

SODIUM NITROPRUSSIDE

GHS Safety Data Sheet

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Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

SODIUM NITROPRUSSIDE

OTHER NAMES

C5-Fe-N6-Na2-O, Na2Fe(CN)5NO.2H2O, "sodium nitrosylpentacyanoferrate (III)", "sodium nitrosylpentacyanoferrate (III)", "sodium nitroferricyanide dihydrate", "sodium nitroprussiate dihydrate"

PROPER SHIPPING NAME

TOXIC SOLID, INORGANIC, N.O.S.(contains sodium nitroprusside)

PRODUCT USE

Reagent for the detection of many organic compounds including acetone, aldehydes, alkali sulfides, zinc and sulfur dioxide. Also used as an anti-hypertensive, in strictly limited dosage.

SUPPLIER

Company: S D FINE- CHEM LIMITED

Address:

315- 317, T.V. INDUSTRIAL ESTATE,
248, WORLI,

MUMBAI- 400030.INDIA.

technical@sdfine.com

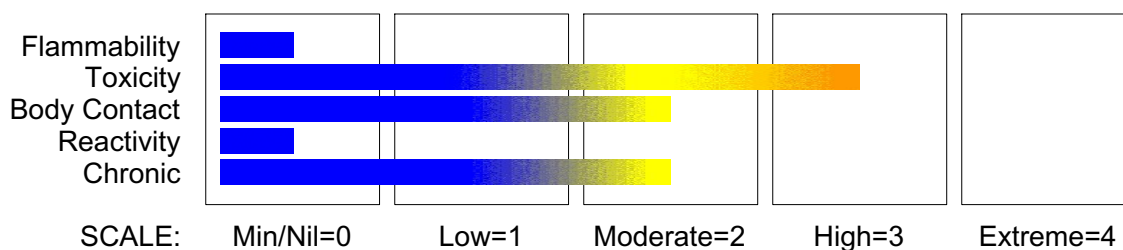
Telephone: 91- 22- 24959898

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Section 2 - HAZARDS IDENTIFICATION

HAZARD RATINGS



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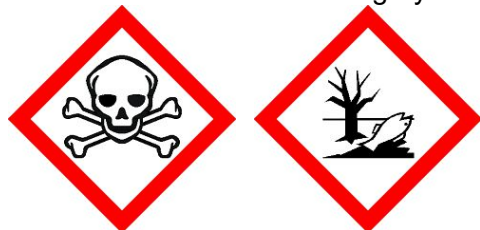
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Section 2 - HAZARDS IDENTIFICATION

GHS Classification

Acute Aquatic Hazard Category 2
Acute Toxicity (Inhalation) Category 4
Acute Toxicity (Oral) Category 2
Skin Corrosion/Irritation Category 3



EMERGENCY OVERVIEW

HAZARD

DANGER

Determined by using GHS criteria:

H300 H301 H332 H316 H401

Fatal if swallowed

Toxic if swallowed

Harmful if inhaled

Causes mild skin irritation

Toxic to aquatic life

Harmful to life in the soil

Very ecotoxic to terrestrial vertebrates

Ecotoxic to terrestrial vertebrates

Harmful to terrestrial vertebrates

PRECAUTIONARY STATEMENTS

Prevention

Avoid breathing dust/fume/gas/mist/vapours/spray.

Wash thoroughly after handling.

Do not eat, drink or smoke when using this product.

Use only outdoors or in a well-ventilated area.

Avoid release to the environment.

Response

IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.

IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.

Call a POISON CENTER or doctor/physician if you feel unwell.

Rinse mouth.

If skin irritation occurs: Get medical advice/ attention.

