

# Material Safety Data Sheet

Date: 01/20/2022

Rev. 9

MSDS No. : AA05371-0000000005

## 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
Reproductive toxicity substance	Category 2
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

H361 : Suspected of damaging fertility or the unborn child

H400: Very toxic to aquatic life

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

Precautionary statements

- Precaution

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P201 : Obtain special instructions before use.

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 of 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/m<sup>3</sup>, STEL - 5mg/m<sup>3</sup>

ACGIH Regulation : TLV-TWA - 5mg/m<sup>3</sup>

### 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.

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

Sodium Hydroxide : Mist Inhalation, eye and skin contact

Sodium Carbonate : None of data

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

#### Acute Toxicity

##### - Oral :

Sodium Cyanide : LD50 4.8 mg/kg Rat ECB IUCLID

Sodium Cyanide : LD50 8 mg/kg Rat ATSDR

Sodium Cyanide : LD50 5.11 mg/kg Rabbit ECB IUCLID

Sodium Hydroxide : LD50 325 mg/kg Rabbit

(Reliability 4, Insufficient data for hazard classification)

Sodium Carbonate : LD50 2800 mg/kg Rat

##### - Skin:

Sodium Cyanide : LD50 7.7 mg/kg Rat(Powder) ECB IUCLID

Sodium Cyanide : LD50 11.3mg/kg Rat(Liquid) ECB IUCLID

Sodium Hydroxide : LD50 1350mg/kg Rabbit

Sodium Carbonate : LD50 > 2000 mg/kg Rabbit

##### - Inhalation:

Sodium Cyanide : Dust LD50 0.063 mg/L Rat 4hr

Sodium Hydroxide : None of data

Sodium Carbonate : Dust LD50 120mg/L 4hr Rat

(Original : LC50(2h) = 0.8mg/L)

#### Skin corrosion/irritation :

Sodium Cyanide : Becase skin toxicity is strong, it is impossible to conduct skin irritation tests according to the OECD Guide-line No.404.

Sodium Cyanide : Irritating to respiratory system, eyes, skin.

Sodium Hydroxide : As a result of skin corrosion/irritation test using rabbits, irritation was observed.

OECD Guideline 404

Causes severe corrosion in humans.

Causes severe necrosis of rabbit skin.

Corrosive substances due to strong alkalinity

Sodium Carbonate : In a skin irritation test using rabbits, it was mildly irritating.

#### Serious eye damage/irritation :

Sodium Cyanide : None of data

Sodium Hydroxide : As a result of severe eye damage/irritation test using rabbits, severe conjunctival irritation was observed. OECD Guideline 405

Classified as severe eye damage category 1 accrding to the criteria for classification, labeling and material safety data sheets announced by the Ministry of Employment and Labor<Appendix 1>.

As a result of eye irritation test using rabbits, severe irritation occurs in the middle or higher.

#### Respiratory sensitization :

Sodium Cyanide : None of data

Sodium Hydroxide : None of data

Sodium Carbonate : Due to the alkaline properties an irritation of the respiratory tract is also possible.

#### Skin sensitization :

Sodium Cyanide : None of data

Sodium Hydroxide : Skin sensitization was not found in

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- Carcinogenicity :
- Germ cell mutagenicity:

human skin sensitization tests.

Sodium Carbonate : None of data

None of data

Sodium Cyanide : Negative

Sodium Hydroxide : Negative

(As a result of chromosomal abnormality test using CHO cells in vitro, positive in the presence of metabolic activation system and negative in the absence of metabolic activation system. It appears to be due to the formation of chromosomal abnormalities in the S9 product.)

Sodium Carbonate : Negative

Sodium Cyanide : Results of Reproductive toxic test using rat, estrous cycle occur more than the control group

Sodium Hydroxide : None of data

Sodium Carbonate : None of data

Sodium Cyanide : Results of acute oral test using Rat, Other impact are not observed except for spasm, salivation, prostrate. \* Reference : ECHA  
Sodium Hydroxide : Irritating to respiratory and airways and causing pulmonary edema in humans.

Sodium Carbonate : Causes respiratory irritation

Sodium Cyanide : 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  
Sodium Hydroxide : No reliable data available

Sodium Carbonate :

- Species : Rat

- Route of admin : inhalation

- Exposure period : 3.5 months

- Doses : 70+/-2.9mg/m3

- Control group : yes, concurrent no treatment

- LOAEL : 70mg/m3

- Method : other

- Year : 1966

None of data

- Reproductive toxic:

- Specific target organ toxicity(single exposure)

- Specific target organ toxicity(repeated exposure)

- Aspiraton hazard

## 12. ECOLOGICAL INFORMATION

### 1. Aquatic Terrestrial Ecological Toxicity

- Fish

LC50 0.102 mg/L 96 hr

- Crustacean

EC50 0.426 mg/L 96 hr

- Algae

None of data

### 2. Persistence and Degradability

- Persistence

None of data

- Degradability

None of data

### 3. Bioaccumulative Potential

- 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