

CHO-BOND® 584

SDS No: PHC-049

SDS Preparation Date (mm/dd/yyyy): 05/03/2017

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SAFETY DATA SHEET

SECTION 1. IDENTIFICATION

Product identifier used on the label

: **CHO-BOND® 584**

Product Code(s) : 50-00-0584-0029; 50-01-0584-0029; 50-02-0584-0029; 50-03-0584-0029; 50-10-0584-0029; 50-30-0584-0029

Recommended use of the chemical and restrictions on use

: Silver-filled conductive epoxy.
No restrictions on use known.

Chemical family : Mixture of: Inorganic substances in powdered form; Epoxy resin; Ether

SDS number : PHC-049

Name, address, and telephone number of the manufacturer:

Parker Hannifin Corp.

Chomerics Division
77 Dragon Court
Woburn, MA, USA
01888

Manufacturer's Telephone # : (781) 935-4850

24 Hr. Emergency Tel # : INFOTRAC - (800) 535-5053 (Within Continental US); (352) 323-3500 (Outside US)

Name, address, and telephone number of the supplier:

Refer to manufacturer

SECTION 2. HAZARDS IDENTIFICATION

Classification of the chemical

Silver liquid. Mild odor.

Most important hazards:

May cause an allergic skin reaction. Suspected of causing genetic defects. Occupational exposure to the substance or mixture may cause adverse effects. For further information, please refer to section 11 of the SDS.

Toxic to aquatic life with long lasting effects. Avoid release to the environment. See Section 12 for more environmental information.

This material is classified as hazardous under U.S. OSHA regulations (29CFR 1910.1200) (Hazcom 2012) and Canadian WHMIS regulations (Hazardous Products Regulations) (WHMIS 2015). Classification:

Skin sensitization - Category 1

Germ cell mutagenicity - Category 2

Label elements

Hazard pictogram(s)



Signal Word
WARNING!

Hazard statement(s)

May cause an allergic skin reaction. Suspected of causing genetic defects.

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Precautionary statement(s)

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Avoid breathing dust, fume or vapors. Contaminated work clothing must not be allowed out of the workplace. Wear protective gloves/clothing and eye/face protection.

IF exposed or concerned: Get medical advice/attention.

IF ON SKIN: Wash with plenty of soap and water. If skin irritation or rash occurs: Get medical advice/attention. Wash contaminated clothing before reuse.

Store locked up.

Dispose of contents/container in accordance with local regulation.

Other hazards

Other hazards which do not result in classification:

Excessive heating above 50°C / 122°F may degrade the resin component. May release peroxides on exposure to light and air, or on contact with incompatibles. Rate of peroxide formation is not known. Toxic fumes, gases or vapors may evolve on burning. May be mildly irritating to skin, eyes and respiratory system. Inhalation of fumes may result in metal fume fever, a flu-like illness. May cause gastrointestinal irritation. Silver in the form of a finely divided dust may cause discoloration in contact with skin, and argyrosis in case of inhalation.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Mixture

<u>Chemical name</u>	<u>Common name and synonyms</u>	<u>CAS #</u>	<u>Concentration (% by weight)</u>
silver	Silver metal Argentum	7440-22-4	65.0 - 75.0
Bisphenol A / epichlorohydrin resin	Reaction product: bisphenol-A-(epichlorohydrin)	25068-38-6	20.0 - 30.0
o-Cresyl glycidyl ether	2,3-epoxypropyl o-tolyl ether	2210-79-9	5.0 - 8.0

The exact concentrations of the above listed chemicals are being withheld as a trade secret as allowed by 29CFR1910.1200.

SECTION 4. FIRST-AID MEASURES

Description of first aid measures

- Ingestion* : Do not induce vomiting. Never give anything by mouth to a person who is unconscious or is having convulsions. IF exposed or concerned: Get medical attention/advice.
- Inhalation* : Move to fresh air. If breathing is difficult, give oxygen by qualified medical personnel only. If breathing stops, provide artificial respiration. IF exposed or concerned: Get medical attention/advice.
- Skin contact* : IF ON SKIN: Wash with plenty of soap and water. If skin irritation occurs: Get medical advice/attention. Wash contaminated clothing before reuse.
- Eye contact* : Rinse thoroughly with plenty of water, also under the eyelids. IF exposed or concerned: Get medical attention/advice.

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Most important symptoms and effects, both acute and delayed

- : May cause severe skin sensitization with allergic contact dermatitis symptoms such as swelling, rash and eczema.
- Suspected of causing genetic defects.
- May be mildly irritating to skin, eyes and respiratory system. Exposure may cause temporary irritation, redness or discomfort. May cause coughing and breathing difficulties.
- Inhalation of fumes may result in metal fume fever, a flu-like illness. Symptoms of metal fume fever may include fever, fatigue, vomiting, muscle aches and shortness of breath.
- Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.
- Silver in the form of a finely divided dust may cause discoloration in contact with skin, and argyrosis in case of inhalation.

Indication of any immediate medical attention and special treatment needed

- : Provide general supportive measures and treat symptomatically.

SECTION 5. FIRE-FIGHTING MEASURES

Extinguishing media

Suitable extinguishing media

- : Carbon dioxide (CO₂); Dry chemical; Alcohol resistant foam; Water fog

Unsuitable extinguishing media

- : Do not use a solid water stream as it may scatter and spread fire.

