

# MATERIAL SAFETY DATA SHEET

Prepared to U.S. OSHA, CMA, ANSI and Canadian WHMIS Standards

## PART I

What is the material and what do I need to know in an emergency?

### 1. PRODUCT IDENTIFICATION

**SYNONYMS:** 14K GOLD; 18K GOLD; 24K GOLD; GREEN GOLD; ROSE GOLD  
(1 quart volume)

**CHEMICAL NAME/CLASS:** Cyanide Solution

**PRODUCT USE:** Gold Bath

**SUPPLIER/MANUFACTURER'S NAME:**

**ADDRESS:**

**EMERGENCY PHONE:** 1-800-424-9300 (CHEMTREC)

**BUSINESS PHONE:**

**DATE OF PREPARATION /LAST REVISION:** May 27, 1999/May 1, 2005

### 2. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	% w/w	EXPOSURE LIMITS IN AIR				
			ACGIH		OSHA		OTHER
			TLV mg/m <sup>3</sup>	STEL mg/m <sup>3</sup>	PEL mg/m <sup>3</sup>	STEL mg/m <sup>3</sup>	
Sodium Cyanide  Note: The following exposure limits are for Sodium Cyanide as CN.	143-33-9	< 2	NE	5, C (Skin)	5 (Skin)	NE	NIOSH REL: 5 C (10 minute) NIOSH IDLH: 25 DFG MAK: 3.8, skin, C (I)
Gold	7440-57-5	< 1	NE	NE	NE	NE	NE
Potassium Cyanide  Note: The following exposure limits are for Potassium Cyanide as CN.	506-61-6	< 1	NE	5, C (Skin)	5 (Skin)	NE	NIOSH REL: 5 C (10 minute) NIOSH IDLH: 25 DFG MAK: 5, skin, C (I)
Water and other components. Each of the other components are present in less than 1 percent concentration (0.1% concentration for potential carcinogens, reproductive toxins, respiratory tract sensitizers, and mutagens).		Balance	None of the other components contribute significant additional hazards at the concentrations present in this product. All pertinent hazard information has been provided in this document, per the requirements of the Federal Occupational Safety and Health Administration Standard (29 CFR 1910.1200), U.S. State equivalent Standards and Canadian Workplace Hazardous Materials Identification System Standards (CPR 4).				
NOTE: The components of this product form Gold Cyanide Complex and a small quantity of Sodium Hydroxide (<1%). The following information is for Sodium Hydroxide, which contributes to the skin irritancy hazard of this product.			2,C	NE	2	NE	NIOSH REL: C, 2 mg/m <sup>3</sup> NIOSH IDLH: 10

NE = Not Established; C = Ceiling Limit; (I) = Inhalable fraction of the aerosol. See Section 16 for Definitions of Terms Used

NOTE: All WHMIS required information is included. It is located in appropriate sections based on the ANSI Z400.1-1993 format.

### 3. HAZARD IDENTIFICATION

**EMERGENCY OVERVIEW:** This colorless to light-yellow liquid has a slight, almond-like odor. **Health Hazards:** This product is severely irritating to exposed tissue. This solution is poisonous; ingestion of small quantities can be fatal. Additionally, inhalation over-exposures may be harmful or fatal. Skin contact may cause severe irritation or tissue damage, especially upon prolonged exposure. **Flammability/Reactivity Hazards:** This product is not reactive nor flammable under normal conditions; however if heated to decomposition, this solution may produce toxic vapors containing hydrogen cyanide and sodium and potassium compounds. **Emergency Response:** Emergency responders must wear proper personal protective equipment.

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HMIS <sup>D</sup>		
HEALTH	3	
FLAMMABILITY	0	
PHYSICAL HAZARD	0	
Personal Protection		
HMIS <sup>D</sup> HMIS <sup>D</sup> HMIS <sup>D</sup> HMIS <sup>D</sup> HMIS <sup>D</sup> HMIS <sup>D</sup> HMIS <sup>D</sup> HMIS <sup>D</sup> HMIS <sup>D</sup> HMIS <sup>D</sup>		

**SYMPTOMS OF OVER-EXPOSURE BY ROUTE OF EXPOSURE:** The primary routes of over-exposure for this product would be via inhalation, contact with skin and eyes, and skin absorption. The following paragraphs describe the symptoms of overexposure, via route of entry.

**INHALATION:** Over-exposure to mists or sprays of this product by inhalation may cause irritation of the nose, throat and respiratory tract. Inhalation over-exposures to this product can also cause cyanide poisoning. Symptoms of such poisoning can include weakness, headache, confusion, nausea, vomiting, convulsions, coma and possibly death.

**CONTACT WITH SKIN or EYES:** Brief contact with the skin is irritating; repeated or prolonged skin contact can cause dermatitis (i.e. red, inflamed skin) and "Cyanide Rash" (i.e. itching, macular, papular and vesicular eruptions). Sodium Cyanide and Potassium Cyanide (components of this product), are sensitizers and can cause the development of allergy-like skin reactions (i.e. rashes and welts).

