SECTION 05: FIRE FIGHTING MEASURES

T.D.G. FLAM. CLASS	NOT REGULATED.
FLAMMABILITY	SEE FLASH POINT.
IF YES, UNDER WHICH CONDITIONS?	
EXTINGUISHING MEDIA	CARBON DIOXIDE, DRY CHEMICAL, ALCOHOL FOAM, WATER FOG. WATER SPRAY.
SPECIAL PROCEDURES	DO NOT USE A JET OF WATER OR FOAM.WEAR FULL PROTECTIVE EQUIPMENT INCLUDING A SELF-CONTAINED BREATHING APPARATUS.USE WATER-SPRAY TO KEEP CONTAINERS COOL.
FLASH POINT (C), METHOD	63.
AUTO IGNITION TEMPERATURE	N.AV.
UPPER FLAMMABLE LIMIT (% BY VOL.)	13 %.
LOWER FLAMMABLE LIMIT (% BY VOL.)	2.1.
EXPLOSION DATA	
EXPLOSIVE POWER	N.AV.
RATE OF BURNING	N.AV.
SENSITIVITY TO STATIC DISCHARGE	N.AV.
SENSITIVITY TO IMPACT	N.AV.
UNUSUAL FIRE AND EXPLOSION HAZARDS	NONE KNOWN.
HAZARDOUS COMBUSTION PRODUCTS	N.AV.

SECTION 06: ACCIDENTAL RELEASE MEASURES

LEAK/SPILL	COMBUSTIBLE LIQUID.KEEP AWAY FROM HEAT OR FLAME. ABSORB WITH AN INERT MATERIAL SUCH AS SAND, SOIL OR VERMICULITE; SWEEP UP AND DISPOSE OF IN ACCORDANCE TO ALL GOVERNMENT REGULATIONS. ELIMINATE IGNITION SOURCES.SCOOP UP USED ABSORBENT INTO DRUMS.PREVENT RUNOFF INTO DRAINS, SEWERS, AND OTHER WATERWAYS.REPORT AS PER REGULATORY REQUIREMENTS.

SECTION 07: HANDLING AND STORAGE

HANDLING PROCEDURES AND EQUIPMENT	KEEP CONTAINERS CLOSED WHEN NOT IN USE.AVOID CONTACT WITH EYES, SKIN, AND CLOTHING.WASH THOROUGHLY AFTER HANDLING.
STORAGE NEEDS	STORE IN A COOL, DRY, WELL VENTILATED AREA, AWAY FROM HEAT AND IGNITION SOURCES.STORE AWAY FROM INCOMPATIBLE MATERIALS.KEEP THE CONTAINER TIGHTLY

CLOSED WHEN NOT IN USE.

SECTION 08: EXPOSURE CONTROLS/PERSONAL PROTECTION

GLOVES/ TYPE	WEAR IMPERVIOUS GLOVES.
RESPIRATORY/TYPE	ATMOSPHERIC LEVELS SHOULD BE MAINTAINED BELOW THE EXPOSURE GUIDELINE. WHEN RESPIRATORY PROTECTION IS REQUIRED FOR CERTAIN OPERATIONS, USE AN NIOSH APPROVED AIR-PURIFYING RESPIRATOR.
EYE/TYPE	CHEMICAL SAFETY GOGGLES.
FOOTWEAR/TYPE	SAFETY SHOES.
CLOTHING/TYPE	FULL COVER CLOTHING.
OTHER/TYPE	EYE BATH AND SAFETY SHOWER.
ENGINEERING CONTROLS	GENERAL (MECHANICAL) ROOM VENTILATION IS EXPECTED TO BE SATISFACTORY.

SECTION 09: PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	CLEAR. LIQUID.
ODOUR	MILD ODOUR.
ODOUR THRESHOLD	200 PPM.
VAPOUR PRESSURE (MMHG)	0.75.
VAPOUR DENSITY (AIR=1)	5.4.
EVAPORATION RATE	0.1.
BOILING POINT	186 (C).
PH	N.AV.
SPECIFIC GRAVITY (WATER=1)	0.79 (20(C)).
SOLUBILITY IN WATER (% W/W)	INSOLUBLE.
COEFFICIENT OF WATER/OIL DIST	N.AV.

SECTION 10: STABILITY AND REACTIVITY

CHEMICAL STABILITY:	
YES	YES.
NO, WHICH CONDITIONS?	
COMPATABILITY WITH OTHER SUBSTANCES:	
YES	
NO, WHICH ONES?	OXIDIZING AGENTS.
REACTIVITY CONDITIONS?	AVOID EXCESSIVE HEAT, OPEN FLAMES AND ALL IGNITION SOURCES.
HAZARDOUS PRODUCTS OF DECOMPOSITION	NONE KNOWN.
HAZARDOUS POLYMERIZATION	WILL NOT OCCUR.

SECTION 11: TOXICOLOGICAL INFORMATION

EXPOSURE LIMIT OF MATERIAL.....	NOT ESTABLISHED.
LC 50 OF MATERIAL, SPECIES &..... ROUTE	NONE FOUND.
LD 50 OF MATERIAL, SPECIES &..... ROUTE	N.AV.
CARCINOGENICITY OF MATERIAL.....	N.AV.
REPRODUCTIVE EFFECTS.....	N.AV.
IRRITANCY OF MATERIAL.....	SEE SECTION 03.
SENSITIZING CAPABILITY OF..... MATERIAL	N.AV.
SYNERGISTIC MATERIALS.....	N.AV.

SECTION 12: ECOLOGICAL CONSIDERATIONS

SECTION 13: DISPOSAL CONSIDERATIONS

WASTE DISPOSAL.....	IN ACCORDANCE WITH MUNICIPAL, PROVINCIAL AND FEDERAL REGULATIONS.

SECTION 14: TRANSPORT INFORMATION

UN NUMBER.....	N.AP.
TDG CLASSIFICATION.....	NOT REGULATED.
PACKING GROUP.....	N.AP.
SPECIAL SHIPPING INSTRUCTIONS.....	N.AP.

SECTION 15: REGULATORY INFORMATION

WHMIS CLASSIFICATION.....	B3. D2B.
CPR COMPLIANCE.....	THIS PRODUCT HAS BEEN CLASSIFIED IN ACCORDANCE WITH THE HAZARD CRITERIA OF THE CPR AND THE MSDS CONTAINS ALL THE INFORMATION REQUIRED BY THE CPR.

