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June 2020

Update 2020 – 4

**TO: HOLDERS OF THE *PREVENTION MANUAL***

This update of the *Prevention Manual* contains amendments implemented since update 2020 – 03.

The revised pages are amendments for:

- Item R5.48-1, *Exposure Limits*

A summary is attached and the amended pages are included as part of the package, effective **June 22, 2020**.

These amended pages and the complete manual are available at <https://www.worksafebc.com/en/law-policy/occupational-health-safety/ohs-policies>

Ian Shaw  
Head of Law & Policy

Attachments

**PREVENTION MANUAL**  
**Transmittal Sheet for Update 2020 – 4**

<b>Check As Done</b>	<b>Remove Old Pages Numbered/Titled:</b>	<b>Insert New Pages Numbered/Titled:</b>
<input type="checkbox"/>	R5.48-1	Pages 1 to 18

**RE: Exposure Limits****ITEM: R5.48-1**

## **BACKGROUND**

### **1. Explanatory Notes**

Section 5.48 provides established limits for a worker's exposure to hazardous chemical substances. Generally, these exposure limits are established according to the Threshold Limit Values ("TLVs") adopted by the American Conference of Governmental Industrial Hygienists ("ACGIH"). However, the Board has authority to make exceptions and adopt occupational exposure limits for specific chemical substances that are not consistent with the TLVs established by the ACGIH. This policy sets out those exceptions.

### **2. The OHSR**

Section 5.48:

Except as otherwise determined by the Board, the employer must ensure that no worker is exposed to a substance that exceeds the ceiling limit, short-term exposure limit, or 8-hour TWA limit prescribed by ACGIH.

Section 5.57:

- (1) If a substance identified as any of the following is present in the workplace, the employer must replace it, if practicable, with a material which reduces the risk to workers:
  - (a) ACGIH A1 or A2, or IARC 1, 2A or 2B carcinogen;
  - (b) ACGIH reproductive toxin;
  - (c) ACGIH sensitizer;
  - (d) ACGIH L endnote.
- (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 5.54.

### 3. Preamble to Policy

The following is a preamble to be applied to those exposure limits developed by the Board as an exception to the TLVs established by the ACGIH:

*An exposure limit is a maximum allowed airborne concentration and is not intended to represent a fine line between safe and harmful conditions. In determining an exposure limit, it is not possible to take into account all factors that could influence the effect that exposure to the substance may have on an individual worker.*

*Therefore, for all hazardous substances, regardless of any assigned exposure limit, the guiding principle is elimination of exposure or reduction to the lowest level that is reasonably achievable below the exposure limit.*

*Due to a wide variation in individual susceptibility, some workers may experience discomfort from some substances at concentrations at or below the exposure limit. Others may be affected more seriously by aggravation of a pre-existing condition, or by development of an occupational disease. Furthermore, other workplace contaminants may affect an individual's response. The effects of combined chemical exposures are often unknown or poorly defined.*

## **POLICY**

### 1. Table of Exposure Limits for Excluded Substances

As presented in the table below, the Board has determined exposure limits for the following specific substances that differ from the TLVs established by the ACGIH. For solid and liquid particulate matter, except where the terms inhalable, thoracic, or respirable particulate mass are used, the exposure limits listed in the table below are expressed in terms of "total particulate matter".

Substance/Chemical Name	CAS No.	Unit	8-hour TWA Limit	Short-term exposure Limit, STEL	Ceiling Limit
ABATE (TEMEPHOS), TOTAL	3383-96-8	mg/m <sup>3</sup>	10	20	
ACETAMIDE	60-35-5		No BC exposure limit		
ACETONE CYANOHYDRIN	75-86-5	ppm			1
ALDICARB	116-06-3		No BC exposure limit		
ALLYLAMINE	107-11-9	ppm	2		
ALLYLBROMIDE	106-95-6		No BC exposure limit		
ALLYLMETHACRYLATE	96-05-9		No BC exposure limit		
ATRAZINE	1912-24-9	mg/m <sup>3</sup>	5		
BENDIOCARB	22781-23-3		No BC exposure limit		
BENZYL CHLORIDE	100-44-7	ppm			1

Substance/Chemical Name	CAS No.	Unit	8-hour TWA Limit	Short-term exposure Limit, STEL	Ceiling Limit
BORON TRIBROMIDE	10294-33-4	ppm			1
BORON TRICHLORIDE	10294-34-5	ppm	No BC exposure limit		
BORON TRIFLUORIDE	7637-07-2	ppm	0.1		1
BORON TRIFLUORIDE ETHERS, as BF <sub>3</sub>	109-63-7, 353-42-4		No BC exposure limit		
BROMOCHLOROMETHANE	74-97-5	ppm	200	250	
BUTENES, ALL ISOMERS, INCLUDING ISOBUTENE	106-98-9, 107-01-7, 590-18-1, 624-64-6, 25167-67-3, 115-11-7		No BC exposure limit		
n-BUTYL ALCOHOL (n-BUTANOL)	71-36-3	ppm	15		30
n-BUTYL ACETATE	123-86-4	ppm	20		
sec-BUTYL ACETATE	105-46-4	ppm	200		
tert-BUTYL ACETATE	540-88-5	ppm	200		
tert-BUTYL HYDROPEROXIDE	75-91-2		No BC exposure limit		
n-BUTYL METHACRYLATE	97-88-1	ppm	50		
4-tert-BUTYLBENZOIC ACID	98-73-7		No BC exposure limit		
CADUSAFOS	95465-99-9		No BC exposure limit		
CALCIUM CARBONATE (incl. LIMESTONE, MARBLE), TOTAL	1317-65-3	mg/m <sup>3</sup>	10	20	
CALCIUM CHROMATE, as Cr, TOTAL	13765-19-0	mg/m <sup>3</sup>	0.001		
CAPROLACTAM DUST	105-60-2	mg/m <sup>3</sup>	1	3	
CAPTAFOL	2425-06-1	mg/m <sup>3</sup>	0.1		
CARBARYL	63-25-2	mg/m <sup>3</sup>	5		
CARBON DIOXIDE	124-38-9	ppm	5000	15,000	
CARBON DISULFIDE	75-15-0	ppm	4	12	
CARBON MONOXIDE	630-08-0	ppm	25	100	
CARBON TETRACHLORIDE	56-23-5	ppm	2		
CARFENTRAZONE-ETHYL	128639-02-1		No BC exposure limit		
CHLORDANE	57-74-9	mg/m <sup>3</sup>	0.5		
CHLORDANE, INHALABLE FRACTION & VAPOUR	57-74-9	mg/m <sup>3</sup>	No BC exposure limit		
CHLORINE	7782-50-5	ppm	0.5	1	
CHLORINE DIOXIDE	10049-04-4	ppm	0.1	0.3	
CHLOROACETIC ACID	79-11-8	ppm	0.3		
o-CHLOROBENZYLIDENE MALONONITRILE	2698-41-1	ppm			0.05
CHLOROBROMOMETHANE (see BROMOCHLOROMETHANE)	74-97-5		(See individual exposure limits for BROMOCHLOROMETHANE)		
1-CHLORO-1,1-DIFLUOROETHANE	75-68-3	ppm	1000		
CHLORODIFLUOROMETHANE	75-45-6	ppm	500	1250	
CHLOROFORM	67-66-3	ppm	2		
β-CHLOROPRENE	126-99-8	ppm	10		

