MATERIAL SAFETY DATA SHEET

SECTION 1: IDENTIFICATION

Product identifier : **SUPER RADIATOR CLEANER**

Product Use : Cooling system additive.
Chemical Family : Mixture.
Manufacturer part no. : C2124C

Supplier's name and address:

Radiator Specialty Co., of Canada
1711 Aimco Blvd.
Mississauga, ON, Canada
L4W 1H7

Manufacturer's name and address:
Refer to Supplier

Information Telephone # : (905) 625-9117 (Monday - Friday, 8 AM - 4 PM)
24 Hr. Emergency Tel # : 613-996-6666 (CANUTEC)

SECTION 2 - HAZARDS IDENTIFICATION

Classification : WHMIS information: This product is a WHMIS Controlled Product. It meets one or more of the criteria for a controlled product provided in Part IV of the Canadian Controlled Products Regulations (CPR). WHMIS classification:
Class D1A (Materials Causing Immediate and Serious Toxic Effects, Very Toxic Material);
Class D2A (Materials Causing Other Toxic Effects, Very Toxic Material);
Class E (Corrosive Material).

Labelling: Phrases recommended to appear on a supplier label, can be found in Section 15. WHMIS symbols required on a supplier label:

Emergency Overview : Clear liquid. Bland odour.
Warning!
POISON! May be fatal if inhaled. Harmful or fatal if absorbed through the skin. May be harmful if swallowed. May cause nausea, vomiting, headache and other central nervous system effects. Corrosive. Prolonged contact may cause corrosive burns and eye damage. May cause respiratory irritation. Contains material which can cause damage to the blood system, the liver and the kidneys. Contains material which may cause cancer, based on animal data.

POTENTIAL HEALTH EFFECTS:

Signs and symptoms of short-term (acute) exposure

Inhalation : May cause severe irritation to the nose, throat and respiratory tract. Symptoms may include pain, headache, nausea, vomiting, dizziness, drowsiness and other central nervous system effects. Inhalation in very high concentrations may result in blood system effects, such as red blood cell fragility. May result in unconsciousness and possibly death.

Skin : Causes severe irritation. Prolonged contact may produce chemical burns to affected skin areas. May be absorbed and cause symptoms similar to those for inhalation.

Eyes : Causes severe eye irritation. Could cause burns and permanent eye damage if not promptly removed.

Ingestion : May cause severe irritation and corrosive damage in the mouth, throat and stomach. Ingestion may cause symptoms similar to inhalation.

Effects of long-term (chronic) exposure
: Prolonged or repeated contact may cause drying, cracking and defatting of the skin. Contains: 2-butoxyethanol. Chronic overexposure to 2-butoxyethanol may cause liver, kidney and blood damage, based on animal data. Humans are less sensitive to these effects. Effects appear to be species specific.

Carcinogenic status : Possible cancer hazard. See TOXICOLOGICAL INFORMATION, Section 11.

Additional health hazards : See TOXICOLOGICAL INFORMATION, Section 11.

Potential environmental effects
: See ECOLOGICAL INFORMATION, Section 12.

SECTION 3 - COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients	CAS #	Wt.%
Citric acid	77-92-9	10.00 - 30.00
Tetrasodium salt of EDTA	64-02-8	7.00 - 13.00
2-butoxyethanol	111-76-2	1.00 - 5.00
Dodecylbenzenesulfonic acid	27176-87-0	1.00 - 5.00
N-Methyl-2-pyrrolidone	872-50-4	1.00 - 5.00
potassium hydroxide	1310-58-3	1.00 - 5.00

SECTION 4 - FIRST AID MEASURES

Inhalation : Immediately remove person to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen by qualified medical personnel only. Seek immediate medical attention/advice.

Skin contact : Remove/Take off immediately all contaminated clothing. Wash off immediately with plenty of water for at least 15 minutes. Seek immediate medical attention/advice.