Special hazards arising from the substance or mixture / Conditions of flammability

- : Not considered flammable. However, may burn if exposed to extreme heat and flame. After prolonged storage, may release explosive peroxides in the presence of air. Rate of peroxide formation is not known. Closed containers may rupture if exposed to excess heat or flame due to a build-up of internal pressure.

Flammability classification (OSHA 29 CFR 1910.106)

- : Not classified as flammable.

Hazardous combustion products

- : Carbon oxides; Metal oxides; Acids; Phenols; Aldehydes; Other unidentified organic compounds

Special protective equipment and precautions for firefighters

Protective equipment for fire-fighters

- : Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA. Firefighters should wear proper protective equipment and self-contained breathing apparatus with full face piece operated in positive pressure mode.

Special fire-fighting procedures

- : Move containers from fire area if safe to do so. Cool closed containers exposed to fire with water spray. Do not allow run-off from fire fighting to enter drains or water courses. Dike for water control.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

- : Keep people away from and upwind of spill/leak. Restrict access to area until completion of clean-up. Wear appropriate protective equipment. Refer to protective measures listed in sections 7 and 8.

Environmental precautions

- : Prevent product from entering drains, sewers, waterways and soil. Avoid release to the environment.

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Methods and material for containment and cleaning up

- : Ventilate the area. Remove all sources of ignition. Prevent further leakage or spillage if safe to do so. For spilled liquids: absorb spill with inert, non-combustible material such as sand, then place into suitable containers. Pick up and transfer to properly labeled containers. Contaminated absorbent material may pose the same hazards as the spilled product. Contact the proper local authorities. Refer to Section 13 for disposal of contaminated material.

Special spill response procedures

- : If a spill/release in excess of the EPA reportable quantity is made into the environment, immediately notify the national response center in the United States (phone: 1-800-424-8802).

US CERCLA Reportable quantity (RQ): silver (1000 lbs / 454 kg)

In Canada: Contact appropriate local and provincial environmental authorities for assistance and/or reporting requirements.

SECTION 7. HANDLING AND STORAGE

Precautions for safe handling

- : Obtain special instructions before use. Do not handle until all safety precautions have been read and understood.
Persons with recurrent skin eczema or sensitization problems should be excluded from working with this product. Once a person is sensitized, no further exposure to the material that caused the sensitization should be permitted.
Provide adequate ventilation. Wear suitable protective equipment during handling. Wear protective gloves/clothing and eye/face protection. Avoid breathing dust, fume or vapors. Avoid contact with skin, eyes and clothing. Keep away from extreme heat and flame. Keep away from incompatibles. Keep containers tightly closed when not in use. Wash thoroughly after handling. Contaminated work clothing must not be allowed out of the workplace. Empty containers retain residue (liquid and/or vapor) and can be dangerous.

Conditions for safe storage

- : Store in cool/well-ventilated place. Store locked up. Storage area should be clearly identified, clear of obstruction and accessible only to trained and authorized personnel. Inspect periodically for damage or leaks. Keep away from incompatibles.

Incompatible materials

- : Strong oxidizing agents; Strong acids; Strong bases; Amines; Mercaptans

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

<u>Exposure Limits:</u>				
<u>Chemical Name</u>	<u>ACGIH TLV</u>		<u>OSHA PEL</u>	
	<u>TWA</u>	<u>STEL</u>	<u>PEL</u>	<u>STEL</u>
silver	0.1 mg/m ³ (dust and fume)	N/Av	0.01 mg/m ³	N/Av
Bisphenol A / epichlorohydrin resin	N/Av	N/Av	N/Av	N/Av
o-Cresyl glycidyl ether	N/Av	N/Av	N/Av	N/Av

ACGIH - Biological Exposure Indices:

No biological exposure limits noted for the ingredient(s).

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Exposure controls

Ventilation and engineering measures

- : Provide adequate ventilation. Apply technical measures to comply with the occupational exposure limits. Where reasonably practicable this should be achieved by the use of local exhaust ventilation and good general extraction. In case of insufficient ventilation wear suitable respiratory equipment.

Respiratory protection

- : If airborne concentrations are above the permissible exposure limit or are not known, use NIOSH-approved respirators. Respirators should be selected based on the form and concentration of contaminants in air, and in accordance with OSHA (29 CFR 1910.134) or CSA Z94.4-02. Advice should be sought from respiratory protection specialists.

Skin protection

- : Wear protective gloves/clothing. The suitability for a specific workplace should be discussed with the producers of the protective gloves. Wear resistant clothing and boots.

Eye / face protection

- : Wear eye/face protection. Wear as appropriate: Safety glasses with side shields; Tightly fitting safety goggles. A full face shield may also be necessary.

Other protective equipment

- : Ensure that eyewash stations and safety showers are close to the workstation location. Other equipment may be required depending on workplace standards.

