

Material Safety Data Sheet

Date: 03/17/2021

Rev. 8

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

Product Name : SODIUM CYANIDE
Usage : Extraction of gold, silver, and other nonferrous metals from ores
Electroplating, Heat treatment of metals
Production of hydrocyanic acid, insecticides, dyes and pigments
Fumigation, Ore floatation
Organic synthesis

Manufacturer : TAE KWANG INDUSTRIAL Co., Ltd.
310, DONGHO-RO, JUNG-GU, SEOUL, KOREA
C.P.O BOX : 1173 SEOUL
CABLE "TAE KWANG" SEOUL
TELEX "PIGEON" K28219
FACSIMILE 82-2-3406-0226
TELEPHONE 82-2-3406-0521

Emergency Contact Point : TAE KWANG INDUSTRIAL Co., Ltd. Petrochemical 3rd Plant
Safety & Environment(S&E) Team
Tel. No. (Day) S&E Team 82-52-259-9691
(Night) Control Room 82-52-259-9733

TAE KWANG INDUSTRIAL Co., Ltd.
Petrochemical Sales Department
Tel. No. Sales Department 82-2-3406-0334

2. HAZARDOUS IDENTIFICATION

This material is hazardous according to Regulation of Korea Toxic Chemical Control Act

: **HAZARDOUS CHEMICAL**

And this material is toxic chemical and Accident Precaution Chemical according to Regulation of Korea

: **Toxic Chemicals Control Act : Toxic Chemical and Accident Precaution Chemical**

Classified as Dangerous Goods by the criteria of the International Maritime Dangerous Goods Code (IMDG Code)for Transport by ship : Dangerous Goods

Health hazard classification :

Acute toxicity substance(oral)	Category 2
Acute toxicity substance(dermal)	Category 1
Acute toxicity substance(Inhalation:just,mist)	Category 2
Specific target organ toxicity(Repeated exposure)	Category 1
Acute aquatic toxicity level	Category 1
Chronic aquatic toxicity level	Category 1

Warning

Danger/Hazard Symbol



Warning Statement

Danger

Hazard Statement

H300: Fatal if swallowed

H310: Fatal in contact with skin

H330: Fatal if inhaled

H372: Causes damage to organs through prolonged or repeated exposure

H400: Very toxic to aquatic life

H410: Very toxic to aquatic life with long-lasting effects

Precautionary statements

- Precaution

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P202: Do not handle until all safety precautions have been read and understood
P260: Do not breathe dust/fumes/gas/mist/vapours/spray
P262: Do not get in eyes, on skin, or on clothing.
P264: Wash ... thoroughly after handling.
P270: Do not eat, drink or smoke when using this product.
P271: Use only outdoors or in a well-ventilated area
P273: Avoid release to the environment.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P284: Wear respiratory protection in case of inadequate ventilation

- Response

P301+310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/
P302+352: Wash with plenty of water if on skin
P304+340: Remove person to fresh air and keep comfortable for breathing if inhaled
P310: Immediately call a POISON CENTER/doctor/
P314: Get medical advice or attention if you feel unwell
P320: Urgently do first aid
P321: Do first aid
P330: Rinse mouth.
P361+364: Take off immediately all contaminated clothing, wash contaminated clothing before reuse
P391: Collect spillage.

- Storage

P403+233: Store in a well ventilated place. Keep container tightly closed
P405: Store locked up.

- Disposal

P501: Dispose of contents/container in accordance with local regulation

Other Hazard(NFPA*) * NFPA : National Fire Protection Association

Health 3
Flammable 0
Reactivity 0

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical name	Synonym	CAS. No.	Composition	EC Number	UN Number
Sodium Cyanide	Sodium Cyanide	143-33-9	98.0 wt%	205-599-4	1689
Caustic Soda	Sodium hydroxide	1310-73-2	0.5 wt%	215-185-5	1823
Sodium Carbonate	Sodium Carbonate	497-19-8	1.0 wt%	207-838-8	-
Water	Water, Oxidane	7732-18-5	0.5 wt%	-	-

4. FIRST AID MEASURES

Eye contact :

Move victim to fresh air and take off contaminated clothing as soon as possible
Be careful that Paramedics are not exposed sodium cyanide
If no pulse, start CPR
If no respiration, give artificial respiration and give victim 100% oxygen
Get medical attention Immediately
Warning : to prevent infection, do not use mouth to mouth resuscitation, use respirator
Wash eyes immediately with large amounts of water at least 15 minutes, occasionally lifting upper and lower lids,
May cause infection If direct mouth to mouth contact with victim that contaminated with sodium cyanide
When use antidote or take other measures, Be permitted from local hospital

