1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product information

Trade name	:	Cyanco® Sodium cyanide solution, 24% or less
Use of the Substance / Preparation	:	For industrial use
Function	:	Electroplating agent Gold mining
Supplier	:	Cyanco Canada Inc. 3545 Ashby St. Laurent,QC H4R 2K3 Canada
Telephone	:	514-337-2421
Telefax	:	514-337-9057
CANADA: CANUTEC EMERGENCY NUMBER	:	613-996-6666
Product Regulatory Services	:	905-451-3810
MSDS prepared by	:	Regulatory Affairs Department (905) 451-3810 EXT 128 Date prepared: 11/06/2011

2. HAZARDS IDENTIFICATION

***** EMERGENCY OVERVIEW *****

***Form**-liquid* ***Colour**-light yellow* **Odour**-*characteristic Almond like odor.*

Very toxic by inhalation, in contact with skin and if swallowed.
Contact with acids liberates very toxic gas.
Irritating to eyes and skin.
Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Under the action of acids (as well as carbon dioxide !) hydrocyanic acid is released which is combustible and may react with air to explosive gas mixtures.
Hydrocyanic acid may cause all degrees of poisoning.

Causes severe eye burns.

Eye contact

Corrosive. May cause burns resulting in permanent damage.

Skin Contact

Highly toxic. May be fatal if absorbed through the skin.

Inhalation

Highly toxic. May be fatal if inhaled.

Ingestion

Highly toxic. May be fatal if swallowed.

Potential environmental effect

Very toxic to aquatic organisms; may cause long-term adverse effects in the aquatic environment.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical nature

solution in water

Information on ingredients / Hazardous components

Sodium cyanide			
CAS-No.	143-33-9	Percent (Wt./ Wt.)	>= 23 - < 31 %

Other information

This material is classified as hazardous under OSHA regulations.

4. FIRST AID MEASURES

General advice

Seek qualified Medical attention immediately!
IMPORTANT: Specific antidote treatment recommendations may vary by region or country. See Material Safety Data Sheet for proper treatment in your region or contact nearest hospital emergency room for recommendations.
When responding to cyanide emergencies, always implement self-protection, measures.
While protecting your self from exposure, remove the affected persons from the hazard area.
Always use protective equipment items (e.g. suitable respiratory equipment and suitable protective clothing / protective gloves made of butyl rubber, fluoro rubber, chloroprene rubber, etc.).
Immediately start decontamination, while removing contaminated or soaked clothing immediately for safe disposal.
After decontamination with large amounts of flowing water is complete, keep warm, position comfortably, and cover as necessary.
Patients who are unconscious but breathing should be placed in the stabilized lateral position.
In case of cardiac arrest, begin protected cardiopulmonary resuscitation (CPR) immediately. (NEVER PERFORM DIRECT MOUTH TO MOUTH BREATHING due to possible exposure to the rescuer!)
If available and recommended in your region, amyl nitrite may be indicated as a first aid measure for the treatment of cyanide.
Always apply oxygen if available.
Never leave the victims unattended.

Inhalation

Inhalation is possible if cyanide is in the form of aerosols, mists, dusts, or smoke.
Never perform direct mouth-to-mouth or mouth-to-nose artificial respiration. Use artificial respiration bag or respirator due to the potential danger of poisoning the rescuers!
There is a danger of poisoning the rescuers!

Maintain an open airway
In case of breathing difficulties immediately apply oxygen.
Immediately contact the emergency doctor immediately (alarm report: cyanide / hydrocyanic acid poisoning).

Skin contact

No cases of cyanide intoxication have been observed to date following contact with dry sodium or potassium cyanide on dry skin free of injuries. However, if the dry sodium or potassium cyanide comes in contact with moisture or acids, then hydrogen cyanide may be released, causing cyanide intoxication.
Wash off immediately using large amounts of water (and soap if available) while removing all contaminated clothes and shoes.
Immediately contact or summon an emergency physician immediately in case of intoxication symptoms (key terms: intoxication with cyanide / prussic acid).

