

SAFETY DATA SHEET

Version: 1.0
Date of Issue: 16 March 2018
Date of First Issue: 16 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 Denex 3
Other Means of Identification None

Recommended use and restrictions

Recommended use PC14 Metal surface treatment products, including galvanic and electroplating products
Restrictions on use Anything other than the above.

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

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 1
Specific target organ toxicity — single exposure - Category 2
Specific target organ toxicity — single exposure - Category 3
Specific target organ toxicity — repeated exposure - Category 2
Hazardous to the aquatic environment, Chronic - Category 3

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 damage to organs.
May cause drowsiness or dizziness.
May cause damage to organs through prolonged or repeated exposure.
Harmful to aquatic life with long lasting effects.

Precautionary Statement(s)

Do not breathe vapour.
Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
Keep container tightly closed.

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Wash hands and exposed skin thoroughly after handling.
Wear protective gloves/protective clothing/eye protection/face protection.
IF INHALED: Remove person to fresh air and keep comfortable for breathing.
Call a POISON CENTER/doctor if you feel unwell.
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
If skin irritation occurs: 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: Call a POISON CENTER/doctor.

Other hazards

None known.

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
Acetone	67-64-1	<80	Propan-2-one; Propanone	Flammable Liquids - Category 2 Eye Irritation - Category 2 Specific Target Organ Toxicity - Single Exposure - Category 3 (Narcotic effects / CSN)
Polymer of Epichlorohydrin (Phenol-Formaldehyde Novolac)	28064-14-4	<20	Phenol, polymer with formaldehyde, glycidyl ether; Bisphenol F - Phenol Polymer	Skin Irritation - Category 2 Skin Sensitizer - Category 1 Eye Irritation - Category 2 Aquatic Chronic - Category 2
4,4'Sulfonyldianiline	80-08-0	<5	Dapsone; 4,4'-diamino diphenyl sulfone	Acute Toxicity (Oral) - Category 4 Specific Target Organ Toxicity - Single Exposure - Category 2 (Hematological effects) Specific Target Organ Toxicity - Repeated Exposure - Category 2 (Hematological effects / Liver / Spleen) Aquatic Chronic - Category 2
Methyl ethyl ketone	78-93-3	<5	Butanone; Butan-2-one; Ethyl methyl ketone	Flammable Liquids - Category 2 Eye Irritation - Category 2 Specific Target Organ Toxicity - Single Exposure - Category 3 (Narcotic effects / CSN)
Boron Trifluoride Complex	75-23-0	<1	Ethanamine; trifluoroborane	Acute Toxicity (Inhalation) - Category 4 Skin Corrosion - Category 1 Specific Target Organ Toxicity - Single Exposure - Category 3 (Respiratory tract irritation)

SECTION 4: FIRST AID MEASURES



Description of first aid measures

Self-protection of the first aider

Use personal protective equipment as required. Wear appropriate personal protective equipment, avoid direct contact. Ensure adequate ventilation. Do not

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Inhalation	breath vapour. Avoid all contact. Contaminated clothing should be laundered before reuse. IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Keep warm and at rest. Apply artificial respiration if patient is not breathing. If breathing is laboured, oxygen should be administered by qualified personnel. Obtain medical attention.
Skin Contact	IF ON SKIN: Remove contaminated clothing and wash all affected areas with plenty of water. Contaminated clothing should be thoroughly cleaned. After cleaning apply high-fat content skin care cream. If skin irritation occurs: Get medical advice/attention.
Eye Contact	IF IN EYES: Flush eyes with water for at least 15 minutes while holding eyelids open. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if eye irritation develops or persists.
Ingestion	IF SWALLOWED: Do NOT induce vomiting. Rinse mouth. Drink two glasses of water. Do not give milk or alcoholic beverages. Do not give anything by mouth to an unconscious person. Keep warm and at rest. If aspiration is suspected obtain immediate medical attention.
Most important symptoms and effects, both acute and delayed	Causes skin irritation. May cause an allergic skin reaction. Causes serious eye irritation. May cause damage to organs. (Blood circulatory system). May cause drowsiness or dizziness. May cause damage to organs through prolonged or repeated exposure. (Blood circulatory system, Liver, Spleen). Inhalation of solvent vapours may give rise to nausea, headaches and dizziness. Swallowing small amounts is not likely to produce harmful effects. Ingestion of larger amounts may produce abdominal pain, nausea and vomiting.
Indication of any immediate medical attention and special treatment needed	Treat symptomatically. Latency of several hours is possible. If vomiting occurs spontaneously, keep head below hips to prevent aspiration into the lungs. Check the acid/alkali balance. After swallowing do not give any milk or digestible oils. Give a slurry of activated charcoal in water to drink.

