular damage	R
Phthalic anhydride	Sensitizer	Sensitizer	S
Picric acid	Sensitization	Skin sensitization	S
Piperazine and its salts **	Sensitization	Skin sensitization	S
Platinum – soluble salts	Sensitization	Asthma	S
Propylene dichloride	---	Sensitizer	S
Propylene oxide	Sensitizer	Sensitizer	S
Pyrethrum	Sensitization	Liver damage, LRT irritation	S*
Rosin cores solder thermal decomposition products	Sensitizer	Sensitizer	S
Substilins	Sensitization	Asthma, skin, URT and LRT irritation	S
Tetrakis (hydroxymethyl) phosphonium sulfate	Sensitizer	Sensitizer	S
Tetryl	Sensitization	URT irritation	S*
Toluene	CNS	Female reproductive effect, pregnancy loss	R
Toluene-2,4 or 2,6-diisocyanate (TDI)	Sensitizer	Sensitizer	S
1,3,5-Triglycidyl-s-triazinetriene	Sensitization, reproductive	Male reproductive damage	S*, R
Trimellitic anhydride	Sensitization	Respiratory sensitizer	S
Turpentine	Sensitizer	Sensitizer	S
4-vinyl cyclohexene	Reproductive	Female and male reproductive damage	R
Vinyl cyclohexene dioxide	Reproductive	Female and male reproductive damage	R

* A substance which the ACGIH considers to have an adverse reproductive and/or sensitizing effect, but these effects are not the basis of the TLV. Substances for which the reproductive and/or sensitizing effect form the basis for the TLV are unmarked (no asterisk).

** Indicate substances that are listed in the Table of OELs for Excluded Substances – WorkSafeBC's Policy Item R5.48-1.

NOTE: all these listed substances will continue to be recognized as reproductive toxins or sensitizing agents; the purpose of the proposed amendments is to maintain the current status quo.