SECTION 16: OTHER INFORMATION

N.AV.=NOT AVAILABLE.....
N.AP.=NOT APPLICABLE.....
PREPARED BY..... Regulatory Affairs
DATED..... 07201999

WINSHIELD WASHER FLUID

* *
* M S D S *
* *
* Canadian Centre for Occupational Health and Safety *
* * * * * * * * * * * * Issue : 2001-1 (February, 2001) *

*** IDENTIFICATION ***

MSDS RECORD NUMBER : 2487897
PRODUCT NAME(S) : WINDSHIELD WASHER FLUID
PRODUCT IDENTIFICATION : PRODUCT CODE R00072260000
DATE OF MSDS : 1999-06-29
CURRENCY NOTE : This MSDS was provided to CCOHS in electronic form on 2000-12-18

*** MANUFACTURER INFORMATION ***

MANUFACTURER : SUN COMPANY, INC
ADDRESS : Ten Penn Center
1801 Market Street
Philadelphia Pennsylvania
U.S.A. 19103-1699
Telephone: 215-977-6182 (Joanne Houck)
EMERGENCY TELEPHONE NO. : 800-964-8861 (SUN COMPANY, AFTER NORMAL BUSINESS HOURS)
800-424-9300 (CHEMTREC, AFTER NORMAL BUSINESS HOURS)

1. CHEMICAL PRODUCT AND COMPANY INFORMATION

REVISION DATE: 06/29/1999
UN NUMBER- UN1993

PRIMARY APPLICATION- WINDSHIELD WASHER FLUID

MANUFACTURER- SUN COMPANY, INC.
TEN PENN CENTER
1801 MARKET STREET
PHILADELPHIA PA 19103-1699

SYNONYMS..... : WINDSHIELD WASHER PREMIX
CAS REGISTRY NO: SEE SEC. 2
CAS NAME..... : NO CLASSIFICATION - MIXTURE
CHEMICAL FAMILY: BLEND
INFORMATION
SUPPLIER.. JOANNE HOUCK
PHONE.... : (610) 859-1120

EMERGENCY PHONE NUMBERS (AFTER NORMAL BUSINESS HOURS)
SUN CO.. 1-800-964-8861

CHEMTREC. 1-800-424-9300

2. COMPOSITION / INFORMATION ON INGREDIENTS

COMPONENT/CAS NO.	LO%	HI%	EXPOSURE GUIDELINES OSHA TWA	OSHA STEL	ACGIH TWA	ACGIH STEL	SUN/MFR TWA	SUN/MFR STEL	UNIT
LIMITS FOR THE PRODUCT:				NO SPECIFIC LIMIT					
METHANOL									
67-56-1	35.00	45.00	200	250	200	250			PPM
WATER									
7732-18-5	55.00	65.00		NO SPECIFIC LIMIT					
C.I. ACID BLUE 9									
3844-45-9	.00	1.00		NO SPECIFIC LIMIT					

ADDITIONAL EXPOSURE LIMITS ---------- GOVERNMENT REGULATION
OTHER LIMIT- SEE SECTION 2

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW ----------

DANGER] FLAMMABLE LIQUID AND VAPOR. HARMFUL IF INHALED. HIGH VAPOR CONCENTRATIONS MAY CAUSE DIZZINESS. MAY CAUSE SKIN IRRITATION. CAUSES EYE IRRITATION. POISON] MAY BE FATAL OR CAUSE BLINDNESS IF SWALLOWED. MAY CAUSE SEVERE CHRONIC TOXICITY.

APPEARANCE-- CLEAR BLUE LIQUID ODOR-- MILD ALCOHOL ODOR

POTENTIAL HEALTH EFFECTS ----------

PRIMARY ROUTES OF ENTRY- INHALATION(X) SKIN(X) EYE(X) INGESTION(X)

INHALATION ----------
EXCESSIVE EXPOSURES MAY CAUSE IRRITATION TO EYES, NOSE, THROAT, LUNGS; RESPIRATORY TRACT; CENTRAL NERVOUS SYSTEM (BRAIN) EFFECTS; HEADACHES, NAUSEA; DIZZINESS, LOSS OF BALANCE AND COORDINATION; UNCONSCIOUSNESS, COMA; RESPIRATORY FAILURE AND DEATH. REPEATED EXCESSIVE EXPOSURES MAY CAUSE LIVER EFFECTS OR DAMAGE. KIDNEY EFFECTS OR DAMAGE.

SKIN ----------
SKIN ABSORPTION OF MATERIAL MAY PRODUCE SYSTEMIC TOXICITY. MAY CAUSE MODERATE IRRITATION WITH PROLONGED OR REPEATED CONTACT. REMOVES NATURAL OILS & FATS FROM SKIN.

EYE ----------
CONTACT WITH THE EYE MAY CAUSE MODERATE IRRITATION. CORNEAL DAMAGE OR OPACITY.

INGESTION ----------
HARMFUL OR FATAL IF SWALLOWED. CANNOT BE MADE NON-POISONOUS. INGESTION OF THIS MATERIAL MAY CAUSE BLINDNESS; CENTRAL NERVOUS SYSTEM (BRAIN)

EFFECTS; NAUSEA, VOMITING AND DIARRHEA; INGESTION OF THIS MATERIAL MAY CAUSE DAMAGE TO CENTRAL NERVOUS SYSTEM (BRAIN); VISION; LIVER; KIDNEYS;

CARCINOGEN LISTED BY-IARC(NO) NTP(NO) OSHA(NO) ACGIH(NO) OTHER(NO)

PRE-EXISTING MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE-
DISORDERS OR DISEASES OF THE SKIN, EYE, LIVER, KIDNEY, RESPIRATORY, PULMONARY AND LUNG (E.G. ASTHMA-LIKE CONDITIONS).

4. FIRST AID MEASURES

INHALATION ----------
MOVE PERSON TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION, OBTAIN MEDICAL ASSISTANCE.

SKIN ----------
WASH WITH SOAP AND WATER UNTIL NO ODOR REMAINS. IF REDNESS OR SWELLING DEVELOPS, OBTAIN MEDICAL ASSISTANCE. IMMEDIATELY REMOVE SOAKED CLOTHING. WASH CLOTHING BEFORE REUSE. DESTROY CONTAMINATED SHOES.

EYE ----------
FLUSH WITH WATER FOR AT LEAST 15 MINUTES. OBTAIN MEDICAL ASSISTANCE.