Substance/Chemical Name	CAS No.	Unit	8-hour TWA Limit	Short-term exposure Limit, STEL	Ceiling Limit
CHLOROTRIFLUOROMETHANE	75-72-9	ppm	1000		
CHROMITE ORE PROCESSING (CHROMATE), as Cr, TOTAL		mg/m <sup>3</sup>	0.05		
CHROMIUM, METAL, TOTAL	7440-47-3	mg/m <sup>3</sup>	0.5		
CHROMIUM, Cr(III) COMPOUNDS, TOTAL	7440-47-3	mg/m <sup>3</sup>	0.5		
CHROMIUM, INSOLUBLE, Cr(VI) COMPOUNDS, TOTAL	7440-47-3	mg/m <sup>3</sup>	0.01		
CHROMIUM, WATER-SOLUBLE, Cr(VI) COMPOUNDS, TOTAL	7440-47-3	mg/m <sup>3</sup>	0.025		0.1
CHROMIUM and INORGANIC COMPOUNDS:					
METALLIC CHROMIUM, as Cr(0), INHALABLE	7440-47-3		No BC exposure limit		
TRIVALENT CHROMIUM COMPOUNDS, as Cr(III), INHALABLE	7440-47-3		No BC exposure limit		
HEXVALENT CHROMIUM COMPOUNDS, as Cr(VI), INHALABLE	7440-47-3		No BC exposure limit		
CHROMYL CHLORIDE, as Cr(VI), INHALABLE FRACTION & VAPOUR	7440-47-3		No BC exposure limit		
CHROMITE ORE PROCESSING (also known as CHROMITE ORE PROCESSING (CHROMATE), as Cr, TOTAL)		mg/m <sup>3</sup>	0.05		
CHROMYL CHLORIDE, TOTAL	14977-61-8	ppm	0.025		
CITRAL, INHALABLE	5292-40-5		No BC exposure limit		
CLOPIDOL	2971-90-6	mg/m <sup>3</sup>	10		
COBALT and INORGANIC COMPOUNDS, as Co, TOTAL	7440-48-4	mg/m <sup>3</sup>	0.02		
COBALT and INORGANIC COMPOUNDS, as Co, INHALABLE	7440-48-4		No BC exposure limit		
CRESOL, ALL ISOMERS	1319-77-3, 95-48-7, 108-39-4, 106-44-5	mg/m <sup>3</sup>	10		
CUMENE	98-82-8	ppm	25	75	
CYANAZINE	21725-46-2		No BC exposure limit		
CYANOACRYLATES, ETHYL and METHYL (also known as "ETHYL CYANOACRYLATE" and "METHYL 2-CYANOACRYLATE" respectively)	7085-85-0, 137-05-3		(See individual exposure limits for ETHYL CYANOACRYLATE and METHYL 2-CYANOACRYLATE)		
CYANOGEN	460-19-5	ppm	10		
CYANOGEN BROMIDE	506-68-3		No BC exposure limit		
CYCLOHEXENE	110-83-8	ppm	300		
CYCLOPENTADIENE	542-92-7	ppm	75		
DIBUTYL PHOSPHATE	107-66-4	ppm	1	2	
DICHLOROMETHANE	75-09-2	ppm	25		
DICYCLOHEXYLMETHANE-4,4'-DIISOCYANATE	5124-30-1	ppm	0.005		0.01
DICYCLOPENTADIENE	77-73-6	ppm	5		
DICYCLOPENTADIENE, including CYCLOPENTADIENE	77-73-6, 542-92-7		(See individual exposure limits for CYCLOPENTADIENE and DICYCLOPENTADIENE)		
2,4-DICHLOROPHENOXYACETIC ACID AND ITS ESTERS	94-75-7	mg/m <sup>3</sup>	10	20	
DIELDRIN	60-57-1	mg/m <sup>3</sup>	0.25		

