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MATERIAL SAFETY DATA SHEET (MSDS)

SODIUM NITROPRUSSIDE AR (SODIUM NITROSO PENTA CYNO FERRATE III)

1. Product Identification

Synonyms: Sodium nitroferricyanide dihydrate; Sodium nitroprusside dihydrate; Ferrate (2-), pentacyanonitrosyl-, disodium dihydrate; Disodium nitroprusside dihydrate

CAS No.: 14402-89-2 (Anhydrous); 13755-38-9 (Dihydrate)

Product Coad: S0190200100

Molecular Weight: 297.95

Chemical Formula: Na₂Fe(CN)₅NO.2H₂O

2. Composition/Information on Ingredients

| Ingredient | CAS No | Percent | Hazardous |
|--------------------------|------------|-----------|-----------|
| Sodium Nitroferricyanide | 14402-89-2 | 90 - 100% | Yes |

3. Hazards Identification

Emergency Overview DANGER! MAY BE FATAL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. AFFECTS BLOOD, CARDIOVASCULAR SYSTEM, CENTRAL NERVOUS SYSTEM AND THYROID. CONTACT WITH ACIDS LIBERATES POISONOUS GAS. MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT.

Potential Health Effects Sodium nitroferricyanide decomposes on contact with biological material to release free cyanide. Although it does release free cyanide in the body, it is less toxic orally than intravenously. It is believed that it is either absorbed poorly or decomposed in the gastrointestinal tract prior to absorption. Nonetheless, it remains a highly toxic material. In most cases, cyanide poisoning causes a deceptively healthy pink to red skin color. However, if a physical injury or lack of oxygen is involved, the skin color may be bluish. Reddening of the eyes and pupil dilation are symptoms of cyanide poisoning. Cyanosis (blue discoloration of the skin) tends to be associated with severe cyanide poisonings.

Inhalation: May cause irritation to the respiratory tract and systemic poisoning with symptoms paralleling ingestion.

Ingestion: The toxic effects may be similar to nitrite poisoning; symptoms may include headache, flushing of the skin, vomiting, colic and diarrhea, muscular weakness, dizziness, collapse, fall in blood pressure, cyanosis, convulsions, coma, respiratory paralysis, and death due to circulatory collapse. Cyanide poisoning may cause nausea, diarrhea and abdominal pain. Larger doses may produce sudden loss of consciousness and prompt death from respiratory arrest. Smaller but still lethal doses may prolong the illness for one or more hours. Bitter almond odor may be noted on the breath or vomitus

Skin Contact: May cause irritation, redness, and pain. May be absorbed through the skin, causing systemic poisoning with symptoms paralleling ingestion.

Eye Contact: May cause irritation, redness and pain.

Chronic Exposure: Repeated, prolonged exposure through any route may cause symptoms similar to iodism or bromide intoxication: skin rashes, weakness, fatigue, nausea, vomiting, diarrhea and confusion.

Aggravation of Pre-existing Conditions: Workers using cyanides should have a preplacement and periodic medical exam. Those with history of central nervous system, thyroid, skin, heart or lung diseases may be more susceptible to the effects of this substance.

4. First Aid Measures

IN CASE OF CYANIDE POISONING, start first aid treatment immediately, then get medical attention. A cyanide antidote kit (amyl nitrite, sodium nitrite and sodium thiosulfate) should be available in any cyanide work area. Actions to be taken in case of cyanide poisoning should be planned and practiced before beginning work with cyanides. Oxygen and amyl nitrite can be given by a first responder before medical help arrives. Allow victim to inhale amyl nitrite for 15-30 seconds per minute until sodium nitrite and sodium thiosulfate can be administered intravenously (see Note to Physician). A new amyl nitrite ampule should be used every 3 minutes. If conscious but symptoms (nausea, difficult breathing, dizziness, etc.) are evident, give oxygen. If consciousness is impaired (non-responsiveness, slurred speech, confusion, drowsiness) or the patient is unconscious but breathing, give oxygen and amyl nitrite by means of a respirator. If not breathing, give oxygen and amyl nitrite immediately by means of a positive pressure respirator (artificial respiration).

Inhalation: If inhaled, remove to fresh air. Administer antidote kit and oxygen per pre-planned instructions if symptoms occur. Keep patient warm and at rest. Do not give mouth to mouth resuscitation.

Ingestion: If ingested, antidote kit and oxygen should be administered per above. If the patient is conscious, immediately give the patient activated charcoal slurry. Never give anything by mouth to an unconscious person. Do not induce vomiting as it could interfere with resuscitator use.

Skin Contact: Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately. Wash clothing before reuse. Thoroughly clean shoes before reuse. Administer antidote kit and oxygen per preplanned instructions if symptoms occur.

Eye Contact: Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Note to Physician: If patient does not respond to amyl nitrite, inject intravenously with 10mL of a 3% solution of sodium nitrite at a rate of not more than 2.5 to 5 mL per minute. Once nitrite administration is complete, follow directly with 50 mL of a 25% solution of sodium thiosulfate at the same rate by the same route. Give victim oxygen and keep under observation. If exposure was severe, watch victim for 24-48 hours. If signs of cyanide poisoning persist or reappear, repeat nitrite and thiosulfate injections 1 hour later in 1/2 the original doses. Cyanocobalamin (B12), 1 mg intramuscularly, may speed recovery. Moderate cyanide exposures need be treated only by supportive measures such as bed rest and oxygen.

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5. Fire Fighting Measures

Fire: Not considered to be a fire hazard.

Explosion: Not considered to be an explosion hazard.

Fire Extinguishing Media: Use any means suitable for extinguishing surrounding fire.

Special Information: In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. May emit toxic and flammable fumes of cyanide if involved in a fire.

