

**Table #1 – American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs)
Proposed for Adoption as New or Revised B.C. Exposure Limits (ELs)**

Note: ELs being proposed and/or retained are in **bold text and highlighted in yellow**.

Substance [CAS No.]	Existing WorkSafeBC ELs			Current ACGIH TLVs			Proposed Changes	Health Effects / ACGIH TLV Basis; Industrial Application
	8-hour TWA	15- minute STEL	Ceiling Limit	8-hour TWA	15- minute STEL	Ceiling Limit		
Antimony Trioxide – Production [1309-64-4]	(L)	--	--	-- (Withdrawn)	--	--	It is proposed to: (i) adopt the 8-hour TWA of 0.02 mg/m ³ (inhalable) for "Antimony Trioxide" as a B.C. EL; and (ii) withdraw the existing 8-hour TWA of (L) for "Antimony Trioxide – Production", to harmonize with the current ACGIH TLV. The individual entry of "Antimony Trioxide – Production" has been incorporated into a broader entry, "Antimony Trioxide".	<u>Health Effects / TLV basis:</u> The 2021 TLV was recommended to minimize the potential for pneumonitis.
Antimony Trioxide [1309-64-4]	--	--	--	0.02 mg/m ³ (Inhalable)	--	--		<u>Designations / notations:</u> • ACGIH: A2 • IARC 2A <u>Use:</u> Antimony metal and its compounds are obtained from antimony ore, which is usually antimony trisulfide (<i>i.e.</i> , stibnite). Antimony trioxide can be used as: (i) a flame retardant in fabrics, resins, and wood coatings; (ii) as a pigment and opacifier in glass, ceramics, and plastics; (iii) as a chemical intermediate; and (iv) as a raw material in the manufacture of antimony metal.

Definitions / Notations

ACGIH A2	ACGIH designation for substance classified as "suspected human carcinogen" (Group A2).
(L)	ACGIH L endnote whereby exposure by all routes should be carefully controlled to levels as low as possible.
IARC 2A	IARC designation for substances classified as "probably carcinogenic to humans" (Group 2A).
(Withdrawn)	Substances whose adopted ACGIH Documentation and TLVs were withdrawn by the ACGIH for a variety of reasons, including insufficient data, regrouping, etc.
Ceiling Limit	The concentration of a substance in air which may not be exceeded at any time during the work period.
STEL	15-minute <u>Short-Term Exposure Limit</u> (STEL): time weighted average concentration of a substance in air which may not be exceeded over any 15-minute period, limited to no more than 4 such periods in an 8-hour work shift with at least one hour between any 2 successive 15-minute excursion periods.
TWA	8-hour <u>Time Weighted Average</u> (TWA) Limit, whereby the concentration of a substance in air which may not be exceeded over a normal 8-hour work period.

Table #1 (continued) – ACGIH TLVs Proposed for Adoption as New or Revised B.C. Exposure Limits (ELs)

Note: ELs being proposed and/or retained are in **bold text and highlighted in yellow**.

Substance [CAS No.]	Existing WorkSafeBC ELs			Current ACGIH TLVs			Proposed Changes	Health Effects / ACGIH TLV Basis; Industrial Application
	8-hour TWA	15-minute STEL	Ceiling Limit	8-hour TWA	15-minute STEL	Ceiling Limit		
Benzene [71-43-2]	0.5 ppm	2.5 ppm	--	0.02 ppm	--	--	It is proposed to: (i) adopt the 8-hour TWA of 0.02 ppm as a B.C. EL; and (ii) withdraw the existing 15-minute STEL to harmonize with the current ACGIH TLV.	<p><u>Health Effects / TLV basis:</u> The 2023 TLV was recommended to minimize the potential for myelodysplastic syndrome (MDS), acute myeloid leukemia (AML), leukemia, hematologic effects, as well as chromosomal damage.</p> <p><u>Designations / notations:</u></p> <ul style="list-style-type: none"> • ACGIH: A1; Skin • IARC 1 <p><u>Use:</u> Benzene was previously used as a solvent, especially for inks, rubber, lacquers, and paint removers. At present, such uses are minimal. Historically, benzene has been found in gasoline from trace amounts to as much as 30% in some countries, though the North American average should now be <1%. Currently, most benzene is used in the chemical industry as a raw material for numerous organic chemicals and in plastics manufacture. Benzene is also: (i) used in the production of ethylbenzene, cumene (which is used in the production of phenol and acetone), and cyclohexane; and (ii) occurs as an intermediate in styrene production.</p>

Definitions / Notations

ACGIH A1 ACGIH designation for substance classified as “confirmed human carcinogen” (Group A1).
IARC 1 IARC designation for substances classified as “carcinogenic to humans” (Group 1).
Skin ACGIH designation which identifies a substance which contributes significantly to the overall exposure by the skin route (cutaneous absorption).

Ceiling Limit The concentration of a substance in air which may not be exceeded at any time during the work period.

STEL 15-minute Short-Term Exposure Limit (STEL): time weighted average concentration of a substance in air which may not be exceeded over any 15-minute period, limited to no more than 4 such periods in an 8-hour work shift with at least one hour between any 2 successive 15-minute excursion periods.

TWA 8-hour Time Weighted Average (TWA) Limit, whereby the concentration of a substance in air which may not be exceeded over a normal 8-hour work period.

Table #1 (continued) – ACGIH TLVs Proposed for Adoption as New or Revised B.C. Exposure Limits (ELs)

Note: ELs being proposed and/or retained are in **bold text and highlighted in yellow**.