General hygiene considerations

- : Avoid breathing dust, fume or vapors. Avoid contact with skin, eyes and clothing. Do not eat, drink or smoke when using this product. Wash thoroughly after handling. Remove and wash contaminated clothing before re-use. Handle in accordance with good industrial hygiene and safety practice. Contaminated work clothing must not be allowed out of the workplace.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	: Silver liquid.
Odor	: Mild odor.
Odor threshold	: N/Av
pH	: N/Av
Melting/Freezing point	: N/Av
Initial boiling point and boiling range	: N/Av
Flash point	: > 93.3°C (200°F) (based on ingredients)
Flashpoint (Method)	: N/Av
Evaporation rate (BuAe = 1)	: N/Av
Flammability (solid, gas)	: Not applicable.
Lower flammable limit (% by vol.)	: N/Av
Upper flammable limit (% by vol.)	: N/Av
Oxidizing properties	: None known.
Explosive properties	: Not explosive
Vapor pressure	: N/Av
Vapor density	: N/Av
Relative density / Specific gravity	: > 1
Solubility in water	: Insoluble.
Other solubility(ies)	: N/Av
Partition coefficient: n-octanol/water or Coefficient of water/oil distribution	: N/Av
Auto-ignition temperature	: N/Av

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Decomposition temperature : N/Av
Viscosity : N/Av
Volatiles (% by weight) : N/Av
Volatile organic Compounds (VOC's)
: 0 g/L
Absolute pressure of container
: N/Av
Flame projection length : N/Av
Other physical/chemical comments
: No additional information.

SECTION 10. STABILITY AND REACTIVITY

Reactivity : Not normally reactive.
Chemical stability : Stable under normal conditions. After prolonged storage, may release explosive peroxides in the presence of air. Rate of peroxide formation is not known. Excessive heating above 50°C / 122°F may degrade the resin component.
Possibility of hazardous reactions
: Hazardous polymerization does not occur.
Conditions to avoid : Direct sources of heat. Do not use in areas without adequate ventilation. Avoid contact with incompatible materials.
Incompatible materials : Strong oxidizing agents; Strong acids; Strong bases; Amines; Mercaptans
Hazardous decomposition products
: Peroxides. Refer also to hazardous combustion products, Section 5.

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure:

Routes of entry inhalation : YES
Routes of entry skin & eye : YES
Routes of entry ingestion : YES
Routes of exposure skin absorption
: YES

Potential Health Effects:

Signs and symptoms of short-term (acute) exposure

Sign and symptoms Inhalation

: Mild respiratory irritant. May cause coughing and breathing difficulties. Inhalation of fumes may result in metal fume fever, a flu-like illness. Symptoms of metal fume fever may include fever, fatigue, vomiting, muscle aches and shortness of breath.

Sign and symptoms ingestion

: Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

Sign and symptoms skin

: May cause mild skin irritation. Exposure may cause temporary irritation, redness or discomfort. Can be absorbed through skin.

Sign and symptoms eyes

: Direct eye contact may cause slight or mild, transient irritation. Exposure may cause temporary irritation, redness or discomfort.

Potential Chronic Health Effects

: Silver in the form of a finely divided dust may cause discoloration in contact with skin, and argyrosis in case of inhalation.

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Mutagenicity : This material is classified as hazardous under U.S. OSHA regulations (29CFR 1910.1200) (Hazcom 2012) and Canadian WHMIS regulations (Hazardous Products Regulations) (WHMIS 2015). Classification:
Germ cell mutagenicity - Category 2. Suspected of causing genetic defects.
Contains: o-Cresyl glycidyl ether. o-Cresyl glycidyl ether induced a reproducible, dose-related increase in the His⁺ revertant frequency in Salmonella tester strains TA1535 and TA100, without rodent liver S9 metabolic activation. Therefore, the test substance is considered a direct-acting gene-mutagen in Salmonella under the conditions of the study. These positive findings suggest that the test substance induced repairable DNA damage in human lymphocytes.

Carcinogenicity : Not classifiable as a human carcinogen, based on currently available data. No components are listed as carcinogens by ACGIH, IARC, OSHA or NTP.

Reproductive effects & Teratogenicity

: This product is not expected to cause reproductive or developmental effects.

Sensitization to material : This material is classified as hazardous under U.S. OSHA regulations (29CFR 1910.1200) (Hazcom 2012) and Canadian WHMIS regulations (Hazardous Products Regulations) (WHMIS 2015). Classification:
Skin sensitization - Category 1. May cause an allergic skin reaction.
May cause severe skin sensitization with allergic contact dermatitis symptoms such as swelling, rash and eczema.
Not expected to be a respiratory sensitizer.

Specific target organ effects : According to the classification criteria of U.S. OSHA regulations (29CFR 1910.1200) (Hazcom 2012) and Canadian WHMIS regulations (Hazardous Products Regulations) (WHMIS 2015), this product is not expected to cause target organ toxicity through single or repeated exposures.

Medical conditions aggravated by overexposure

: Pre-existing skin, eye and respiratory disorders.

Synergistic materials

: None known or reported by the manufacturer.

Toxicological data

: Not classified for acute toxicity based on available data. No data is available on the product itself. The calculated ATE values for this mixture are:
ATE inhalation (mists) = 101.5 mg/L/4H

See below for individual ingredient acute toxicity data.

<u>Chemical name</u>	<u>LC₅₀ (4hr)</u>	<u>LD₅₀</u>	
	<u>inh, rat</u>	<u>(Oral, rat)</u>	<u>(Rabbit, dermal)</u>
silver	> 5.16 mg/L (dust) (No mortality)	> 2000 mg/kg (No mortality)	> 2000 mg/kg (No mortality)
Bisphenol A / epichlorohydrin resin	N/Av	11 400 mg/kg	> 2000 mg/kg (No mortality)
o-Cresyl glycidyl ether	> 6.09 mg/L (mist)	> 5000 mg/kg	> 2000mg/kg (No mortality)

Other important toxicological hazards

: None known or reported by the manufacturer.