If splashed into the eyes, the solution will cause immediate irritation. Symptoms of such over-exposure include discomfort, tearing, and blurring of vision. Repeated or prolonged exposures of this product with the eyes can also cause corneal opacity (clouding of the surface of the eye) and possibly permanent eye injury. Chronic exposure may damage optic nerves.

**SKIN ABSORPTION:** Sodium Cyanide and Potassium Cyanide (components of this product) can be absorbed through the skin. Symptoms of such over-exposure will include those described for "Inhalation" and "Contact With Eyes or Skin". Repeated or prolonged

over-exposures can be fatal.

**INGESTION:** Though not anticipated to be a significant route of occupational exposure, ingestion of this product, even in small quantities, can be fatal. The symptoms of "Cyanide Poisoning" are described under "Inhalation".

**INJECTION:** Accidental injection of this liquid will cause local pain and irritation and systemic symptoms similar to those of over-exposure by "Inhalation".

**HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in Lay Terms.** Over-exposure to this liquid may cause the following symptoms:

**ACUTE:** This product is poisonous and over-exposures can be fatal if ingested, inhaled or absorbed through the skin. This product can be severely irritating and potentially damaging to contaminated tissue.

**CHRONIC:** Chronic over-exposures to this solution can cause dermatitis (inflammation of the skin) after prolonged or repeated skin contact and may damage optic nerves. Sodium Cyanide and Potassium Cyanide are sensitizers and can cause the development of allergy-like reactions. Refer to Section 11 (Toxicological Information) for more detailed information of the carcinogenicity of this product.

**TARGET ORGANS:** Skin, eyes, respiratory system, blood and metabolic enzymes.

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## PART II *What should I do if a hazardous situation occurs?*

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### 4. FIRST-AID MEASURES

IN CASE OF CYANIDE POISONING, START FIRST-AID TREATMENT IMMEDIATELY, THEN CALL PHYSICIAN.

**SKIN EXPOSURE:** If this product contaminates the skin, immediately begin decontamination with running water. Remove exposed or contaminated clothing, taking care not to contaminate eyes. Minimum recommended flushing is for 15 minutes. If consciousness is impaired, oxygen and amyl nitrite should be administered as indicated below. Victim must seek immediate medical attention.

**EYE EXPOSURE:** If this product enters the eyes, open victim's eyes while under gentle running water. Use sufficient force to open eyelids. Have victim "roll" eyes. Minimum flushing is for 15 minutes. Victim must seek immediate medical attention.

**INHALATION:** If vapors or mists of this product are inhaled, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. If consciousness is impaired, oxygen and amyl nitrite should be administered as indicated below. Remove or cover gross contamination to avoid exposure to rescuers.

**INGESTION:** If this product is swallowed, CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT INFORMATION. If victim is conscious, induce vomiting until vomit fluid is clear. Victim should drink milk, egg whites, or large quantities of water. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or who cannot swallow. If consciousness is impaired, oxygen and amyl nitrite should be administered as indicated below.

All persons working with this product should be aware of the potential for cyanide poisoning and trained to provide First-Aid using oxygen and amyl nitrite. Always have on-hand the materials needed. Actions to be taken in case of cyanide poisoning should be planned and practiced before beginning work with cyanides. Identification of community hospital resources and emergency medical assistance in order that they be equipped and trained on the handling of cyanide emergencies is essential.

**ANTIDOTE:** If the victim has difficulty breathing, is becoming confused and/or is losing consciousness, administer amyl nitrite. Crush one pearl of amyl nitrite onto a cloth and hold to the victim's nose 15, then take away for 15 seconds. Repeat 5-6 times, using a new pearl every 5 minutes (0.3 mg size) or every 3 minutes (0.18 mg size), until patient regains consciousness. While amyl nitrite is being used, monitor the victim's blood pressure. If it drops below 80/60, stop the amyl nitrite and obtain the opinion of physician immediately. If breathing has stopped, trained personnel should begin artificial respiration or, if the heart has stopped, cardiopulmonary resuscitation (CPR) immediately (avoid mouth to mouth contact). If breathing is difficult, oxygen (preferably 100 percent) may be helpful. Quickly transport victim to an emergency facility.

Victims of chemical exposure must be taken for medical attention. Rescuers should be taken for medical attention, if necessary. Take copy of label and MSDS to physician or health professional with victim. Physicians should refer to Section 11 (Toxicology Information) for additional information.

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:** Over-exposure to this product may aggravate pre-existing respiratory, blood, and skin conditions.

**RECOMMENDATIONS TO PHYSICIANS:** Provide prophylactic treatment for "Cyanide Poisoning"; treat symptoms and eliminate over-exposures.

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### 5. FIRE-FIGHTING MEASURES

**FLASH POINT:** Not applicable.

**AUTOIGNITION TEMPERATURE:** Not applicable.

**FLAMMABLE LIMITS (in air by volume, %):**

Lower (LEL): Not applicable.

Upper (UEL): Not applicable.