Storage

Store locked up.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
sodium nitroprusside	14402-89-2	>98

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Section 4 - FIRST AID MEASURES

SWALLOWED

- IF SWALLOWED, REFER FOR MEDICAL ATTENTION, WHERE POSSIBLE, WITHOUT DELAY.
 - For advice, contact a Poisons Information Centre or a doctor.
 - Urgent hospital treatment is likely to be needed.
 - In the mean time, qualified first-aid personnel should treat the patient following observation and employing supportive measures as indicated by the patient's condition.
 - If the services of a medical officer or medical doctor are readily available, the patient should be placed in his/her care and a copy of the MSDS should be provided. Further action will be the responsibility of the medical specialist.
 - If medical attention is not available on the worksite or surroundings send the patient to a hospital together with a copy of the MSDS.
 - Where medical attention is not immediately available or where the patient is more than 15 minutes from a hospital or unless instructed otherwise:
 - INDUCE vomiting with fingers down the back of the throat, ONLY IF CONSCIOUS. Lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.
- NOTE: Wear a protective glove when inducing vomiting by mechanical means.

EYE

- » If this product comes in contact with the eyes:
- Immediately hold eyelids apart and flush the eye continuously with running water.
- Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
- Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes.
- Transport to hospital or doctor without delay.
- Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

SKIN

- » If skin contact occurs:
- Immediately remove all contaminated clothing, including footwear.
- Flush skin and hair with running water (and soap if available).
- Seek medical attention in event of irritation.

INHALED

- If fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.
- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
- Transport to hospital, or doctor, without delay.

NOTES TO PHYSICIAN

- Signs symptoms of acute cyanide poisoning reflect cellular hypoxia and are often non-specific.
- Cyanosis may be a late finding.
- A bradycardic, hypertensive and tachypneic patient suggests poisoning especially if CNS and cardiovascular depression subsequently occurs.
- Immediate attention should be directed towards assisted ventilation, administration of 100% oxygen, insertion of intravenous lines and institution of cardiac monitoring.
- Obtain an arterial blood gas immediately and correct any severe metabolic acidosis (pH below 7.15).
- Mildly symptomatic patients generally require supportive care alone. Nitrites should

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Section 4 - FIRST AID MEASURES

not be given indiscriminately - in all cases of moderate to severe poisoning, they should be given in conjunction with thiosulfate. As a temporizing measure supply amyl nitrite perles (0.2ml inhaled 30 seconds every minute) until intravenous lines for sodium nitrite are established. 10 ml of a 3% solution is administered over 4 minutes to produce 20% methaemoglobin in adults. Follow directly with 50 ml of 25% sodium thiosulfate, at the same rate, IV. If symptoms reappear or persist within 1/2-1 hour, repeat nitrite and thiosulfate at 50% of initial dose. As the mode of action involves the metabolic conversion of the thiosulfate to thiocyanate, renal failure may enhance thiocyanate toxicity.

- Methylene blue is not an antidote. [Ellenhorn and Barceloux: Medical Toxicology]

If amyl nitrite intervention is employed then Medical Treatment Kits should contain the following:

- One box containing one dozen amyl nitrite ampoules
- Two sterile ampoules of sodium nitrite solution (10 mL of a 3% solution in each)
- Two sterile ampoules of sodium thiosulfate solution (50 mL of a 25% solution in each)
- One 10 mL sterile syringe. One 50 mL sterile syringe. Two sterile intravenous needles.
- One tourniquet.
- One dozen gauze pads.
- Latex gloves
- A "Biohazard" bag for disposal of bloody/contaminated equipment.
- A set of cyanide instructions on first aid and medical treatment.

- Notes on the use of amyl nitrite:-

- AN is highly volatile and flammable - do not smoke or use around a source of ignition.
- If treating patient in a windy or draughty area provide some shelter or protection (shirt, wall, drum, cupped hand etc.) to prevent amyl nitrite vapour from being blown away. Keep ampoule upwind from the nose, the objective is to get amyl nitrite into the patients lungs.
- Rescuers should avoid AN inhalation to avoid becoming dizzy and losing competence.
- Lay the patient down. Since AN dilates blood vessels and lowers blood pressure, lying down will help keep patient conscious.
- DO NOT overuse - excessive use might put the patient into shock. Experience at DuPont plants has not shown any serious after-effects from treatment with amyl nitrite.