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SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity : Toxic to aquatic life with long lasting effects. No data is available on the product itself. The product should not be allowed to enter drains or water courses, or be deposited where it can affect ground or surface waters. The product contains the following substances which are hazardous for the environment: Bisphenol A / epichlorohydrin resin; o-Cresyl glycidyl ether. This product also contains: Silver. The acute toxicity of silver to aquatic species varies drastically by the chemical form and correlates with the availability of free ionic silver. Aquatic toxicity is highly variable not only by organism but with physical and chemical characteristics of the water itself.

See the following tables for individual ingredient ecotoxicity data.

Ecotoxicity data:

<u>Ingredients</u>	CAS No	Toxicity to Fish		
		LC50 / 96h	NOEC / 21 day	M Factor
silver	7440-22-4	N/Av	N/Av	None.
Bisphenol A / epichlorohydrin resin	25068-38-6	3.6 mg/L (Rainbow trout)	N/Av	None.
o-Cresyl glycidyl ether	2210-79-9	2.8 - 5.1 mg/L (Rainbow trout)	N/Av	None.

<u>Ingredients</u>	CAS No	Toxicity to Daphnia		
		EC50 / 48h	NOEC / 21 day	M Factor
silver	7440-22-4	N/Av	N/Av	None.
Bisphenol A / epichlorohydrin resin	25068-38-6	1.1 - 2.8 mg/L (Daphnia magna)	0.3 mg/L (Read-across)	None.
o-Cresyl glycidyl ether	2210-79-9	16 mg/L (Daphnia magna)	N/Av	None.

<u>Ingredients</u>	CAS No	Toxicity to Algae		
		EC50 / 96h or 72h	NOEC / 96h or 72h	M Factor
silver	7440-22-4	N/Av	N/Av	None.
Bisphenol A / epichlorohydrin resin	25068-38-6	9.4 mg/L/72hr (Green algae) (Read-across)	2.8 mg/L/72hr (Read-across)	None.
o-Cresyl glycidyl ether	2210-79-9	5.1 mg/L/72hr (Green algae)	N/Av	None.

Persistence and degradability

: The product itself has not been tested.
Contains the following chemicals which are not readily biodegradable: silver; Bisphenol A / epichlorohydrin resin; o-Cresyl glycidyl ether.

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Bioaccumulation potential : The product itself has not been tested. See the following data for ingredient information.

<u>Components</u>	<u>Partition coefficient n-octanol/water (log Kow)</u>	<u>Bioconcentration factor (BCF)</u>
Bisphenol A / epichlorohydrin resin (CAS 25068-38-6)	> 2.915	31
o-Cresyl glycidyl ether (CAS 2210-79-9)	2.5	N/Av

Mobility in soil : The product itself has not been tested.

Other Adverse Environmental effects

: No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

SECTION 13. DISPOSAL CONSIDERATIONS

Handling for Disposal : Handle in accordance with good industrial hygiene and safety practice. Refer to protective measures listed in sections 7 and 8. This material and its container must be disposed of in a safe way.

Empty containers retain residue and can be dangerous. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

Methods of Disposal : Dispose in accordance with all applicable federal, state, provincial and local regulations.

RCRA : If this product, as supplied, becomes a waste in the United States, it may meet the criteria of a hazardous waste as defined under RCRA, Title 40 CFR 261. It is the responsibility of the waste generator to determine the proper waste identification and disposal method. For disposal of unused or waste material, check with local, state and federal environmental agencies.

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SECTION 14. TRANSPORTATION INFORMATION

Regulatory Information	UN Number	UN proper shipping name	Transport hazard class(es)	Packing Group	Label
49CFR/DOT	None.	Not regulated.	not regulated	none	
49CFR/DOT Additional information	Not regulated unless shipping internationally by sea or air. Refer to IMDG or IATA information for international sea or air shipments, as appropriate.				
TDG	UN3082	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. [Reaction product: bisphenol-A-(epichlorohydrin); 2,3-epoxypropyl o-tolyl ether]	9	III	 
TDG Additional information	This material may be shipped as an exempted marine pollutant in accordance with TDG Section 1.45.1 and Special Provision 99.				
ICAO/IATA	UN3082	Environmentally hazardous substance, liquid, n.o.s. [Reaction product: bisphenol-A-(epichlorohydrin); 2,3-epoxypropyl o-tolyl ether]	9	III	 
ICAO/IATA Additional information	Refer to the appropriate Packing Instruction, prior to shipping this material. Review all State and Operator Variations, prior to shipping this material. The environmentally hazardous substance mark must appear on packagings holding more than 5 litres of the material.				
IMDG	UN3082	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. [Reaction product: bisphenol-A-(epichlorohydrin); 2,3-epoxypropyl o-tolyl ether]	9	III	 
IMDG Additional information	May be shipped as Limited Quantity when transported in containers no larger than 5.0 Litres; in packages not exceeding 30 kg gross mass. The environmentally hazardous substance mark must appear on packagings holding more than 5 litres of the material.				

Special precautions for user : Appropriate advice on safety must accompany the package. Avoid release to the environment.

Environmental hazards : This mixture meets the criteria for an environmentally hazardous material according to the IMDG Code. See Section 12 for more environmental information.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

: Not applicable.