**FIRE EXTINGUISHING MATERIALS:**

Water Spray: YES

Carbon Dioxide: NO

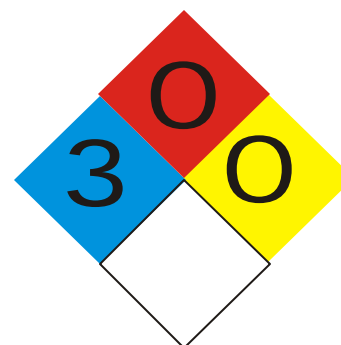
Foam: YES

Dry Chemical: YES

Halon: YES

Other: Any "ABC" Class.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** Due to the presence of cyanide



**NFPA RATING**

compounds, this solution presents a significant health hazard to fire-fighters. When involved in a fire, this material may decompose and produce irritating fumes and toxic gases (e.g., hydrogen cyanide and potassium and sodium compounds).

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## 5. FIRE-FIGHTING MEASURES (Continued)

Explosion Sensitivity to Mechanical Impact: Not sensitive.

Explosion Sensitivity to Static Discharge: Not sensitive.

SPECIAL FIRE-FIGHTING PROCEDURES: Incipient fire responders should wear eye protection. Structural fire fighters must wear Self-Contained Breathing Apparatus and full protective equipment. Fire response equipment should be rinsed with bleach solution, followed by a triple rinse with water. Move fire-exposed containers from the area of the fire, if it can be done without risk to fire-fighters. If possible, fire-fighters should control run-off water to prevent environmental contamination.

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## 6. ACCIDENTAL RELEASE MEASURES

SPILL AND LEAK RESPONSE: Uncontrolled releases should be responded to by appropriately trained personnel using pre-planned procedures. Proper protective equipment should be used. In case of a spill, clear the affected area, protect people, and respond with trained personnel.

Minimum recommended level of Personal Protective Equipment for uncontrolled releases should be **Level B: triple-gloves (rubber gloves and nitrile gloves, over latex gloves), chemically resistant suit and boots, hard-hat, and Self-Contained Breathing Apparatus**. Absorb spilled liquid with poly pads or other suitable absorbent materials. Rinse the area with a bleach solution followed by triple rinse with water. Decontaminate the area thoroughly. Decontaminate all spill response equipment thoroughly after clean-up operations are concluded. Place all spill residue in an appropriate container and seal. Dispose of in accordance with U.S. Federal, State, and local hazardous waste disposal regulations, or the appropriate standards of Canada and its provinces (see Section 13, Disposal Considerations).

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## PART III

*How can I prevent hazardous situations from occurring?*

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## 7. HANDLING and STORAGE

WORK AND HYGIENE PRACTICES: Avoid getting this product ON YOU or IN YOU. Wash thoroughly after handling this product. Avoid breathing vapors or mists generated by this product. Do not eat, drink, smoke or apply cosmetics while handling this product. Use ventilation and other engineering controls to ensure exposure limits are below those stated in Section 2 (Composition and Information on Ingredients). Remove contaminated clothing immediately.

STORAGE AND HANDLING PRACTICES: All employees who handle this material should be trained to handle it safely. Use in a well-ventilated location. Open containers slowly, on a stable surface. Containers of this product must be properly labeled. Empty containers may contain residual amounts of this product; therefore, empty containers should be handled with care.

Store containers in a cool, dry location, away from direct sunlight, sources of intense heat, or where freezing is possible. Store away from incompatible materials (see Section 10, Stability and Reactivity). Material should be stored in secondary containers, or in a diked area, as appropriate. Keep container tightly closed when not in use. Storage areas should be made of fire-resistant materials. If appropriate, post warning signs in storage and use areas. Inspect all incoming containers before storage, to ensure containers are properly labeled and not damaged.

PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT: Follow practices indicated in Section 6 (Accidental Release Measures). Make certain application equipment is locked and tagged-out safely. Always use this product in areas where adequate ventilation is provided. Decontaminate equipment using soapy water before maintenance begins. Collect all rinsates and dispose of according to applicable U.S. Federal, State, or local procedures or the appropriate standards of Canada and its provinces.

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## 8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation to ensure exposures are below the limits provided in Section 2 (Composition and Information on Ingredients). Ensure eyewash/safety shower stations are available near areas where this product is used. Medical treatment kits for cyanide poisoning should be conveniently located for easy access.

RESPIRATORY PROTECTION: Maintain airborne contaminant concentrations below exposure limits in Section 2 (Composition and Information on Ingredients). If respiratory protection is needed use only protection authorized in 29 CFR 1910.134, or

applicable State regulations. Use supplied air respiration protection if oxygen levels are below 19.5% or are unknown. The following respiratory protection guidelines for Sodium Cyanide are provided:

## 8. EXPOSURE CONTROLS - PERSONAL PROTECTION (Continued)

### CONCENTRATION

UP TO 25 mg/m<sup>3</sup>:

### RESPIRATORY PROTECTION

Supplied Air Respirator or full facepiece Self Contained Breathing Apparatus.

EMERGENCY OR PLANNED ENTRY INTO UNKNOWN CONCENTRATIONS OR IDLH CONDITIONS:

Positive pressure, full facepiece Self Contained Breathing Apparatus; or positive pressure, full facepiece Supplied Air Respirator with an auxiliary positive pressure Self Contained Breathing Apparatus.

ESCAPE:

Gas mask with high-efficiency particulate filter and canister to protect against cyanides; or escape-type Self Contained Breathing Apparatus.