SECTION 5: FIRE-FIGHTING MEASURES

Extinguishing media	
Suitable Extinguishing Media	As appropriate for surrounding fire. Alcohol resistant foams (ATC type) are preferred. Carbon dioxide.
Unsuitable extinguishing Media	Water is not generally recommended since it can be ineffective; however, it can be used successfully to cool containers exposed to the fire and to disperse fumes. 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. (Flash point 51 - 61°C). May decompose in a fire giving off toxic fumes. Oxides of carbon. Acetone vapours can form flammable mixtures with air. Vapours are heavier than air and may travel considerable distances to a source of ignition and flashback. Can form explosive mixture with air particularly in empty uncleaned receptacles.
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. Do not breathe vapour. Avoid all contact. Use personal protective equipment as required. See Section: 8.
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. Avoid contact with plastic. Adsorb spillages onto sand, earth or any suitable adsorbent material. Do

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NOT absorb in saw-dust or other combustible absorbents. 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.
See Section: 8, 13

Reference to other sections

SECTION 7: HANDLING AND STORAGE

Precautions for safe handling

Take precautionary measures against static discharge. Do not use sparking tools. Ensure adequate ventilation. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Do not breathe vapour. Avoid all contact. Use protective skin cream before handling the product. 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.

Conditions for safe storage, including any incompatibilities

Ground/bond container and receiving equipment. 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. Keep away from direct sunlight. Do not store and transport with flammable/combustible materials etc.

Storage temperature
Incompatible materials

Ambient. Recommended: <50 °C

Keep away from: Oxidizing agents (May cause fire), Alkalis, Acids (Concentrated nitric and sulfuric acid mixtures), Amines, chloroform, chlorine compounds, barium hydroxide and sodium hydroxide. Can react with Rubber, plastic and Copper.

Specific end use(s)

PC14 Metal surface treatment products, including galvanic and electroplating products.

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	
Acetone	67-64-1	250	500	1000	-	A4
Methyl ethyl 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: A4: Not Classifiable as a Human Carcinogen: Agents which cause concern that they could be carcinogenic for humans but which cannot be assessed conclusively because of the lack of data. In vitro or animal studies do not provide indications of carcinogenicity which are sufficient to classify the agent into one of the other categories.

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/m³	f/cc	STEL (ppm)	STEL (mg/m³)	
Acetone	67-64-1	500	1200	-	750	1800	Alberta
		500	1190	-	1000	2380	OEL
Methyl ethyl 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)

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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 ³)	STEL (ppm)	STEL (mg/m ³)	Note
Acetone	67-64-1	250	-	500	-	WEL
		500	-	750	-	NW
		1000	2400	1250	3000	YK
Methyl ethyl 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.

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
Acetone	67-64-1	500	700	WEL
		500	750	SK
Methyl ethyl 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
Acetone	67-64-1	Acetone: Urine	25 mg/l	End of Shift	Ns
Methyl ethyl ketone	78-93-3	Methyl ethyl ketone: Urine	2 mg/L	End of Shift	Ns

Source: 2015 ACGIH Biological Exposure Indices (BEIs)

Ns - Nonspecific

Exposure controls

Appropriate engineering controls

Ensure adequate ventilation or use appropriate containment. May form explosive mixture with air particularly in empty uncleaned receptacles. Atmospheric levels should be controlled in compliance with the occupational exposure limit. Have available eyewash bottle with clean water.

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

Keep good industrial hygiene. Protective clothing should be selected specifically for the working place, depending on concentration and quantity of the hazardous substances handled. The resistance of the protective clothing to chemicals should be ascertained with the respective supplier. Avoid breathing vapours. Avoid all contact. IF exposed: Wash immediately with water. Wash contaminated clothing before reuse. Do not eat, drink or smoke at the work place.