Eye contact : Immediately flush eyes with plenty of water for at least 15 minutes. Seek immediate medical attention/advice.

Ingestion : Seek immediate medical attention/advice. Do not induce vomiting. Never give anything by mouth to an unconscious person.

Notes For Physician : Corrosive. Immediate medical attention is required.

SECTION 5 - FIRE FIGHTING MEASURES

Fire hazards/conditions of flammability

: Not flammable under normal conditions of use. Contact with metals may release small amounts of flammable hydrogen gas. Closed containers may rupture if exposed to excess heat or flame due to a build-up of internal pressure.

Oxidizing properties : None known.

Explosion data: Sensitivity to mechanical impact / static discharge

: Not expected to be sensitive to mechanical impact or static discharge.

Suitable extinguishing media : Use media suitable to the surrounding fire such as water fog or fine spray, alcohol foams, carbon dioxide and dry chemical.

Special fire-fighting procedures/equipment

: Firefighters should wear proper protective equipment and self-contained breathing apparatus with full face piece operated in positive pressure mode. Move containers from fire area if safe to do so. Water spray may be useful in cooling equipment exposed to heat and flame.

Hazardous combustion products

: Carbon oxides; Potassium oxides; Sulphur oxides; hydrogen sulphide; Nitrogen oxides (NOx); Other unidentified organic compounds.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Personal precautions : All persons dealing with the clean-up should wear the appropriate personal protective equipment. Keep all other personnel upwind and away from the spill/release. Restrict access to area until completion of clean-up. Refer to protective measures listed in sections 7 and 8.

Environmental precautions : Ensure spilled product does not enter drains, sewers, waterways, or confined spaces. For large spills, dike the area to prevent spreading.

Spill response/cleanup : Ventilate area of release. Remove all sources of ignition. Dilute with water and neutralize with Sodium Carbonate (soda ash) or Sodium Bicarbonate (baking soda). Absorb material with inert absorbent, and place into labelled containers for disposal. Refer to Section 13 for disposal of contaminated material. Notify the appropriate authorities as required.

Prohibited materials : None known.

SECTION 7 - HANDLING AND STORAGE

Safe Handling procedures : Use in a well-ventilated area. Wear suitable protective equipment during handling. Avoid breathing vapour or mist. Avoid contact with skin, eyes and clothing. Keep away from heat, sparks and open flames. Keep away from bases, metals and other incompatibles. Wash thoroughly after handling.

Storage requirements : Store in a cool, dry, well-ventilated area. Store away from incompatibles and out of direct sunlight. Storage area should be clearly identified, clear of obstruction and accessible only to trained and authorized personnel. Inspect periodically for damage or leaks. No smoking in the area.

Incompatible materials : Bases; Strong oxidizing agents; Metals; Reducing agents; Other unidentified organic compounds.

Special packaging materials : Always keep in containers made of the same materials as the supply container.

SECTION 8 - EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits

Ingredients	ACGIH TLV		OSHA PEL	
	TWA	STEL	PEL	STEL
Citric acid	N/Av	N/Av	N/Av	N/Av
Tetrasodium salt of EDTA	N/Av	N/Av	N/Av	N/Av
2-butoxyethanol	20 ppm	N/Av	50 ppm (240 mg/m³) (skin)	N/Av
Dodecylbenzenesulfonic acid	N/Av	N/Av	N/Av	N/Av
N-Methyl-2-pyrrolidone	10 ppm (skin) (AIHA WEEL)	N/Av	N/Av	N/Av
potassium hydroxide	2 mg/m³ (Ceiling)	N/Av	2 mg/m³ (Ceiling) (final rule limit)	N/Av

Ventilation and engineering measures
: Use general or local exhaust ventilation to maintain air concentrations below recommended exposure limits.

Respiratory protection : If the TLV is exceeded, a NIOSH/MSHA-approved respirator is advised. Advice should be sought from respiratory protection specialists.