6. Accidental Release Measures

Ventilate area of leak or spill. Keep unnecessary and unprotected people away from area of spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Pick up and place in a suitable container for reclamation or disposal, using a method that does not generate dust.

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Separate from incompatibles. Workers must carefully follow good hygienic practices, including no eating, drinking, or smoking in workplace. Proper use and maintenance of protective equipment is essential. Workers using cyanide need preplacement and annual medical exams. Special training should be given to workers using cyanide. Containers of this material may be hazardous when empty since they retain product residues (dust, solid); observe all warnings and precautions listed for the product. All persons with the potential for cyanide poisoning should be trained to provide immediate First Aid using oxygen and amyl nitrite. A cyanide antidote kit (amyl nitrite, sodium nitrite, and sodium thiosulfate) should be readily available in cyanide workplaces. The antidotes should be checked annually to ensure they are still within their shelf-lives. Identification of community hospital resources and emergency medical squads in order to equip and train them on handling cyanide emergencies is essential.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits: -OSHA Permissible Exposure Limit (PEL):

5 mg/m³ (TWA) (as CN)

Ventilation System: A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved): If the exposure limit is exceeded and engineering controls are not feasible, wear a supplied air, full-facepiece respirator, airlined hood, or full-facepiece self-contained breathing apparatus. Breathing air quality must meet the requirements of the OSHA respiratory protection standard (29CFR1910.134).

Skin Protection: Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection: Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance: Red transparent crystals.

Odor: Odorless.

Solubility: 43 g/100 cc water @ 16C (61F)

Density: 1.72

pH: No information found.

% Volatiles by volume @ 21C (70F): 0

Boiling Point: Not applicable.

10. Stability and Reactivity

Stability: Stable under ordinary conditions of use and storage.

Hazardous Decomposition Products: Thermal decomposition products may include carbon oxides, nitrogen oxides, and hydrogen cyanide. When heated to decomposition or comes in contact with acid or acid fumes it emits toxic fumes of cyanides.

Hazardous Polymerization: Will not occur.

Incompatibilities: Strong acids, strong oxidizers.

Conditions to Avoid: Heat, incompatibles.

11. Toxicological Information

Anhydrous: Oral rat LD50: 99 mg/kg. Investigated as a reproductive effector.

---NTP Carcinogen---

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| Ingredient | Known | Anticipated | IARC Category |
|--------------------------|-------|-------------|---------------|
| Sodium Nitroferricyanide | No | No | None |
| (14402-89-2) | | | |

12. Ecological Information

Environmental Fate: No information found.

Environmental Toxicity: No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Proper Shipping Name: TOXIC SOLID, INORGANIC, N.O.S. (SODIUM NITROFERRICYANIDE)

Hazard Class: 6.1

UN/NA: UN3288

Packing Group: II

15. Regulatory Information

-----\Chemical Inventory Status - Part 1\-----

| Ingredient | TSCA | EC | Japan | Australia |
|---------------------------------------|------|-----|-------|-----------|
| Sodium Nitroferricyanide (14402-89-2) | Yes | Yes | No | Yes |

-----\Chemical Inventory Status - Part 2\-----

--Canada--

| Ingredient | Korea | DSL | NDSL | Phil. |
|---------------------------------------|-------|-----|------|-------|
| Sodium Nitroferricyanide (14402-89-2) | Yes | Yes | No | Yes |

-----\Federal, State & International Regulations - Part 1\-----

-SARA 302- -----SARA 313-----

| Ingredient | RQ | TPQ | List | Chemical Catg. |
|---------------------------------------|----|-----|------|----------------|
| Sodium Nitroferricyanide (14402-89-2) | No | No | No | Cyanide comp |

-----\Federal, State & International Regulations - Part 2\-----

-RCRA- -TSCA-

| Ingredient | CERCLA | 261.33 | 8(d) |
|---------------------------------------|--------|--------|------|
| Sodium Nitroferricyanide (14402-89-2) | No | P030 | No |

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Chemical Weapons Convention: No TSCA 12(b): No CDTA: No

SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No

Reactivity: No (Pure / Solid)

Australian Hazchem Code: 4X

Poison Schedule: None allocated.

WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: **3** Flammability: **0** Reactivity: **1**

Label Hazard Warning: DANGER! MAY BE FATAL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. AFFECTS BLOOD, CARDIOVASCULAR SYSTEM, CENTRAL NERVOUS SYSTEM AND THYROID. CONTACT WITH ACIDS LIBERATES POISONOUS GAS. MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT.

Label Precautions: Do not breathe dust.

Avoid contact with eyes, skin and clothing.

Keep container closed.

Use only with adequate ventilation.

Wash thoroughly after handling.

Label First Aid: IN ALL CASES, GET MEDICAL ATTENTION IMMEDIATELY. KEEP A CYANIDE ANTIDOTE KIT (amyl nitrite, sodium nitrite and sodium thiosulfate) in area of product use or storage. First-aiders must take precautions to avoid contact with cyanide substance. If inhaled, remove to fresh air. Administer antidote kit and oxygen per pre-planned instructions if symptoms occur. Keep patient warm and at rest. Do not give mouth to mouth resuscitation. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Administer antidote kit and oxygen per preplanned instructions if symptoms occur.

Product Use: Laboratory Reagent.

In accordance with REACH Regulation (CE) N° 1907/2006 and with CLP Regulation (CE) N° 1272/2008

DISCLAIMER:

- **SUVCHEM** Products are to be used as Lab Chemicals for R&D only. Not for drug, medicinal, household or other uses.
- **SUVCHEM** shall not be responsible for any damage resulting from handling or from contact with the above product.
- **SUVCHEM** provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product.

End of document