EYE PROTECTION: Splash goggles or safety glasses. Face shields are recommended if splashes/sprays may occur.

HAND PROTECTION: Wear rubber or neoprene gloves for routine industrial use. Use triple gloves for spill response, as stated in Section 6 (Accidental Release Measures) of this MSDS.

BODY PROTECTION: Use body protection as necessary to prevent body contact.

HMIS PERSONAL PROTECTIVE EQUIPMENT RATING: C (gloves, goggles, body protection). Face shields may be needed if splashes/sprays may be generated.

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## 9. PHYSICAL and CHEMICAL PROPERTIES

RELATIVE VAPOR DENSITY(air = 1): Not available.

SPECIFIC GRAVITY: Not available.

SOLUBILITY IN WATER: Completely soluble.

VAPOR PRESSURE, @ 20°C (68°F): Not available.

ODOR THRESHOLD: Not available.

COEFFICIENT WATER/OIL DISTRIBUTION: Not available.

APPEARANCE AND COLOR: Colorless to light yellow liquid with a slight, almond-like odor.

HOW TO DETECT THIS SUBSTANCE (warning properties): The appearance and odor may be distinguishing characteristics of this product.

EVAPORATION RATE (nBuAc=1): Similar to water.

FREEZING/MELTING POINT: 0°C (32°F)

BOILING POINT: 100°C (212°F)

pH: > 12.10

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## 10. STABILITY and REACTIVITY

STABILITY: Stable.

DECOMPOSITION PRODUCTS: The products of thermal decomposition include hydrogen cyanide, other cyanide compounds, and substances containing sodium, potassium, and gold.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Oxidizers, strong acids, bases and nitrites. Contact of this product with acids or acid salts can release toxic hydrogen cyanide gas.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Incompatible materials.

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## PART IV

*Is there any other useful information about this material?*

## 11. TOXICOLOGICAL INFORMATION

TOXICITY DATA: Toxicology information for components greater than 1 percent in concentration are provided below.

### SODIUM CYANIDE:

LDLo - Oral-Human: 2800 ug/kg

LDLo - Oral: Human - man: 6557 ug/kg:

Behavioral - fluid intake; Gastrointestinal - gastritis

LDLo - Oral - Human: 2857 ug/kg

TDLo - Oral: Human - man: 714 ug/kg: Behavioral

-hallucinations, distorted perceptions; Behavioral

- muscle

LDLo - Unreported: Human - man: 2206 ug/kg

LD<sub>50</sub> - Oral - rat: 6440 ug/kg

### SODIUM CYANIDE (continued):

LD<sub>50</sub> - Intraperitoneal - rat: 4300 ug/kg: Details of toxic effects not reported other than lethal dose value

LD<sub>50</sub> - Intraperitoneal - mouse: 4900 ug/kg

LD<sub>50</sub> - Subcutaneous - mouse: 3600 ug/kg

LD<sub>50</sub> - Unreported - mouse: 10 mg/kg

LD<sub>50</sub> - Subcutaneous - dog: 5360 ug/kg

LDLo - Intravenous - dog: 1300 ug/kg

### SODIUM CYANIDE (continued):

LD<sub>50</sub> - skin - rabbit: 10400 ug/kg: Behavioral - somnolence (general depressed activity); Behavioral - tremor Lungs, Thorax, or Respiration - dyspnea

LDLo - Subcutaneous - rabbit: 2200 ug/kg

LD<sub>50</sub> - Intramuscular - rabbit: 1666 ug/kg

LD<sub>50</sub> - Ocular - rabbit: 5048 ug/kg

LD<sub>50</sub> - Subcutaneous - guinea pig: 5800 ug/kg

## 11. TOXICOLOGICAL INFORMATION (Continued)

### TOXICITY DATA (continued):

#### **SODIUM CYANIDE (continued):**

LD<sub>50</sub> - Oral - chicken: 21 mg/kg: Sense Organs and Special Senses (Eye) - effect, not otherwise specified; Lungs, Thorax, or Respiration - other changes; Gastrointestinal - changes in structure or function of salivary glands

LD<sub>50</sub> - Oral - quail: 8500 ug/kg: Behavioral - tremor, ataxia; dyspnea

LD<sub>50</sub> - Oral - duck: 2500 ug/kg

LDLo - Parenteral - frog: 60 mg/kg

LD<sub>50</sub> - Oral: Mammal - domestic: 4 mg/kg

LD<sub>50</sub> - Oral: Mammal - species unspecified: 8 mg/kg

#### **SODIUM CYANIDE (continued):**

LD<sub>50</sub> - Oral: Bird - wild bird species: 4 mg/kg

TDLo - Oral - rat: 837 mg/kg/13 weeks (continuous); Endocrine - androgenic

TCLo - Oral - rat: 2148 mg/kg: male 13 week(s) pre-mating: Reproductive - Paternal Effects - spermatogenesis, testes, epididymis, sperm duct

TDLo - Oral - mouse: 4177 mg/kg: male 13 week(s) pre-mating: Reproductive - Paternal