Skin protection : Impervious gloves must be worn when using this product. Advice should be sought from glove suppliers. Wear resistant clothing and boots.

Eye / face protection : Chemical splash goggles are recommended. A full face shield may also be necessary.

Other protective equipment : An eyewash station and safety shower should be made available in the immediate working area.

General hygiene considerations
: Handle in accordance with good industrial hygiene and safety practice. Avoid breathing vapour or mist. Avoid contact with skin, eyes and clothing. Wash contaminated clothing before reuse. Wash hands thoroughly after using this product, and before eating, drinking or smoking.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Physical state : liquid
Appearance : Clear liquid.
Odour : Bland odour.
Odour threshold : N/Av
pH : 4.5 - 6
Boiling point : 100°C
Specific gravity : 1.09
Melting/Freezing point : N/Av
Coefficient of water/oil distribution : N/Av
Vapour pressure (mmHg @ 20° C / 68° F) : N/Av
Solubility in water : Soluble
Vapour density (Air = 1) : N/Av
Evaporation rate (n-Butyl acetate = 1) : N/Av
Volatile organic Compounds (VOC's) : N/Av
Volatiles (% by weight) : 4.2
Flash point : N/Ap
Flash point Method : N/Av
Auto-ignition temperature : N/Av

Lower flammable limit (% by vol.) : N/Ap
Upper flammable limit (% by vol.) : N/Ap
Flame Projection Length : N/Ap
Flashback observed : N/Ap
Absolute pressure of container : N/Ap
Viscosity : N/Av
General Information : No additional information.

Section 10: STABILITY AND REACTIVITY

Stability and reactivity : Stable under the recommended storage and handling conditions prescribed. After prolonged storage, may release explosive peroxides in the presence of air. Exposure to sunlight accelerates decomposition. Contact with metals may release small amounts of flammable hydrogen gas.
Hazardous polymerization : Hazardous polymerization does not occur.
Conditions to avoid : Avoid heat and open flame. Keep away from direct sunlight. Ensure adequate ventilation, especially in confined areas.
Materials To Avoid And Incompatibility : Bases; Strong oxidizing agents; Reducing agents.
Hazardous decomposition products : Peroxides Refer to Section 5 for additional 'Hazardous combustion products'.

SECTION 11 - TOXICOLOGICAL INFORMATION

Target organs : Eyes, skin, respiratory system, central nervous system, blood system, liver, brain and kidneys.
Routes of exposure : *Inhalation:* YES *Skin Absorption:* YES *Skin & Eyes:* YES *Ingestion:* YES
Irritancy : Prolonged contact may produce chemical burns to affected skin areas. Possible severe eye irritation and tissue damage.
Toxicological data : There is no available data for the product itself, only for the ingredients. See below for individual ingredient acute toxicity data.

Ingredients	LC_{50} (4hr) inh, rat	LD_{50} (Oral, rat)	LD_{50} (Rabbit, dermal)
Citric acid	N/Av	3000 mg/kg	> 2000 mg/kg (No mortality)
Tetrasodium salt of EDTA	N/Av	1700 - 1913 mg/kg	N/Av
2-butoxyethanol	450 ppm (2.175 mg/L) (vapour)	530 mg/kg	400 - 500 mg/kg
Dodecylbenzenesulfonic acid	N/Av	650 mg/kg	2000 mg/kg
N-Methyl-2-pyrrolidone	> 5.1 mg/L (aerosol) (No mortality)	3906 mg/kg	5000 - 10 000 mg/kg
potassium hydroxide	N/Av	205 mg/kg	> 1260 mg/kg

Carcinogenic status : Contains the following chemicals listed as confirmed animal carcinogens (A3) by ACGIH: 2-butoxyethanol. No other components are classified as carcinogenic by IARC, ACGIH, OSHA or NTP.
Reproductive effects : Not expected to cause reproductive effects.
Teratogenicity : Not expected to be a teratogen.
Mutagenicity : Not expected to be mutagenic in humans.
Epidemiology : None known or reported by the manufacturer.
Sensitization to material : Not expected to be a skin or respiratory sensitizer.
Synergistic materials : None known or reported by the manufacturer.
other important hazards : CNS depression may result from extreme exposures.
Conditions aggravated by overexposure : Pre-existing skin, eye, respiratory or blood system disorders.