Eye/face protection



Wear protective eye glasses for protection against liquid splashes.
Recommended: Class 2B goggles

Skin protection

Hand protection:

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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: Butyl rubber, Minimum thickness: 0.5mm, breakthrough time: >480 minutes.

Unsuitable gloves materials: Can react with Rubber and plastic.

Body protection:

Flame-resistant antistatic protective clothing. 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. Open system(s): Wear suitable respiratory protective equipment.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	Clear-Yellowish Liquid.
Odour	Acetone
Odour threshold	Not available.
pH	Not established.
Melting point/freezing point	95°C
Initial boiling point and boiling range	56.6°C
Flash point	20°C [Closed cup] (Acetone)
Evaporation rate (Water = 1)	7.7 (BuAc = 1)
Flammability (solid, gas)	Not applicable - Liquid
Upper/lower flammability or explosive limits	Flammable Limits (Upper) (%v/v): 12.8 (Acetone) Flammable Limits (Lower) (%v/v): 2.5 (Acetone)
Vapour pressure	400 mmHg @ 39.5°C
Vapour density	2.0 (Air = 1)
Relative density	0.79 (H ₂ O=1)
Solubility(ies)	Completely miscible with water.
Partition coefficient: n-octanol/water	Not available.
Auto-ignition temperature	Not available.
Decomposition Temperature	Not available.
Viscosity	Not available.
Explosive properties	Not explosive.
Oxidising properties	Not oxidising.

Other information

Volatile Organic Compound Content: 76.8%

SECTION 10: STABILITY AND REACTIVITY

Reactivity	Stable under normal conditions.
Chemical stability	Stable under normal conditions.
Possibility of hazardous reactions	Highly flammable liquid and vapour. Vapours are heavier than air and may travel considerable distances to a source of ignition and flashback. May form explosive mixture with air particularly in empty uncleaned receptacles. May form peroxides on prolonged exposure to air and light.
Conditions to avoid	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Keep away from direct sunlight. Do not use sparking tools.
Incompatible materials	Keep away from: Oxidizing agents (May cause fire), Alkalis, Acids (Concentrated nitric and sulfuric acid mixtures), Amines, chloroform, chlorine compounds, barium hydroxide and sodium hydroxide.
Hazardous decomposition product(s)	Can react with Rubber, plastic and Copper. May decompose in a fire giving off toxic fumes. Oxides of carbon.

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SECTION 11: TOXICOLOGICAL INFORMATION

Information on toxicological effects

Acute toxicity - Ingestion

Based upon the available data, the classification criteria are not met.
Acute Toxicity Estimate Mixture Calculation: Estimated LC50 > 2000 mg/kg bw/day.

Acute toxicity - Inhalation

Based upon the available data, the classification criteria are not met.
Acute Toxicity Estimate Mixture Calculation: Estimated LC50 > 20.0 mg/l.

Acute toxicity - Skin Contact

Based upon the available data, the classification criteria are not met.
Acute Toxicity Estimate Mixture Calculation: Estimated LC50 > 2000 mg/kg bw/day.

Skin corrosion/irritation

Polymer of Epichlorohydrin (Phenol-Formaldehyde Novolac)
Boron Trifluoride Complex

Skin Irritation - Category 2: Causes skin irritation.

Skin Irritation - Category 2

No data

Skin corrosion/irritation - Category 1

No data

Serious eye damage/irritation

Acetone

Eye Irritation - Category 2: Causes eye irritation.

Eye Irritation - Category 2

Irritating to eyes. (rabbit) (OECD 405)

Polymer of Epichlorohydrin (Phenol-Formaldehyde Novolac)
Methyl ethyl ketone

Eye Irritation - Category 2

No data

Eye Irritation - Category 2

Irritating to eyes. (rabbit) (OECD 405)

Respiratory or skin sensitization

Polymer of Epichlorohydrin (Phenol-Formaldehyde Novolac)

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

Skin Sensitizer - Category 1

No data

Germ cell mutagenicity

Carcinogenicity

Reproductive toxicity

STOT - single exposure

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

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

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

Specific target organ toxicity — single exposure - Category 2: May cause damage to organs.