Effects - testes, epididymis, sperm duct

#### **SODIUM CYANIDE (continued):**

TDLo - Implant - hamster: 5999 mg/kg: female 6-9 day(s) after conception: Reproductive - Effects on Embryo or Fetus - fetotoxicity; Reproductive - Specific Developmental Abnormalities -

musculoskeletal system, cardiovascular system

TDLo - Implant - hamster: 5928 mg/kg: female 6-9 day(s) after conception: Reproductive - Fertility

- post-implantation mortality Reproductive - Specific Developmental Abnormalities - Central Nervous System

Sex chromosome loss and nondisjunction:

Inhalation - *Drosophila melanogaster*: 200 ppb

SUSPECTED CANCER AGENT: The components of this product are not found on the following lists: FEDERAL OSHA Z LIST, NTP, CAL/OSHA, and therefore are not considered to be, nor suspected to be, cancer-causing agents by these agencies.

IRRITANCY OF PRODUCT: Repeated or prolonged exposure to this product will cause severe irritation and potential skin tissue damage.

SENSITIZATION TO THE PRODUCT: Sodium Cyanide and Potassium Cyanide (components of this product) are sensitizers and can cause allergy-like skin reactions upon repeated or prolonged exposure.

REPRODUCTIVE TOXICITY INFORMATION: Listed below is information concerning the effects of this product and its components on the human reproductive system.

Mutagenicity: This product is not reported to have mutagenic effects in humans. Mutation data are available for Potassium Cyanide and Sodium Cyanide (components of this product); these data were obtained during clinical studies on specific human or animal tissues exposed to high doses of these compounds.

Embryotoxicity: This product is not reported to have embryotoxic effects in humans. Embryotoxic tests on Potassium Cyanide (a component of this product) in animals have shown effects only at exposure levels very nearly lethal to the maternal animals.

Teratogenicity: This product is not reported to have teratogenic effects in humans. Human teratogenic data are available for Potassium Cyanide and Sodium Cyanide (a component of this product); these data were obtained during clinical studies on specific human tissues exposed to high doses of these compounds.

Reproductive Toxicity: This product is not reported to have adverse reproductive effects in humans. Clinical studies on test animals exposed to relatively high doses of Potassium Cyanide and Sodium Cyanide (a component of this product) indicate adverse reproductive effects.

*A mutagen is a chemical which causes permanent changes to genetic material (DNA) such that the changes will propagate through generational lines. An embryotoxin is a chemical which causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A teratogen is a chemical which causes damage to a developing fetus, but the damage does not propagate across generational lines. A reproductive toxin is any substance which interferes in any way with the reproductive process.*

BIOLOGICAL EXPOSURE INDICES: Currently, no Biological Exposure Indices (BEIs) are applicable to the components of this product.

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## 12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES SHOULD BE AIMED AT PREVENTING ANY RELEASE TO THE ENVIRONMENT.

ENVIRONMENTAL STABILITY: The components of this product will decompose into organic and inorganic compounds. The following environmental data are available for the components of this product:

**POTASSIUM CYANIDE:** Solubility: Soluble in 2 parts cold 1 part boiling water; 100 g/100 cc hot water above 176°C. With exposure to air Potassium Cyanide is slowly attacked by carbon dioxide and moisture. Decomposes rapidly in water.

**SODIUM CYANIDE:** Will release hydrogen cyanide slowly after contact with water. B)D: 6% in seven days.

## 12. ECOLOGICAL INFORMATION (Continued)

**EFFECT OF MATERIAL ON PLANTS or ANIMALS:** This product may be extremely harmful or fatal to contaminated plant and animal life if released into the environment. Refer to Section 11 (Toxicology Information) for information on this product's components effects on test animals.

**EFFECT OF CHEMICAL ON AQUATIC LIFE:** This product is extremely harmful or fatal to aquatic plant and animal life in bodies of water which has been contaminated with this product. Additional toxicity data are available for substances in this product, as follows:

**POTASSIUM CYANIDE:**

LC<sub>50</sub> (*Salmo salar* atlantic salmon) 24 hours = 0.08-068 mg/L  
EC<sub>0</sub> (*Salmo gairdneria* rainbow trout) 40 minutes = 0.001 mg/L  
TLm (bluegill) 48 hours = 0.16 ppm  
TLm (zebrafish) 48 hours = 0.49 ppm

**SODIUM CYANIDE:**

TLm (bluegill) 96 hours = 0.15 ppm  
LC<sub>50</sub> (prawn) 48 hours = 0.25 ppm

**SODIUM CYANIDE (continued):**

LC<sub>50</sub> (*Pimephales promelas* fathead minnow) 96 hours = 0.32 mg/L  
LC<sub>50</sub> (*Salmo gairdneri* rainbow trout fry) 96 hours = 0.0521-0.0748 mg/L  
LC<sub>50</sub> (*Dinophilus gyrociliatus* worm) 96 hours = 5.94-7.57 mg/L  
LC<sub>50</sub> (*Daphnia magna* giant water flea) 96 hours = 0.17 mg/L  
LC<sub>50</sub> (*Helisoma trivolvis* mollusk) 96 hours = > 100 mg/L  
LC<sub>50</sub> (*Gammarus fasciatus* crustacean) 96 hours = 1.7 mg/L  
LC<sub>50</sub> (*Lumbriculus variegatus* worm) 96 hours = 21 mg/L

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## 13. DISPOSAL CONSIDERATIONS

**PREPARING WASTES FOR DISPOSAL:** Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority.

**EPA WASTE NUMBER:** Depending on the nature of the wastes, the following EPA waste numbers may be applicable: D002, D003, F007 or F008, to wastes consisting only of this product.