SECTION 15 - REGULATORY INFORMATION

US Federal Information:

Components listed below are present on the following U.S. Federal chemical lists:

Ingredients	CAS #	TSCA Inventory	CERCLA Reportable Quantity(RQ) (40 CFR 117.302):	SARA TITLE III: Sec. 302, Extremely Hazardous Substance, 40 CFR 355:	SARA TITLE III: Sec. 313, 40 CFR 372, Specific Toxic Chemical	
					Toxic Chemical	de minimus Concentration
silver	7440-22-4	Yes	1000 lb/454 kg	None.	Yes	1%
Bisphenol A / epichlorohydrin resin	25068-38-6	Yes	None.	None.	No	N/Ap
o-Cresyl glycidyl ether	2210-79-9	Yes	None.	None.	No	N/Ap

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SARA TITLE III: Sec. 311 and 312, SDS Requirements, 40 CFR 370 Hazard Classes:

Health hazards (Skin sensitization; Germ cell mutagenicity)

Under SARA Sections 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

US State Right to Know Laws:

The following chemicals are specifically listed by individual States:

<u>Ingredients</u>	CAS #	California Proposition 65		State "Right to Know" Lists					
		Listed	Type of Toxicity	CA	MA	MN	NJ	PA	RI
silver	7440-22-4	No	N/Ap	Yes	Yes	Yes	Yes	Yes	Yes
Bisphenol A / epichlorohydrin resin	25068-38-6	No	N/Ap	No	No	No	No	No	No
o-Cresyl glycidyl ether	2210-79-9	No	N/Ap	No	No	No	No	No	No

Canadian Information:

Canadian Environmental Protection Act (CEPA) information: All ingredients listed appear on the Domestic Substances List (DSL).

Canadian National Pollutant Release Inventory (NPRI): This product contains the following substances listed on the NPRI:
silver (Part 1, Group A Substance)

WHMIS information: Refer to Section 2 for a WHMIS Classification for this product.

International Information:

Components listed below are present on the following International Inventory list:

<u>Ingredients</u>	CAS #	European EINECS	Australia AICS	Philippines PICCS	Japan ENCS	Korea KECI/KECL	China IECSC	New Zealand IOC
silver	7440-22-4	231-131-3	Present	Present	Not listed	KE-31261	Present	HSR003077
Bisphenol A / epichlorohydrin resin	25068-38-6	500-033-5	Present	Present	(7)-1283	KE-24000	Present	HSR003180
o-Cresyl glycidyl ether	2210-79-9	218-645-3	Present	Present	(3)-594, (3)-574	KE-24799	Present	HSR007257

SECTION 16. OTHER INFORMATION

Legend

: ACGIH: American Conference of Governmental Industrial Hygienists
AICS: Australian Inventory of Chemical Substances
CA: California
CAS: Chemical Abstract Services
CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR: Code of Federal Regulations
CSA: Canadian Standards Association
DOT: Department of Transportation
EC50: Effective Concentration 50%
EINECS: European Inventory of Existing Commercial chemical Substances
ENCS: Existing and New Chemical Substances
EPA: Environmental Protection Agency

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HSDB: Hazardous Substances Data Bank
IARC: International Agency for Research on Cancer
IBC: Intermediate Bulk Container
IECSC: Inventory of Existing Chemical Substances
IMDG: International Maritime Dangerous Goods
IOC: Inventory of Chemicals
KECI: Korean Existing Chemicals Inventory
KECL: Korean Existing Chemicals List
LC: Lethal Concentration
LD: Lethal Dose
MA: Massachusetts
MN: Minnesota
N/Av: Not Available
N/Ap: Not Applicable
NIOSH: National Institute of Occupational Safety and Health
NJ: New Jersey
NOEC: No observable effect concentration
NTP: National Toxicology Program
OECD: Organisation for Economic Co-operation and Development
OSHA: Occupational Safety and Health Administration
PA: Pennsylvania
PEL: Permissible exposure limit
PICCS: Philippine Inventory of Chemicals and Chemical Substances
RCRA: Resource Conservation and Recovery Act
RI: Rhode Island
RTECS: Registry of Toxic Effects of Chemical Substances
SARA: Superfund Amendments and Reauthorization Act
SDS: Safety Data Sheet
STEL: Short Term Exposure Limit
TDG: Canadian Transportation of Dangerous Goods Act & Regulations
TLV: Threshold Limit Values
TSCA: Toxic Substance Control Act
TWA: Time Weighted Average
WHMIS: Workplace Hazardous Materials Identification System

References

- : 1. ACGIH, Threshold Limit Values for Chemical Substances and Physical Agents & Biological Exposure Indices for 2017.
- 2. International Agency for Research on Cancer Monographs, searched 2017.
- 3. Canadian Centre for Occupational Health and Safety, CCIInfoWeb databases, 2017 (Chempendium, HSDB and RTECs).
- 4. Material Safety Data Sheets from manufacturer.
- 5. US EPA Title III List of Lists - March 2015 version.
- 6. California Proposition 65 List - January 27, 2017 version.
- 7. OECD - The Global Portal to Information on Chemical Substances - eChemPortal, 2017.

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Other special considerations for handling

: Provide adequate information, instruction and training for operators.



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SAFETY DATA SHEET

<p><u>Prepared for:</u> Parker Hannifin Corp. 77 Dragon Court Woburn, MA, USA 01888 Telephone: 781-935-4850 Direct all enquiries to: Parker Hannifin Corp.</p>	
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END OF DOCUMENT

SAFETY DATA SHEET

1. Identification

Product identifier CHO-BOND 29 Epoxy Hardener

Other means of identification

SDS number PHC-048

Recommended use Hardener

Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer

Company name Parker Hannifin Corp.