Substance [CAS No.]	Existing WorkSafeBC ELs			Current ACGIH TLVs			Proposed Changes	Health Effects / ACGIH TLV Basis; Industrial Application
	8-hour TWA	15- minute STEL	Ceiling Limit	8-hour TWA	15-minute STEL	Ceiling Limit		
Cumene [98-82-8]	25 ppm	75 ppm	--	5 ppm	--	--	It is proposed to: (i) adopt the 8-hour TWA of 5 ppm as a B.C. EL; and (ii) withdraw the existing 15-minute STEL to harmonize with the current ACGIH TLV.	<p><u>Health Effects / TLV basis:</u> The 2021 TLV was recommended to minimize the potential for upper respiratory tract adenoma (benign tumour), as well as neurological effects.</p> <p><u>Designations / notations:</u></p> <ul style="list-style-type: none"> • IARC 2B <p><u>Use:</u> Cumene has been a chemical intermediate used primarily in the manufacture of acetone, phenol, as well as (to a lesser extent) acetophenone, alpha-methyl styrene diisopropylbenzene, and dicumylperoxide. Commercially, cumene has been used as: (i) a thinner for paints, enamels, and lacquers; (ii) a solvent for fats and resins; (iii) a constituent of some petroleum-based solvents such as naphtha; (iv) a catalyst for acrylic and polyester resins; (v) a raw material for peroxides and oxidation catalysts; and (vi) a starting material in the manufacture of aspirin and penicillin. Cumene has been used in gasoline blending, diesel fuel, and high-octane motor fuels, particularly as aviation fuel.</p>

Definitions / Notations

IARC 2B	IARC designation for substances classified as “possibly carcinogenic to humans” (Group 2B).
Ceiling Limit	The concentration of a substance in air which may not be exceeded at any time during the work period.
STEL	15-minute <u>Short-Term Exposure Limit</u> (STEL): time weighted average concentration of a substance in air which may not be exceeded over any 15-minute period, limited to no more than 4 such periods in an 8-hour work shift with at least one hour between any 2 successive 15-minute excursion periods.
TWA	8-hour <u>Time Weighted Average</u> (TWA) Limit, whereby the concentration of a substance in air which may not be exceeded over a normal 8-hour work period.

Table #1 (continued) – ACGIH TLVs Proposed for Adoption as New or Revised B.C. Exposure Limits (ELs)

Note: ELs being proposed and/or retained are in **bold text and highlighted in yellow**.

Substance [CAS No.]	Existing WorkSafeBC ELs			Current ACGIH TLVs			Proposed Changes	Health Effects / ACGIH TLV Basis; Industrial Application
	8-hour TWA	15-minute STEL	Ceiling Limit	8-hour TWA	15-minute STEL	Ceiling Limit		
Dipropylene glycol methyl ether [34590-94-8] <i>Note: Also known as "bis-(2-Methoxypropyl) ether (DPGME)"</i>	100 ppm	150 ppm	--	-- (Withdrawn)	-- (Withdrawn)	--	It is proposed to: (i) adopt the 8-hour TWA of 50 ppm for " <i>Dipropylene glycol methyl ether (DPGME)</i> " as a B.C. EL; and (ii) withdraw the existing 8-hour TWA of 100 ppm as well as the existing 15-minute STEL of 150 ppm for " <i>Dipropylene glycol methyl ether</i> ", to harmonize with the current ACGIH TLV.	<u>Health Effects / TLV basis:</u> The 2021 TLV was recommended to minimize the potential for liver effects, and central nervous system effects.
Dipropylene glycol methyl ether (DPGME) [13429-07-7; 13588-28-8; 20324-32-7; 34590-94-8; 55956-21-3]	--	--	--	50 ppm	--	--	The individual entry of " <i>Dipropylene glycol methyl ether</i> " is regrouped as " <i>Dipropylene glycol methyl ether (DPGME)</i> ". The individual entry of " <i>Dipropylene glycol methyl ether</i> " with the CAS number 34590-94-8 is being changed to " <i>Dipropylene glycol methyl ether (DPGME)</i> " that includes the following four CAS numbers: 34590-94-8; 13429-07-7; 13588-28-8; 20324-32-7; 55956-21-3. This is because DPGME has four possible isomers that exist and are produced together.	<u>Use:</u> Dipropylene glycol methyl ether (DPGME) is an organic solvent used in the manufacture of a wide variety of industrial and commercial products, including paints, varnishes, inks, and cleaners. DPGME also has cosmetic uses as a solvent, dispersing agent, emollient, and fragrance. It is also found in hair conditioners, hair sprays, body paint, nail and skincare products, polishes, carpet cleaners, bathroom cleaners, floor cleaners, general-purpose cleaning products, and some graffiti removers.

Definitions / Notations

(Withdrawn)	Substances whose adopted ACGIH Documentation and TLVs were withdrawn by the ACGIH for a variety of reasons, including insufficient data, regrouping, etc.
Ceiling Limit	The concentration of a substance in air which may not be exceeded at any time during the work period.
STEL	15-minute <u>Short-Term Exposure Limit</u> (STEL): time weighted average concentration of a substance in air which may not be exceeded over any 15-minute period, limited to no more than 4 such periods in an 8-hour work shift with at least one hour between any 2 successive 15-minute excursion periods.
TWA	8-hour <u>Time Weighted Average</u> (TWA) Limit, whereby the concentration of a substance in air which may not be exceeded over a normal 8-hour work period.

Table #1 (continued) – ACGIH TLVs Proposed for Adoption as New or Revised B.C. Exposure Limits (ELs)

Note: ELs being proposed and/or retained are in **bold text and highlighted in yellow**.