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## 14. TRANSPORTATION INFORMATION

**THIS MATERIAL IS HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.**

**PROPER SHIPPING NAME:** Corrosive liquids, toxic, n.o.s. (Sodium hydroxide, Gold cyanide)  
**HAZARD CLASS NUMBER and DESCRIPTION:** 8 (Corrosive Material)  
**UN IDENTIFICATION NUMBER:** UN 2922  
**PACKING GROUP:** III  
**DOT LABEL(S) REQUIRED:** Limited Quantity

NOTE: Limited quantity exceptions are applicable for this product if requirements in 49 CFR 173.154 (b), 2 are met. Under these exceptions, inner packagings must not be over 5.0 liters (1.3 gallon), net capacity for liquids, packed in strong outer packagings. Each package must not exceed 30 kg (66 lb) gross weight. Limited quantities which meet these requirements are excepted from labeling, unless offered or intended for transport by air. In addition, shipments of these limited quantities are not subject to Subpart F (Placarding) of Part 172. Packages must comply with Subpart B of Part 172.

**NORTH AMERICAN EMERGENCY RESPONSE GUIDE NUMBER (1996):** 154

**MARINE POLLUTANT:** Cyanide solutions are listed as Marine Pollutants by the Department of Transportation (49 CFR 172.101, Appendix B). Shipments by water must be marked according to 49 CFR 172.322.

**TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS:** THIS MATERIAL IS CONSIDERED AS DANGEROUS GOODS. Refer to above information for shipments to Canada.

**UPS GUIDE FOR SHIPPING GROUND and AIR HAZARDOUS MATERIALS:**

**PROPER SHIPPING NAME:** Corrosive liquids, toxic, n.o.s. (Sodium hydroxide, Gold cyanide)  
**HAZARD CLASS NUMBER and DESCRIPTION:** 8 (Corrosive Material)  
**UN IDENTIFICATION NUMBER:** UN 2922  
**PACKING GROUP:** III  
**DOT LABEL(S) REQUIRED:** Limited Quantity (Ground);  
Corrosive and DOT E8249 (Air)  
**AIR MAXIMUM NET QUANTITY:** 5 Liters

## 15. REGULATORY INFORMATION

**U.S. SARA REPORTING REQUIREMENTS:** The components of this product listed in Section 2 (Composition and Information on Ingredients) are subject to the reporting requirements of Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act.

COMPONENT	SARA 302 (40 CFR 355, Appendix A)	SARA 304 (40 CFR Table 302.4)	SARA 313 (40 CFR 372.65)
Potassium Cyanide	Yes	Yes	No
Sodium Cyanide	Yes	Yes	No

**U.S. SARA THRESHOLD PLANNING QUANTITY:** Potassium Cyanide = 100 lb. Sodium Cyanide = 100 lb.

**U.S. CERCLA REPORTABLE QUANTITY (RQ):** Potassium Cyanide = 10 lb. Sodium Cyanide = 10 lb.

**U.S. TSCA INVENTORY STATUS:** The components of this product are listed on the TSCA Inventory.

**CANADIAN DSL/NDSL INVENTORY STATUS:** The components of this product are on the DSL or NDSL Inventory.

**OTHER U.S. FEDERAL REGULATIONS:** Not applicable.

**U.S. STATE REGULATORY INFORMATION:** Components of this product are covered under specific State regulations, as denoted below:

<p><b>Alaska - Designated Toxic and Hazardous Substances:</b> Cyanides.</p> <p><b>California - Permissible Exposure Limits for Chemical Contaminants:</b> Cyanide.</p> <p><b>Florida - Substance List:</b> Potassium Cyanide, Sodium Cyanide.</p> <p><b>Illinois - Toxic Substance List:</b> Cyanide, inorganic salts.</p> <p><b>Kansas - Section 302/313 List:</b> Potassium Cyanide, Sodium Cyanide.</p> <p><b>Massachusetts - Substance List:</b> Potassium Cyanide, Sodium Cyanide.</p>	<p><b>Michigan - Critical Materials Register:</b> Cyanides.</p> <p><b>Minnesota - List of Hazardous Substances:</b> Cyanides.</p> <p><b>Missouri- Employer Information/Toxic Substance List:</b> Potassium Cyanide, Sodium Cyanide.</p> <p><b>New Jersey - Right to Know Hazardous Substance List:</b> Potassium Cyanide, Sodium Cyanide.</p> <p><b>North Dakota - List of Hazardous Chemicals, Reportable Quantities:</b> Potassium Cyanide, Sodium Cyanide.</p>	<p><b>Pennsylvania - Hazardous Substance List:</b> Potassium Cyanide, Sodium Cyanide.</p> <p><b>Rhode Island - Hazardous Substance List:</b> Cyanides, Potassium Cyanide, Sodium Cyanide.</p> <p><b>Texas - Hazardous Substance List:</b> No.</p> <p><b>West Virginia - Hazardous Substance List:</b> No.</p> <p><b>Wisconsin - Toxic and Hazardous Substances:</b> No.</p>
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**CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65):** No component of this product is on the California Proposition 65 Lists.