Substance/Chemical Name	CAS No.	Unit	8-hour TWA Limit	Short-term exposure Limit, STEL	Ceiling Limit
DIETHANOLAMINE	111-42-2	mg/m <sup>3</sup>	2		
DIETHYLENE GLYCOL MONOBUTYL ETHER	112-34-5		No BC exposure limit		
N,N-DIETHYLHYDROXYLAMINE	3710-84-7		No BC exposure limit		
DIISOCYANATES, N.O.S.		ppm	0.005		0.01
DIMETHOXYMETHANE	109-87-5	ppm	1000	1250	
DIMETHYL ETHER	115-10-6	ppm	1000		
DIMETHYL SULFATE	77-78-1	ppm			0.1
DIMETHYLACETAMIDE (also known as N,N-DIMETHYLACETAMIDE)	127-19-5	ppm	10		
DIMETHYLFORMAMIDE	68-12-2	ppm	10		
DIMETHYLPHENOL, ALL ISOMERS	95-65-8; 95-87-4; 105-67-9; 108-68-9; 526-75-0; 576-26-1; 1300-71-6		No BC exposure limit		
DINITROBENZENE, ALL ISOMERS	99-65-0; 100-25-4; 528-29-0; 25154-54-5	ppm	0.15		
DINITRO-O-CRESOL	534-52-1	mg/m <sup>3</sup>	0.2		
n-DIOCTYL PHTHALATE	117-84-0	mg/m <sup>3</sup>	5		
ENDOSULFAN	115-29-7	mg/m <sup>3</sup>	0.1		
ENFLURANE	13838-16-9	ppm	2		
EPICHLOROHYDRIN	106-89-8	ppm	0.1		
EPN, INHALABLE	2104-64-5	mg/m <sup>3</sup>	0.1		
EPN, INHALABLE FRACTION & VAPOUR	2104-64-5		No BC exposure limit		
ETHYL ACETATE	141-78-6	ppm	150		
ETHYL CYANOACRYLATE	7085-85-0	ppm	0.2		
ETHYL ISOCYANATE	109-90-0		No BC exposure limit		
ETHYL METHACRYLATE	97-63-2	ppm	50		
ETHYLENE DIBROMIDE	106-93-4	ppm	0.5		
ETHYLENE DICHLORIDE (1,2-DICHLOROETHANE)	107-06-2	ppm	1	2	
ETHYLENE GLYCOL, AEROSOL	107-21-1	mg/m <sup>3</sup>			100
ETHYLENE GLYCOL, PARTICULATE	107-21-1	mg/m <sup>3</sup>	10	20	
ETHYLENE GLYCOL, VAPOUR	107-21-1	ppm			50
ETHYLENEIMINE	151-56-4	ppm	0.5		
ETHYLENE OXIDE	75-21-8	ppm	0.1	1	
ETHYLIDENE NORBORNENE	16219-75-3	ppm			5
FLUDIOXONIL	131341-86-1		No BC exposure limit		
FLUORINE	7782-41-4	ppm	0.1		
FLUORINE, as F	7782-41-4	ppm	(See individual exposure limit for FLUORINE)		
FLUOROXENE	406-90-6	ppm	2		
FOLPET	133-07-3		No BC exposure limit		

Substance/Chemical Name	CAS No.	Unit	8-hour TWA Limit	Short-term exposure Limit, STEL	Ceiling Limit
FORMAMIDE	75-12-7	ppm	10		
FURFURYL ALCOHOL	98-00-0	ppm	5	10	
GLYCERIN MIST, TOTAL	56-81-5	mg/m <sup>3</sup>	10		
GLYCERIN MIST, RESPIRABLE	56-81-5	mg/m <sup>3</sup>	3		
GYP SUM, TOTAL	13397-24-5	mg/m <sup>3</sup>	10	20	
HALOTHANE	151-67-7	ppm	2		
HARD METALS, containing COBALT and TUNGSTEN CARBIDE, as Co	7440-48-4, 12070-12-1	mg/m <sup>3</sup>	No BC exposure limit		
HEXAMETHYLENE DIISOCYANATE	822-06-0	ppm	0.005		0.01
n-HEXANE	110-54-3	ppm	20		
HEXANE, ALL ISOMERS except n-HEXANE	75-83-2; 79-29-8; 96-14-0; 107-83-5	ppm	200		
HEXAZINONE	51235-04-2		No BC exposure limit		
HEXYLENE GLYCOL	107-41-5	ppm			25
HYDROGEN FLUORIDE, as F	7664-39-3	ppm			2
HYDROGEN SULFIDE	7783-06-4	ppm			10
INDENE	95-13-6	ppm	10		
INDIUM TIN OXIDE, as In	50926-11-9		No BC exposure limit		
IODIDES			No BC exposure limit		
IODINE	7553-56-2	ppm			0.1
IRON OXIDE, FUME	1309-37-1	mg/m <sup>3</sup>	5	10	
IRON PENTACARBONYL	13463-40-6	ppm	0.01		
IRON SALTS, SOLUBLE, as Fe		mg/m <sup>3</sup>	1	2	
ISOBUTYL ACETATE	110-19-0	ppm	150		
ISOBUTYL NITRITE, INHALABLE FRACTION & VAPOUR	542-56-3	ppm			1
ISOPHORONE DIISOCYANATE	4098-71-9	ppm	0.005		0.01
ISOPROPYL ACETATE	108-21-4	ppm	100	200	
ISOPROPYL GLYCIDYL ETHER (IGE)	4016-14-2	ppm			50
LEAD CHROMATE, as Cr(VI), INHALABLE	7758-97-6		No BC exposure limit		
LEAD CHROMATE, as Cr, TOTAL	7758-97-6	mg/m <sup>3</sup>	0.012		
LEAD CHROMATE, as Pb, TOTAL	7758-97-6	mg/m <sup>3</sup>	0.05		
LITHIUM HYDRIDE	7580-67-8	mg/m <sup>3</sup>	0.025		
LITHIUM HYDROXIDE	1310-65-2	mg/m <sup>3</sup>			1
MAGNESIUM OXIDE, RESPIRABLE DUST AND FUME, as Mg	1309-48-4	mg/m <sup>3</sup>	3	10	
MALEIC ANHYDRIDE	108-31-6	ppm	0.1		
MANGANESE, ELEMENTAL AND INORGANIC COMPOUNDS, as Mn, TOTAL	7439-96-5	mg/m <sup>3</sup>	0.2		
MANGANESE, ELEMENTAL AND INORGANIC COMPOUNDS, as Mn, INHALABLE	7439-96-5		No BC exposure limit		
MANGANESE, ELEMENTAL AND INORGANIC COMPOUNDS, as Mn, RESPIRABLE	7439-96-5	mg/m <sup>3</sup>	0.02		