Substance [CAS No.]	Existing WorkSafeBC ELs			Current ACGIH TLVs			Proposed Changes	Health Effects / ACGIH TLV Basis; Industrial Application
	8-hour TWA	15- minute STEL	Ceiling Limit	8-hour TWA	15- minute STEL	Ceiling Limit		
Hexane, all isomers, except n-Hexane [96-14-0, 107-83-5, 75-83-2, 79-29-8]	200 ppm	--	--	(Withdrawn)	--	--	<p>These recommendations apply to the branched isomers of hexane (i.e., hexane isomers), as well as commercial hexanes containing less than 54% n-Hexane.</p> <p>For commercial hexanes that contain ≥54% n-Hexane, n-Hexane's B.C. EL of 20 ppm (8-hour TWA) is applicable.</p>	<p><u>Health Effects / TLV basis:</u> The 2023 TLV was recommended to minimize the potential of the following:</p> <ul style="list-style-type: none"> <u>For "Hexane (Commercial, <54% n-Hexane)":</u> peripheral neuropathy; and <u>For "Branched Hexane Isomers":</u> upper respiratory tract irritation and lung damage. <p><u>Designations / notations:</u></p> <ul style="list-style-type: none"> ACGIH: Skin, for "Hexane (Commercial, <54% n-hexane)" only <p><u>Use:</u> Commercial hexane has variable composition, and is manufactured from crude oil, natural gas, and petroleum refining processes. Hexane isomers occur naturally as constituents of natural gas and in the paraffin fraction of crude oil.</p> <p>Commercial hexane and hexane isomers are primarily used as solvents (e.g., extraction of oils and acids) and industrial intermediates (e.g., synthesis of synthetic rubber and polymers). Such substances are also found in various commercial and consumer products (e.g., auto products, arts, crafts, home maintenance products, adhesives, printing inks, lacquers, stains, etc.).</p>
Hexane (Commercial, <54% n-Hexane) and the branched hexane isomers [64742-49-0, 64742-89-8, 75-83-2, 79-29-8, 96-14-0, 107-83-5]	--	--	--	--	--	--		
• Hexane (Commercial, <54% n-Hexane)	--	--	--	100 ppm	--	--		
• Branched Hexane Isomers	--	--	--	200 ppm	--	--		

Definitions / Notations

Skin	ACGIH designation which identifies a substance which contributes significantly to the overall exposure by the skin route (cutaneous absorption).
(Withdrawn)	Substances whose adopted ACGIH Documentation and TLVs were withdrawn by the ACGIH for a variety of reasons, including insufficient data, regrouping, etc.
Ceiling Limit	The concentration of a substance in air which may not be exceeded at any time during the work period.
STEL	15-minute <u>Short-Term Exposure Limit</u> (STEL): time weighted average concentration of a substance in air which may not be exceeded over any 15-minute period, limited to no more than 4 such periods in an 8-hour work shift with at least one hour between any 2 successive 15-minute excursion periods.
TWA	8-hour <u>Time Weighted Average</u> (TWA) Limit, whereby the concentration of a substance in air which may not be exceeded over a normal 8-hour work period.

Table #1 (continued) – ACGIH TLVs Proposed for Adoption as New or Revised B.C. Exposure Limits (ELs)

Note: ELs being proposed and/or retained are in **bold text and highlighted in yellow**.

Substance [CAS No.]	Existing WorkSafeBC ELs			Current ACGIH TLVs			Proposed Changes	Health Effects / ACGIH TLV Basis; Industrial Application
	8-hour TWA	15- minute STEL	Ceiling Limit	8-hour TWA	15- minute STEL	Ceiling Limit		
sec-Hexyl acetate [108-84-9]	50 ppm	--	--	20 ppm	50 ppm	--	It is proposed to: (i) adopt the 8-hour TWA of 20 ppm and the 15-minute STEL of 50 ppm as B.C. ELs; as well as (ii) withdraw the existing B.C. ELs to harmonize with the current ACGIH TLVs.	<u>Health Effects / TLV basis:</u> The 2021 TLV was recommended to minimize the potential for central nervous system impairment, upper respiratory tract irritation, and eye irritation. <u>Use:</u> sec-Hexyl acetate is naturally present in apples and their leaves. In addition, sec-Hexyl acetates are reported to be used: (i) as a perfume and cosmetic fragrance; (ii) as a component in housefly insecticide; (iii) as a solvent for nitrocellulose and other lacquers.
Isopropylamine [75-31-0]	5 ppm	10 ppm	--	2 ppm	5 ppm	--	It is proposed to: (i) adopt the 8-hour TWA of 2 ppm and the 15-minute STEL of 5 ppm as B.C. ELs; as well as (ii) withdraw the existing B.C. ELs to harmonize with the current ACGIH TLVs.	<u>Health Effects / TLV basis:</u> The 2021 TLV was recommended to minimize the potential for upper respiratory tract irritation, ocular irritation, and visual impairment. <u>Designations / notations:</u> • ACGIH: Skin <u>Use:</u> Isopropylamine can be manufactured, used or generated by degradation of plant and animal waste. Isopropylamine is also: (i) used as solvent, depilatory, and solubilizer for some herbicides; (ii) used as an intermediate in the synthesis of dyes, rubber accelerators, insecticides, herbicides, bactericides, textile specialties, surface-active agents, and pharmaceuticals; (iii) found in certain foods; (iv) found in cigarette smoke; as well as (v) naturally released into the air by decomposing plants, animals, and manure.

Definitions / Notations

Skin	ACGIH designation which identifies a substance which contributes significantly to the overall exposure by the skin route (cutaneous absorption).
Ceiling Limit	The concentration of a substance in air which may not be exceeded at any time during the work period.
STEL	15-minute <u>Short-Term Exposure Limit</u> (STEL): time weighted average concentration of a substance in air which may not be exceeded over any 15-minute period, limited to no more than 4 such periods in an 8-hour work shift with at least one hour between any 2 successive 15-minute excursion periods.
TWA	8-hour <u>T</u> ime <u>W</u> eighted <u>A</u> verage (TWA) Limit, whereby the concentration of a substance in air which may not be exceeded over a normal 8-hour work period.

Table #1 (continued) – ACGIH TLVs Proposed for Adoption as New or Revised B.C. Exposure Limits (ELs)

Note: ELs being proposed and/or retained are in **bold text and highlighted in yellow**.