INGESTION ----------
GIVE LIQUIDS AND INDUCE VOMITING UNLESS VICTIM IS UNCONSCIOUS. IF INDIVIDUAL IS CONSCIOUS, GIVE MILK OR WATER TO DILUTE. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. IF VICTIM IS CONSCIOUS AND ALERT VOMITING SHOULD BE INDUCED BY OR UNDER THE DIRECTION OF A PHYSICIAN OR POISON CONTROL CENTER. OBTAIN EMERGENCY MEDICAL ATTENTION.

5. FIRE FIGHTING MEASURES

FLASH POINT: 98 (DEG. F); 36 (DEG. C)
AUTOIGNITION TEMP.: NOT DETERMINED (DEG. F); NOT DETERMINED (DEG. C)

---FLAMMABLE LIMITS IN AIR---
LOWER EXPLOSIVE LIMIT (LEL): NOT DETERMINED % VOLUME
UPPER EXPLOSIVE LIMIT (UEL): NOT DETERMINED % VOLUME

FIRE AND EXPLOSION HAZARDS ----------
FLAMMABLE LIQUID (FLASH POINT LESS THAN 100F)

EXTINGUISHING-MEDIA ----------
WATER SPRAY. ALCOHOL RESISTANT FOAM. DRY CHEMICAL. CARBON DIOXIDE.

SPECIAL FIRE FIGHTING INSTRUCTIONS ---------
USE WATER SPRAY. COOL TANK/ CONTAINER. WEAR SELF-CONTAINED BREATHING APPARATUS. WEAR STRUCTURAL FIREFIGHTERS PROTECTIVE CLOTHING.

NFPA/HMIS CLASSIFICATION HAZARD RATING

HEALTH - 1 / 1
FIRE - 2 / 2
REACTIVITY - 0 / 0
PERSONAL PROTECTION INDEX - X

0=LEAST 1=SLIGHT
2=MODERATE 3=HIGH
4=EXTREME

SPECIFIC HAZARD: FLAMMABLE

6. ACCIDENTAL RELEASE MEASURES

PREVENT IGNITION; STOP LEAK; VENTILATE AREA. CONTAIN SPILL. USE WATER SPRAY TO DISPERSE VAPORS. KEEP UPWIND OF LEAK. USE PERSONAL PROTECTIVE EQUIPMENT STATED IN SECTION 8. ADVISE EPA; STATE AGENCY IF REQUIRED. ABSORB ON INERT MATERIAL. SHOVEL, SWEEP OR VACUUM SPILL.

7. HANDLING AND STORAGE

KEEP AWAY FROM HEAT, SPARKS AND FLAME. KEEP IN COOL, DRY PLACE. KEEP CONTAINER TIGHTLY CLOSED. KEEP IN WELL VENTILATED SPACE. STORAGE HAS TEMPERATURE LIMITS--SEE STABILITY. NFPA CLASS 1C STORAGE. CONSULT NFPA AND OSHA CODES. TRANSFER OPERATIONS MUST BE ELECTRICALLY GROUNDED TO DISSIPATE STATIC BUILDUP. AVOID PROLONGED BREATHING OF MIST OR VAPOR. AVOID CONTACT WITH THIS MATERIAL. AVOID CONTACT WITH EYES. WASH THOROUGHLY AFTER HANDLING. NEVER SIPHON BY MOUTH.

8. EXPOSURE CONTROL / PERSONAL PROTECTION

CONSULT WITH A HEALTH/SAFETY PROFESSIONAL FOR SPECIFIC SELECTION.

VENTILATION ----------
USE ONLY WITH ADEQUATE VENTILATION. VENTILATE AS NEEDED TO COMPLY WITH EXPOSURE LIMIT. EXPLOSION PROOF VENTILATION EQUIPMENT REQUIRED.

PERSONAL PROTECTIVE EQUIPMENT ----------
EYE ----------
SPLASH PROOF CHEMICAL GOGGLES OR FULL FACE SHIELD RECOMMENDED TO PROTECT AGAINST SPLASH OF PRODUCT.
GLOVES ----------
PROTECTIVE GLOVES RECOMMENDED WHEN PROLONGED SKIN CONTACT CANNOT BE AVOIDED. THE FOLLOWING GLOVE MATERIALS ARE ACCEPTABLE: POLYETHYLENE; NEOPRENE; NITRILE; POLYVINYL ALCOHOL; VITON; NATURAL RUBBER;
RESPIRATOR ----------
CONCENTRATION-IN-AIR DETERMINES PROTECTION NEEDED. USE ONLY NIOSH CERTIFIED RESPIRATORY PROTECTION. HALF-MASK AIR PURIFYING RESPIRATOR

WITH ORGANIC VAPOR CARTRIDGES IS ACCEPTABLE TO 10 TIMES THE EXPOSURE LIMIT. FULL-FACE AIR PURIFYING RESPIRATOR WITH ORGANIC VAPOR CARTRIDGES IS ACCEPTABLE TO 50 TIMES THE EXPOSURE LIMIT NOT TO EXCEED THE CARTRIDGE LIMIT OF 1000 PPM. PROTECTION BY AIR PURIFYING RESPIRATORS IS LIMITED. USE A POSITIVE PRESSURE-DEMAND FULL-FACE SUPPLIED AIR RESPIRATOR OR SCBA FOR EXPOSURES ABOVE 50X THE EXPOSURE LIMIT. IF EXPOSURE IS ABOVE IDLH(IMMEDIATELY DANGEROUS TO LIFE & HEALTH) OR THERE IS THE POSSIBILITY OF AN UNCONTROLLED RELEASE OR EXPOSURE LEVELS ARE UNKNOWN THEN USE A POSITIVE PRESSURE-DEMAND FULL-FACE SUPPLIED AIR RESPIRATOR WITH ESCAPE BOTTLE OR SCBA.

OTHER ----------

IF CONTACT IS UNAVOIDABLE, WEAR CHEMICAL RESISTANT CLOTHING. THE FOLLOWING MATERIALS ARE ACCEPTABLE AS PROTECTIVE CLOTHING MATERIALS: POLYETHYLENE; POLYVINYL ALCOHOL(PVA); NEOPRENE; NITRILE; VITON; SAFETY SHOWER AND EYE WASH AVAILABILITY RECOMMENDED. LAUNDER SOILED CLOTHES. FOR NON-FIRE EMERGENCIES, POSITIVE PRESSURE SELF-CONTAINED BREATHING APPARATUS (SCBA) & STRUCTURAL FIREFIGHTERS' PROTECTIVE CLOTHING WILL PROVIDE LIMITED PROTECTION.

9. PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT..... : 148 (DEG. F) _____ 64 (DEG. C)
MELTING POINT..... : N.D. (DEG. F) _____ N.D. (DEG. C)
SPECIFIC GRAVITY... : 0.97 (WATER=1)
PACKING DENSITY.... : N/A (KG/M3)
VAPOR PRESSURE..... : 97.68 (MM HG @ 20 DEG C)
VAPOR DENSITY..... : N/A (AIR=1)
SOLUBILITY IN WATER.: 100% (% BY VOLUME)
PH INFORMATION..... : N.D. AT CONC. N.D. G/L H2O
% VOLATILES BY VOL..: N/A
EVAPORATION RATE... : N/A (ETHYL ETHER=1)
OCTANOL/WATER COEFF.: N.D.
APPEARANCE..... : CLEAR BLUE LIQUID
ODOR..... : MILD ALCOHOL ODOR
ODOR THRESHOLD..... : N.D. (PPM)
VISCOSITY..... : N.D. SUS @ N.D DEG F ... N.D. CST @ N.D DEG C
MOLECULAR WEIGHT... : N.D. (G/MOLE)

10. STABILITY AND REACTIVITY

STABILITY ----------

STABLE

CONDITIONS TO AVOID-

HEAT, SPARKS AND OPEN FLAMES. STORE AT TEMPERATURES BELOW 120 DEG F.

INCOMPATIBLE MATERIALS ----------

STRONG OXIDIZERS

HAZARDOUS DECOMPOSITION ----------
COMBUSTION WILL PRODUCE CARBON MONOXIDE AND ASPHYXIANTS
POLYMERIZATION ----------
WILL NOT OCCUR.

11. TOXICOLOGICAL INFORMATION

FOR THE PRODUCT ----------
INHALATION/ORAL: POISON] CANNOT BE MADE NON-POISONOUS. HARMFUL/FATAL IF INHALED OR SWALLOWED. EFFECTS MAY BE DELAYED. OVEREXPOSURE MAY CAUSE EYE & RESPIRATORY IRRITATION, HEADACHE, NAUSEA, VOMITING, VISUAL IMPAIRMENT, CONFUSION, RESPIRATORY FAILURE, COMA & DEATH. IF SWALLOWED CAN CAUSE BLINDNESS, SEVERE GASTROINTESTINAL TRACT IRRITATION, CNS (BRAIN) EFFECTS. MASSIVE OVERDOSE MAY CAUSE HEART, LIVER, KIDNEY, BRAIN EFFECTS/DAMAGE. SKIN: CAN BE ABSORBED. PROLONGED OR REPEATED CONTACT MAY CAUSE MODERATE IRRITATION, NUMBNESS, REDNESS, DERMATITIS. EYE: IRRITANT. CAN CAUSE PAIN, SWELLING, DOUBLE VISION, CORNEAL INJURY AND PERMANENT BLINDNESS.

METHANOL (COMPONENT)
INHALATION/ORAL: POISON] CANNOT BE MADE NON-POISONOUS. HARMFUL/FATAL IF INHALED OR SWALLOWED. EFFECTS MAY BE DELAYED. OVEREXPOSURE MAY CAUSE EYE & RESPIRATORY IRRITATION, HEADACHE, NAUSEA, VOMITING, VISUAL IMPAIRMENT, CONFUSION, RESPIRATORY FAILURE, COMA & DEATH. LC50 (RAT) 4HR:64000 PPM. IF SWALLOWED, MAY CAUSE BLINDNESS, SEVERE GI IRRITATION CNS (BRAIN) EFFECTS. MASSIVE OVERDOSE MAY CAUSE HEART, LIVER, KIDNEY, BRAIN EFFECTS/DAMAGE. SKIN: CAN BE ABSORBED. PROLONGED OR REPEATED CONTACT MAY CAUSE MODERATE IRRITATION, NUMBNESS, REDNESS, DERMATITIS. EYE: IRRITANT. CAN CAUSE PAIN, SWELLING, DOUBLE VISION, CORNEAL INJURY AND PERMANENT BLINDNESS.

WATER (COMPONENT)
INHALATION: NON-TOXIC UNDER USUAL CIRCUMSTANCES. ENTRY OF WATER INTO THE LUNGS EXCLUDES OXYGEN AND ACTS AS AN ASPHYXIANT, AND CAN CAUSE DEATH (DROWNING). SKIN: MINIMAL IRRITATION WITH PROLONGED OR REPEATED CONTACT. WHEN HEATED, MAY CAUSE THERMAL BURNS TO SKIN AND EYE. ORAL: NON-TOXIC.

C.I. ACID BLUE 9 (COMPONENT)
NO DATA AVAILABLE FOR ANY ROUTE OF EXPOSURE.

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL DATA----------

NO DATA AVAILABLE.

13. DISPOSAL CONSIDERATIONS

FOLLOW FEDERAL, STATE AND LOCAL REGULATIONS. RCRA HAZARDOUS WASTE. DO NOT FLUSH TO DRAIN/ STORM SEWER. CONTRACT TO AUTHORIZED DISPOSAL SERVICE.

14. TRANSPORTATION INFORMATION

DOT-
PROPER SHIPPING NAME- FLAMMABLE LIQUID, N.O.S. (CONTAINS METHANOL)
HAZARD CLASS- 3 (FLAMMABLE LIQUID)
IDENTIFICATION NUMBER- UN1993
LABEL REQUIRED- PG II, FLAMMABLE LIQUID

IMDG- PROPER SHIPPING NAME- NO DATA AVAILABLE

IATA- PROPER SHIPPING NAME- NO DATA AVAILABLE

15. REGULATORY INFORMATION

SARA 302 THRESHOLD PLANNING QUANTITY. N/A

SARA 304 REPORTABLE QUANTITY ..... 11111 POUNDS

SARA 311 CATEGORIES- IMMEDIATE (ACUTE) HEALTH EFFECTS.. Y
DELAYED (CHRONIC) HEALTH EFFECTS.. Y
FIRE HAZARD ..... Y
SUDDEN RELEASE OF PRESSURE HAZARD. N
REACTIVITY HAZARD ..... N

WHEN A PRODUCT AND/OR COMPONENT IS LISTED BELOW, THE REGULATORY LIST ON WHICH IT APPEARS IS INDICATED.