Substance/Chemical Name	CAS No.	Unit	8-hour TWA Limit	Short-term exposure Limit, STEL	Ceiling Limit
MERCURY, ARYL COMPOUNDS	7439-97-6	mg/m <sup>3</sup>	0.05		0.1
MESITYL OXIDE	141-79-7	ppm	10	25	
METHOMYL	16752-77-5	mg/m <sup>3</sup>	2.5		
METHOXYFLURANE	76-38-0	ppm	2		
2-METHOXY-1-PROPANOL	1589-47-5	ppm	20	40	
1-METHOXYPROPYL-2-ACETATE	108-65-6	ppm	50	75	
2-METHOXYPROPYL-1-ACETATE	70657-70-4	ppm	20	40	
METHYLENE BISPHENYL ISOCYANATE	101-68-8	ppm	0.005		0.01
METHYLENE bis (4-CYCLOHEXYL-ISOCYANATE)	5124-30-1	ppm	0.005		0.01
4,4'-METHYLENE BIS(2-CHLOROANILINE)	101-14-4	ppm	0.01		
4,4'-METHYLENEDIANILINE	101-77-9	ppm	0.01		
METHYL 2-CYANOACRYLATE	137-05-3	ppm	0.2		
METHYL ETHYL KETONE (MEK)	78-93-3	ppm	50	100	
METHYL ISOBUTYL CARBINOL	108-11-2	ppm	25	40	
METHYL PARATHION	298-00-0	mg/m <sup>3</sup>	0.2		
METHYL PROPYL KETONE (2-PENTANONE)	107-87-9	ppm	150	250	
METHYLTETRAHYDROPHthalic ANHYDRIDE ISOMERS	3425-89-6; 5333-84-6; 11070-44-3; 19438-63-2; 19438-64-3; 26590-20-5; 42498-58-8		No BC exposure limit		
METHYL VINYL KETONE	78-94-4	ppm			0.2
MONOMETHYLFORMAMIDE	123-39-7		No BC exposure limit		
1,5-NAPHTHYLENE DIISOCYANATE	3173-72-6	ppm	0.005		0.01
NATURAL RUBBER LATEX, AS TOTAL PROTEINS, INHALABLE	9006-04-6	mg/m <sup>3</sup>	0.001		
NICKEL, ELEMENTAL, SOLUBLE INORGANIC COMPOUNDS (NOS)	7440-02-0	mg/m <sup>3</sup>	0.05		
NICKEL, INSOLUBLE INORGANIC COMPOUNDS (NOS)	7440-02-0	mg/m <sup>3</sup>	0.05		
NICKEL CARBONYL, as Ni	13463-39-3	ppm	0.001		0.05
NITRAPYRIN	1929-82-4	mg/m <sup>3</sup>	10	20	
NITRAPYRIN, INHALABLE FRACTION & VAPOUR	1929-82-4		No BC exposure limit		
NITROGEN DIOXIDE	10102-44-0	ppm			1
5-NITRO-O-TOLUIDINE, INHALABLE	99-55-8	mg/m <sup>3</sup>	1		
5-NITRO-O-TOLUIDINE, INHALABLE FRACTION & VAPOUR	99-55-8		No BC exposure limit		
2-NITROPROPANE	79-46-9	ppm	5		
NITROUS OXIDE	10024-97-2	ppm	25		
OIL MIST, MINERAL, MILDLY REFINED		mg/m <sup>3</sup>	0.2		
OIL MIST, MINERAL, SEVERELY REFINED		mg/m <sup>3</sup>	1		
PARAQUAT, as the cation, INHALABLE	4685-14-7		No BC exposure limit		
PARAQUAT, as the cation, RESPIRABLE	4685-14-7	mg/m <sup>3</sup>	0.1		
PARAQUAT, as the cation, TOTAL	4685-14-7	mg/m <sup>3</sup>	0.5		

Substance/Chemical Name	CAS No.	Unit	8-hour TWA Limit	Short-term exposure Limit, STEL	Ceiling Limit
PENTACHLORONAPHTHALENE	1321-64-8	mg/m <sup>3</sup>	0.5		
PENTACHLORONAPHTHALENE, INHALABLE FRACTION & VAPOUR	1321-64-8		No BC exposure limit		
PENTACHLOROPHENOL	87-86-5	mg/m <sup>3</sup>	0.5		
2,4-PENTANEDIONE	123-54-6		No BC exposure limit		
PERACETIC ACID	79-21-0		No BC exposure limit		
PHENYL ISOCYANATE	103-71-9	ppm	0.005		0.01
PHENYL MERCAPTAN	108-98-5	ppm			0.1
PHOSPHINE	7803-51-2	ppm	0.3	1	
o-PHTHALALDEHYDE	643-79-8		No BC exposure limit		
PHTHALIC ANHYDRIDE	85-44-9	ppm	1		
o-PHTHALODINITRILE	91-15-6		No BC exposure limit		
PIPERAZINE AND ITS SALTS, as PIPERAZINE	110-85-0	mg/m <sup>3</sup>	0.3	1	
PIPERIDINE	110-89-4	ppm	1		
PLASTER OF PARIS, TOTAL	26499-65-0	mg/m <sup>3</sup>	10	20	
PROPOXUR	114-26-1	mg/m <sup>3</sup>	0.5		
n-PROPYL ACETATE	109-60-4	ppm	200	250	
PROPYL ACETATE ISOMERS (including ISOPROPYL ACETATE and n-PROPYL ACETATE)	108-21-4, 109-60-4		(See individual exposure limits for ISOPROPYL ACETATE and n-PROPYL ACETATE)		
PROPYLENE GLYCOL ETHYL ETHER	1569-02-4		No BC exposure limit		
PROPYLENEIMINE	75-55-8	ppm	2		
RESIN ACIDS, as TOTAL RESIN ACIDS	8050-09-7		No BC exposure limit		
ROSIN CORE SOLDER THERMAL DECOMPOSITION PRODUCTS (COLOPHONY)	8050-09-7		No BC exposure limit (L)		
RHODIUM, METAL AND INSOLUBLE COMPOUNDS, as Rh	7440-16-6	mg/m <sup>3</sup>	0.1	0.3	
RHODIUM, SOLUBLE COMPOUNDS, as Rh	7440-16-6	mg/m <sup>3</sup>	0.001	0.003	
SELENIUM AND COMPOUNDS, as Se	7782-49-2	mg/m <sup>3</sup>	0.1		
SILICA, AMORPHOUS:					
DIATOMACEOUS EARTH, UNCALCINED, TOTAL	61790-53-2	mg/m <sup>3</sup>	4		
DIATOMACEOUS EARTH, UNCALCINED, RESPIRABLE	61790-53-2	mg/m <sup>3</sup>	1.5		
PRECIPITATED SILICA and SILICA GEL, TOTAL	112926-00-8	mg/m <sup>3</sup>	4		
PRECIPITATED SILICA and SILICA GEL, RESPIRABLE	112926-00-8	mg/m <sup>3</sup>	1.5		
SILICA FUME, TOTAL	69012-64-2	mg/m <sup>3</sup>	4		
SILICA FUME, RESPIRABLE	69012-64-2	mg/m <sup>3</sup>	1.5		
SILICON TETRAHYDRIDE (SILANE)	7803-62-5	ppm	0.5	1	
SILVER AND COMPOUNDS, as Ag	7440-22-4	mg/m <sup>3</sup>	0.01	0.03	
SIMAZINE	122-34-9		No BC exposure limit		