Substance [CAS No.]	Existing WorkSafeBC ELs			Current ACGIH TLVs			Proposed Changes	Health Effects / ACGIH TLV Basis; Industrial Application
	8-hour TWA	15- minute STEL	Ceiling Limit	8-hour TWA	15-minute STEL	Ceiling Limit		
Isopropyl ether [108-20-3]	250 ppm	310 ppm	--	20 ppm	--	--	It is proposed to: (i) adopt the 8-hour TWA of 20 ppm as a B.C. EL; as well as (ii) withdraw the existing B.C. ELs to harmonize with the current ACGIH TLVs.	<p><u>Health Effects / TLV basis:</u> The 2024 TLV was recommended to minimize the potential for embryo / fetal damage as well as body weight effects.</p> <p><u>Designations / notations:</u></p> <ul style="list-style-type: none"> ACGIH: R <p><u>Use:</u> Isopropyl ether is a synthetic substance that is produced as a by-product of the manufacture of isopropyl alcohol. This substance: (i) has been used in the petrochemical industry as a solvent, fuel additive, and intermediate; (ii) is used in the pharmaceutical industry in the manufacture of active pharmaceutical ingredients.</p>
Methylcyclohexane [108-87-2]	400 ppm	--	--	100 ppm	--	--	It is proposed to adopt the 8-hour TWA of 100 ppm to harmonize with the current ACGIH TLVs.	<p><u>Health Effects / TLV basis:</u> The 2023 TLV was recommended to minimize the potential for kidney damage.</p> <p><u>Use:</u> Methylcyclohexane is naturally present in crude petroleum oils; industrial uses include: (i) adhesives and sealant chemicals; (ii) agricultural chemicals (non-pesticidal); (iii) fuels and fuel additives; (iv) intermediates; (v) processing aides; and (vi) solvents. Methylcyclohexane is also present in consumer products used for auto care, hobby/craft, and home maintenance (e.g., caulk / sealants, paints / stains, etc.).</p>

Definitions / Notations

R	Substance in which the ACGIH has noted an adverse reproductive effect.
Ceiling Limit	The concentration of a substance in air which may not be exceeded at any time during the work period.
STEL	15-minute <u>Short-Term Exposure Limit</u> (STEL): time weighted average concentration of a substance in air which may not be exceeded over any 15-minute period, limited to no more than 4 such periods in an 8-hour work shift with at least one hour between any 2 successive 15-minute excursion periods.
TWA	8-hour <u>Time Weighted Average</u> (TWA) Limit, whereby the concentration of a substance in air which may not be exceeded over a normal 8-hour work period.

Table #1 (continued) – ACGIH TLVs Proposed for Adoption as New or Revised B.C. Exposure Limits (ELs)

Note: ELs being proposed and/or retained are in **bold text and highlighted in yellow**.

Substance [CAS No.]	Existing WorkSafeBC ELs			Current ACGIH TLVs			Proposed Changes	Health Effects / ACGIH TLV Basis; Industrial Application
	8-hour TWA	15-minute STEL	Ceiling Limit	8-hour TWA	15-minute STEL	Ceiling Limit		
Mica [12001-26-2]	3 mg/m ³ (Respirable)	--	--	0.1 mg/m³, <1% silica (Respirable)	--	--	It is proposed to: (i) adopt the 8-hour TWA of 0.1 mg/m ³ , <1% silica (Respirable) as a B.C. EL; and (ii) withdraw the existing B.C. EL to harmonize with the current ACGIH TLV. <u>Note:</u> When occupational exposures are to mica containing >1% crystalline silica, the TLV for crystalline silica should be applied (in addition to the TLV for mica). The TLV for crystalline silica is the same as the existing B.C. EL.	<u>Health Effects / TLV basis:</u> To minimize the potential pneumoconiosis. <u>Use:</u> Ground mica is used in various applications, including: (i) as a filler for paint, cement, and asphalt; (ii) as an insulation material in electrical cables; (iii) as a component of drilling muds in the petrochemical industry; (iv) in electrical vacuum tubes and condensers; (v) as a bulking and/or viscosity-increasing agent in cosmetics.

Definitions / Notations

(Respirable)	Particles are considered to be "respirable" when a substantial fraction of particles is equal or less than 10 µm (microns) in diameter. (For comparison, human hair width can range from 30 µm to 100 µm in diameter). "Respirable" fraction particles are a health hazard when deposited in the gas-exchange region of the lungs.
Ceiling Limit	The concentration of a substance in air which may not be exceeded at any time during the work period.
STEL	15-minute <u>Short-Term Exposure Limit</u> (STEL): time weighted average concentration of a substance in air which may not be exceeded over any 15-minute period, limited to no more than 4 such periods in an 8-hour work shift with at least one hour between any 2 successive 15-minute excursion periods.
TWA	8-hour <u>Time Weighted Average</u> (TWA) Limit, whereby the concentration of a substance in air which may not be exceeded over a normal 8-hour work period.

Table #1 (continued) – ACGIH TLVs Proposed for Adoption as New or Revised B.C. Exposure Limits (ELs)

Note: ELs being proposed and/or retained are in **bold text and highlighted in yellow**.