Address 77 Dragon Court
Woburn, MA 01888
United States

Telephone 781-935-4580

Website www.chomerics.com

E-mail chomailbox@parker.com

Emergency phone number INFOTRAC - Domestic 800-535-5053

INFOTRAC - International 352-323-3500

Supplier Refer to Manufacturer

2. Hazard(s) identification

Physical hazards This mixture does not meet the classification criteria according to OSHA HazCom 2012.

Health hazards Skin corrosion/irritation Category 1

Serious eye damage/eye irritation Category 1

Sensitization, skin Category 1

Environmental hazards This mixture does not meet the classification criteria according to OSHA HazCom 2012.

OSHA defined hazards This mixture does not meet the classification criteria according to OSHA HazCom 2012.

Label elements



Signal word Danger

Hazard statement Causes severe skin burns and eye damage. May cause an allergic skin reaction. Causes serious eye damage.

Precautionary statement

Prevention Do not breathe mist or vapor. Wash thoroughly after handling. Contaminated work clothing must not be allowed out of the workplace. Wear protective gloves/protective clothing/eye protection/face protection.

Response If swallowed: Rinse mouth. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If inhaled: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center/doctor. Specific treatment (see this label). If skin irritation or rash occurs: Get medical advice/attention. Wash contaminated clothing before reuse.

Storage Store locked up.

Disposal Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC) No OSHA defined hazard classes.

Other hazards which do not result in classification: May cause respiratory irritation. May cause severe irritation and corrosive damage in the mouth, throat and stomach. Prolonged or repeated overexposure may cause liver and kidney effects.

Supplemental information None.

3. Composition/information on ingredients

Mixtures

Chemical name	Common name and synonyms	CAS number	%
Triethylenetetramine, Propoxylated	1,2-Ethanediamine, N,N'-bis(2-aminoethyl)-, polymer with methyloxirane	26950-63-0	60 - 100
Triethylenetetraamine	Not Available	112-24-3	15 - 40
2,4,6-tris-(dimethylaminomethyl)-ph enol	Not Available	90-72-2	5 - 10
N-(3-(trimethoxysilyl)propyl)ethylen ediamine	Not Available	1760-24-3	0.1 - 1

The exact concentrations of the above listed chemicals are being withheld as a trade secret as allowed by 29CFR1910.1200.

4. First-aid measures

Inhalation	Move to fresh air. If breathing is difficult, give oxygen. If breathing stops, provide artificial respiration. Get medical attention immediately.
Skin contact	Wash contaminated clothing before reuse.
Eye contact	Immediately flush eyes with plenty of water for at least 20 minutes.
Ingestion	Do not induce vomiting. Never give anything by mouth to a victim who is unconscious or is having convulsions. Seek immediate medical attention/advice.
Most important symptoms/effects, acute and delayed	Direct contact with concentrated solutions may be corrosive to the eyes and may cause severe damage including blindness. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Exposure to low vapor concentrations may cause swelling (edema) of the eyes, resulting in blurring of vision with a bluish haze and / or appearance of halos around lights. Direct skin contact may cause corrosive skin burns, deep ulcerations and possibly permanent scarring. Can cause severe respiratory irritation. Symptoms may include coughing, choking and wheezing. May cause severe irritation and corrosive damage in the mouth, throat and stomach. Symptoms may include abdominal pain, vomiting, burns, perforations, bleeding. Symptoms may include pain, headache, nausea, vomiting, dizziness, drowsiness and other central nervous system effects.
Indication of immediate medical attention and special treatment needed	Provide general supportive measures and treat symptomatically. Chemical burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Keep victim under observation. Symptoms may be delayed.
General information	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Wash contaminated clothing before reuse.

5. Fire-fighting measures

Suitable extinguishing media	Alcohol resistant foam. Water spray. Water fog. Dry chemical powder. Carbon dioxide (CO2).
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire-fighting equipment/instructions	Ventilate the contaminated area. Move containers from fire area if you can do so without risk. Cool containers / tanks with water spray. Prevent fire extinguishing water from contaminating surface water or the ground water system.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	No unusual fire or explosion hazards noted. However, may ignite if exposed to extreme heat and flame. Closed containers may rupture if exposed to excess heat or flame due to a build-up of internal pressure.
Hazardous combustion products	Carbon oxides. Nitrogen oxides (NOx). Ammonia. Hydrogen cyanide (hydrocyanic acid). Aldehydes. Ketones. Other irritating fumes and smoke.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Wear appropriate protective equipment and clothing during clean-up. See Section 8 of the SDS for Personal Protective Equipment. Restrict access to area until completion of clean-up. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
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Methods and materials for containment and cleaning up

Remove sources of ignition. Do not flush into surface water or sanitary sewer system. Ventilate the contaminated area. Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal. For waste disposal, see Section 13. Contaminated absorbent material may pose the same hazards as the spilled product.
In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations.

Environmental precautions

Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage**Precautions for safe handling**

Use only in well-ventilated areas. Protect from moisture. Keep away from heat. Wash hands after handling and before eating. Keep container tightly closed. Wear chemically resistant protective equipment during handling. Empty containers retain residue and can be dangerous.

Conditions for safe storage, including any incompatibilities

Keep away from heat and flame. Keep containers tightly closed in a cool, well-ventilated place. Inspect periodically for damage or leaks. Protect against physical damage. Keep containers dry and tightly closed to avoid moisture absorption and contamination.