METHANOL - CT MA NJ PA RI WV 01 07

01=SARA 313	02=SARA 302/304	03=IARC CARCINOGEN
04=OSHA CARCINOGEN	05=ACGIH CARCINOGEN	06=NTP CARCINOGEN
07=CERCLA 302.4	08=WHMIS CONTROLLED PROD.	
10=OTHER CARCINOGEN		
PA=PENNSYLVANIA RTK	NJ=NEW JERSEY RTK	CA=CALIFORNIA PROP 65
MA=MASSACHUSETTS RTK	MI=MICHIGAN 406	MN=MINNESOTA RTK
FL=FLORIDA	RI=RHODE ISLAND	IL=ILLINOIS
NY=NEW YORK	WV=WEST VIRGINIA	CT=CONNECTICUT
LA=LOUISIANA	ME=MAINE	OH=OHIO

THIS PRODUCT OR ALL COMPONENTS OF THIS PRODUCT ARE LISTED ON THE U.S. TSCA INVENTORY.

16. OTHER INFORMATION

WINSHIELD WASHER FLUID

NONE

XANTHATE POTASSIUM AMYL

* *
* M S D S *
* *
* Canadian Centre for Occupational Health and Safety *
* * * * * * * * * * * * Issue : 2001-1 (February, 2001) *

*** IDENTIFICATION ***

MSDS RECORD NUMBER : 2494557
PRODUCT NAME(S) : Xanthate Potassium Amyl
PRODUCT IDENTIFICATION : Code LA1352
DATE OF MSDS : 1999-03-25
CURRENCY NOTE : This MSDS was provided to CCOHS in electronic form on 2000-12-20

*** SUPPLIER/DISTRIBUTOR INFORMATION ***

SUPPLIER/DISTRIBUTOR : VAN WATERS & ROGERS LTD
ADDRESS : 9800 Van Horne Way
Richmond British Columbia
Canada V6X 1W5
EMERGENCY TELEPHONE NO. : 800-424-9300 (CHEMTREC)

*** MATERIAL SAFETY DATA ***

Xanthate Potassium Amyl LA1352 1 99-03-25EEE
LA1352.1 Xanthate Potassium Amyl

VAN WATERS & ROGERS LTD. 9800 VAN HORNE WAY RICHMOND, B C. V6X 1W5

WHMIS CODES: B.6 D.1B

For Emergency Assistance
Involving Chemicals Call
CHEMTREC (800) 424-9300

WHMIS (Classification)
WHMIS CLASS B-6: Reactive and very flammable material.
WHMIS CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC).

Section I. Chemical Product Identification

Product Name	Xanthate Potassium Amyl	Code	LA1352
		CAS#	Not applicable.
Synonym	Not available.	DSL	On the DSL list.
Chemical Name	Not applicable.	CI#	Not available.
Chemical Family	Not available.		
Chemical Formula	Not applicable.		
Material Uses	Not available.		

Section II. Composition and Information on Ingredients

Name	CAS #	% by Weight	Exposure Limits TLV/PEL	LC50/LD50
Potassium amyl xanthate	002720732	60-100	Not available.	ORAL (LD50): Acute: 1000 mg/kg [Rat].
Potassium Hydroxide	001310583	1-5	CEIL: 2 (mg/m3) from ACGIH (TLV) TWA: 2 (mg/m3)	ORAL (LD50): Acute: 273 mg/kg [Rat].
Isoamyl alcohol	000123513	1-5	TWA: 100 CEIL: 125 (ppm) from ACGIH (TLV) TWA: 360 CEIL: 450 (mg/m3)	ORAL (LD50): Acute: 3438 mg/kg [Rabbit]. 1300 mg/kg [Rat].

Section III. Hazards Identification

Potential Acute Health Effects	Extremely hazardous in case of skin contact (corrosive). Very hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.
Potential Chronic Health Effects	Extremely hazardous in case of skin contact (corrosive). CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section IV. First Aid Measures

Eye Contact	Check for and remove any contact lenses. IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. COLD water may be used. DO NOT use an eye ointment. Seek medical attention.
Skin Contact	After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. COLD water may be used. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.
Hazardous Skin Contact	Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.
Inhalation	Allow the victim to rest in a well-ventilated area. Seek immediate medical attention.
Hazardous Inhalation	Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.
Ingestion	DO NOT induce vomiting. Examine the lips and mouth to

	ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.
Hazardous Ingestion	No additional information.

Section V. Fire and Explosion Data

The Product is:	Flammable.
Auto-Ignition Temperature	Not available.
Flash Points	Not available.
Flammable Limits	LOWER: 1.25% UPPER: 50%
Products of Combustion	These products are carbon oxides (CO, CO2), sulfur oxides (SO2, SO3..). Some metallic oxides.
Fire Hazards in Presence of Various Substances	Flammable in presence of heat, of oxidizing materials.
Explosion Hazards in Presence of Various Substances	Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. Slightly explosive to explosive in presence of oxidizing materials.
Fire Fighting Media and Instructions	Flammable solid. SMALL FIRE: Use DRY chemicals, CO2, water spray or foam. LARGE FIRE: Use water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.
Special Remarks on Fire Hazards	No additional remark.
Special Remarks on Explosion Hazards	Vapors or dust may explode.

Section VI. Accidental Release Measures

Small Spill	Use appropriate tools to put the spilled solid in a convenient waste disposal container. If necessary: Neutralize the residue with a dilute solution of acetic acid.
Large Spill	Spontaneously combustible solid. Stop leak if without risk. Absorb with an inert material and put the spilled material in an appropriate waste disposal. Obtain advice on use of water as spilled material may react with it. DO NOT touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all sources of ignition. Cover with WET earth, sand or other non-combustible material. Call for assistance on disposal. Neutralize the residue with a dilute solution of acetic acid. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section VII. Handling and Storage

Precautions	Keep locked up. DO NOT ingest. DO NOT breathe dust. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, metals, acids.
Storage	Keep container tightly closed. Keep in a cool and well-ventilated area. Highly toxic or infectious materials should be stored in a separate locked safety storage cabinet or room.

Section VIII. Exposure Controls/Personal Protection

Engineering Controls	Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.
Personal Protection	Splash goggles. Lab coat. Dust respirator. Be sure to use a MSHA/NIOSH approved respirator or equivalent. Gloves.
Personal Protection in Case of a Large	Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested

Spill	protective clothing might not be sufficient; consult a specialist BEFORE handling this product.
Exposure Limits	Potassium Hydroxide CEIL: 2 (mg/m3) from ACGIH (TLV) TWA: 2 (mg/m3) Isoamyl alcohol TWA: 100 CEIL: 125 (ppm) TWA: 360 CEIL: 450 (mg/m3) Consult local authorities for acceptable exposure limits.