ADDITIONAL NOTES:

- Major medical treatment procedures may vary e.g. US (FDA method as recommended by DuPont) uses amyl nitrite as a methaemoglobin generator, followed by treatment with sodium nitrite and then sodium thiosulfate.

MODES OF ACTION: Amyl nitrite (AN) reacts with haemoglobin (HB) to form about 5% methaemoglobin (MHB). Sodium nitrite (NaNO_2) reacts with haemoglobin to form approximately 20-30% methaemoglobin. Methaemoglobin attracts cyanide ions (CN) from tissue and binds with them to become cyanmethaemoglobin (CNMHB). Sodium thiosulfate ($\text{Na}_2\text{S}_2\text{O}_3$) converts cyanmethaemoglobin to thiocyanate (HSCN) which is excreted by the kidneys. i.e. $\text{AN} + \text{HB} = \text{MHB}$ $\text{NaNO}_2 + \text{HB} = \text{MHB}$ $\text{CN} + \text{MHB} = \text{CNMHB}$ $\text{Na}_2\text{S}_2\text{O}_3 + \text{CNMHB} + \text{O}_2 = \text{HSCN}$

- The administration of the antidote salts is intravenous in normal saline, Ringers lactate or other available IV fluid.
- European practice may use 4-dimethylaminophenol (DMAP) as a methaemoglobin generator. Also hydroxycobalamin (Vitamin B12a) is used. Hydroxycobalamin works by reacting with cyanide to form cyanocobalamin (Vitamin B12) which is excreted in the urine.
- European and Australian NOHSC (ASCC) propose dicobalt edetate (Kelocyanor) as antidote. This acts by chelating cyanide to form stable cobaltcyanide, which is excreted in the urine. In all cases hyperbaric therapy may increase the efficiency of a cyanide antidote kit.

May produce metabolic cyanide.

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Section 5 - FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

- Water spray or fog.
- Foam.
- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.

FIRE FIGHTING

- Alert Fire Brigade and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Use fire fighting procedures suitable for surrounding area.
- Do not approach containers suspected to be hot.
- Cool fire exposed containers with water spray from a protected location.
- If safe to do so, remove containers from path of fire.
- Equipment should be thoroughly decontaminated after use.

FIRE/EXPLOSION HAZARD

- Non combustible.
 - Not considered a significant fire risk, however containers may burn.
- Decomposition may produce toxic fumes of: nitrogen oxides (NO_x), metal oxides.
May emit poisonous fumes.

FIRE INCOMPATIBILITY

- » None known.

Personal Protective Equipment

Gas tight chemical resistant suit.

Section 6 - ACCIDENTAL RELEASE MEASURES

EMERGENCY PROCEDURES

MINOR SPILLS

- » Environmental hazard - contain spillage.
- Remove all ignition sources.
- Clean up all spills immediately.
- Avoid contact with skin and eyes.
- Control personal contact by using protective equipment.
- Use dry clean up procedures and avoid generating dust.
- Place in a suitable, labelled container for waste disposal.

MAJOR SPILLS

- » Environmental hazard - contain spillage.
- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Stop leak if safe to do so.
- Contain spill with sand, earth or vermiculite.
- Collect recoverable product into labelled containers for recycling.
- Neutralise/decontaminate residue.
- Collect solid residues and seal in labelled drums for disposal.

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Section 6 - ACCIDENTAL RELEASE MEASURES

- Wash area and prevent runoff into drains.
- After clean up operations, decontaminate and launder all protective clothing and equipment before storing and re-using.
- If contamination of drains or waterways occurs, advise emergency services.

