

# SAFETY DATA SHEET

Version: 1.0

Date of Issue: 27 March 2018

Date of First Issue: 27 March 2018

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In accordance with Schedule 1 of the Hazardous Products Regulations (HPR) (WHMIS 2015)

## SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

### Product identifier

Product Name M-Bond 610 Adhesive  
Other Means of Identification None

### Recommended use and restrictions

Recommended use Adhesives.  
Restrictions on use None known.

### Initial Supplier Identifier

Company Identification VISHAY MEASUREMENTS GROUP, INC.  
Post Office Box 27777  
Raleigh, NC 27611  
USA  
Telephone (+1) 800.204.6278  
E-Mail (competent person) [mm.us@vishaypg.com](mailto:mm.us@vishaypg.com)

### Emergency telephone number

Emergency Phone No. 1-800-424-9300 CHEMTREC (24 hours)  
Languages spoken English

## SECTION 2: HAZARDS IDENTIFICATION

### Classification of the substance or mixture

#### In accordance with Schedule 1 of the Hazardous Products Regulations (HPR) (WHMIS 2015)

Flammable Liquid - Category 2  
Skin corrosion/irritation - Category 2  
Eye Irritation - Category 2  
Skin Sensitisation - Category  
Specific target organ toxicity — single exposure - Category 3  
Carcinogenicity - Category 2  
Hazardous to the aquatic environment, Chronic - Category 2

### Label elements

Hazard Pictogram(s)



Signal Word(s)

DANGER

Hazard Statement(s)

Highly flammable liquid and vapour.  
Causes skin irritation.  
May cause an allergic skin reaction.  
Causes serious eye irritation.  
May cause drowsiness or dizziness.  
May cause respiratory irritation.  
Suspected of causing cancer.  
Harmful to aquatic life with long lasting effects.

Precautionary Statement(s)

Do not breathe vapour. Obtain special instructions before use.  
Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.  
Keep container tightly closed.  
Avoid breathing vapours.

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Wash hands and exposed skin thoroughly after handling.  
Wear protective gloves/protective clothing/eye protection/face protection.  
IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell.  
Rinse mouth.  
IF ON SKIN: Wash with plenty of water.  
If skin irritation or rash occurs: Get medical advice/attention.  
IF INHALED: Remove person to fresh air and keep comfortable for breathing.  
Call a POISON CENTER/doctor if you feel unwell.  
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
If eye irritation persists, get medical advice/attention.  
IF exposed or concerned: Get medical advice/attention.

## Other hazards

May form explosive peroxides.

## SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Substances Not applicable

## Mixtures

GHS Classification

Chemical Name	CAS No.	Concentration (%W/W)	Common name(s), synonym(s) of the substance	Hazard classification
Tetrahydrofuran	109-99-9	<70	Tetramethylene oxide; Butane, 1,4-epoxy-	Flammable Liquids - Category 2 Eye Irritation - Category 2 (SCL ≥ 25%) Acute Toxicity (Oral) - Category 4 Specific Target Organ Toxicity - Single Exposure - Category 3 (Narcotic effects / Respiratory Tract Irritation) (SCL ≥ 25%) Carcinogenicity - Category 2
Polymer of Epichlorohydrin (Phenol-Formaldehyde Novolac)	28064-14-4	<35	Phenol, polymer with formaldehyde, glycidyl ether; Bisphenol F - Phenol Polymer	Skin Irritation - Category 2 Skin Sensitizer - Category 1 Eye Irritation - Category 2 Hazardous to the aquatic environment, Chronic - Category 2
Ethyl methyl ketone	78-93-3	<15	Butanone; Butan-2-one; Methyl ethyl ketone	Flammable Liquids - Category 2 Eye Irritation - Category 2 Specific Target Organ Toxicity - Single Exposure - Category 3 (Narcotic effects / CSN)

## SECTION 4: FIRST AID MEASURES



### Description of first aid measures

Self-protection of the first aider

Inhalation

Skin Contact

Use personal protective equipment as required. Wear appropriate personal protective equipment, avoid direct contact. Ensure adequate ventilation. Avoid breathing vapours. Avoid all contact. Contaminated clothing should be laundered before reuse.

IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell.

IF ON SKIN: Remove contaminated clothing and wash all affected areas with plenty of water. Wash contaminated clothing before reuse. If skin irritation or rash

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Eye Contact	occurs: Get medical advice/attention. IF exposed or concerned: Get medical advice/attention. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention. IF exposed or concerned: Get medical advice/attention.
Ingestion	IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth. Make victim drink plenty of water. Do not give anything by mouth to an unconscious person. Do not induce vomiting unless instructed to do so by medical personnel. IF exposed or concerned: Get medical advice/attention.
<b>Most important symptoms and effects, both acute and delayed</b>	Causes skin irritation. May cause an allergic skin reaction. Causes serious eye irritation. May cause respiratory irritation. May cause an allergic skin reaction. May cause drowsiness or dizziness. Suspected of causing cancer.
<b>Indication of any immediate medical attention and special treatment needed</b>	Treat symptomatically. IF INHALED: Respiratory symptoms, including pulmonary edema, may be delayed. IF IN EYES: After rinsing affected eyes must be seen by an ophthalmologist.

## SECTION 5: FIRE-FIGHTING MEASURES

### Extinguishing media

Suitable Extinguishing Media

As appropriate for surrounding fire. Extinguish with carbon dioxide, dry chemical, foam or waterspray.

Unsuitable extinguishing Media

Do not use water jet. Direct water jet may spread the fire.

### Special hazards arising from the substance or mixture

Highly flammable liquid and vapour. May decompose in a fire giving off toxic fumes. Carbon monoxide, Carbon dioxide, Phenolic and Explosive Peroxides. Vapours are heavier than air and may travel considerable distances to a source of ignition and flashback. Prevent liquid entering sewers, basements and workpits; vapour may create explosive atmosphere. May form explosive peroxides.

### Special protective equipment and precautions for fire fighters

Fire fighters should wear complete protective clothing including self-contained breathing apparatus. Do not breathe fumes. Keep containers cool by spraying with water if exposed to fire. Avoid run off to waterways and sewers.

## SECTION 6: ACCIDENTAL RELEASE MEASURES

### Personal precautions, protective equipment and emergency procedures

Ensure adequate ventilation. Stop leak if safe to do so. Eliminate all ignition sources if safe to do so. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use personal protective equipment as required. See Section: 8. Avoid breathing vapours.

### Environmental precautions

Avoid release to the environment. Do not allow to enter drains, sewers or watercourses. Spillages or uncontrolled discharges into watercourses must be alerted to the Environment Agency or other appropriate regulatory body. Prevent liquid entering sewers, basements and workpits; vapour may create explosive atmosphere.

### Methods and material for containment and cleaning up

Use non-sparking equipment when picking up flammable spill. Adsorb spillages onto sand, earth or any suitable adsorbent material. Transfer to a container for disposal. Ventilate the area and wash spill site after material pick-up is complete. Dispose of this material and its container as hazardous waste.

### Reference to other sections

See Section: 8, 13

## SECTION 7: HANDLING AND STORAGE

### Precautions for safe handling

Ensure operatives are trained to minimise exposures. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Avoid all contact. Do not breathe vapour. Ensure adequate ventilation. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. May form explosive peroxides. Take precautionary measures against static discharges. Use personal protective equipment as required. See Section: 8. Do not eat, drink or smoke when using this product. Wash hands before breaks and after work.