Skin contact :

Move victim to fresh air
Remove contaminated clothing, jewelry, and shoes immediately. Wash with soap or mild detergent and large amounts of water until no evidence of chemical remains (at least 15-20 minutes).
If no pulse, start CPR
If no respiration, give artificial respiration and give victim 100% oxygen
Warning : to prevent infection, do not use mouth to mouth resuscitation, use respirator
May cause infection If direct mouth to mouth contact with victim that contaminated with sodium cyanide

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When use antidote or take other measures, Be permitted from local hospital
Get medical attention Immediately

Inhalation :

Move victim to fresh air
Be careful that Paramedics are not exposed sodium cyanide
If no pulse, start CPR
If no respiration, give artificial respiration and give victim 100% oxygen
Warning : to prevent infection, do not use mouth to mouth resuscitation, use respirator
Use a bag valve or similar device to perform artificial respiration (rescue breathing)
May cause infection If direct mouth to mouth contact with victim that contaminated with sodium cyanide
When use antidote or take other measures, Be permitted from local hospital
Get medical attention Immediately

Ingestion :

If no pulse, start CPR
If no respiration, give artificial respiration and give victim 100% oxygen
Warning : to prevent infection, do not use mouth to mouth resuscitation, use respirator
Never make a person vomit
When use antidote or take other measures, Be permitted from local hospital
If conscious, give vitim 2~4 cups of milk or water
Get medical attention Immediately

Antidote :

Antidote : Nithiodote injection
Component : Sodium Nitrite + Sodium Thiosulfate
If exposed, call the medical team and take special first-aid measures. For example follow-up
Let the medical team know about this material and take protective measures

5. FIRE FIGHTING MEASURES

Extinguishing media :

Adequate extinguishing media Water, extinguishing agent, carbon dioxide, mist, spray or sand
Inorganic cyanide Do not use carbon dioxide because hydrogen cyanide may be formed by reaction
Be careful when use water spray, mist spray, hydrogen cyanide may be formed by reaction
Avoid use of water jet for extinguishing

Specific hazards arising from the chemical :

May explode by heat, shock, friction or contamination
May react explosively by contact of air, water, form
Vapor can travle a considerable distance to a source of ignition and flashback
Container may explode if heated
Cylinders exposed may be popping up
Explode when dissolve with nitride or chlorate over than 150 °C
May form hydrogen cyanide, nitride, sodium oxide when be thermal decomposed

Fire fighting :

Wear self contained breathing apparatus, chemical resistant-gloves, -footwear and -protective clothing
Avoid skin exposure
Follow general fire fighting method
Do fire fighting far away from fire
Move containers from fire area, if you can do without the risk
Dike for later disposal
Avoide the spread of substances
Use extinguishing media with water
Small fire : exthinguish to use powder exthinguishing agent, carbon dioxide, water, spray or form
Large fire : exthinguish to use mist or spray

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Notify local firestation and inform the location of the fire and characteristics hazard
Wear chemical resistant-protective clothing with self contained breathing apparatus
Do not allow run off from firefighting to enter drains or water courses
Use fire fighting measures that suit the surrounding materials.
Do not approach containers suspected to be hot
Cool down container exposed with water spray in safety area
Move containers from path of fire, if you can do without the risk
Equipment should be thoroughly decontaminated after use

6. ACCIDENTAL RELEASE MEASURES

Personal precautions :

Wear appropriate chemical resistant-protective clothing to prevent skin contact
Wear appropriate eye protective equipment to prevent eye contact
Eye showers are close to the workstation location that supposed to be exposed by substance
Wear special-dust protective masks to prevent inhale if dust is exposed

Environmental Precaution

Do not exhaust on the environment
Do not allow to enter waterway, drains, basement, confined spaces
Collect spillage

Methods for containment and cleaning up :

- Small spills
 - Cover or absorb with dry sand, soil, the other incombustible material and move the material into the proper container.
 - Collect and seal in properly labelled containers or drums for disposal.
- Large spills
 - Dike for later disposal.
 - Keep unnecessary people away, isolate hazard area and deny entry.
 - Increase ventilation before entering closed area.
 - Notify local government, local environment office, police station, fire station or local labor authority.
 - Minster of Environment distributes the report to other other organization.