8. Exposure controls/personal protection**Occupational exposure limits****US. Workplace Environmental Exposure Level (WEEL) Guides**

Components	Type	Value
Triethylenetetraamine (CAS 112-24-3)	TWA	6 mg/m ³ 1 ppm

Biological limit values

No biological exposure limits noted for the ingredient(s).

Exposure guidelines**US WEEL Guides: Skin designation**

Triethylenetetraamine (CAS 112-24-3)

Can be absorbed through the skin.

Appropriate engineering controls

If exposure limits have not been established, maintain airborne levels to an acceptable level. Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions.

Individual protection measures, such as personal protective equipment**Eye/face protection**

A full face shield may also be necessary. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

Skin protection**Hand protection**

Wear appropriate chemical resistant gloves. Advice should be sought from glove suppliers.

Other

Use of an impervious apron is recommended.

Respiratory protection

Use a NIOSH/MSHA approved respirator if there is a risk of exposure to dust/fume at levels exceeding the exposure limits. Advice should be sought from respiratory protection specialists.

Thermal hazards

Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations

Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Contaminated work clothing should not be allowed out of the workplace.

9. Physical and chemical properties**Appearance****Physical state**

Liquid.

Form

Liquid.

Color

Amber.

Odor

Amine-like.

Odor threshold

Not available.

pH

Not available.

Melting point/freezing point

Not available.

Initial boiling point and boiling range

Not available.

Flash point

> 199.9 °F (> 93.3 °C)

Evaporation rate

Not available.

Flammability (solid, gas)	Not available.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Relative density	Not available.
Solubility(ies)	
Solubility (water)	Not available.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions. Do not add nitrates or nitrosating agents. A nitrosamine, which may cause cancer, could be formed.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Contact with incompatible materials. Direct sources of heat. Do not use in areas without adequate ventilation. Protect from moisture.
Incompatible materials	Strong acids. Oxidizing agents. Peroxides. Phenols. Aldehydes. Ketones. Nitrogen Compounds.
Hazardous decomposition products	None known, refer to hazardous combustion products in Section 5.

11. Toxicological information

Information on likely routes of exposure

Ingestion	Causes digestive tract burns.
Inhalation	Can cause severe respiratory irritation.
Skin contact	May be absorbed through the skin, producing symptoms similar to ingestion or inhalation.
Eye contact	Causes eye burns.

Symptoms related to the physical, chemical and toxicological characteristics	Direct contact with concentrated solutions may be corrosive to the eyes and may cause severe damage including blindness. Exposure to low vapor concentrations may cause swelling (edema) of the eyes, resulting in blurring of vision with a bluish haze and / or appearance of halos around lights. Direct skin contact with concentrated solutions may cause corrosive skin burns, deep ulcerations and possibly permanent scarring. May cause severe irritation to the nose, throat, and respiratory tract. Symptoms may include coughing, choking and wheezing. May cause severe irritation and corrosive damage in the mouth, throat and stomach. Symptoms may include abdominal pain, vomiting, burns, perforations, and bleeding. Symptoms may include pain, headache, nausea, vomiting, dizziness, drowsiness and other central nervous system effects.
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Information on toxicological effects

Acute toxicity	The below product data is the calculated ATE values for this mixture. Individual ingredient component data appears below the product mixture ATE values.
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Product	Species	Test Results
CHO-BOND 29 Epoxy Hardener (CAS Mixture)		
Acute		
<i>Dermal</i>		
LD50	Rabbit	2274 mg/kg

Product	Species	Test Results
<i>Oral</i> LD50	Rat	6421 mg/kg
Components	Species	Test Results
2,4,6-tris-(dimethylaminomethyl)-phenol (CAS 90-72-2)		
Acute		
<i>Dermal</i>		
LD50	Rabbit	No data in literature
<i>Inhalation</i>		
LC50	Rat	No data in literature
<i>Oral</i>		
LD50	Rat	1200 mg/kg
N-(3-(trimethoxysilyl)propyl)ethylenediamine (CAS 1760-24-3)		
Acute		
<i>Dermal</i>		
LD50	Rat	> 2009 mg/kg
<i>Inhalation</i>		
LC50	Rat	No data in literature
<i>Oral</i>		
LD50	Rat	2413 mg/kg
Triethylenetetraamine (CAS 112-24-3)		
Acute		
<i>Dermal</i>		
LD50	Rabbit	805 mg/kg
<i>Inhalation</i>		
		No data in literature
<i>Oral</i>		
LD50	Rat	4340 mg/kg
Triethylenetetramine, Propoxylated (CAS 26950-63-0)		
Acute		
<i>Dermal</i>		
LD50	Rabbit	No data in literature
<i>Inhalation</i>		
LC50	Rat	No data in literature
<i>Oral</i>		
LD50	Rat	No data in literature

* Estimates for product may be based on additional component data not shown.

Skin corrosion/irritation	Not available.
Serious eye damage/eye irritation	Causes eye burns.
Respiratory or skin sensitization	
Respiratory sensitization	This product is not expected to cause respiratory sensitization.
Skin sensitization	May cause an allergic skin reaction.
Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
Carcinogenicity	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.
OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)	
Not listed.	
Reproductive toxicity	This product is not expected to cause reproductive or developmental effects.
Specific target organ toxicity - single exposure	Not classified as a specific target organ toxicity -single exposure.