Eye contact

In case of contact with the eyes, immediately flush eyes with copious amounts of water for a minimum of 15 minutes while removing clothes. It is important to seek medical attention for all eye exposures due to potential caustic burns of the eyes.
Immediately contact or summon an emergency physician in case of intoxication symptoms (key terms: intoxication with cyanide / prussic acid).
An ophthalmologist should also be consulted for evaluation of caustic burns to the eyes. Eye burns may not be apparent for up to 48 hours post exposure due to the caustic properties of sodium cyanide.

Ingestion

Thoroughly rinse mouth with water.
Seek professional medical care immediately.
Do not induce vomiting
Call emergency doctor immediately (alarm report: cyanide / hydro-cyanic acid poisoning).

Immediately transport to a medical facility.

Notes to physician

IMPORTANT: Specific antidote and treatment may vary by region. If you are not familiar with current treatment recommendations, you should contact the Poison Control Center for your region or country for specific recommendations and guidelines.
Possible signs of poisoning:
Intoxication is classified by 2 categories:
Mild poisoning
Severe poisoning
The following symptoms are not sufficient to ensure a correct diagnosis:
Symptoms of the central nervous system:
Early stage: headache, dizziness, somnolence (drowsiness), nausea.
Advanced stage: seizures, coma.
Pulmonary symptoms:
Early stage: dyspnea, tachypnea.
Advanced stage: hyperventilation, Cheyne-Stokes respiration, apnea.
Cardiovascular symptoms:
Early stage
hypertension, sinus arrhythmia, atrioventricular arrhythmia, bradycardia.
Advanced stage: tachycardia, complex arrhythmia, cardiac arrest.
Skin symptoms:
Early stage: rosy skin color.
Advanced stage: cyanosis.
Effect on the metabolism:
Lactate acidosis: pH 7.1 and lactate level of 17 mmol/l are described.

Treatment:
NOTE: The treatment advice may vary by region. See Material Safety Data Sheet or contact regional poison control center for appropriate antidote treatment used in your region.

The rescuer or medical responder should first of all protect themselves from exposure.
Decontaminate the victim to prevent further absorption and exposure to rescuers. Monitor vital signs.
Rapid treatment with appropriate antidote therapy is essential to saving lives during a high dose acute exposure to cyanide. NOTE: removal of toxic substance has equal importance to implementation of antidote therapy.
NOTE: This is an outline of antidotes available for informational purposes. It is important for the treating physician to be familiar with the administration of cyanide antidotes available in the country where the chemical is being used!
Mild poisoning
Treatment is dependant on clinical presentation with symptoms and history of exposure (related to dose).
100% oxygen and artificial respiration if indicated.
Closely monitor patient and their vital signs (Blood pressure, pulse and respirations).
Monitor the patient for onset of symptoms or deterioration of status.
Depending on the pathology and clinical findings, based on strictly monitored controls of the clinical findings, it may be necessary for the physician to implement symptom-oriented treatment for pulmonary edema prophylaxis. X-rays of the lungs may be necessary for pulmonary edema diagnosis.
Specific antidote treatment can be indicated for moderate to severe cyanide intoxication: (It is important to know that there are several different types of antidotes available for treatment of cyanide intoxication in different countries) If the treating physician is not familiar with cyanide exposure and treatment, they should contact the medical division of their regional poison control centers for immediate assistance with additional information as needed.
For all cyanide exposure:
All cyanide exposed persons should undergo continued monitoring for several hours, even if patient feels well to ensure there are no residual or recurrent poisoning symptoms.
Severe poisoning
Artificial respiration with 100% oxygen.
Immediate antidote administration with the legal antidote for the country of the exposure.
Listed below are the two most commonly used antidotes:
1. Methemoglobin-forming agent
Nitrite Therapy: (amyl nitrite, sodium nitrite and sodium thiosulfate) (commonly referred to as the Taylor, Lilly or Pasadena Cyanide Antidote Kit).
For moderate to severe exposures (patient still conscious)
Amyl Nitrite Aspirols: (1-3 aspirols administered as an inhalant, held 1 -2 inches under the nose for 15-30 seconds, and then remove for 15-30 seconds) (read medication information insert prior to administering).
Sodium nitrite 300 - 600 mg administered intravenously over a period of 5 to 15 minutes.
Sodium Thiosulfate (12.5 g - 100-500 mg/kg weight) intravenously over a period of 15-20 minutes.
If patient is conscious, then sodium Thiosulfate may be administered as an antidote by itself: (see antidote package information insert)
Sodium Thiosulfate (12.5 g - 100-500 mg/kg weight) IV may be administered depending on the clinical presentation and symptoms.
2. Complexing antidote agent: Hydroxycobalamin (commonly known as the Cyanokit)
Treatment as follows:
Administer hydroxocobalamin (Cyanokit®) 5 g i.v. (70 mg/kg b.w. in adults) by infusion over a period of 20 - 30 minutes. Administration of this dose can be repeated as required depending on the severity of poisoning. Infusion time for repeated dose: 30 minutes to 2 hours. The only permissible route of administration for hydroxocobalamine is intravenously. (The physician should read the medication package information carefully to ensure proper reconstitution to liquid state and administration of antidote!).