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**Conditions for safe storage, including any incompatibilities**

Storage temperature  
Incompatible materials

**Specific end use(s)**

Ground/bond container and receiving equipment. Keep only in original container. Store in a well-ventilated place. Keep container tightly closed. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. May form explosive peroxides. Keep away from direct sunlight. Ambient. Keep at temperature not exceeding (°C): 32  
Keep away from: Oxidizing agents, Corrosive Substances, Reducing agents, Strong Acids and Alkalis.  
Adhesives

## SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

**Control parameters**

**Occupational Exposure Limits**

SUBSTANCE	CAS No.	ACGIH® TLV® (ppm)		OSHA PEL (ppm)		Note
		TWA	STEL	TWA	STEL	
Tetrahydrofuran	109-99-9	50	100	200	-	A3
Ethyl methyl ketone	78-93-3	200	300	200	-	-

Source: ACGIH: American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) OSHA PELs 1910.1000

Note: A3: Confirmed Animal Carcinogen with Unknown Relevance to Humans: The agent is carcinogenic in experimental animals at a relatively high dose, by route(s) of administration, at site(s), of histological type(s), or by mechanism(s) that may not be relevant to worker exposure. Available epidemiological studies do not confirm an increased risk of cancer in exposed humans. Available evidence does not suggest that the agent is likely to cause cancer in humans except under uncommon or unlikely routes or levels of exposure.

Alberta: Occupational Health And Safety Code, 2009; Quebec: Health and Safety Work Act, 2016

SUBSTANCE	CAS No.	8-hour Occupational Exposure Limits			15-minute or ceiling Occupational Exposure Limits		Note
		ppm	mg/m <sup>3</sup>	f/cc	STEL (ppm)	STEL (mg/m <sup>3</sup> )	
Tetrahydrofuran	109-99-9	50	147	-	100	295	Alberta, 1
		100	300	-	-	-	OEL
Ethyl methyl ketone	78-93-3	200	590	-	300	885	Alberta
		50	150	-	100	300	OEL

Source: Alberta: Occupational Health And Safety Code, 2009

OEL: Quebec Work Health and Safety Regulations, Health and safety work Act, (chapter S – 2.1, a. 223)

1: Can be readily absorbed through intact skin.

British Columbia: Occupational Health and Safety Guidelines, 2015; Northwest Territories: Occupational Health & Safety Regulations, 2012; Yukon Territory: Occupational Health and Safety Act, 1986

SUBSTANCE	CAS No.	LTEL (8 hr TWA ppm)	LTEL (8 hr TWA mg/m <sup>3</sup> )	STEL (ppm)	STEL (mg/m <sup>3</sup> )	Note
Tetrahydrofuran	109-99-9	50	-	100	-	WEL, Sk
		50	-	100	-	NW, Sk
Ethyl methyl ketone	78-93-3	50	-	100	-	WEL
		200	-	300	-	NW
		200	590	250	740	YK

Source: WEL: Occupational Health and Safety Guidelines Part 5: Chemical Agents and Biological Agents (British Columbia)

NW: WSCC, Occupational Health & Safety Regulations, Northwest Territories Volume 3

Yukon Territory (YK): Occupational Health and Safety Act . O.I.C. 1986/164 Occupational Health Regulations.

Sk - Can be absorbed through skin.

Ontario: Occupational Health and Safety Act, 1990; Saskatchewan: The Occupational Health and Safety Regulations, 1996.

SUBSTANCE	CAS No.	Time Weighted Average (TWA) (ppm)	STEL (ppm)	Note
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Tetrahydrofuran	109-99-9	50	100	WEL
Ethyl methyl ketone	78-93-3	200	300	WEL
		200	300	SK

Source: WEL: Occupational Health and Safety Act, R.R.O. 1990, REGULATION 833, CONTROL OF EXPOSURE TO BIOLOGICAL OR CHEMICAL AGENTS (Ontario)

Saskatchewan (SK): The Occupational Health and Safety Act, 1993. O-1.1 REG 1 The Occupational Health and Safety Regulations, 1996.