Personal Protective Equipment advice is contained in Section 8 of the MSDS.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- Prevent concentration in hollows and sumps.
- DO NOT enter confined spaces until atmosphere has been checked.
- DO NOT allow material to contact humans, exposed food or food utensils.
- Avoid contact with incompatible materials.
- When handling, DO NOT eat, drink or smoke.
- Keep containers securely sealed when not in use.
- Avoid physical damage to containers.
- Always wash hands with soap and water after handling.
- Work clothes should be laundered separately. Launder contaminated clothing before re-use.
- Use good occupational work practice.
- Observe manufacturer's storing and handling recommendations.
- Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.

SUITABLE CONTAINER

- Glass container is suitable for laboratory quantities.
- Lined metal can, lined metal pail/ can.
- Plastic pail.
- Polyliner drum.
- Packing as recommended by manufacturer.
- Check all containers are clearly labelled and free from leaks.

For low viscosity materials

- Drums and jerricans must be of the non-removable head type.
- Where a can is to be used as an inner package, the can must have a screwed enclosure.

For materials with a viscosity of at least 2680 cSt. (23 deg. C) and solids (between 15 C deg. and 40 deg C.):

- Removable head packaging;
 - Cans with friction closures and
 - low pressure tubes and cartridges
- may be used.

-

Where combination packages are used, and the inner packages are of glass, there must be sufficient inert cushioning material in contact with inner and outer packages *.

-

In addition, where inner packagings are glass and contain liquids of packing group I and II there must be sufficient inert absorbent to absorb any spillage *.

-

* unless the outer packaging is a close fitting moulded plastic box and the substances are not incompatible with the plastic.

All inner and sole packagings for substances that have been assigned to Packaging Groups I or II on the basis of inhalation toxicity criteria, must be hermetically sealed.

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Section 7 - HANDLING AND STORAGE

STORAGE INCOMPATIBILITY

- Contact with acids produces toxic fumes. ferricyanide:
- mixtures with water, acids, or alcohols may slowly decompose producing hydrocyanic acid
- reacts explosively with strong oxidisers, ammonia chromium trioxide, chromic acid, chromic anhydride, sodium nitrite
- reacts violently with copper(II) nitrate, trihydrate.
- Metals and their oxides or salts may react violently with chlorine trifluoride and bromine trifluoride.
- These trifluorides are hypergolic oxidisers. They ignite on contact (without external source of heat or ignition) with recognised fuels - contact with these materials, following an ambient or slightly elevated temperature, is often violent and may produce ignition.
- The state of subdivision may affect the results.

STORAGE REQUIREMENTS

- Plastic bag
- NOTE: Bags should be stacked, blocked, interlocked, and limited in height so that they are stable and secure against sliding or collapse.
- Store in original containers.
- Keep containers securely sealed.
- Store in a cool, dry, well-ventilated area.
- Store away from incompatible materials and foodstuff containers.
- Protect containers against physical damage and check regularly for leaks.
- Observe manufacturer's storing and handling recommendations.

SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS



- +: May be stored together
O: May be stored together with specific precautions
X: Must not be stored together

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

The following materials had no OELs on our records

- sodium nitroprusside:

CAS:14402- 89- 2 CAS:13755- 38- 9

EMERGENCY EXPOSURE LIMITS

Material	Revised IDLH Value (mg/m3)	Revised IDLH Value (ppm)
sodium nitroprusside	25	

MATERIAL DATA

» It is the goal of the ACGIH (and other Agencies) to recommend TLVs (or their equivalent) for all substances for which there is evidence of health effects at airborne concentrations encountered in the workplace.

At this time no TLV has been established, even though this material may produce adverse health effects (as evidenced in animal experiments or clinical experience). Airborne

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

concentrations must be maintained as low as is practically possible and occupational exposure must be kept to a minimum.

NOTE: The ACGIH occupational exposure standard for Particles Not Otherwise Specified (P.N.O.S) does NOT apply.