5. FIRE-FIGHTING MEASURES

Flash point	Not combustible.
Lower explosion limit	not applicable
Upper explosion limit	not applicable
Autoignition temperature	not applicable

Suitable extinguishing media

quenching powder

In case of fire in the surroundings:, alkali powder quenching agent

Extinguishing media which must not be used for safety reasons

carbon dioxide (CO2)

Specific hazards during fire fighting

May be released in case of fire: Hydro-cyanic acid

Special protective equipment for fire-fighters

As in any fire, wear self-contained positive-pressure breathing apparatus, (MSHA/NIOSH approved or equivalent) and full protective gear.

Further information

Standard procedure for chemical fires. Ensure there are sufficient retaining facilities for water used to extinguish fire. Water used to extinguish fire should not enter drainage systems, soil or stretches of water. Contaminated fire-extinguishing water must be disposed of in accordance with the regulations issued by the appropriate local authorities. Fire residues should be disposed of in accordance with the regulations.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions

Wear personal protective equipment.
Keep out unprotected persons.
Keep unauthorized persons away.

Ensure sufficient ventilation. Avoid skin contact because of the danger of skin absorption.

Make safe or remove all sources of ignition.

Environmental precautions

Do not allow entrance in soil, stretches of water, groundwater, drainage systems, surface water. Cyanide-containing sewage water and solutions must be decontaminated before entering a public canal network or stretch of water.

Methods for cleaning up

Absorb with liquid-binding material e.g. inert absorbent

Pick up mechanically. Collect in suitable containers.

Dispose of absorbed material in accordance with the regulations.

Waste to be packed like clean product and to be marked. Identification label on packages not to be removed until recycling.

Additional advice

On contact with acid, hydrogen cyanide is produced.

7. HANDLING AND STORAGE

Handling

Safe handling advice

Container may be opened only under exhaust ventilation hood.
Seal container hermetically immediately after use.

Store under lock and key or in a way that only skilled persons have access to it.

Advice on protection against fire and explosion

The product is not combustible.
see section 5.

Storage

Requirements for storage areas and containers

Keep container tightly sealed and store in a dry, well-ventilated place.
clean, dry, lockable.
Ensure there are sufficient retaining facilities for water used to extinguish fire.

Unsuitable materials aluminium

Advice on common storage

Do not store together with: acid and acidic salts.
Keep away from food, drink and animal feedingstuffs.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Component occupational exposure guidelines

- **Hydrogen cyanide**

CAS-No. 74-90-8

Control parameters

4.7 ppm as CN	Ceiling Limit Value:(CAD BC OEL)	
as CN	Skin designation:(CAD BC OEL)	Can be absorbed through the skin.
10 ppm 11 mg/m3 as CN	Ceiling Limit Value:(OEL (QUE))	
as CN	Skin designation:(OEL (QUE))	Can be absorbed through the skin.
as CN	(OEL (QUE))	Recirculation prohibited
4.7 ppm 5.2 mg/m3 as CN	Ceiling Limit Value:(CAD AB OEL)	
as CN	Skin designation:(CAD AB OEL)	Can be absorbed through the skin.

as CN	(CAD AB OEL)	Included in the regulation but with no data values. See regulation for further details
4.7 ppm as CN	Ceiling Limit Value:(CAD SK OEL)	
as CN	Skin designation:(CAD SK OEL)	Can be absorbed through the skin.
4.7 ppm as CN	Ceiling Limit Value:(CAD MB OEL)	
as CN	Skin designation:(CAD MB OEL)	Can be absorbed through the skin.
4.7 ppm as CN	Ceiling Limit Value (CEV):(CAD ON OEL)	
as CN	Skin designation:(CAD ON OEL)	Can be absorbed through the skin.