Substance/Chemical Name	CAS No.	Unit	8-hour TWA Limit	Short-term exposure Limit, STEL	Ceiling Limit
STEARATES	57-11-4; 557-04-0; 557-05-1; 822-16-2	mg/m <sup>3</sup>	10 (J)		
STODDARD SOLVENT (MINERAL SPIRITS)	8052-41-3	mg/m <sup>3</sup>	290	580	
STRONTIUM CHROMATE, as Cr, TOTAL	7789-06-2	mg/m <sup>3</sup>	0.0005		
STYRENE	100-42-5	ppm	20	40	
STYRENE OXIDE	96-09-3	ppm	No BC exposure limit		
SULFOMETURON METHYL	74222-97-2	mg/m <sup>3</sup>	5		
SULFOMETURON METHYL, INHALABLE FRACTION & VAPOUR	74222-97-2		No BC exposure limit		
SULFOXAFLOR	946578-00-3		No BC exposure limit		
SULFUR DIOXIDE	7446-09-5	ppm	2	5	
SULFUR PENTAFLUORIDE	5714-22-7	ppm			0.01
SULPROFOS	35400-43-2	mg/m <sup>3</sup>	1		
TANTALUM and TANTALUM OXIDE dusts, as Ta	7440-25-7	mg/m <sup>3</sup>	5		
TEMEPHOS, TOTAL	3383-96-8		(See individual exposure limits for ABATE (TEMEPHOS), TOTAL)		
1,1,2,2-TETRABROMOETHANE, INHALABLE FRACTION & VAPOUR	79-27-6	ppm	0.1		
1,1,1,2-TETRACHLORO-2,2-DIFLUOROETHANE	76-11-9	ppm	500		
1,1,2,2-TETRACHLORO-1,2-DIFLUOROETHANE	76-12-0	ppm	200		
TETRAETHYL LEAD, as Pb	78-00-2	mg/m <sup>3</sup>	0.075		
TETRAMETHYL LEAD, as Pb	75-74-1	mg/m <sup>3</sup>	0.075		
TETRAMETHYL SUCCINONITRILE	3333-52-6	ppm	0.5		
THIACLOPRID	111988-49-9		No BC exposure limit		
THIODICARB	59669-26-0		No BC exposure limit		
THIOGLYCOLIC ACID	68-11-1	ppm	1		
THIOGLYCOLIC ACID and salts	68-11-1		No BC exposure limit		
THIONYL CHLORIDE	7719-09-7	ppm			1
THIRAM	137-26-8	mg/m <sup>3</sup>	1		
TIN and INORGANIC COMPOUNDS, excluding TIN HYDRIDE and INDIUM TIN OXIDE, as Sn	7440-31-5; 18282-10-5; 21651-19-4		(See individual exposure limits for TIN and INORGANIC COMPOUNDS, excluding TIN HYDRIDE, as Sn, METAL; and for TIN and INORGANIC COMPOUNDS, excluding TIN HYDRIDE, as Sn, OXIDE and INORGANIC COMPOUNDS)		
TIN and INORGANIC COMPOUNDS, excluding TIN HYDRIDE, as Sn, METAL	7440-31-5	mg/m <sup>3</sup>	2		
TIN and INORGANIC COMPOUNDS, excluding TIN HYDRIDE, as Sn, OXIDE and INORGANIC COMPOUNDS	7440-31-5	mg/m <sup>3</sup>	2		
2,4-TOLUENE DIISOCYANATE (TDI)	584-84-9	ppm	0.005		0.01
2,6-TOLUENE DIISOCYANATE (TDI)	91-08-7	ppm	0.005		0.01
2,4- and 2,6-TOLUENE DIISOCYANATE AS A MIXTURE	584-84-9 91-08-7		No BC exposure limit (see section 5.51, OHSR)		

Substance/Chemical Name	CAS No.	Unit	8-hour TWA Limit	Short-term exposure Limit, STEL	Ceiling Limit
TRIBUTYL PHOSPHATE	126-73-8	ppm	0.2		
1,2,3-TRICHLOROPROPANE	96-18-4	ppm	10		
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	ppm	500	1250	
TRIMELLITIC ANHYDRIDE	552-30-7	mg/m <sup>3</sup>			0.04
TRIMETHYL HEXAMETHYLENE DIISOCYANATE	28679-16-5	ppm	0.005		0.01
2,4,6-TRINITROTOLUENE (TNT), TOTAL	118-96-7	mg/m <sup>3</sup>	0.1		
2,4,6-TRINITROTOLUENE (TNT), INHALABLE FRACTION & VAPOUR	118-96-7		No BC exposure limit		
TRIORTHOCRESYL PHOSPHATE	78-30-8	mg/m <sup>3</sup>	0.1		
TRI-n-BUTYL TIN COMPOUNDS	688-73-3	mg/m <sup>3</sup>	0.05		
TUNGSTEN as W					
Metal and insoluble compounds	7440-33-7	mg/m <sup>3</sup>	5	10	
Soluble compounds	7440-33-7	mg/m <sup>3</sup>	1	3	
URANIUM COMPOUNDS, NATURAL, SOLUBLE, as U	7440-61-1	mg/m <sup>3</sup>	0.05		
VEGETABLE OIL MIST, RESPIRABLE FRACTION, EXCEPT CASTOR, CASHEW NUT, OR SIMILAR IRRITATING OILS	8008-89-7	mg/m <sup>3</sup>	3		
VINYLDENE CHLORIDE	75-35-4	ppm	1		
VINYL TOLUENE, ALL ISOMERS	25013-15-4	ppm	25	75	
WARFARIN	81-81-2	mg/m <sup>3</sup>	0.1		
WOOD DUST:					
ALLERGENIC		mg/m <sup>3</sup>	1		
NON-ALLERGENIC, HARDWOOD		mg/m <sup>3</sup>	1		
NON-ALLERGENIC, SOFTWOOD		mg/m <sup>3</sup>	2.5		
m-XYLENE ALPHA, ALPHA' -DIAMINE	1477-55-0	mg/m <sup>3</sup>			0.1
ZINC CHROMATES, as Cr, TOTAL	11103-86-9, 13530-65-9, 37300-23-5	mg/m <sup>3</sup>	0.01		
ZINC STEARATE, TOTAL	557-05-1	mg/m <sup>3</sup>	10	20	