7. HANDLING AND STORAGE

Because sodium cyanide is extremely toxic, all persons handling the material must be familiar with and observe the following instructions.

Handling :

- a) Make sure that sodium cyanide solid or solution does not come into direct contact with the body.
Use rubber gloves, aprons, boots, goggles and other protective items when handling.
- b) Be sure not to inhale air containing sodium cyanide powder or cyanic acid vapor.
Cyanic acid vapor is especially dangerous since it does not have a sharp odor and is difficult to be detected. Wear dust-proof masks or gas mask when necessary.
- c) Do not handle the material near places where acids is handled
since acid reacts with sodium cyanide and forms cyanic acid vapor.
- d) Remove immediately by washing in case sodium cyanide solution is spilled
since cyanic acid vapor is also formed by the reaction with carbonic acid gas in the air.
- e) Provide ventilation equipment in areas where sodium cyanide is handled for a long time.
- f) The handling area should be such an easy-to-wash concrete floor. Use a treatment tank for drain water.
- g) This material should be handled by at least two workers to watch the situation with each other.
- h) Do not eat foods or drink beverage in the same area where sodium cyanide is handled.
- i) The workers must take a bath or shower and change their clothes after the work.

Storage :

- a) Must be stored in a cool, dry, well ventilated place, in a special locked storeroom and out of direct sunlight
- b) Must not be stored in any place where acidic gases may be generated or, acid, nitrates or nitrites are stored.

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- c) When the packages is not opened, no special ventilation equipment is required.
But avoid long term storage once sodium cyanide is dissolved or the chemicals comes into contact with air.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupation Exposure Limit :

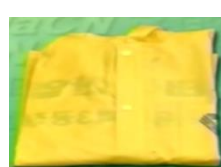
Korea Regulation : TWA - 3mg/m³, STEL - 5mg/m³

ACGIH Regulation : TLV-TWA - 5mg/m³

Adequate exposure control :

Ensure compliance with applicable exposure limit.

Personnel protective equipment :



Respirator :

Respirator must be complete examination of KOSHA("안" mark)

Use NIOSH(U.S.A) & OSHA(U.S.A) Approved respirator whenever necessary.

Self contained breathing apparatus is preferred.

Eye protection :

Wear splash resistant safety goggles with a facepiece.

Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

Gloves :

Wear appropriate chemical resistant gloves.

Clothing :

Wear appropriate chemical resistant clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state :	Crystalline solid
Colour :	White
Odour :	Almond odour (Ammonia odour if it is decomposed by water of air)
pH :	Strong alkali solution
Melting/Freezing Point(°C) :	563°C
Boiling Point(°C) :	1,496°C
Flash Point(°C) :	Not applicable
Evaporating rate :	Not available
Flammability (Solid, Vapor) :	Not available
Flammability Limits(%) :	Not applicable
Vapour Pressure :	1 mmHg (817°C)
Solubility :	Solubility in 100 grams of water

Temperature (°C)	0	25	35	45
Solubility (grams)	43	64	82	82

Relative Vapour Density(air = 1) :	Not available
Specific Gravity :	1.595 at 20°C
n-octanol/water partition coefficient :	-0.25
Autoignition Temperature(°C) :	Not applicable
Decomposition Temperature(°C) :	≥300°C
Viscosity :	4 cP (30°C, 26% solution)
Molecular Weight :	49.01

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10. STABILITY AND REACTIVITY

Chemical stability :	Stable under normal temperature and pressure.
Conditions to avoid :	Avoid heat, flames, sparks and other sources of ignition. Containers may rupture or explode if exposed to heat.
Incompatible materials :	Acids, oxidizing materials, combustible materials, halogens, peroxides, metals
Hazardous decomposition :	Cyanide compounds

11. TOXICOLOGICAL INFORMATION

1. Information on the likely route of exposure.

The possible routes of exposure are skin contact, inhalation (respiratory system) when handle the material.