## Biological limit value

SUBSTANCE	CAS No.	Biological exposure determinant factors	Biological Exposure Indices	Sampling Time	Note
Tetrahydrofuran	109-99-9	Tetrahydrofuran: Urine	2 mg/L	End of Shift	Ns
Ethyl methyl ketone	78-93-3	Ethyl methyl ketone: Urine	2 mg/L	End of Shift	Ns

Source: 2015 ACGIH Biological Exposure Indices (BEIs)

Ns - Nonspecific

## Exposure controls

### Appropriate engineering controls

Ensure operatives are trained to minimise exposures. Ensure adequate ventilation. Atmospheric levels should be controlled in compliance with the occupational exposure limit.

### Individual protection measures, such as personal protective equipment (PPE)

General hygiene measures for the handling of chemicals are applicable. Keep good industrial hygiene. Avoid all contact. Avoid breathing vapours. Wash hands before breaks and after work. Keep work clothes separately. Do not eat, drink or smoke at the work place. IF exposed: Flush with fresh water if contact with skin or eyes.

Eye/face protection



Wear protective eye glasses for protection against liquid splashes. Wear eye protection with side protection.

Skin protection



### Hand protection:

Wear impervious gloves. Gloves should be changed regularly to avoid permeation problems. Breakthrough time of the glove material: refer to the information provided by the gloves' producer. Recommended: Polyethylene-Laminate (Minimum thickness 0.1mm).

### Body protection:

Wear impervious protective clothing, including boots, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Respiratory protection



In case of inadequate ventilation wear respiratory protection. A suitable mask with filter type A may be appropriate.

## SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

### Information on basic physical and chemical properties

Appearance	Almost colourless Liquid
Odour	Ether-like Odour
Odour threshold	Not available.
pH	Not established.
Melting point/freezing point	Not available.

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Initial boiling point and boiling range	66°C
Flash point	-14 °C (Mixture)
Evaporation rate (Water = 1)	8 (BuAc = 1)
Flammability (solid, gas)	Not applicable - Liquid
Upper/lower flammability or explosive limits	Flammable Limits (Upper) (%v/v): 11.8 (Acetone) Flammable Limits (Lower) (%v/v): 1.8 (Acetone)
Vapour pressure	129 (mmHg) @ 20°C
Vapour density	2.4 (Air = 1)
Relative density	0.9 (H <sub>2</sub> O = 1)
Solubility(ies)	Water: >50%
Partition coefficient: n-octanol/water	Not available.
Auto-ignition temperature	320 °C
Decomposition Temperature	Not available.
Viscosity	Not available.
Explosive properties	Not available. (May form explosive peroxides.)
Oxidising properties	Not oxidising.

#### Other information

Volatile Organic Compound Content: 712 g/L

## SECTION 10: STABILITY AND REACTIVITY

<b>Reactivity</b>	Stable under normal conditions. May form peroxides on prolonged storage if air is present.
<b>Chemical stability</b>	Stable under normal conditions.
<b>Possibility of hazardous reactions</b>	Highly flammable liquid and vapour. The vapour may be invisible, heavier than air and spread along ground. May form explosive peroxides. Contact with aliphatic amines will cause irreversible polymerization with considerable heat build-up.
<b>Conditions to avoid</b>	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Keep away from direct sunlight. Keep at a temperature not exceeding (°C): 32. Avoid contact with air. Avoid contact with heat and ignition sources and oxidizers. Avoid distillation to dryness, which can form explosive peroxides.
<b>Incompatible materials</b>	Oxidizing agents, Corrosive Substances, Reducing agents, Strong Acids and Alkalis.
<b>Hazardous decomposition product(s)</b>	May decompose in a fire giving off toxic fumes. Carbon monoxide, Carbon dioxide, Phenolic and Explosive Peroxides.