Substance [CAS No.]	Existing WorkSafeBC ELs			Current ACGIH TLVs			Proposed Changes	Health Effects / ACGIH TLV Basis; Industrial Application
	8-hour TWA	15- minute STEL	Ceiling Limit	8-hour TWA	15- minute STEL	Ceiling Limit		
Trimethyl benzene (mixed isomers) [25551-13-7]	25 ppm	--	--	-- (Withdrawn)	--	--	It is proposed to: (i) adopt the 8-hour TWA of 10 ppm for " <i>Trimethyl benzene, isomers</i> " as a B.C. EL; and (ii) withdraw the existing 8-hour TWA of 25 ppm for " <i>Trimethyl benzene (mixed isomers)</i> " to harmonize with the current ACGIH TLV. The individual entry of " <i>Trimethyl benzene (mixed isomers)</i> " is regrouped as " <i>Trimethyl benzene, isomers</i> ". This TLV-TWA is intended for the three isomeric forms of trimethyl benzene (TMB) separately or together.	<u>Health Effects / TLV basis:</u> The 2021 TLV was recommended to minimize the potential for central nervous system impairment, and hematologic effects. <u>Use:</u> Trimethyl benzene (TMB) is a commercially available mixture of isomers (<i>i.e.</i> , 1,2,3-TMB, 1,2,4-TMB, and 1,3,5-TMB). TMB isomers and mixtures are: (i) a component of gasoline; (ii) used as a solvent in surface coatings, inks, as well as cleaners; (iii) found in vehicle emissions.
Trimethyl benzene, isomers [25551-13-7; 526-73-8; 95-63- 6; 108-67-8]	--	--	--	10 ppm	--	--		

Definitions / Notations

(Withdrawn)	Substances whose adopted ACGIH Documentation and TLVs were withdrawn by the ACGIH for a variety of reasons, including insufficient data, regrouping, etc.
Ceiling Limit	The concentration of a substance in air which may not be exceeded at any time during the work period.
STEL	15-minute <u>Short-Term Exposure Limit</u> (STEL): time weighted average concentration of a substance in air which may not be exceeded over any 15-minute period, limited to no more than 4 such periods in an 8-hour work shift with at least one hour between any 2 successive 15-minute excursion periods.
TWA	8-hour <u>Time Weighted Average</u> (TWA) Limit, whereby the concentration of a substance in air which may not be exceeded over a normal 8-hour work period.

Table #1 (continued) – ACGIH TLVs Proposed for Adoption as New or Revised B.C. Exposure Limits (ELs)

Note: ELs being proposed and/or retained are in **bold text and highlighted in yellow**.

Substance [CAS No.]	Existing WorkSafeBC ELs			Current ACGIH TLVs			Proposed Changes	Health Effects / ACGIH TLV Basis; Industrial Application
	8-hour TWA	15- minute STEL	Ceiling Limit	8-hour TWA	15-minute STEL	Ceiling Limit		
Xylene (o, m & p isomers) [1330-20-7; 95-47-6; 106-42-3; 108-38-3]	100 ppm	150 ppm	--	-- (Withdrawn)	-- (Withdrawn)	--	It is proposed to: (i) adopt the 8-hour TWA of 20 ppm for "Xylene, all isomers" as a B.C. EL; and (ii) withdraw the existing B.C. ELs for "Xylene (o, m & p isomers)", to harmonize with the current ACGIH TLV. The individual entry of "Xylene (o, m & p isomers)" is regrouped as of "Xylene, all isomers".	<u>Health Effects / TLV basis:</u> The 2021 TLV was recommended to minimize the potential for eye irritation, upper respiratory tract irritation, hematologic effects, ototoxicity (for <i>p</i> -xylene and mixtures containing <i>p</i> -xylene), and central nervous system impairment. <u>Use:</u> Mixed xylene is: (i) present in gasoline, aviation fuel, and many petroleum solvents; and (ii) used as a solvent in paints, coatings, and in rubber cement. <i>M</i> -xylene is an intermediate in the preparation of isophthalic acid, <i>o</i> -xylene is employed in the manufacture of phthalic anhydride, and <i>p</i> -xylene is used in the synthesis of terephthalic acid. The <i>o</i> - and <i>p</i> -isomers are used in pharmaceutical and insecticide syntheses. Commercially, <i>p</i> -xylene is the most important of the three isomers, as it is used in the production of polyester.
Xylene, all isomers [1330-20-7; 95-47-6; 106-42-3; 108-38-3]	--	--	--	20 ppm	--	--		

Definitions / Notations

(Withdrawn)	Substances whose adopted ACGIH Documentation and TLVs were withdrawn by the ACGIH for a variety of reasons, including insufficient data, regrouping, etc.
Ceiling Limit	The concentration of a substance in air which may not be exceeded at any time during the work period.
STEL	15-minute <u>Short-Term Exposure Limit</u> (STEL): time weighted average concentration of a substance in air which may not be exceeded over any 15-minute period, limited to no more than 4 such periods in an 8-hour work shift with at least one hour between any 2 successive 15-minute excursion periods.
TWA	8-hour <u>Time Weighted Average</u> (TWA) Limit, whereby the concentration of a substance in air which may not be exceeded over a normal 8-hour work period.

Table #2 – New or Revised American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs) that are Not Proposed for Adoption as B.C. Exposure Limits (ELs)

Note: ELs being retained are in **bold text and highlighted in yellow**.