**ANSI LABELING (Z129.1):** **DANGER!** MAY BE FATAL IF SWALLOWED, INHALED, OR ABSORBED THROUGH SKIN. OVEREXPOSURE CAN RESULT IN CYANOSIS AND RESPIRATORY ARREST. SEVERELY IRRITATING TO CONTAMINATED TISSUE. CONTACT WITH ACID CAN GENERATE TOXIC HYDROGEN CYANIDE GAS.

Target Organs: Blood, metabolic enzymes, skin, eyes, respiratory system.

Do not get in eyes, on skin, or on clothing. Do not breathe mist or vapor. Keep container tightly closed. Use with adequate ventilation. Wear suitable eye, face and hand protection. Wash thoroughly after handling. Store in cold, dry place away from incompatible chemicals. **FIRST-AID:** **In case of contact:** Immediately flush eyes or skin with running water for at least 15 minutes while removing contaminated clothing and shoes. **If inhaled:** Remove to fresh air. Break AMYL NITRATE PEARL in a cloth and hold under victim's nose for 15 seconds. Repeat five times in 15 second intervals. **If swallowed:** If the victim is conscious, induce vomiting immediately, as directed by medical personnel. Get medical attention immediately. If victim is fully conscious, give a cupful of water. Never give anything by mouth to an unconscious person. **For additional aid:** Contact the U.S. Poison Control Center at 1-800-222-1222. **Note to Physician:** Treat victim for cyanide poisoning. **GET MEDICAL ATTENTION IMMEDIATELY.** Refer to Material Safety Data Sheet for additional information.

## 15. REGULATORY INFORMATION (Continued)

### **ADDITIONAL CANADIAN REGULATIONS:**

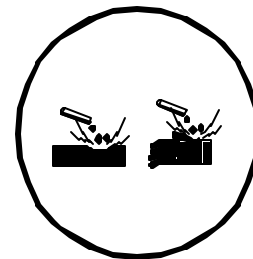
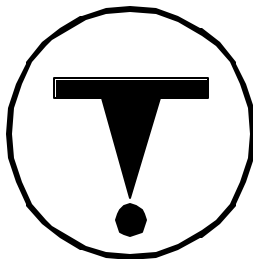
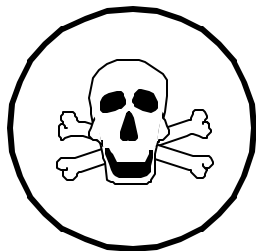
**CANADIAN DSL/NDL INVENTORY STATUS:** The components of this product are on the DSL Inventory.

**OTHER CANADIAN REGULATIONS:** Not applicable.

**CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS:** The components of this product are not on the CEPA Priorities Substances Lists

**CANADIAN WHMIS SYMBOLS:**

- D1-B:** Materials Causing Immediate and Serious Toxic Effects
- D2-B:** Materials Causing Other Toxic Effects/Toxic Material
- E:** Corrosive Material/Severely Irritating



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## 16. OTHER INFORMATION

### **FOR FURTHER INFORMATION:**

For matters pertaining to the health hazards, safety precautions, environmental compliance issues associated with this product, please contact ADVANCED CHEMICAL SAFETY by calling (858)874-5577 or via email at [neal@chemical-safety.com](mailto:neal@chemical-safety.com)

# DEFINITIONS OF TERMS

A large number of abbreviations and acronyms appear on a MSDS. Some of these which are commonly used include the following:

**CAS #:** This is the Chemical Abstract Service Number which uniquely identifies each constituent. It is used for computer-related searching.

## EXPOSURE LIMITS IN AIR:

**ACGIH** - American Conference of Governmental Industrial Hygienists, a professional association which establishes exposure limits.

**TLV** - Threshold Limit Value - an airborne concentration of a substance which represents conditions under which it is generally believed that nearly all workers may be repeatedly exposed without adverse effect. The duration must be considered, including the 8-hour Time Weighted Average (**TWA**), the 15-minute Short Term Exposure Limit, and the instantaneous Ceiling Level. Skin absorption effects must also be considered.

**OSHA** - U.S. Occupational Safety and Health Administration.

**PEL** - Permissible Exposure Limit - This exposure value means exactly the same as a TLV, except that it is enforceable by OSHA. The OSHA Permissible Exposure Limits are based in the 1989 PELs and the June, 1993 Air Contaminants Rule (Federal Register: 58: 35338-35351 and 58: 40191). Both the current PELs and the vacated PELs are indicated. The phrase, "Vacated 1989 PEL," is placed next to the PEL which was vacated by Court Order.

**IDLH** - Immediately Dangerous to Life and Health - This level represents a concentration from which one can escape within 30-minutes without suffering escape-preventing or permanent injury. The **DFG - MAK** is the Republic of Germany's Maximum Exposure Level, similar to the U.S. PEL.