## SECTION 11: TOXICOLOGICAL INFORMATION

<b>Information on toxicological effects</b>	
<b>Acute toxicity - Ingestion</b>	Based upon the available data, the classification criteria are not met. Acute Toxicity Estimate Mixture Calculation: Estimated LC50 > 2000 mg/kg bw/day.
Tetrahydrofuran:	Acute Toxicity (Oral) - Category 4 LD50 1650 mg/kg bw/day (Unnamed, 1978)
<b>Acute toxicity - Inhalation</b>	Based upon the available data, the classification criteria are not met. Acute Toxicity Estimate Mixture Calculation: Estimated LC50 > 20.0 mg/l.
<b>Acute toxicity - Skin Contact</b>	Based upon the available data, the classification criteria are not met. Acute Toxicity Estimate Mixture Calculation: Estimated LC50 > 2000 mg/kg bw/day.
<b>Skin corrosion/irritation</b>	Skin Irritation - Category 2: Causes skin irritation.
Polymer of Epichlorohydrin (Phenol-Formaldehyde Novolac)	Skin Irritation - Category 2
Ethyl methyl ketone:	No data
	Not classified
	Prolonged skin contact will result in defatting of the skin, leading to irritation, and in some cases, dermatitis. (Smith R & Mayers MR, 1944).
<b>Serious eye damage/irritation</b>	Eye Irritation - Category 2: Causes eye irritation.
Tetrahydrofuran:	Eye Irritation - Category 2 EU Harmonised Classification
	No data.

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Polymer of Epichlorohydrin (Phenol-Formaldehyde Novolac)  
Ethyl methyl ketone

#### Respiratory or skin sensitization

Polymer of Epichlorohydrin (Phenol-Formaldehyde Novolac)

#### Germ cell mutagenicity

#### Carcinogenicity

Tetrahydrofuran:

#### Reproductive toxicity

#### STOT - single exposure

Tetrahydrofuran:

Ethyl methyl ketone

#### STOT - repeated exposure

#### Aspiration hazard

#### Other information

Eye Irritation - Category 2

No data

Eye Irritation - Category 2

Irritating to eyes. (rabbit) (OECD 405)

Skin Sensitizer - Category 1: May cause an allergic skin reaction.

Skin Sensitizer - Category 1

Allergic contact dermatitis (Pontén, A et al, 1999)

Based upon the available data, the classification criteria are not met.

Carcinogenicity - Category 2: Suspected of causing cancer.

Carcinogenicity - Category 2 EU Harmonised Classification

NOAEC 1800 ppm Suspected carcinogen (Unnamed, 1998)

Based upon the available data, the classification criteria are not met.

Specific target organ toxicity — single exposure - Category 3: May cause respiratory irritation. May cause drowsiness or dizziness.

Specific target organ toxicity — single exposure - Category 3

Central nervous depression (Malley, L.A. et al, 2001)

Specific target organ toxicity — single exposure - Category 3 Harmonised Classification

Rats at all dose levels: gait and/or posture abnormalities. Higher dose groups some rats were comatose or prostrate within a few hours of dosing, with some animals being unconscious for 24 hours. (OECD 423)

Based upon the available data, the classification criteria are not met.

Based upon the available data, the classification criteria are not met.

None known.

## SECTION 12: ECOLOGICAL INFORMATION

#### Toxicity

Polymer of Epichlorohydrin (Phenol-Formaldehyde Novolac)

#### Persistence and degradability

#### Bioaccumulative potential

#### Mobility in soil

#### Other adverse effects

Aquatic Chronic 2; Toxic to aquatic life with long lasting effects.

Estimated Mixture LC50 > 1 to ≤ 10 mg/l. (Fish)

Aquatic Chronic - Category 2

Aquatic acute: EC50 1.6 mg/l 48hr (Daphnia magna) (Wyness LE et al, 1993)

Aquatic chronic: No data

Part of the components are poorly biodegradable.

The product has low potential for bioaccumulation.

The substance is predicted to have high mobility in soil. Miscible with water.

None known.

## SECTION 13: DISPOSAL CONSIDERATIONS

#### Waste treatment methods

Dispose of this material and its container as hazardous waste. Send after pre-treatment to a appropriate hazardous waste incinerator facility according to legislation. Send after pre-treatment to a appropriate hazardous waste incinerator facility according to legislation.