- **Sodium cyanide**

CAS-No. 143-33-9

Control parameters

10 mg/m3	Time Weighted Average (TWA):(OEL (QUE))	Total dust.
10 mg/m3	Time Weighted Average (TWA):(CAD AB OEL)	Total dust.
5 mg/m3	Time Weighted Average (TWA):(CAD AB OEL)	Respirable dust.
10 mg/m3	Time Weighted Average (TWA):(CAD BC OEL)	Total dust.
3 mg/m3	Time Weighted Average (TWA):(CAD BC OEL)	Respirable dust.
5 mg/m3 as CN	Ceiling Limit Value:(CAD AB OEL)	
as CN	Skin designation:(CAD AB OEL)	Can be absorbed through the skin.
5 mg/m3 as CN	Ceiling Limit Value:(CAD BC OEL)	
as CN	Skin designation:(CAD BC OEL)	Can be absorbed through the skin.
10 ppm 11 mg/m3 as CN	Ceiling Limit Value:(OEL (QUE))	
as CN	Skin designation:(OEL (QUE))	Can be absorbed through the skin.
as CN	(OEL (QUE))	Recirculation prohibited
5 mg/m3	Ceiling Limit Value:(CAD SK OEL) Skin designation:(CAD SK OEL)	Can be absorbed through the skin.
5 mg/m3 as CN	Ceiling Limit Value:(CAD MB OEL)	
as CN	Skin designation:(CAD MB OEL)	Can be absorbed through the skin.
5 mg/m3 as CN	Ceiling Limit Value (CEV):(CAD ON OEL)	
as CN	Skin designation:(CAD ON OEL)	Can be absorbed through the skin.

Other information

Suitable measuring processes are:

Hydro-cyanic acid

OSHA method ID 120

Engineering measures

Engineer out the risk of exposure.
Ensure suitable suction/aeration at the work place and with operational machinery.

Personal protective equipment

Respiratory protection

A respiratory protection program that meets OSHA 1910.134 and ANSI Z88.2 or applicable federal/provincial requirements must be followed whenever workplace conditions warrant respirator use. NIOSH's "Respirator Decision Logic" may be useful in determining the suitability of various types of respirators.

Hand protection

Glove material	Natural rubber (NR)
Material thickness	0.5 mm
Break through time	>= 480 min
Method	DIN EN 374
Glove material	Nitrile
Material thickness	0.11 mm
Break through time	>= 480 min
Method	DIN EN 374
Glove material	Nitrile
Material thickness	0.33 mm
Break through time	>= 480 min
Method	DIN EN 374
Glove material	Polychloroprene with natural-latex liner.
Material thickness	0.6 mm
Break through time	>= 480 min
Method	DIN EN 374
Glove material	PVC gloves

The above mentioned hand protection is based on knowledge of the chemistry and anticipated uses of this product but it may not be appropriate for all workplaces. A hazard assessment should be conducted prior to use to ensure suitability of gloves for specific work environments and processes prior to use.

Eye protection

goggles
face-shield

Skin and body protection

chemical protective suit
During cleaning work: rubber or plastic boots.

Hygiene measures

Avoid contact with skin.
After contact with skin, wash immediately with plenty of water.

No eating, drinking, smoking, or snuffing tobacco at work. Wash face and/or hands before break and end of work.

preventive skin protection

Keep working clothes separately.

Avoid contaminating clothes with product.
Immediately change moistened and saturated work clothes.
Immediately rinse contaminated or saturated clothing with water.

Protective measures

All precautionary measures indicated have to be observed.

The work-place related airborne concentrations have to be kept below of the indicated exposure limits.

If workplace exposure limits are exceeded and/or larger amounts are released (leakage, spilling, dust) the indicated respiratory protection should be used.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	liquid
Colour	light yellow
Odour	characteristic Almond like odor.