2. Delayed and immediate effects and chronic effects form short and long term exposure.

<input type="radio"/> Acute Toxicity	
- Oral :	LD50 4.8 mg/kg Rat ECB IUCLID LD50 8 mg/kg Rat ATSDR LD50 5.11 mg/kg Rabbit ECB IUCLID
- Skin:	LD50 7.7 mg/kg Rat (Powder) ECB IUCLID LD50 11.3 mg/kg Rat (Liquid) ECB IUCLID Dust LD50 0.063 mg/L Rat 4hr
- Inhalation:	
<input type="radio"/> Skin corrosion/irritation :	Category 1
<input type="radio"/> Serious eye damage/irritation :	None of data
<input type="radio"/> Respiratory sensitization :	None of data
<input type="radio"/> Skin sensitization :	None of data
<input type="radio"/> Carcinogenicity :	None of data
<input type="radio"/> Germ cell mutagenicity:	Negative
<input type="radio"/> Reproductive toxic:	Results of Reproductive toxic test using Rat, estrous cycle occur more than the control group
<input type="radio"/> Specific target organ toxicity(single exposure)	Results of acute oral test using Rat, Other impact are not observed except for spasm, salivation, prostrate * Reference : ECHA
<input type="radio"/> Specific target organ toxicity(repeated exposure)	NOEC 9.2 ppm (Rat, ACH, 28 days, inhalation(Gas)) - Symptoms of eye, nose irritation or shortness of breath NOEC 59.6 ppm - Cause low activity, tremor, spasm, then death * Reference : Monsanto Environmental Health Laboratory The average hemoglobin and lymphocyte counts of workers at the electroplating workplace are significantly higher than that of their control group(P<0.001), Symptoms of headache, weakness, changes in taste and smell, throat irritation, vomiting, and shortness of breath occur frequently. High thyroid hormone(THS) levels in silver recovery facility workers * Reference : El Ghawabi, Blanc
<input type="radio"/> Aspiraton hazard	None of data

12. ECOLOGICAL INFORMATION

1. Aquatic Terrestrial Ecological Toxicity

<input type="radio"/> Fish	LC50 0.102 mg/L 96 hr
<input type="radio"/> Crustacean	EC50 0.426 mg/L 96 hr
<input type="radio"/> Algae	None of data

2. Persistence and Degradability

<input type="radio"/> Persistence	None of data
<input type="radio"/> Degradability	None of data

3. Bioaccumulative Potential

<input type="radio"/> Biodegradability	None of data
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Accumulation

None of data

4. Mobility in soil

None of data

5. Other adverse effects

None of data

13. DISPOSAL CONSIDERATIONS

Disposal methods :

Dispose in accordance with Waste Control Act in Korea and all applicable regulations

U.S. disposal regulations : U.S. EPA 40 CFR 262

Hazardous waste number(s) : P106

Disposal Consideration:

None of data

14. TRANSPORT INFORMATION

UN Number : 1689

UN Proper shipping name : SODIUM CYANIDE, SOLID

Transport hazard class : 6.1

Packing group : 1

Marine pollutant : applicable

Special Precautions , which a user needs to be aware of, or needs to comply with in connection with transport :

In case of fire, emergency procedures class F-A

In case of spills, emergency procedures class S-A

15. REGULATORY INFORMATION

Regulation for Korea Industrial Safety and Health Act :

- Substances for setting of occupational exposure limits Applicable
- Substances requiring Work environment measurement Applicable
- Hazardous substances requiring management Applicable
- Required harmful substances N/A
- Prohibited harmful substances N/A
- Substances requiring Special medical examination Applicable
- Substances requiring submission of PSM report N/A

Regulation of Korea Toxic Chemicals Control Act :

Accident precaution chemical, toxic chemical

Regulation of Act on the safety control of hazardous substances :

N/A

Korea Wastes Control Act :

Designated Wastes

High-Pressure Gas Safety Control Act

Not Applicable

Other Regulation.

Other Domestic Regulation :

- Persistent Organic Pollutants Administration Law N/A
- Hazardous and Noxious Substances (HNS) Applicable
- Act on Control etc. of Manufacture of Specific N/A
Substance for Protection of the Ozone Layer

U.S. Regulations

- OSHA Regulation : N/A
- CERCLA 103 Regulation : 4.45kg or 10lb
- EPCRA 302 Regulation : 4.45kg or 100lb
- EPCRA 304 Regulation : 4.45kg or 100lb
- EPCRA 313 Regulation : N/A
- Rotterdam Convention substance : N/A
- Stockholm Convention substance : N/A
- Montreal Protocol substance : N/A

EU classification information

- Firm classification results : N/A

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|--------------------------------------|-----|
| - Hazard statement : | N/A |
| - Precautionary measures statement : | N/A |
| <input type="radio"/> EU REACH | N/A |
| <input type="radio"/> U.S TSCA | N/A |
| <input type="radio"/> JAPAN CSCL | N/A |

16. OTHER INFORMATION

The References are provided as followings :

ICSC
HSDB
CICAD
IUCLID