Section IX. Physical and Chemical Properties

Physical State and Appearance	Solid.	Odor	Sulfurous.
		Taste	Not available.
Molecular Weight	Not applicable.	Color	Yellow. Yellow to Green.
pH (1% soln/water)	10.5 [Basic.]		
Boiling Point	Not available.		
Melting Point	380 C (716 F) based on data for: Potassium Hydroxide.		
Critical Temperature	Not available.		
Specific Gravity	Weighted average: 1.16 (Water = 1)		
Vapor Pressure	The highest known value is 0 mm of Hg (@ 20 C) (Potassium Hydroxide).		
Vapor Density	Not available.		
Volatility	<20% (v/v).		
Odor Threshold	Not available.		
Evaporation rate	Not available.		
Viscosity	Not available.		
Water/Oil Dist. Coeff.	Not available.		

Ionicity (in Water)	Not available.
Dispersion Properties	See solubility in water.
Solubility	Soluble in cold water. Insoluble in diethyl ether.

Section X. Stability and Reactivity Data

Stability	The product is stable.
Instability Temperature	Not available.
Conditions of Instability	Solid xanthates are stable when kept cool and dry, exposure to heat causes decomposition. Acids and oxdizing agents accelerate aging. In solution, xanthates will decompose slowly even at room temperature.
Incompatibility with various substances	Highly reactive with metals. Reactive with oxidizing agents, acids.
Corrosivity	Highly corrosive in presence of aluminum, of zinc, of copper.
Special Remarks on Reactivity	Hazardous Decomposition Products: Carbon disulphide, trithiocarbonate, amyl alcohol.
Special Remarks on Corrosivity	No additional remark.
Hazardous Polymerization	No.

Section XI. Toxicological Information

Routes of Entry	Eye contact. Inhalation. Ingestion.
Toxicity to Animals	Acute oral toxicity (LD50): 273 mg/kg [Rat]. (Potassium Hydroxide). Acute dermal toxicity (LD50): 3220 mg/kg [Rabbit]. (Isoamyl alcohol).
Chronic Effects on Humans	Extremely hazardous in case of skin contact (corrosive). CARCINOGENIC EFFECTS: Not available.

	MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.
Other Toxic Effects on Humans	Extremely hazardous in case of skin contact (corrosive). Very hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.
Special Remarks:	No additional remarks on Toxicity to Animals
Special Remarks:	No additional remarks on Chronic Effects on Humans
Special Remarks:	No additional remarks on other Toxic Effects on Humans

Section XII. Ecological Information

Ecotoxicity	Not available.
BOD5 and COD	Not available.
Products of Biodegradation	Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.
Toxicity of the Products of Biodegradation	The products of degradation are less toxic than the product itself.
Special Remarks on the Products of Biodegradation	No additional remark.

Section XIII. Disposal Considerations

Waste Disposal	Recycle, if possible. Consult your local or regional authorities.

Section XIV. Transport Information

TDG Classification	TDG CLASS 4.2: Spontaneously combustible substance.
Shipping name	Xanthates
PIN	UN3342
Packing Group	III
Special Provisions for Transport	No additional remark.

Section XV. Other Regulatory Information

Other Regulations	OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Section XVI. Other Information

References Not available.

Other Special Considerations No additional remark.

Verified by Hardev Bendick.

Validated by Hardev Bendick on 2/19/99.

Information Contact EH&S Department
Vancouver, B C.
(604) 273-1441

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========== END OF MSDS ==========

teckcominco

MATERIAL SAFETY DATA SHEET

SECTION 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Identity: Polaris Zinc Concentrate

Manufacturer:
Cominco Mining Partnership
Polaris Operations
Polaris, N.W.T.
X0A 0Y0
Emergency Telephone: (250) 364-4214

Supplier:
Teck Cominco Metals Ltd.
1500 - 120 Adelaide Street, W.
Toronto, Ontario
M5H 1T1

MSDS Preparer:
Teck Cominco Metals Ltd.
600 - 200 Burrard Street
Vancouver, British Columbia
V6C 3L7

Date of MSDS Preparation: July 23, 1997

Product Use: Zinc concentrate is used in the production of zinc metal and zinc alloys.

SPECIAL NOTES:
Caution: The toxicological properties of this material have not been fully investigated. The information contained in this MSDS is based on information in the technical and scientific literature about the material's constituent compounds. Use appropriate procedures to prevent direct contact with the skin or eyes and to prevent ingestion or inhalation.

SECTION 2. COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous Ingredient	Approximate Percent by Weight	C.A.S. Number	Exposure Limits*		LD_{50}/LC_{50} Species and Route	
Zinc Sulfide	89 to 97	1314-98-3	OSHA PEL**	None established	Human-inh TCLo	124 mg/m^3/50M
			ACGIH TLV**	None established	Rat-oral LD_{50}	>2 gm/kg
			NIOSH REL**	None established	Rat-inh LC_{50}	>5040 mg/m^3/4H
					Rat-skin LD_{50}	>2 gm/kg
Iron Sulfide	2 to 4	7439-89-6	OSHA PEL***	None established	No data	
			ACGIH TLV***	None established		
			NIOSH REL***	None established		
Lead Sulfide	1 to 2	1314-87-0	OSHA PEL	0.05 mg/m^3	Guinea Pig-oral LDLo 10 gm/kg	
			ACGIH TLV	0.05 mg/m^3		
			NIOSH REL	<0.1 mg/m^3		

NOTE: TLVs for individual states may differ from OSHA TLVs. Check with local authorities for the applicable state TLVs.
*OSHA - Occupational Safety and Health Administration; ACGIH - American Conference of Governmental Industrial Hygienists; NIOSH - National Institute for Occupational Safety and Health.
**The OSHA PEL for zinc oxide dust is 15 mg/m^3 total and 5 mg/m^3 respirable. The ACGIH TLV for zinc oxide dust is 10 mg/m^3 and the NIOSH REL for zinc oxide dust is 5 mg/m^3 with a STEL of 15 mg/m^3.
***The OSHA PEL for iron oxide fume is 10 mg/m^3. The ACGIH TLV and the NIOSH REL for iron oxide dust and fume is 5 mg/m^3.

European Economic Community (EEC) Classification: Lead: Lead compounds are classified as Category 1 and Category 3 reproductive toxins and as harmful.

EEC R Phrase(s): Lead Compounds: R61 - may cause harm to unborn child; R62 - possible risk of impaired fertility; R20/22 - harmful by inhalation and if swallowed; R33 - danger of cumulative effects.