(E) = the value is for particulate matter containing no asbestos and less than 1% crystalline silica

(N) = the 8-hour TWA listed in the Table is for the total dust. The substance also has an 8-hour TWA of 3 mg/m<sup>3</sup> for the respirable fraction

(J) = does not include stearates of toxic metals

(L) = exposure by all routes should be carefully controlled to levels as low as possible

## 2. Dusts

The Board categorizes particulates that are insoluble or poorly soluble in water and do not cause toxic effects other than by inflammation or the mechanism of "lung overload", as "nuisance dusts".

A "nuisance dust" will have an exposure limit or TLV of 10 mg/m<sup>3</sup> for total particulate. It is recognized that the respirable fraction of "nuisance dusts" may also be measured. The equivalent exposure limit for respirable particulate is 3 mg/m<sup>3</sup>. Respirable particulate refers to the fraction of inhaled dust that is capable of passing through the

upper respiratory tract to the gas exchange region of the lung. Total particulate refers to a wide range of particle sizes capable of being deposited in the various regions of the respiratory tract.

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<b>EFFECTIVE DATE:</b>	June 22, 2020
<b>AUTHORITY:</b>	Section 5.48 of the <i>OHSR</i> .
<b>CROSS REFERENCES:</b>	
<b>HISTORY:</b>	<p>June 22, 2020 – Housekeeping changes were made to add the following substances to the Table of Exposure Limits for Excluded Substances in accordance with the exposure limit review and adoption procedure:</p> <ul style="list-style-type: none"><li>4-tert-BUTYLBENZOIC ACID</li><li>CYCLOHEXENE</li><li>FORMAMIDE</li><li>HEXAZINONE</li><li>METHYL ISOBUTYL CARBINOL</li><li>RESIN ACIDS, as TOTAL RESIN ACIDS</li><li>ROSIN CORE SOLDER THERMAL DECOMPOSITION PRODUCTS (COLOPHONY)</li><li>STYRENE</li><li>STYRENE OXIDE</li><li>SULFUR PENTAFLUORIDE</li><li>THIODICARB</li></ul> <p>April 6, 2020 – Housekeeping changes.</p> <p>January 6, 2020 – Changes were made to remove the following substances from the Table of Exposure Limits for Excluded Substances in accordance with the exposure limit review and adoption procedure:</p> <ul style="list-style-type: none"><li>CALCIUM SILICATE, NATURALLY OCCURRING AS WOLLASTONITE</li><li>CALCIUM SILICATE, SYNTHETIC NONFIBROUS</li><li>FORMALDEHYDE</li><li>FURFURAL</li><li>LIQUIFIED PETROLEUM GAS</li><li>STYRENE</li></ul> <p>And to add BORON TRIFLUORIDE (8-hour TWA Limit) to the Table of Exposure Limits for Excluded Substances.</p> <p>November 22, 2019 – Housekeeping changes were made to replace the term Occupational Exposure Limit (“OEL”) with Exposure Limit within this policy to ensure consistency with the terminology used throughout the <i>OHSR</i>.</p> <p>May 15, 2019 – Housekeeping changes were made to add the following substances to the Table of Occupational Exposure Limits for</p>

Excluded Substances in accordance with the OEL review and adoption procedure:

CHLORDANE  
CHLORDANE, INHALABLE FRACTION & VAPOUR  
o-CHLOROBENZYLIDENE MALONONITRILE  
COBALT and INORGANIC COMPOUNDS, as Co, TOTAL  
COBALT and INORGANIC COMPOUNDS, as Co, INHALABLE  
CYANAZINE  
CYCLOPENTADIENE  
DICYCLOPENTADIENE  
DICYCLOPENTADIENE, including CYCLOPENTADIENE  
DIMETHYLPHENOL, ALL ISOMERS  
DINITROBENZENE, ALL ISOMERS  
DINITRO-O-CRESOL  
EPN, INHALABLE  
EPN, INHALABLE FRACTION & VAPOUR  
FLUORINE, as F  
INDIUM TIN OXIDE, as In  
ISOBUTYL NITRITE, INHALABLE FRACTION & VAPOUR  
4,4'-METHYLENE BIS(2-CHLOROANILINE)  
METHYLTETRAHYDROPHthalic ANHYDRIDE ISOMERS  
METHYL VINYL KETONE  
MONOMETHYLFORMAMIDE  
NITRAPYRIN  
NITRAPYRIN, INHALABLE FRACTION & VAPOUR  
5-NITRO-O-TOLUIDINE, INHALABLE  
5-NITRO-O-TOLUIDINE, INHALABLE FRACTION & VAPOUR  
PENTACHLORONAPHTHALENE  
PENTACHLORONAPHTHALENE, INHALABLE FRACTION & VAPOUR  
o-PHTHALALDEHYDE  
PROPYLENE GLYCOL ETHYL ETHER  
SULFOMETURON METHYL  
SULFOMETURON METHYL, INHALABLE FRACTION & VAPOUR  
SULFOXAFLOL  
TEMEPHOS, TOTAL