Substance [CAS No.]	Existing WorkSafeBC ELs			New or Revised ACGIH TLVs			Rationale to not adopt new/revised ACGIH TLV as a WorkSafeBC EL **(See Explanatory Notes at the end of document)	Health Effects / ACGIH TLV Basis; Industrial Application
	8-hour TWA	15-minute STEL	Ceiling Limit	8-hour TWA	15-minute STEL	Ceiling Limit		
tert-Butyl Hydroperoxide [75-91-2]	--	--	--	0.1 ppm	--	--	<p>Due to a lack of a validated sampling method for the 2023 ACGIH TLV, it is proposed that the ACGIH TLV not be adopted as a B.C. EL at this time.</p> <p>Key regulation(s) include the following:</p> <ul style="list-style-type: none"> • <i>OHSR 5.57(1)</i> (Designated substances): tert-Butyl Hydroperoxide is a designated substance, thus the employer must replace it, if practicable, with a material which reduces the risk to workers. 	<p><u>Health Effects / TLV basis:</u> To minimize the potential for upper and lower respiratory tract damage, eye damage and nasal cancer.</p> <p><u>Designations / notations:</u></p> <ul style="list-style-type: none"> • ACGIH: A2 <p><u>Use:</u> tert-Butyl Hydroperoxide (TBHP) is a synthetic compound that is used as: (i) a chemical intermediate; (ii) a cationic emulsion polymerization initiator; and (iii) a catalyst in polymerization reactions to produce polyethylene, polyvinyl chloride, unsaturated polyesters and other related products.</p>
Glycidyl methacrylate [106-91-2]	--	--	--	0.01 ppm	--	--	<p>Due to a lack of a validated sampling method for the 2022 ACGIH TLV, it is proposed that the ACGIH TLV not be adopted as a B.C. EL at this time.</p> <p>Key regulation(s) include the following:</p> <ul style="list-style-type: none"> • <i>OHSR 5.52</i> (Skin Designation): If skin absorption may contribute to the overall exposure, effective measures must be taken to limit exposure by this route. • <i>OHSR 5.57(1)</i> (Designated substances): Glycidyl methacrylate is a designated substance, thus the employer must replace it, if practicable, with a material which reduces the risk to workers. • <i>OHSR 5.58(1)</i> (Protective Policy): The employer must develop policies appropriate to the risk; and identify ways to eliminate or minimize exposure. 	<p><u>Health Effects / TLV basis:</u> To minimize the potential for upper respiratory tract irritation and damage, mutagenic effects, cancer.</p> <p><u>Designations / notations:</u></p> <ul style="list-style-type: none"> • ACGIH: A2; DSEN; Skin • IARC 2A <p><u>Use:</u> Glycidyl methacrylate is used as an intermediate in the synthesis of various resins, including those used in hydrogel lenses, dental resin, as well as adhesion promotion / crosslinking co-monomer (e.g., acrylic / vinyl resins).</p>

Table #2 (continued) – New or Revised American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs) that are Not Proposed for Adoption as B.C. Exposure Limits (ELs)

Note: ELs being retained are in **bold text and highlighted in yellow**.

Substance [CAS No.]	Existing WorkSafeBC ELs			New or Revised ACGIH TLVs			Rationale to not adopt new/revised ACGIH TLV as a WorkSafeBC EL **(See Explanatory Notes at the end of document)	Health Effects / ACGIH TLV Basis; Industrial Application
	8-hour TWA	15-minute STEL	Ceiling Limit	8-hour TWA	15-minute STEL	Ceiling Limit		
Ketene [463-51-4]	0.5 ppm	1.5 ppm	--	--	--	0.05 ppm	Due to a lack of a validated sampling method for the 2021 ACGIH TLV, it is proposed that the ACGIH TLV not be adopted as a B.C. EL at this time. As such, the existing 8-hour TWA of 0.5 ppm and 15-minute STEL of 1.5 ppm for this substance will be maintained at this time. Key regulation(s) include the following: <ul style="list-style-type: none"> • <i>OHSR</i> 5.54 (Exposure control plan): An exposure control plan must be implemented when measurement is not possible at 50% of the applicable exposure limit. 	<u>Health Effects / TLV basis:</u> To minimize the potential for lung damage, pulmonary edema, upper respiratory tract irritation, and eye irritation. <u>Use:</u> Ketene is used as a manufacturing intermediate, mainly as an acetylating agent in chemical synthesis (including the synthesis of acid anhydrides and acetate esters).
2-Methyl-2-butene [513-35-9]	--	--	--	10 ppm	--	--	Due to a lack of a validated sampling method for the 2021 ACGIH TLV, it is proposed that the ACGIH TLV not be adopted as a B.C. EL at this time. Key regulation(s) include the following: <ul style="list-style-type: none"> • <i>OHSR</i> 5.2 (General information requirement): If a worker is or may be exposed to a chemical agent which could cause an adverse health effect, the employer must ensure its possible effects on worker health and safety (and any precautions required to protect the worker) are clearly communicated to the worker; written procedures prepared and implemented to eliminate or minimize a risk of exposure; and supervisors and workers are appropriately trained. 	<u>Health Effects / TLV basis:</u> To minimize the potential for clastogenic effects (<i>i.e.</i> , damage or changes to chromosomes). <u>Use:</u> 2-Methyl-2-butene is naturally present in natural gas and crude oil; and can be derived from these substances primarily through cracking processes. 2-Methyl-2-butene is primarily employed as a chemical intermediate, with the majority used in the production of isoprene.

Table #2 (continued) – New or Revised American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs) that are Not Proposed for Adoption as B.C. Exposure Limits (ELs)

Note: ELs being retained are in **bold text and highlighted in yellow**.