Sensory irritants are chemicals that produce temporary and undesirable side-effects on the eyes, nose or throat. Historically occupational exposure standards for these irritants have been based on observation of workers' responses to various airborne concentrations. Present day expectations require that nearly every individual should be protected against even minor sensory irritation and exposure standards are established using uncertainty factors or safety factors of 5 to 10 or more. On occasion animal no-observable-effect-levels (NOEL) are used to determine these limits where human results are unavailable. An additional approach, typically used by the TLV committee (USA) in determining respiratory standards for this group of chemicals, has been to assign ceiling values (TLV C) to rapidly acting irritants and to assign short-term exposure limits (TLV STELs) when the weight of evidence from irritation, bioaccumulation and other endpoints combine to warrant such a limit. In contrast the MAK Commission (Germany) uses a five-category system based on intensive odour, local irritation, and elimination half-life. However this system is being replaced to be consistent with the European Union (EU) Scientific Committee for Occupational Exposure Limits (SCOEL); this is more closely allied to that of the USA.

OSHA (USA) concluded that exposure to sensory irritants can:

- cause inflammation
- cause increased susceptibility to other irritants and infectious agents
- lead to permanent injury or dysfunction
- permit greater absorption of hazardous substances and
- acclimate the worker to the irritant warning properties of these substances thus increasing the risk of overexposure.

PERSONAL PROTECTION



EYE

- Safety glasses with side shields.
- Chemical goggles.
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59].

HANDS/FEET

- Wear chemical protective gloves, eg. PVC.
 - Wear safety footwear or safety gumboots, eg. Rubber.
- Suitability and durability of glove type is dependent on usage. Factors such as:
- frequency and duration of contact,

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

- chemical resistance of glove material,
 - glove thickness and
 - dexterity,
- are important in the selection of gloves.

OTHER

- Overalls.
 - Eyewash unit.
 - Barrier cream.
 - Skin cleansing cream.
-
- Respirators may be necessary when engineering and administrative controls do not adequately prevent exposures.
 - The decision to use respiratory protection should be based on professional judgment that takes into account toxicity information, exposure measurement data, and frequency and likelihood of the worker's exposure - ensure users are not subject to high thermal loads which may result in heat stress or distress due to personal protective equipment (powered, positive flow, full face apparatus may be an option).
 - Published occupational exposure limits, where they exist, will assist in determining the adequacy of the selected respiratory . These may be government mandated or vendor recommended.
 - Certified respirators will be useful for protecting workers from inhalation of particulates when properly selected and fit tested as part of a complete respiratory protection program.
 - Use approved positive flow mask if significant quantities of dust becomes airborne.
 - Try to avoid creating dust conditions.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required. For further information consult your Occupational Health and Safety Advisor.

ENGINEERING CONTROLS

» Local exhaust ventilation usually required. If risk of overexposure exists, wear approved respirator. Correct fit is essential to obtain adequate protection. Supplied-air type respirator may be required in special circumstances. Correct fit is essential to ensure adequate protection.

An approved self contained breathing apparatus (SCBA) may be required in some situations.

Provide adequate ventilation in warehouse or closed storage area. Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

Type of Contaminant:	Air Speed:
solvent, vapours, degreasing etc., evaporating from tank (in still air).	0.25- 0.5 m/s (50- 100 f/min.)
aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation)	0.5- 1 m/s (100- 200 f/min.)
direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)	1- 2.5 m/s (200- 500 f/min.)
grinding, abrasive blasting, tumbling, high	2.5- 10 m/s (500- 2000 f/min.)

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).

Within each range the appropriate value depends on:

Lower end of the range

- 1: Room air currents minimal or favourable to capture
- 2: Contaminants of low toxicity or of nuisance value only.
- 3: Intermittent, low production.
- 4: Large hood or large air mass in motion

Upper end of the range

- 1: Disturbing room air currents
- 2: Contaminants of high toxicity
- 3: High production, heavy use
- 4: Small hood- local control only

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2 m/s (200-400 f/min) for extraction of solvents generated in a tank 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE

Ruby-red, practically odourless, transparent crystals. Soluble in 2.3 parts water, slightly soluble in alcohol. Slowly decomposes in aqueous solution. Hygroscopic.