1,1,2,2-TETRABROMOETHANE, INHALABLE FRACTION & VAPOUR

TETRAMETHYL SUCCINONITRILE

THIACLOPRID

TIN and INORGANIC COMPOUNDS, excluding TIN HYDRIDE and INDIUM TIN OXIDE, as Sn

TIN and INORGANIC COMPOUNDS, excluding TIN HYDRIDE, as Sn, METAL

TIN and INORGANIC COMPOUNDS, excluding TIN HYDRIDE, as Sn, OXIDE and INORGANIC COMPOUNDS

2,4,6-TRINITROTOLUENE (TNT), TOTAL

2,4,6-TRINITROTOLUENE (TNT), INHALABLE FRACTION & VAPOUR

m-XYLENE ALPHA, ALPHA'-DIAMINE

July 3, 2018 – Housekeeping changes were made to add the following substances to the Table of Occupational Exposure Limits for Excluded Substances in accordance with the OEL review and adoption procedure:

ALDICARB

ALLYL METHACRYLATE

BENDIOCARB

BORON TRIFLUORIDE ETHERS, as BF<sub>3</sub>

tert-BUTYL HYDROPEROXIDE

CALCIUM CHROMATE, as Cr, TOTAL

CARFENTRAZONE-ETHYL

CHLORINE

CHLORINE DIOXIDE

CHROMITE ORE PROCESSING (CHROMATE), as Cr, TOTAL

CHROMIUM AND INORGANIC COMPOUNDS

- METALLIC CHROMIUM, as Cr(0), INHALABLE
- TRIVALENT CHROMIUM COMPOUNDS, as Cr(III), INHALABLE
- HEXAVALENT CHROMIUM COMPOUNDS, as Cr(VI), INHALABLE
- CHROMYL CHLORIDE, as Cr(VI), INHALABLE FRACTION & VAPOUR
- CHROMITE ORE PROCESSING, TOTAL

CHROMYL CHLORIDE, TOTAL

CYANOACRYLATES, ETHYL and METHYL  
DIMETHYLACETAMIDE  
DIMETHYLFORMAMIDE  
ETHYL CYANOACRYLATE  
FLUDRIOXONIL  
ISOPROPYL ACETATE  
LEAD CHROMATE, as Cr(VI), INHALABLE  
LEAD CHROMATE, as Cr, TOTAL  
LEAD CHROMATE, as Pb, TOTAL  
METHYL 2-CYANOACRYLATE  
PARAQUAT, as the cation  
PHOSPHINE  
n-PROPYL ACETATE  
PROPYL ACETATE ISOMERS  
STRONTIUM CHORMATE, as Cr, TOTAL  
THIOGLYCOLIC ACID and salts  
ZINC CHROMATES, as Cr, TOTAL

July 3, 2018 – Housekeeping changes were made to remove the following six substances from the Table of Occupational Exposure Limits for Excluded Substances in accordance with the OEL review and adoption procedure:

ACETYLENE	HYDROGEN
ARGON	NEON
HELIUM	NITROGEN

July 3, 2018 – The following editorial changes were made to the Table of Occupational Exposure Limits for Excluded Substances to improve readability and clarity:

- Adding a clarifying opening statement regarding substances' size-selective exposure limits
- Standardizing terminology for substances and exposure limits with size-selective fractions
- Changing "No previous limit" to "No BC exposure limit"
- Implementing formatting changes



June 1, 2018 – Housekeeping changes were made to add the following substances to the Table of Occupational Exposure Limits for Excluded Substances in accordance with the OEL review and adoption procedure:

GLYCERIN MIST, TOTAL AEROSOL	MANGANESE, ELEMENTAL AND INORGANIC COMPOUNDS, as Mn, RESPIRABLE FRACTION
MANGANESE, ELEMENTAL AND INORGANIC COMPOUNDS, as Mn, INHALABLE FRACTION	NICKEL CARBONYL, as Ni

June 1, 2018 – Housekeeping changes were made to remove sixteen substances to the Table of Occupational Exposure Limits for Excluded Substances in accordance with the OEL review and adoption procedure:

ACETONE	METHYL ISOAMYL KETONE
ALIPHATIC HYDROCARBON GASES, ALKANES [C <sub>1</sub> – C <sub>4</sub> ]	METHYL ISOCYANATE
BARIUM SULFATE	NAPHTHALENE
1-BROMOPROPANE	OXALIC ACID, ANHYDROUS
BUTANE, ISOMERS;	
• n-BUTANE	OXALIC ACID, DIHYDRATE
• ISOBUTANE	PENTANE, ALL ISOMERS
ETHYL TERT-BUTYL ETHER	
1-METHOXY-2-PROPANOL	TRICHLOROACETIC ACID
METHYL FORMATE	TRIETHYLAMINE

The following substances / chemical names were corrected:

- GLYCERIN MIST, RESPIRABLE was corrected to GLYCERIN MIST, RESPIRABLE FRACTION
- MANGANESE, ELEMENTAL AND INORGANIC COMPOUNDS, as Mn was corrected to MANGANESE, ELEMENTAL AND INORGANIC COMPOUNDS, as Mn, TOTAL DUST
- NICKEL CARBONYL was corrected to NICKEL CARBONYL, as Ni

June 1, 2017 – Housekeeping changes were made to remove the following substances to the Table of Occupational Exposure Limits for Excluded Substances in accordance with the OEL review and adoption procedure:

ACETAMIDE	FOLPET
ISOBUTANE	FURFURAL
CADUSAFOS	HEXYLENE GLYCOL
CAPTAFOL	PHTHALIC ANHYDRIDE
β-CHLOROPRENE	STEARATES

ETHYLENE GLYCOL (AEROSOL)	TUNGSTEN as W, metal and insoluble compounds; soluble compounds
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July 15, 2016 – Housekeeping changes were made to add the following substances to the Table of Occupational Exposure Limits for Excluded Substances in accordance with the OEL review and adoption procedure.