Substance [CAS No.]	Existing WorkSafeBC ELs			New or Revised ACGIH TLVs			Rationale to not adopt new/revised ACGIH TLV as a WorkSafeBC EL **(See Explanatory Notes at the end of document)	Health Effects / ACGIH TLV Basis; Industrial Application
	8-hour TWA	15-minute STEL	Ceiling Limit	8-hour TWA	15-minute STEL	Ceiling Limit		
o-Methylcyclohexanone [583-60-8]	50 ppm	75 ppm	--	-- (Withdrawn)	-- (Withdrawn)	--	Due to a lack of a validated sampling method for the 2021 ACGIH TLV, it is proposed that the ACGIH TLV not be adopted as a B.C. EL at this time. As such, the existing 8-hour TWA of 50 ppm and 15-minute STEL of 75 ppm for o-Methylcyclohexanone will be maintained at this time.	<u>Health Effects / TLV basis:</u> To minimize the potential for liver effects, as well as central nervous system impairment.
Methylcyclohexanone, all isomers [583-60-8; 591-24-2; 589-92-4; 1331-22-2]	--	--	--	20 ppm	--	--	Key regulation(s) include the following: <ul style="list-style-type: none"> OHSR 5.54 (Exposure control plan): An exposure control plan must be implemented when measurement is not possible at 50% of the applicable exposure limit. 	<u>Use:</u> Methylcyclohexanone can be naturally found in mint and horse chestnuts. All three isomers are also used as: (i) flavouring agents; (ii) a solvent for varnishes, lacquers, and plastics; as well as (iii) a rust remover.
Perchloryl fluoride [7616-94-6]	3 ppm	6 ppm	--	0.5 ppm	--	--	Due to a lack of a validated sampling method for the 2021 ACGIH TLV, it is proposed that the ACGIH TLV not be adopted as a B.C. EL at this time. Key regulation(s) include the following: <ul style="list-style-type: none"> OHSR 5.54 (Exposure control plan): An exposure control plan must be implemented when measurement is not possible at 50% of the applicable exposure limit. 	<u>Health Effects / TLV basis:</u> To minimize the potential for methemoglobinemia and fluorosis. <u>Use:</u> Perchloryl fluoride is used as a fluorinating agent in chemical synthesis, such as drug production.
Phenylethyl alcohol [60-12-8]	--	--	--	0.5 ppm	--	--	Due to a lack of a validated sampling method for the 2021 ACGIH TLV, it is proposed that the ACGIH TLV not be adopted as a B.C. EL at this time. Key regulation(s) include the following: <ul style="list-style-type: none"> OHSR 5.52 (Skin Designation): If skin absorption may contribute to the overall exposure, effective measures must be taken to limit exposure by this route. OHSR 5.57(1) (Designated substances): Phenylethyl alcohol is a designated 	<u>Health Effects / TLV basis:</u> To minimize the potential for embryo / fetal damage. <u>Designations / notations:</u> <ul style="list-style-type: none"> ACGIH: R; Skin <u>Use:</u> Phenylethyl alcohol (PEA) is a synthetic and a natural substance. PEA has industrial, commercial, and consumer uses, including: (i) chemical product manufacturing, and other basic organic

Table #2 (continued) – New or Revised American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs) that are Not Proposed for Adoption as B.C. Exposure Limits (ELs)

Note: ELs being retained are in **bold text and highlighted in yellow**.

Substance [CAS No.]	Existing WorkSafeBC ELs			New or Revised ACGIH TLVs			Rationale to not adopt new/revised ACGIH TLV as a WorkSafeBC EL **(See Explanatory Notes at the end of document)	Health Effects / ACGIH TLV Basis; Industrial Application
	8-hour TWA	15-minute STEL	Ceiling Limit	8-hour TWA	15-minute STEL	Ceiling Limit		
							<p>substance, thus the employer must replace it, if practicable, with a material which reduces the risk to workers.</p> <ul style="list-style-type: none"> • OHSR 5.58(1) (Protective Policy): The employer must develop policies appropriate to the risk; and identify ways to eliminate or minimize exposure. 	chemical manufacturing; (ii) as softeners and as an absorbent; (iii) in cosmetics as an antimicrobial preservative; (iv) as a fragrance material; (v) as a flavouring agent; (vi) in cleaning products; (vii) as an odour agent in paints, lacquers, and varnishes; (viii) in surface treatments; (ix) in paper products; (x) in room and car deodorizers; (xi) in polishes and waxes; (xii) as a feed additive for animals; (xiii) in pharmaceutical products; and (xiv) as an antibacterial agent in ophthalmic solutions.
Propionitrile [107-12-0]	--	--	--	--	--	10 ppm	<p>Due to a lack of a validated sampling method for the 2024 ACGIH TLV, it is proposed that the ACGIH TLV not be adopted as a B.C. EL at this time.</p> <p>Key regulation(s) include the following:</p> <ul style="list-style-type: none"> • OHSR 5.52 (Skin Designation): If skin absorption may contribute to the overall exposure, effective measures must be taken to limit exposure by this route. • OHSR 5.57(1) (Designated substances): Propionitrile is a designated substance, thus the employer must replace it, if practicable, with a material which reduces the risk to workers. • OHSR 5.58(1) (Protective Policy): The employer must develop policies appropriate to the risk; and identify ways to eliminate or minimize exposure. 	<p><u>Health Effects / TLV basis:</u> To minimize the potential for central nervous system impairment, upper respiratory tract irritation, eye irritation, and pregnancy loss.</p> <p><u>Designations / notations:</u></p> <ul style="list-style-type: none"> • ACGIH: R; Skin <p><u>Use:</u> Propionitrile is used and produced: (i) as a solvent and dielectric fluid; and (ii) as a chemical intermediate in drug manufacturing, petroleum refining, and hydrocarbon extraction. Propionitrile is also present in modern hydrogen cyanide manufacturing facilities and is an organic impurity in acrylonitrile manufacturing.</p>

Table #2 (continued) – New or Revised American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs) that are Not Proposed for Adoption as B.C. Exposure Limits (ELs)

Note: ELs being retained are in **bold text and highlighted in yellow**.

Substance [CAS No.]	Existing WorkSafeBC ELs			New or Revised ACGIH TLVs			Rationale to not adopt new/revised ACGIH TLV as a WorkSafeBC EL **(See Explanatory Notes at the end of document)	Health Effects / ACGIH TLV Basis; Industrial Application
	8-hour TWA	15-minute STEL	Ceiling Limit	8-hour TWA	15-minute STEL	Ceiling Limit		
Triclosan [3380-34-5]	--	--	--	1 mg/m ³	--	--	<p>Due to a lack of a validated sampling method for the 2023 ACGIH TLV, it is proposed that the ACGIH TLV not be adopted as a B.C. EL at this time.</p> <p>Key regulation(s) include the following:</p> <ul style="list-style-type: none"> • <i>OHSR 5.52</i> (Skin Designation): If skin absorption may contribute to the overall exposure, effective measures must be taken to limit exposure by this route. 	<p><u>Health Effects / TLV basis:</u> To minimize the potential for hematologic effects.</p> <p><u>Designations / notations:</u></p> <ul style="list-style-type: none"> • ACGIH: Skin <p><u>Use:</u> Triclosan is used as an antimicrobial ingredient in drug, medicinal, cosmetic, personal hygiene, cleaning, and natural health products. Triclosan is also used to impart microbial resistance to textiles, leather, food contact materials such as cutting boards and countertops, paper, plastic, rubber materials, paints, and coatings.</p>