SECTION 12 - ECOLOGICAL INFORMATION

Ecotoxicity : 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.

See the following tables for individual ingredient ecotoxicity data.

Ecotoxicity data:

Ingredients	CAS No	Toxicity to Fish		
		LC50 / 96h	NOEC / 21 day	M Factor
Citric acid	77-92-9	1516 mg/L (Bluegill sunfish)	N/Av	None.
Tetrasodium salt of EDTA	64-02-8	486 - 1592 mg/L (Bluegill sunfish)	≥ 25.7 mg/L (35 day) (Zebra fish)	None.
2-butoxyethanol	111-76-2	1490 mg/L (Bluegill sunfish)	> 100 mg/L (Zebra fish)	None.
Dodecylbenzenesulfonic acid	27176-87-0	3.2 - 5.6 mg/L (Rainbow trout)	N/Av	None.
N-Methyl-2-pyrrolidone	872-50-4	> 500 mg/L (Rainbow trout)	N/Av	None.
potassium hydroxide	1310-58-3	80 mg/L (Mosquito fish)	N/Av	None.

Ingredients	CAS No	Toxicity to Daphnia		
		EC50 / 48h	NOEC / 21 day	M Factor
Citric acid	77-92-9	1535 mg/L/24hr (Daphnia magna)	N/Av	None.
Tetrasodium salt of EDTA	64-02-8	140 mg/L (Daphnia magna)	25 mg/L	None.
2-butoxyethanol	111-76-2	835 mg/L (Daphnia magna)	100 mg/L	None.
Dodecylbenzenesulfonic acid	27176-87-0	3.5 mg/L (Daphnia magna)	1.65 mg/L	None.
N-Methyl-2-pyrrolidone	872-50-4	> 1000 mg/L/24hr (Daphnia magna)	12.5 mg/L	None.
potassium hydroxide	1310-58-3	56 mg/L Ceriodaphnia (water flea)	N/Av	None.

Ingredients	CAS No	Toxicity to Algae		
		EC50 / 96h or 72h	NOEC / 96h or 72h	M Factor
Citric acid	77-92-9	> 18 000 mg/L/96hr (Green algae)	N/Av	None.
Tetrasodium salt of EDTA	64-02-8	> 100 mg/L/72hr (Green algae)	48.4 mg/L/72hr	None.
2-butoxyethanol	111-76-2	911 mg/L/72hr (Green algae)	286 mg/L/72hr	None.
Dodecylbenzenesulfonic acid	27176-87-0	65.4 mg/L/72hr (Green algae)	7.9 mg/L/72hr	None.
N-Methyl-2-pyrrolidone	872-50-4	600.5 mg/L/72hr (Green algae)	125 mg/L/72hr	None.
potassium hydroxide	1310-58-3	N/Av	N/Av	None.

Mobility : No data is available on the product itself.

Persistence : No data is available on the product itself.
Contains the following chemicals which are not readily biodegradable: Tetrasodium salt of EDTA; potassium hydroxide.
The following ingredients are considered to be readily biodegradable: Citric acid; 2-butoxyethanol; Dodecylbenzenesulfonic acid; N-methyl-2-pyrrolidone.

Bioaccumulation potential : No data is available on the product itself. See the following data for ingredient information.