BORON TRIBROMIDE	HARD METALS, containing COBALT and TUNGSTEN CARBIDE as Co
BORON TRICHLORIDE	ISOBUTYL ACETATE
BORON TRIFLUORIDE	PROPOXUR
SEC-BUTYL ACETATE	SIMAZINE
TERT-BUTYL ACETATE	TOLUENE DIISOCYANATE, 2,4- and 2,6- as a mixture
CALCIUM SILICATE, naturally occurring as WOLLASTONITE	TRIORTHOCRESYL PHOSPHATE
CALCIUM SILICATE, synthetic nonfibrous	WARFARIN
CYANOGEN	

May 1, 2015 – Changes were made to add the following substances to the Table of Occupational Exposure Limits for Excluded Substances:

ACETYLENE	OXALIC ACID, ANHYDROUS and DIHYDRATE
CYANOGEN BROMIDE (NEW TLV)	1,2,3- TRICHLOROPROPANE
LITHIUM HYDRIDE	TRIETHYLAMINE
METHYL FORMATE	

February 1, 2015 – Changes were made to remove eight substances from the Table of Occupational Exposure Limits for Excluded Substances:

BERYLLIUM AND COMPOUNDS	ALPHA-METHYL STYRENE
CARBONYL SULFIDE	NONANE
DIACETYL	PORTLAND CEMENT
ETHYL FORMATE	VANADIUM PENTOXIDE

April 7, 2014 – Changes were made to correct the exposure limit for Ethylidene norbornene.

April 1, 2014 – Changes were made to add 17 substances to the Table of Occupational Exposure Limits for Excluded Substances:

ARGON	METHYL ISOCYANATE
ATRAZINE	NAPHTHALENE
BARIUM SULFATE	NEON
1-BROMOPROPANE	NITROGEN
ETHYLIDENE NORBORNENE	PENTACHLOROPHENOL
ETHYL ISOCYANATE	PENTANE, all isomers
HELIUM	PERACETIC ACID
HYDROGEN	TRICHLOROACETIC ACID
METHOMYL	

May 1, 2013 – Changes were made to add eight substances to the Table of Occupational Exposure Limits for Excluded Substances:

ALIPHATIC HYDROCARBON GASES, ALKANES [C<sub>1</sub> – C<sub>4</sub>]  
 CLOPIDOL  
 DIETHYLENE GLYCOL MONOBUTYL ETHER  
 N,N-DIETHYLHYDROXYLAMINE  
 ETHYL TERT-BUTYL ETHER  
 MANGANESE, elemental and inorganic compounds, as Mn  
 METHYL ISOAMYL KETONE  
 TRIBUTYL PHOSPHATE

April 10, 2012 – Changes were made to add six substances to the Table of Occupational Exposure Limits for Excluded Substances:

ALLYL BROMIDE	CARBONYL SULFIDE
DIACETYL	ETHYL FORMATE
o-PHTHALODINITRILE	NONANE

CAS No for piperazine and its salts was corrected from 142-64-3 to 110-85-0.

October 14, 2011 – Housekeeping change to correct the reference to section 5.57 of the *OHSR*. This is not a substantive change.

September 15, 2011– Changes were made to remove seven substances from the Table of Occupational Exposure Limits for Excluded Substances:

ACETIC ANHYDRIDE	CARBON BLACK
ETHYL BENZENE	METHYL ISOPROPYL KETONE
SOAPSTONE	SOAPSTONE, RESPIRABLE
4,4' THIOBIS (6-tert-butyl-m-CRESOL)	

June 1, 2011 – Changes were made to remove three substances from the Table of Occupational Exposure Limits for Excluded Substances:

COTTON DUST, raw	METHYL ISOBUTYL KETONE
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**THALLIUM AND SOLUBLE COMPOUNDS**

June 1, 2011 – Housekeeping changes to replace “exposure level” with “exposure limit” in item 3 of the Background of this Policy. These changes also add 2,4-Pentanedione to the Table of Occupational Exposure Limits for Excluded Substances pursuant to the Occupational Exposure Limit review and adoption procedure approved by the Board of Directors at their March 2010 meeting.

April 19, 2011 – Housekeeping changes in accordance with the new Occupational Exposure Limit review and adoption procedure approved by the Board of Directors at their March 2010 meeting.

The changes add seven substances to the Table of Occupational Exposure Limits for Excluded Substances:

- |                                      |                  |
|--------------------------------------|------------------|
| ACETIC ANHYDRIDE                     | CARBON BLACK     |
| ETHYL BENZENE                        | MALEIC ANHYDRIDE |
| METHYL ISOPROPYL KETONE              | SOAPSTONE        |
| 4,4' THIOBIS (6-tert-butyl-m-CRESOL) |                  |

September 15, 2010 – Housekeeping changes to update regulation reference, delete practice reference, and make formatting changes.

September 1, 2010 – The Table of Occupational Exposure Limits for Excluded Substances has been amended to include 18 substances for which the Board of Directors has made an exception to the adoption of these substances for which the American Conference of Governmental Industrial Hygienists changed the Threshold Limit Values in 2008 and 2009. The effect of this amendment is that the substances will be re-assigned the OELs that were in effect prior to the revision by ACGIH. The Table of Occupational Exposure Limits for Excluded Substances has been amended to delete two substances so the more protective American Conference of Governmental Industrial Hygienists Threshold Limit Values will now apply to these substances.

April 1, 2010 – The Table of Occupational Exposure Limits for Excluded Substances has been amended to include new or revised substances for which the American Conference of Governmental Industrial Hygienists has changed the Threshold Limit Values in 2010. The effect of this amendment was that the existing occupational exposure limits for these substances continue to be in effect.

October 29, 2003 – This item was originally developed to implement the amendments made to the *OHSR* pertaining to occupational exposure limits. A review of the policy was conducted to ensure that all substances for which an exception was warranted were listed, and there was no duplication with the information provided by the ACGIH. Each amendment of this policy applies to incidents occurring on and after the effective date of the amendment. If a decision made before the amendment effective date is within the appeal period, at Review Division, or at WCAT, it remains subject to the policy in effect at the time of the incident.

**APPLICATION:**