Table #2 – New or Revised American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs) that are Not Proposed for Adoption as B.C. Exposure Limits (ELs)

Definitions / Notations

ACGIH A2	ACGIH designation for substance classified as “suspected human carcinogen” (Group A2).
DSEN	ACGIH designation for dermal sensitizer (i.e., a substance with specific evidence of sensitization by dermal route).
R	Substance in which the ACGIH has noted an adverse reproductive effect.
Skin	ACGIH designation which identifies a substance which contributes significantly to the overall exposure by the skin route (cutaneous absorption).
IARC 2A	IARC designation for substances classified as “probably carcinogenic to humans” (Group 2A).
(Inhalable)	Particles are considered to be “inhalable” when a substantial fraction of particles is equal or less than 100 µm (microns) in diameter. (For comparison, human hair width can range from 30 µm to 100 µm in diameter). “Inhalable” fraction particles are a health hazard when deposited anywhere in the lungs and respiratory tract.
(Respirable)	Particles are considered to be “respirable” when a substantial fraction of particles is equal or less than 10 µm (microns) in diameter. (For comparison, human hair width can range from 30 µm to 100 µm in diameter). “Respirable” fraction particles are a health hazard when deposited in the gas-exchange region of the lungs.
Ceiling Limit	The concentration of a substance in air which may not be exceeded at any time during the work period.
STEL	15-minute <u>Short-Term Exposure Limit</u> (STEL): time weighted average concentration of a substance in air which may not be exceeded over any 15-minute period, limited to no more than 4 such periods in an 8 hour work shift with at least one hour between any 2 successive 15 minute excursion periods.
TWA	8-hour <u>Time Weighted Average</u> (TWA) Limit, whereby the concentration of a substance in air which may not be exceeded over a normal 8-hour work period.

** Where noted above, the lack of validated sampling method for a specific TLV means:

- There are no air sampling devices that can accurately collect and/or measure the specific air contaminant;
- There is only one lab (or no labs) in North America capable of proficiently analyzing samples at the substances’ TLV; and/or
- ACGIH TLVs which are currently outside the analytical detection range of validated sampling methods and laboratory analyses means that the existing methods cannot accurately and reliably determine exposure levels within a concentration range of 0.1 to 2.0 times the TLV.

Table #3 – Existing B.C. Exposure Limits (ELs) that are Already Aligned with the New/Revised Threshold Limit Values (TLVs)

Corresponding Health Effects / TLV Basis have also been updated by the American Conference of Governmental Industrial Hygienists (ACGIH).
Notations / designations that the ACGIH has added for this substance are in **bold text and highlighted in yellow**.

Note: This table is provided for reference only

Substance [CAS No.]	Existing WorkSafeBC ELs			New / Revised ACGIH TLVs			ACGIH Updates to Corresponding Health Effects / TLV Basis	Health Effects / ACGIH TLV Basis; Industrial Application
	8-hour TWA	15- minute STEL	Ceiling Limit	8-hour TWA	15- minute STEL	Ceiling Limit		
Epichlorohydrin [106-89-8]	0.1 ppm	--	--	0.1 ppm	--	--	<p>Key updates from epichlorohydrin's (ECH's) ACGIH TLV Documentation:</p> <ul style="list-style-type: none"> • In 2023, the ACGIH lowered ECH's TLV-TWA; health studies reported respiratory tract irritation below ECH's previous TLV-TWA of 0.5 ppm. • The ACGIH removed reproductive effects from the TLV basis. • Carcinogenicity classification ACGIH A2 was recommended based on evidence from health studies. • Sufficient data were available to recommend an ACGIH DSEN notation. <p>Since ECH's existing B.C. EL is already aligned with the new/revised ACGIH TLV, ECH will be removed from the Table of Exposure Limits for Excluded Substances in Policy R5.48-1 of the <i>Prevention Manual</i>.</p>	<p><u>Health Effects / TLV basis</u>: The 2023 TLV was recommended to minimize the potential for respiratory tract irritation.</p> <p><u>Designations / notations</u>:</p> <ul style="list-style-type: none"> • ACGIH: A2; DSEN; Skin • IARC 2A <p><u>Use</u>: Epichlorohydrin has been the major raw material in the manufacture of epoxy and phenoxy resins. It also has been used in: (i) in the synthesis of glycerol; (ii) in the manufacture of surface-active agents, pharmaceuticals, insecticides, agricultural and textile chemicals, coatings, adhesives, ion exchange resins, solvents, plasticizers, glycidyl esters, and fatty acid derivatives.</p>

Definitions / Notations

ACGIH A2	ACGIH designation for substance classified as "suspected human carcinogen" (Group A2).
DSEN	ACGIH designation for dermal sensitizer (<i>i.e.</i> , a substance with specific evidence of sensitization by dermal route).
IARC 2A	IARC designation for substances classified as "probably carcinogenic to humans" (Group 2A).
Skin	ACGIH designation which identifies a substance which contributes significantly to the overall exposure by the skin route (cutaneous absorption).
Ceiling Limit	The concentration of a substance in air which may not be exceeded at any time during the work period.
STEL	15-minute <u>Short-Term Exposure Limit</u> (STEL): time weighted average concentration of a substance in air which may not be exceeded over any 15-minute period, limited to no more than 4 such periods in an 8-hour work shift with at least one hour between any 2 successive 15-minute excursion periods.
TWA	8-hour <u>T</u> ime <u>W</u> eighted <u>A</u> verage (TWA) Limit, whereby the concentration of a substance in air which may not be exceeded over a normal 8-hour work period.