Safety data

pH	ca. 12 (300 g/l) Medium: water (Circa (ca.) - around, aprox.)
Melting point/range	-15 - -5 °C (Crystal precipitation)
Boiling point/range	ca. 105 °C
Flash point	Not combustible.
Flammability	not applicable
Autoignition temperature:	not applicable
Autoinflammability	not applicable
Lower explosion limit	not applicable
Upper explosion limit	not applicable
maximum absolute explosive pressure	not applicable
Vapour pressure	14.7 hPa (20 °C)
Density	ca. 1.15 g/cm3 (20 °C)
Bulk density	not applicable
Partition coefficient (n-octanol/water)	not investigated

Viscosity, dynamic	not applicable
Viscosity, kinematic	not applicable

Further information

Miscibility in water	completely miscible

10. STABILITY AND REACTIVITY

Materials to avoid	Under the action of acids (as well as carbon dioxide !) hydrocyanic acid is released which is combustible and may react with air to explosive gas mixtures., Keep away from acidic salts.
Hazardous decomposition products	HCN: Hydrogen cyanide (hydrocyanic acid)

11. TOXICOLOGICAL INFORMATION

Product Acute oral toxicity	LD50 Rat: 5 mg/kg Method: literature Test substance: solid product related to substance: Sodium cyanide
Product Acute dermal toxicity	LD50 Rabbit(female): 11.8 mg/kg Method: literature Test substance: solid product related to substance: Sodium cyanide
Product Human experience	Very toxic by inhalation and if swallowed. Inhaling of (at already approx. 200 ppm HCN in the air breathed) or swallowing (approx. 200 - 300 mg KCN) can result in immediate unconsciousness and death. Can be absorbed through the skin. Poisoning has an effect on the central nervous system. Irritating to eyes, respiratory system and skin.

12. ECOLOGICAL INFORMATION

Ecotoxicity effects

Toxicity to fish	LC50 Leuciscus idus melanotus: 0.07 mg/l Test substance: solid product Method: literature

related to substance: Sodium cyanide

Toxicity to daphnia	EC50 Daphnia magna: 0.3 mg/l Test substance: solid product Method: literature related to substance: Sodium cyanide
Toxicity to bacteria	EC50 Escherichia coli: 0.004 mg/l Test substance: solid product Method: literature related to substance: Sodium cyanide

13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL

Advice on disposal: Waste must be disposed of in accordance with local, state, provincial and federal laws and regulations. Empty containers must be handled with care due to product residue.

14. TRANSPORT INFORMATION

T.D.G. Road/Rail

Class	6.1
UN-No	3414
Packing group	I
Proper shipping name	SODIUM CYANIDE SOLUTION
Marine pollutant	Marine pollutant

Sea transport IMDG-Code

Class	6.1
UN-No	3414
Packaging group	I
Marine pollutant	Marine pollutant
EmS	F-A, S-A
Proper technical name (Proper shipping name)	
SODIUM CYANIDE SOLUTION	
Marine pollutant	Marine pollutant

Air transport ICAO-TI/IATA-DGR

Class	6.1
UN-No	3414
Packaging group	I
Proper technical name (Proper shipping name)	
Sodium cyanide solution	

Transport/further information

Do not store together with acids (danger of toxic gases) or with foodstuffs, consumables and feedstuffs.

15. REGULATORY INFORMATION

Canadian Regulations

This MSDS has been prepared in compliance with the Controlled Product Regulations except for use of the 16 headings.

WHMIS Classification

- D1A
- E

International Chemical Inventory Status

Unless otherwise noted, this product is in compliance with the inventory listing of the countries shown below. For information on listing for countries not shown, please contact Regulatory Affairs Department.

• Europe (EINECS/ELINCS)	Listed/registered
• USA (TSCA)	Listed/registered
• Canada (DSL)	Listed/registered
• Australia (AICS)	Listed/registered
• Japan (MITI)	Listed/registered
• Korea (TCCL)	Listed/registered
• Philippines (PICCS)	Listed/registered
• China	Listed/registered

16. OTHER INFORMATION

HMIS Ratings

Health :	3
Flammability :	0
Physical Hazard :	1

Further information

Changes since the last version are highlighted in the margin. This version replaces all previous versions.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.