PHYSICAL PROPERTIES

Mixes with water.
Toxic or noxious vapours/gas.
Contact with acids liberates very toxic gas.

Molecular Weight: 297.95
Melting Range (°C): Not available.
Solubility in water (g/L): Miscible
pH (1% solution): Not available.
Volatile Component (%vol): Negligible
Relative Vapour Density (air=1): Not applicable
Lower Explosive Limit (%): Not applicable
Autoignition Temp (°C): Not available.
State: DIVIDED SOLID

Boiling Range (°C): Not available.
Specific Gravity (water=1): 1.72
pH (as supplied): Not applicable
Vapour Pressure (kPa): Negligible
Evaporation Rate: Not applicable
Flash Point (°C): Not applicable
Upper Explosive Limit (%): Not applicable
Decomposition Temp (°C): Not Available
Viscosity: Not Applicable

Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of incompatible materials.
- Product is considered stable.
- Hazardous polymerisation will not occur.

For incompatible materials - refer to Section 7 - Handling and Storage.

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Section 11 - TOXICOLOGICAL INFORMATION

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

» Toxic effects may result from the accidental ingestion of the material; animal experiments indicate that ingestion of less than 40 gram may be fatal or may produce serious damage to the health of the individual.

» A number of materials such as cyanamide, calcium cyanamide, cyanates, isocyanates, isonitrile, thiocyanates, ferricyanide and ferrocyanide, other complex metallocyanides and cyanoacetates do not exhibit the same toxicology as cyanides and nitriles.

» Complex cyanides are compounds in which the cyanide anion is incorporated into a complex or complexes; these compounds are different in chemical and toxicologic properties from simple cyanides. In solution, the stability of the cyanide complex varies with the type of cation and the complex that it forms. Some of these are dissociable in weak acids to give free cyanide and a cation, while other complexes require much stronger acidic conditions for dissociation. The least-stable complex metallocyanides include $[\text{Zn}(\text{CN})_4]^{2-}$, $\text{Cd}(\text{CN})_3^-$, and $[\text{Cd}(\text{CN})_4]^{2-}$; moderately stable complexes include $\text{Cu}(\text{CN})_2^-$, $[\text{Cu}(\text{CN})_3]^{2-}$, $[\text{Ni}(\text{CN})_4]^{2-}$, and $\text{Ag}(\text{CN})_2^-$; and the most stable complexes include $[\text{Fe}(\text{CN})_6]^{4-}$ and $[\text{Co}(\text{CN})_6]^{4-}$. The toxicity of complex cyanides is usually related to their ability to release cyanide ions in solution, which then enter into an equilibrium with HCN; relatively small fluctuations in pH significantly affect their biocidal properties.

» The toxic properties of cyanide depend on its ability to inhibit enzymes required for the respiration of cells within the body. Acute exposure can cause profuse ineffective breathing, irregular heartbeat, unconsciousness, coma and death by asphyxia. At very low dosages symptoms include weakness, headache, confusion, nausea and vomiting. Normal blood pressure with rapid pulse is usual in mild cases. The respiratory rate varies with the intensity of exposure: rapid with mild exposure, or slow and gasping with severe exposure. Symptoms of mild exposure are reversed when exposure ceases.

Symptoms of poisoning may include salivation, nausea without vomiting, anxiety, confusion, vertigo, giddiness, lower jaw stiffness, convulsions, spasm (opisthotonos), paralysis, coma and cardiac arrhythmias. Cyanide readily forms stable complexes with biologically active metal ions, notably the ferric ion of cytochrome oxidase, producing significant inhibition of enzyme activity with a consequent loss of a cell's ability to utilise oxygen. Cyanosis (blue-grey discolouration of the skin and lips) is often present in cyanide and nitrile poisonings but may be a late finding. Non-lethal doses of cyanide are eventually released from the complex to be transformed to thiocyanate and excreted in the urine.

EYE

» Although the material is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may cause transient discomfort characterised by tearing or conjunctival redness (as with windburn). Slight abrasive damage may also result. The material may produce foreign body irritation in certain individuals.