**NIOSH** is the National Institute of Occupational Safety and Health, which is the research arm of the U.S. Occupational Safety and Health Administration (**OSHA**). NIOSH issues exposure guidelines called **Recommended Exposure Levels (RELs)**. When no exposure guidelines are established, an entry of **NE** is made for reference.

## HAZARD RATINGS:

**HAZARDOUS MATERIALS IDENTIFICATION SYSTEM:** Health Hazard: **0** (minimal acute or chronic exposure hazard); **1** (slight acute or chronic exposure hazard); **2** (moderate acute or significant chronic exposure hazard); **3** (severe acute exposure hazard; onetime overexposure can result in permanent injury and may be fatal); **4** (extreme acute exposure hazard; onetime overexposure can be fatal). Flammability Hazard: **0** (minimal hazard); **1** (materials that require substantial pre-heating before burning); **2** (combustible liquid or solids; liquids with a flash point of 38-93°C [100-200°F]); **3** (Class IB and IC flammable liquids with flash points below 38°C [100°F]); **4** (Class IA flammable liquids with flash points below 23°C [73°F] and boiling points below 38°C [100°F]). Physical Hazard: **0** (normally stable); **1** (material that can become unstable at elevated temperatures or which can react slightly with water); **2** (materials that are unstable but do not detonate or which can react violently with water); **3** (materials that can detonate when initiated or which can react explosively with water); **4** (materials that can detonate at normal temperatures or pressures).

**NATIONAL FIRE PROTECTION ASSOCIATION:** Health Hazard: **0** (material that on exposure under fire conditions would offer no hazard beyond that of ordinary combustible materials); **1** (materials that on exposure under fire conditions could cause irritation or minor residual injury); **2** (materials that on intense or continued exposure under fire conditions could cause temporary incapacitation or possible residual injury); **3** (materials that can on short exposure could cause serious temporary or residual injury); **4** (materials that under very short exposure could cause death or major residual injury). Flammability Hazard and Physical Hazard: Refer to definitions for "Hazardous Materials Identification System".

## FLAMMABILITY LIMITS IN AIR:

Much of the information related to fire and explosion is derived from the National Fire Protection Association (**NFPA**). Flash Point - Minimum temperature at which a liquid gives off sufficient vapors to form an ignitable mixture with air. Autoignition Temperature: The minimum temperature required to initiate combustion in air with no other source of ignition. LEL - the lowest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source. UEL - the highest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source.

## TOXICOLOGICAL INFORMATION:

**Human and Animal Toxicology:** Possible health hazards as derived from human data, animal studies, or from the results of studies with similar compounds are presented. Definitions of some terms used in this section are:

**LD<sub>50</sub>** - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; **LC<sub>50</sub>** - Lethal Concentration (gases) which kills 50% of the exposed animals; **ppm** concentration expressed in parts of material per million parts of air or water; **mg/m<sup>3</sup>** concentration expressed in weight of substance per volume of air; **mg/kg** quantity of material, by weight, administered to a test subject, based on their body weight in kg. Other measures of toxicity include **TDLo**, the lowest dose to cause a symptom and **TCLo** the lowest concentration to cause a symptom; **TD<sub>0</sub>**, **LDLo**, and **LD<sub>0</sub>**, or **TC**, **TC<sub>0</sub>**, **LCLo**, and **LCo**, the lowest dose (or concentration) to cause lethal or toxic effects. **Cancer Information:** The sources are: **IARC** - the International Agency for Research on Cancer; **NTP** - the National Toxicology Program, **RTECS** - the Registry of Toxic Effects of Chemical Substances, **OSHA** and **CAL/OSHA**. IARC and NTP rate chemicals on a scale of decreasing potential to cause human cancer with rankings from 1 to 4. Subrankings (2A, 2B, etc.) are also used. **Other Information:** **BEI** - ACGIH Biological Exposure Indices, represent the levels of determinants which are most likely to be observed in specimens collected from a healthy worker who has been exposed to chemicals to the same extent as a worker with inhalation exposure to the TLV.

**Ecological Information:** **EC** is the effect concentration in water. **BCF** = Bioconcentration Factor, which is used to determine if a substance will concentrate in lifeforms which consume contaminated plant or animal matter. **TL<sub>m</sub>** = median threshold limit; Coefficient of Oil/Water Distribution is represented by **log K<sub>ow</sub>** or **log K<sub>oc</sub>** and is used to assess a substance's behavior in the environment.

## REGULATORY INFORMATION:

This section explains the impact of various laws and regulations on the material. **U.S.:** **EPA** is the U.S. Environmental Protection Agency. **DOT** is the U.S. Department of Transportation. **SARA** is the Superfund Amendments and Reauthorization Act. **TSCA** is the U.S. Toxic Substance Control Act. **CERCLA (or Superfund)** refers to the Comprehensive Environmental Response, Compensation, and Liability Act. Labeling is per the American National Standards Institute (**ANSI Z129.1**). **CANADA:** **CEPA** is the Canadian Environmental Protection Act. **WHMIS** is the Canadian Workplace Hazardous Materials Information System. **TC** is Transport Canada. **DSL/NDSL** are the Canadian Domestic/Non-Domestic Substances Lists.