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

Acetone

Specific target organ toxicity — single exposure - Category 3

LC50 (rat) 132 mg/l Air (3 hours) Central nervous depression, Ataxia (impaired locomotor coordination). Brucker & Peterson (1981)

4,4'Sulfonyldianiline

Specific target organ toxicity — single exposure - Category 2

Human observations: 600 mg/p/Day. Can form methaemoglobin in the blood, causing cyanosis. (Unnamed, 1976).

Methyl ethyl ketone

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

No data.

Boron Trifluoride Complex

Specific target organ toxicity — single exposure - Category 3

No data. (National Institute for Occupational Safety and Health Technical Information Center.)

STOT - repeated exposure

Specific target organ toxicity — repeated exposure - Category 2: May cause damage to organs through prolonged or repeated exposure.

4,4'Sulfonyldianiline

Specific target organ toxicity — repeated exposure - Category 2

NOAEL: 3 mg/kg/Day (rat). Can form methaemoglobin in the blood, causing cyanosis. (OECD 408).

Aspiration hazard

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

Other information

None known.

SECTION 12: ECOLOGICAL INFORMATION

Toxicity

Aquatic Chronic 3: Harmful to aquatic life with long lasting effects.

Polymer of Epichlorohydrin (Phenol-Formaldehyde Novolac)

Estimated Mixture LC50 > 10 to ≤ 100 mg/l (Fish)

Aquatic Chronic - Category 2

Aquatic acute: No data

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4,4'Sulfonyldianiline	Aquatic chronic: No data Aquatic Chronic - Category 2 Harmonised Classification Aquatic acute: No data Aquatic chronic: No data
Persistence and degradability	No data for the mixture as a whole.
Bioaccumulative potential	No data for the mixture as a whole.
Mobility in soil	The substance is predicted to have high mobility in soil. Miscible with water.
Other adverse effects	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.
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SECTION 14: TRANSPORT INFORMATION

	ADR/RID	IMDG	IATA/ICAO
14.1 UN number	UN 1090	UN 1090	UN 1090
14.2 UN proper shipping name	ACETONE (77% MIXTURE)	ACETONE (77% MIXTURE)	ACETONE (77% MIXTURE)
14.3 Transport hazard class(es)	3	3	3
14.4 Packing group	II	II	II
14.5 Environmental hazards	Not classified	Not classified as a Marine Pollutant.	Not classified
14.6 Special precautions for user			
14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code	See Section: 2		

SECTION 15: REGULATORY INFORMATION

Safety, health and environmental regulations/legislation specific for the substance or mixture

National regulations

CEPA, Domestic Substances List

CEPA, List of Toxic Substances (Schedule 1)

CEPA, National Pollutant Release Inventory

Non-Regional

IARC Monographs, List of Classifications

Acetone: Yes

Polymer of Epichlorohydrin (Phenol-Formaldehyde Novolac): Yes

4,4'Sulfonyldianiline: Yes

Methyl ethyl ketone: Yes

Boron Trifluoride Complex: Yes

Methyl ethyl ketone: VOC - Item 65

Methyl ethyl 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

4,4'Sulfonyldianiline: Group 3

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 Acetone (CAS No. 67-64-1), 4,4'Sulfonyldianiline (CAS No. 80-08-0), Methyl ethyl ketone (CAS No. 78-93-3).

Existing ECHA registration(s) for Acetone (CAS No. 67-64-1), 4,4'Sulfonyldianiline (CAS No. 80-08-0) and Methyl ethyl ketone (CAS No. 78-93-3), and

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the Classification and Labelling Inventory for Polymer of Epichlorohydrin (Phenol-Formaldehyde Novolac) (CAS No. 28064-14-4) and Boron Trifluoride Complex (CAS No. 75-23-0).

Literature References:

1. Brucker J.V., & Peterson R. G. 1981. Evaluation of toluene and acetone inhalant abuse. I. Pharmacology and pharmacodynamics. Toxicol Appl Pharmacol 61: 27-38
2. Health Hazard Evaluation Report No. HETA-81-466-1591, Electric Machinery McGraw Edison Company, Minneapolis, Minnesota. National Institute for Occupational Safety and Health Technical Information Center.

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

IARC: International Agency for Research on Cancer

VOC: Volatile Organic Compound

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/TIC: National Institute for Occupational Safety and Health Technical Information Center

CEPA (Canadian Environmental Protection Act)

EU: European Union

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