Specific target organ toxicity - repeated exposure	Not classified as a specific target organ toxicity -repeated exposure.
Chronic effects	Frequent or prolonged contact may defat and dry the skin, leading to discomfort and dermatitis. Prolonged or repeated overexposure may cause liver and kidney effects.
Aspiration toxicity	Not expected to be an aspiration hazard.

12. Ecological information

Ecotoxicity	The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment. May slowly hydrolyze in the presence of water to: Methanol. Acetic acid. Upon completion of the curing process, these hydrolysis products are no longer released.
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Product	Species	Test Results
CHO-BOND 29 Epoxy Hardener (CAS Mixture)		
Aquatic		
<i>Acute</i>		
Fish	LC50	1859.7428 mg/l, 96 hours estimated
Components		
Triethylenetetraamine (CAS 112-24-3)		
Aquatic		
<i>Acute</i>		
Algae	EC50	Green Algae (Scenedesmus subspicatus) 2.5 mg/l, 72 hours
Crustacea	EC50	Water flea (Daphnia magna) 31.1 mg/l, 24 hours
Fish	LC50	Guppy (Poecilia reticulata) 570 mg/l, 96 hours
<i>Chronic</i>		
Crustacea	NOEC	Water flea (Daphnia magna) 1 mg/l, 21 days

* Estimates for product may be based on additional component data not shown.

Persistence and degradability	Contains the following chemicals which are not considered to be readily biodegradable: Triethylenetetraamine.
Bioaccumulative potential	No data available.
Mobility in soil	No data available.
Other adverse effects	No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose of contents/container in accordance with local/regional/national/international regulations.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Hazardous waste code	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.
Waste from residues / unused products	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
Contaminated packaging	Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT	
UN number	UN2735
UN proper shipping name	Amines, liquid, corrosive, n.o.s, or Polyamines, liquid, corrosive, n.o.s. (Triethylenetetraamine, Triethylenetetraamine, Propoxylated)
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Label(s)	8
Packing group	II

Environmental hazards**Marine pollutant** No**Special precautions for user** Read safety instructions, SDS and emergency procedures before handling.**Special provisions** B2, IB2, T11, TP1, TP27**Packaging exceptions** 154**Packaging non bulk** 202**Packaging bulk** 242**IATA****UN number** UN2735**UN proper shipping name** Amines, liquid, corrosive, n.o.s, or Polyamines, liquid, corrosive, n.o.s. (Triethylenetetraamine, Triethylenetetramine, Propoxylated)**Transport hazard class(es)****Class** 8**Subsidiary risk** -**Label(s)** 8**Packing group** II**Environmental hazards** No**Special precautions for user** Read safety instructions, SDS and emergency procedures before handling.**Other information****Passenger and cargo aircraft** Allowed.**Cargo aircraft only** Allowed.**IMDG****UN number** UN2735**UN proper shipping name** Amines, liquid, corrosive, n.o.s, or Polyamines, liquid, corrosive, n.o.s. (Triethylenetetraamine, Triethylenetetramine, Propoxylated)**Transport hazard class(es)****Class** 8**Subsidiary risk** -**Label(s)** 8**Packing group** II**Environmental hazards****Marine pollutant** No**EmS** Not available.**Special precautions for user** Read safety instructions, SDS and emergency procedures before handling.**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code** This substance/mixture is not intended to be transported in bulk.**DOT****IATA; IMDG**

15. Regulatory information

US federal regulations

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

All components are on the U.S. EPA TSCA Inventory List.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories

Immediate Hazard - Yes

Delayed Hazard - No

Fire Hazard - No

Pressure Hazard - No

Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical No

SARA 313 (TRI reporting)

Not regulated.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

US state regulations

US. Massachusetts RTK - Substance List

Triethylenetetraamine (CAS 112-24-3)

US. New Jersey Worker and Community Right-to-Know Act

Triethylenetetraamine (CAS 112-24-3)

US. Pennsylvania Worker and Community Right-to-Know Law

Triethylenetetraamine (CAS 112-24-3)

US. Rhode Island RTK

Not regulated.

US. California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	No
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes

Country(s) or region	Inventory name	On inventory (yes/no)*
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date 06-13-2014

Version # 01

List of abbreviations

ACGIH: American Conference of Governmental Industrial Hygienists
CAS: Chemical Abstract Services
CEPA: Canadian Environmental Protection Act
CPR: Controlled Products Regulation
CSA: Canadian Standards Association
DOT: Department of Transportation
DSL: Domestic Substance List
HMIS: Hazardous Materials Identification System
HPA: Hazardous Protection Act
HSDB: Hazardous Substances Data Bank
IARC: International Agency for Research on Cancer
IATA: International Air Transport Association
ICAO: International Civil Aviation Organisation
IMDG: International Maritime Dangerous Goods
LC: Lethal Concentration
LD: Lethal Dose
NFPA: National Fire Protection Association
NOEC: No observable effect concentration
NTP: National Toxicology Program
OECD: Organisation for Economic Co operation and Development
OEL: National occupational exposure limits
OSHA: Occupational Safety and Health Administration
PPE: Personal Protective Equipment
RCRA: Resource Conservation and Recovery Act
RQ: Reportable Quantity
RTECS: Registry of Toxic Effects of Chemical Substances
SARA: Superfund Amendments and Reauthorization Act
SDS: Safety Data Sheet
STEL: Short Term Exposure Limit
TWA: Time Weighted Average
WEL: Workplace Exposure Limit

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