## SECTION 14: TRANSPORT INFORMATION

	ADR/RID	IMDG	IATA/ICAO
14.1 UN number	UN 1133	UN 1133	UN 1133
14.2 UN proper shipping name	ADHESIVES containing flammable liquid	ADHESIVES containing flammable liquid	ADHESIVES containing flammable liquid
14.3 Transport hazard class(es)	3	3	3
14.4 Packing group	II	II	II
14.5 Environmental hazards	Environmentally hazardous substance	Classified as a Marine Pollutant.	Environmentally hazardous substance
14.6 Special precautions for user	Not applicable.		
14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code	See Section: 2		

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## SECTION 15: REGULATORY INFORMATION

### Safety, health and environmental

regulations/legislation specific for the substance or mixture

#### National regulations

CEPA, Domestic Substances List

Tetrahydrofuran: Yes

Polymer of Epichlorohydrin (Phenol-Formaldehyde Novolac): Yes

Ethyl methyl ketone: Yes

CEPA, List of Toxic Substances (Schedule 1)

Tetrahydrofuran: VOC - Item 65

Ethyl methyl ketone: VOC - Item 65

CEPA, National Pollutant Release Inventory

Tetrahydrofuran: Threshold Category: Part 5, Mass Threshold: 1 tonnes of 10 tonnes Total VOC air release, Concentration threshold: N/A

Ethyl methyl ketone: Threshold Category: Part 1A, Mass Threshold: 10 tonnes

Concentration threshold: 1%; Threshold Category: Part 5, Mass Threshold: 1

tonnes of 10 tonnes Total VOC air release, Concentration threshold: N/A

#### Non-Regional

IARC Monographs, List of Classifications

Tetrahydrofuran: 2B – in preparation

## SECTION 16: OTHER INFORMATION

The following sections contain revisions or new statements: Not applicable – V1.0

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### References:

Existing Safety Data Sheet (SDS).

EU: Harmonised Classification(s) for Tetrahydrofuran (CAS No. 109-99-9) and Ethyl methyl ketone (CAS No. 78-93-3). Existing ECHA registration(s) for Tetrahydrofuran (CAS No. 109-99-9) and Ethyl methyl ketone (CAS No. 78-93-3), and the Classification and Labelling Inventory for Polymer of Epichlorohydrin (Phenol-Formaldehyde Novolac) (CAS No. 28064-14-4).

### Literature References:

1. Smith R & Mayers MR, 1944, Study of poisoning and fire hazards of butanone and acetone, Industrial Hygiene: 23, 174-176
2. Pontén, A. and Bruze, M. (1999), Occupational allergic contact dermatitis from epoxy resins based on bisphenol F. Contact Dermatitis, 41: 235. doi:10.1111/j.1600-0536.1999.tb06149.x
3. Malley, L.A., Christoph G.R., Stadler, J.C., Hansen, J.F., Biesemeir, J.A. and Jasti, S., 2001, Acute and subchronic neurotoxicology evaluation of tetrahydrofuran by inhalation in rats, Drug Chem. Toxicol., 24(3): 201-219
4. Wyness LE, Cheeman H, Lad DD and Baldwin MK (1993), EPIKOTE 862: Acute toxicity to Oncorhynchus mykiss, Daphnia magna and Selenastrum capricornutum; SBGR.92.237

### LEGEND

LTEL: Long Term Exposure Limit

DNEL: Derived No Effect Level

PBT: Persistent, Bioaccumulative and Toxic

ACGIH: American conference of Governmental Industrial Hygiene

TLV: Threshold Limit Value (ACGIH)

OSHA = Occupational Safety and Health Administration

STEL: Short Term Exposure Limit

PNEC: Predicted No Effect Concentration

vPvB: very Persistent and very Bioaccumulative

BEI: Biological Exposure Indices (ACGIH)

TWA: Time Weighted Average

NIOSH: National Institute for Occupational Safety and Health  
Technical Information Center

CEPA (Canadian Environmental Protection Act)

EU: European Union

IARC: International Agency for Research on Cancer

VOC: Volatile Organic Compound

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