Components	Partition coefficient n-octanol/water (log Kow)	Bioconcentration factor (BCF)
Citric acid (CAS 77-92-9)	- 1.72	3 (estimated)
Tetrasodium salt of EDTA (CAS 64-02-8)	- 13.17 (estimated)	1.8 (Bluegill sunfish)
2-butoxyethanol (CAS 111-76-2)	0.8	0.97
Dodecylbenzenesulfonic acid (CAS 27176-87-0)	1.96	36 - 119
N-Methyl-2-pyrrolidone (CAS 872-50-4)	- 0.46	3.16

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 waste according to recommendations in Section 7. Empty containers retain residue (liquid and/or vapour) and can be dangerous.

Methods of Disposal : Dispose of in accordance with federal, provincial and local hazardous waste laws.

SECTION 14: TRANPORT INFORMATION

Regulatory Information	UN Number	Shipping Name	Class	Packing Group	Label
TDG	None	Not regulated.	Not regulated	None	
TDG Additional information	None.				

SECTION 15 - REGULATORY INFORMATION

Labelling:

Warning! POISON! May be fatal if too much is inhaled. Harmful or fatal if absorbed through the skin. May be harmful if swallowed. Severe respiratory irritant May cause headache, nausea, dizziness and other symptoms of central nervous system depression. Corrosive. Prolonged contact may cause corrosive burns and eye damage. Contains material which can cause damage to the blood system, the liver and the kidneys. Contains material which may cause cancer, based on animal data.

Precautions: Use in a well-ventilated area. Wear chemically resistant protective equipment during handling. Do not breathe vapours or spray mist. Avoid contact with skin, eyes and clothing. Keep away from heat, sparks and open flames. Keep away from bases, metals and other incompatibles. Wash thoroughly after handling. Keep containers closed when not in use.

FIRST AID: If inhaled, move to fresh air. If breathing is difficult, give oxygen by qualified medical personnel only. If breathing stops, provide artificial respiration. For skin contact, flush with water for at least 15 minutes, while removing contaminated clothing. For eye contact, flush with running water for at least 15 minutes. If ingested, do not induce vomiting. Never give anything by mouth to an unconscious person. For all cases, obtain medical attention immediately.

Refer To Material Safety Data Sheet for further information.

Canadian Information:

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

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

This product has been classified according to the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR.

US Federal Information:

TSCA: All listed ingredients appear on the Toxic Substances Control Act (TSCA) inventory.

SECTION 16 - OTHER INFORMATION

Legend :

ACGIH: American Conference of Governmental Industrial Hygienists
AIHA: American Industrial Hygiene Association
CAS: Chemical Abstract Services
HSDB: Hazardous Substances Data Bank
IARC: International Agency for Research on Cancer
Inh: Inhalation
LC: Lethal Concentration
LD: Lethal Dose
MSHA: Mine Safety and Health Administration
N/Ap: Not Applicable
N/Av: Not Available
NIOSH: National Institute of Occupational Safety and Health
NOEC: No observable effect concentration
NTP: National Toxicology Program
OECD: Organisation for Economic Co-operation and Development
OSHA: Occupational Safety and Health Administration
PEL: Permissible exposure limit
RTECS: Registry of Toxic Effects of Chemical Substances
STEL: Short Term Exposure Limit
TDG: Canadian Transportation of Dangerous Goods Act & Regulations
TLV: Threshold Limit Values
TWA: Time Weighted Average
WEEL: Workplace Environmental Exposure Level
WHMIS: Workplace Hazardous Materials Identification System

References :

1. ACGIH, Threshold Limit Values for Chemical Substances and Physical Agents & Biological Exposure Indices for 2016.
2. International Agency for Research on Cancer Monographs, searched 2016.
3. Canadian Centre for Occupational Health and Safety, CCInfoWeb databases, 2016 (Chempendium, HSDB and RTECs).
4. Material Safety Data Sheets from manufacturer.
5. OECD - The Global Portal to Information on Chemical Substances - eChemPortal, 2016.

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12. ECOLOGICAL INFORMATION.

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