SKIN

» Skin contact with the material may damage the health of the individual; systemic effects may result following absorption.

» Limited evidence exists, or practical experience predicts, that the material either produces inflammation of the skin in a substantial number of individuals following direct contact, and/or produces significant inflammation when applied to the healthy intact skin of animals, for up to four hours, such inflammation being present twenty-four hours or more after the end of the exposure period. Skin irritation may also be present after prolonged or repeated exposure; this may result in a form of contact dermatitis

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Section 11 - TOXICOLOGICAL INFORMATION

(nonallergic). The dermatitis is often characterised by skin redness (erythema) and swelling (oedema) which may progress to blistering (vesiculation), scaling and thickening of the epidermis. At the microscopic level there may be intercellular oedema of the spongy layer of the skin (spongiosis) and intracellular oedema of the epidermis.

» Skin contact may produce "cyanide rash" with itching, also macular, papular and vesicular eruptions. Secondary infections may follow. Contact irritation causes readily reversible change which disappears after exposure ends.

» Open cuts, abraded or irritated skin should not be exposed to this material.

» Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

INHALED

» The material is not thought to produce respiratory irritation (as classified by EC Directives using animal models). Nevertheless inhalation of dusts, or fumes, especially for prolonged periods, may produce respiratory discomfort and occasionally, distress.

» Inhalation of dusts, generated by the material during the course of normal handling, may produce serious damage to the health of the individual.

» Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.

CHRONIC HEALTH EFFECTS

» Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.

Long term exposure to high dust concentrations may cause changes in lung function (i.e. pneumoconiosis) caused by particles less than 0.5 micron penetrating and remaining in the lung. A prime symptom is breathlessness. Lung shadows show on X-ray.

The toxic properties of cyanide result from its ability to inhibit enzymes required for the respiration of cells within the body.

Chronic exposure to cyanides, at levels too low to produce clinical complaints, may cause dermatitis, itching, scarlet rash, perforation of nasal septum, throat irritation, muscular cramps, weight loss and enlargement of the thyroid gland. Workers with pre-existing CNS, heart and lung disorders are at significant risk.

A wide range of symptoms are thought to be caused by long-term, low-level (often less than 10 ppm) exposure to cyanides. Symptoms include persistent runny nose, weakness, dizziness, giddiness, headache, nausea, vomiting, abdominal pain, throat irritation, changes in taste and smell, muscle cramps, weight loss, flushing of the face, itching and irritation of the upper respiratory tract, throat and eyes and enlargement of the thyroid gland. These symptoms are not specific to cyanide exposure; therefore it has been difficult to prove that chronic cyanide toxicity exists.

Repeated minor contact with cyanides produces a characteristic scarlet rash with itching, papules (small, superficial raised spots on the skin), perforation of the nasal septum and possible sensitisation. Concerns have been expressed that low-level, long term exposures may result in damage to the nerves of the eye.

Chronic exposure to cyanides and certain nitriles may result in interference to iodine uptake by thyroid gland and its consequent enlargement. This occurs following metabolic conversion of the cyanide moiety to the less toxic thiocyanate which is excreted in the urine. Thyroid insufficiency may also occur as a result of metabolic conversion of cyanides to the corresponding thiocyanate..

A small amount of cyanide is excreted, unchanged, in the breath, sweat and urine.

produce

TOXICITY AND IRRITATION

» unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY

Oral (rat) LD50: 99 mg/kg

Oral (mouse) LD50: 61 mg/kg

IRRITATION

Nil Reported

continued...

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Section 11 - TOXICOLOGICAL INFORMATION

Section 12 - ECOLOGICAL INFORMATION

Toxic to aquatic organisms.

May cause long-term adverse effects in the environment.

This material and its container must be disposed of as hazardous waste.

Section 13 - DISPOSAL CONSIDERATIONS

- Containers may still present a chemical hazard/ danger when empty.
- Return to supplier for reuse/ recycling if possible.