Trade Names and Synonyms: None

SECTION 3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Appearance: Dark brown talc-like substance. Caution! The toxicological properties of this substance have not been fully investigated. Overexposure may cause eye, skin, digestive tract, and respiratory tract irritation. Many lead compounds can produce toxic effects in blood forming organs, kidneys and the central nervous system. May cause adverse reproductive or fetal effects. Lead compounds may cause cancer based on studies on laboratory animals. Use appropriate procedures to prevent direct contact with the skin or eyes and to prevent ingestion or inhalation.

EYE:
Eye contact may cause eye irritation.

SKIN:
Skin contact may cause skin irritation.

INHALATION:
Dust is irritating to the nose, throat, and respiratory tract. May cause effects similar to those described for ingestion. The toxicological properties of this substance have not been fully investigated.

INGESTION:
Causes gastrointestinal irritation with nausea, vomiting and diarrhea. Many lead compounds can produce toxic effects in blood forming organs, kidneys and the central nervous system. The toxicological properties of this substance have not been fully investigated.

SIGNS AND SYMPTOM OF EXPOSURE:
Lead is a cumulative poison. When significant continuous or periodic exposure occurs, increasing amounts build up in the body and eventually symptoms and disability may occur. Some signs and symptoms of exposure to lead compounds include gastrointestinal discomfort, a blue-black line on the gums, neuromuscular dysfunction including muscle weakness and paralysis, and mental changes.

CHRONIC EFFECTS:
Many lead compounds can produce toxic effects in blood forming organs, kidneys and the central nervous system. May cause adverse reproductive or fetal effects. Lead compounds may cause cancer based on studies with laboratory animals. The toxicological properties of this substance have not been fully investigated.

REPRODUCTIVE HAZARDS:
Overexposure to lead compounds may cause adverse reproductive effects. Unborn and nursing children can be exposed to lead through their mother. This may cause premature births, smaller babies, and decreased mental ability in the infant.

CARCINOGENICITY INFORMATION:
Lead compounds may cause cancer based on studies with laboratory animals.

TARGET ORGAN:
Target Organs for lead compounds include: the central and peripheral nervous systems, blood-forming organs, kidneys, and the male reproductive system.

SECTION 4. FIRST AID MEASURES

EYE CONTACT FIRST AID:

Immediately flush eyes with plenty of water for at least 15 minutes occasionally lifting the upper and lower eyelids. Get medical attention if irritation develops or persists.

SKIN CONTACT FIRST AID:
Flush skin with plenty of soap and water for at least 15 minutes. Remove contaminated clothing - wash before reuse. Get medical aid if irritation develops or persists.

INHALATION FIRST AID:
If exposed to excessive levels of dusts or fumes, remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if cough or other symptoms develop.

INGESTION FIRST AID:
If victim is conscious and alert, give 2 - 4 cupfuls of water. Never give anything by mouth to an unconscious person. Get medical aid immediately.
NOTES TO PHYSICIAN:
Treat symptomatically and supportively. Chelators of choice for lead poisoning are BAL, calcium-disodium EDTA and penicillamine.

SECTION 5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES
TCC Flash Point: None
Autoignition Temperature: N/A

FLAMMABLE LIMITS IN AIR
LEL: N/A
UEL: N/A

EXTINGUISHING MEDIA:
In case of fire, use water spray, dry chemical, carbon dioxide, or alcohol-resistant foam.

FIRE AND EXPLOSION HAZARDS:
During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.

FIRE FIGHTING INSTRUCTIONS:
As in any fire, wear self-contained breathing apparatus pressure-demand MSHA/NIOSH (approved or equivalent) and full protective gear. Avoid breathing smoke, fumes, and decomposition products.

COMBUSTION PRODUCTS:
Excess heat will generate sulfur oxide, zinc oxide, and lead oxide fumes. Contact with acids will generate flammable and toxic hydrogen sulfide gas.

SECTION 6. ACCIDENTAL RELEASE MEASURES

SAFEGUARDS (PERSONNEL):
Use proper personal protective equipment as specified in Section 8.

INITIAL CONTAINMENT:
Contain spilled material.

LARGE SPILLS PROCEDURE:
Contain spilled material. Clean up spilled material immediately, observing precautions in the Protective Equipment Section. Place in suitable container for recovery or disposal. Treat or dispose of waste material in accordance with all local, state/provincial, and national requirements.

SMALL SPILLS PROCEDURE:
Clean up spilled material immediately, observing precautions in the Protective Equipment Section. Place in suitable container for recovery or disposal. Treat or dispose of waste material in accordance with all local, state/provincial, and national requirements.

SECTION 7. HANDLING AND STORAGE

HANDLING (PERSONNEL):
Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Avoid contact with eyes, skin and clothing. Avoid ingestion and inhalation.

HANDLING (PHYSICAL ASPECTS):
Avoid excessive heat. Avoid contact with acids or oxidizers.

STORAGE PRECAUTIONS:
Store in a cool dry area. Avoid extreme temperatures. Keep away from acids and oxidizers.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS:
Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

EYE/FACE PROTECTION REQUIREMENTS:
Wear safety glasses with side shields (or goggles) and a face shield, if splashing of the material may occur. Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133.

SKIN PROTECTION REQUIREMENTS:
Wear appropriate protective gloves and clothing to prevent skin exposure.

RESPIRATORY PROTECTION REQUIREMENTS:
Follow the OSHA respirator regulations found in 29 CFR 1910.134. Always use a NIOSH approved respirator when required. Use of a NIOSH approved dust respirator is recommended when using or handling this product.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

FORM .....Solid, fine-grained powder
PARTICLE SIZE.....<40 um, 80% <20 um
COLOR.....Dark grey-brown
ODOR.....Weak organic odor from entrained xanthates

ODOR THRESHOLD.....None
BOILING POINT.....Not applicable (1050-2300°C in an inert atmosphere)
SOLUBILITY IN WATER.....Slight or very slight
SPECIFIC GRAVITY.....2.0 (Water = 1) in bulk
MELTING/FREEZING POINT.....Not applicable (will burn first unless in an inert atmosphere)
pH.....7.5 to 8.5
% VOLATILES.....8.4% @ 100°C
IGNITION TEMPERATURE.....Between 700-800°C (generates SO2 and zinc, lead vapors)

SECTION 10. STABILITY AND REACTIVITY

STABILITY:
Stable under normal temperatures and pressures.