Otherwise:

- If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill.
- Where possible retain label warnings and MSDS and observe all notices pertaining to the product.

Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area.

In some areas, certain wastes must be tracked.

A Hierarchy of Controls seems to be common - the user should investigate:

- Reduction,
- Reuse
- Recycling
- Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.

- DO NOT allow wash water from cleaning or process equipment to enter drains.
- It may be necessary to collect all wash water for treatment before disposal.
- In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.
- Where in doubt contact the responsible authority.
- Recycle wherever possible or consult manufacturer for recycling options.
- Consult State Land Waste Management Authority for disposal.
- Bury residue in an authorised landfill.
- Recycle containers if possible, or dispose of in an authorised landfill.

Section 14 - TRANSPORTATION INFORMATION



Labels Required: TOXIC

HAZCHEM: None

UNDG:

Dangerous Goods Class: 6.1
UN Number: 3288

Subrisk:
Packing Group:

None
III

continued...

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Section 14 - TRANSPORTATION INFORMATION

Shipping Name: TOXIC SOLID, INORGANIC, N.O.S. (contains sodium nitroprusside)

Air Transport IATA:

ICAO/IATA Class:	6.1	ICAO/IATA Subrisk:	None
UN/ID Number:	3288	Packing Group:	III
Special provisions:	A3 A5		
Shipping Name: TOXIC SOLID, INORGANIC, N.O.S. *(CONTAINS SODIUM NITROPRUSSIDE)			

Maritime Transport IMDG:

IMDG Class:	6.1	IMDG Subrisk:	None
UN Number:	3288	Packing Group:	III
EMS Number:	F- A, S- A	Special provisions:	274
Limited Quantities:	500 g	Marine Pollutant:	Not Determined
Shipping Name: TOXIC SOLID, INORGANIC, N.O.S.(contains sodium nitroprusside)			

Section 15 - REGULATORY INFORMATION

REGULATIONS

sodium nitroprusside (CAS: 14402-89-2) is found on the following regulatory lists;
International Air Transport Association (IATA) Dangerous Goods Regulations

sodium nitroprusside (CAS: 13755-38-9) is found on the following regulatory lists;
International Air Transport Association (IATA) Dangerous Goods Regulations

Section 16 - OTHER INFORMATION

INGREDIENTS WITH MULTIPLE CAS NUMBERS

Ingredient Name	CAS
sodium nitroprusside	14402- 89- 2, 13755- 38- 9

MSDS SECTION CHANGES

The following table displays the version number of and date on which each section was last changed.

Section Name	Version	Date	Section Name	Version	Date	Section Name	
Version Date Advice to Doctor 21- Aug- 2008	4	21- Aug- 2008	Storage (storage incompatibility) Storage (storage requirement) Personal	4	21- Aug- 2008	Acute Health (inhaled) Acute Health (skin) Acute Health	4
First Aid (eye) 21- Aug- 2008	4	21- Aug- 2008	Protection (eye) Personal	4	21- Aug- 2008	(swallowed) Chronic Health	4
First Aid 21- Aug- 2008 (inhaled) First Aid (skin) 21- Aug- 2008	4	21- Aug- 2008	Protection (hands/feet) Personal	4	21- Aug- 2008	Environmental	4
First Aid 21- Aug- 2008 (swallowed) Fire Fighter (fire 21- Aug- 2008 incompatibility) Fire Fighter 21- Aug- 2008 (fire/explosion hazard)	4	21- Aug- 2008	Protection (other) Instability	4	21- Aug- 2008	Disposal	4
	4	21- Aug- 2008	Condition Acute Health (eye)	4	21- Aug- 2008	Transport	4

The above information is believed to be accurate and represent the best information

continued...

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Section 16 - OTHER INFORMATION

currently available to us, but does not represent any warranty expressed or implied of the properties of the product. User should make their own investigation to determine the suitability of the information for their particular purpose.

Issue Date: 21-Aug-2017