INCOMPATIBILITY WITH OTHER MATERIALS:
Reacts violently with iodine pentachloride. Incompatible with iodine monochloride, hydrogen peroxide, strong oxidizers, and strong acids. May release toxic and flammable hydrogen sulfide gas on contact with acids.

DECOMPOSITION:
This material can decompose by high temperatures forming sulfur oxides, zinc oxide, lead and lead oxide, and toxic and flammable hydrogen sulfide gas.

CONDITIONS TO AVOID:
Contact with incompatible materials (see above), excessive heat and contact with acids and oxidizers.

SECTION 11. TOXICOLOGICAL INFORMATION

EYE EFFECT:
Contact with eyes causes irritation.

SKIN EFFECTS:
Contact with skin may cause skin irritation.

ACUTE ORAL EFFECTS:
Causes gastrointestinal irritation with nausea, vomiting and diarrhea. The toxicological properties of this substance have not been fully investigated.

ACUTE INHALATION EFFECTS:
Dust is irritating to the nose, throat, and respiratory tract. May cause effects similar to those described for ingestion. The toxicological properties of this substance have not been fully investigated.

REPRODUCTIVE AND BIRTH EFFECTS:
Unborn and nursing children can be exposed to lead through their mother. This may cause premature births, smaller babies, and decreased mental ability in the infant. High levels of exposure may cause abortion and damage the male reproductive system.

CHRONIC EFFECTS:

In adults, lead exposure may decrease reaction time, possibly affect the memory, cause weakness in fingers, wrists, and ankles, increase blood pressure in middle-aged men, and cause anemia - a blood disorder.

Unborn and nursing children can be exposed to lead through their mother. This may cause premature births, smaller babies, and decreased mental ability in the infant.

GENETIC TOXICITY:
Lead compounds may have an effect on chromosomes.

SECTION 12. ECOLOGICAL INFORMATION

Lead concentrate is insoluble in water. Certain elements are known to bioaccumulate or bioconcentrate in select environmental media.

Lead: Lead compounds are highly persistent in water. Dissolved lead compounds bioaccumulate in plants and animals, both aquatic and terrestrial. In most surface water and groundwater, lead forms compounds with anions such as hydroxides, carbonates, sulfates, and phosphates and precipitates out of the water column. Lead may occur as sorbed ions or surface coatings on sediment mineral particles or may be carried in colloidal particles in surface water. Most lead is strongly retained in soil, resulting in little mobility. Lead may be immobilized by ion exchange with hydrous oxides or clays or by chelation with humic or fulvic acids in the soil.

Zinc: Zinc in the aquatic environment is adsorbed onto iron and manganese oxides, clay minerals, and organic material in sediments or suspended solids in surface waters. The mobility of zinc in soil is dependent on soil conditions, such as cation exchange capacity, pH, redox potential, and chemical species present in the soil. In general, zinc sorbs strongly to soil particulates and, unless it occurs in a soluble form such as zinc sulfate, is not highly mobile in soil. In aquatic systems, zinc bioaccumulates in both plants and animals. Zinc also bioaccumulates in terrestrial plants, vertebrates, and mammals, with plant uptake from soil dependent on the plant species, soil pH, and soil composition. In general, zinc does not biomagnify through food chains.

The mobility of metals is media dependent. Most metals will bind with organic ligands, reducing their mobility in soil and water. Mobility in air is determined by particle size.

SECTION 13. DISPOSAL CONSIDERATIONS

If material cannot be returned to process or salvage, dispose of only in accordance with applicable regulations.

SECTION 14. TRANSPORT INFORMATION

PROPER SHIPPING NAME	Environmentally Hazardous Substance, Solid, n.o.s. (contains lead sulfide)
TRANSPORT CANADA HAZARD CLASS	9.2
U.S. DOT HAZARD CLASS	9
TRANSPORT CANADA AND US DOT PRODUCT IDENTIFICATION NUMBER	UN3077

MARINE POLLUTANT	No
IMO CLASSIFICATION	MHB - Material Hazardous Only in Bulk

SECTION 15. REGULATORY INFORMATION

U.S.

HAZARDOUS UNDER HAZARD COMMUNICATION STANDARD

Lead Sulfide	Y

INGREDIENTS LISTED ON TSCA INVENTORY Y

CERCLA SECTION 103 HAZARDOUS SUBSTANCES

Lead Sulfide	RQ: 10 pounds
Zinc Compounds	RQ: None assigned

EPCRA SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCE

None of the ingredients qualify

EPCRA SECTION 311/312 HAZARD CATEGORIES

Delayed (chronic) Health Hazard - Carcinogen

EPCRA SECTION 313 TOXIC RELEASE INVENTORY

Lead Compounds	Percent by Weight: 1 to 2
Zinc Compounds	Percent by Weight: 89 to 97

CALIFORNIA PROPOSITION 65: This product contains lead compounds, chemicals known to the State of California to cause cancer and reproductive toxicity.

CANADIAN:

WHMIS CLASSIFICATION: Controlled Product, Classification D2A

This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

SECTION 16. OTHER INFORMATION

The information in this Material Safety Data Sheet is based on the following references:

American Conference of Governmental Industrial Hygienists, 1991, Documentation of the Threshold Limit Values and Biological Exposure Indices, Sixth Edition (Lead Revision 1995).

American Conference of Governmental Industrial Hygienists, 1996, Guide to Occupational Exposure Values.

American Conference of Governmental Industrial Hygienists, 1996, Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices - 1995-1996.

Clayton and Clayton, 1994, Patty's Industrial Hygiene and Toxicology, Fourth Edition.

European Economic Community, Commission Directives 91/155/EEC and 67/548/EEC.

Industry Canada , SOR/88-66, as amended, Controlled Products Regulations.

Lewis, Richard J., Sr., 1991, Hazardous Chemicals Desk Reference, Second Edition.

Merck & Co., Inc., 1989, The Merck Index, An Encyclopedia of Chemicals, Drugs, and Biologicals, Eleventh Edition.

National Library of Medicine, National Toxicology Information Program, 1996, Hazardous Substance Data Bank.

Sax, N. Irving, 1984, Dangerous Properties of Industrial Materials, Sixth Edition.

U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry, 1993, Toxicological Profile for Lead.

U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry, 1995, Update Toxicological Profile for Silica.

U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry, 1994, Update Toxicological Profile for Zinc.

U.S. Environmental Protection Agency, Online Office of Health and Environmental Assessment, Environmental Criteria and Assessment Office, 1996, Integrated Risk Information System.

U.S. Occupational Safety and Health Administration, 1989, Code of Federal Regulations, Title 29, Part 1910.

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