

## Safety Data Sheet

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### 1. Chemical product and company identification

Product name : Hydrazine monohydrate

#### Company information

Name of manufacturer : KANTO CHEMICAL CO., INC.  
 Address : 2-1, Nihonbashi, Muromachi 2-Chome, Chuo-Ku, Tokyo, 103-0022, JP  
 Name of section : Business Administration Department, Reagent Division  
 Telephone number : +81-3-6214-1090  
 Facsimile number : +81-3-3241-1047  
 Mail address : BC32@kanto.co.jp  
 Reference No : 18383  
 Product numbers applied by the SDS : 18147, 18383  
 Recommended use : For research use only  
 Restrictions on use : Seek expert judgment when using the product for applications other than those recommended.

### 2. Hazards identification

#### GHS classification

|                       |                                                    |                                                                                            |
|-----------------------|----------------------------------------------------|--------------------------------------------------------------------------------------------|
| Physical hazards      | Flammable liquids                                  | Category 4                                                                                 |
|                       | Self-reactive substances and mixtures              | Type G                                                                                     |
| Health hazards        | Acute toxicity (oral)                              | Category 3                                                                                 |
|                       | Acute toxicity (dermal)                            | Category 2                                                                                 |
|                       | Acute toxicity (inhalation:vapors)                 | Category 3                                                                                 |
|                       | Skin corrosion/irritation                          | Category 1B                                                                                |
|                       | Serious eye damage/eye irritation                  | Category 1                                                                                 |
|                       | Skin sensitization                                 | Category 1                                                                                 |
|                       | Germ cell mutagenicity                             | Category 2                                                                                 |
|                       | Carcinogenicity                                    | Category 1B                                                                                |
|                       | Reproductive toxicity                              | Category 2                                                                                 |
|                       | Specific target organ toxicity (single exposure)   | Category 1 (central nervous system, liver)                                                 |
|                       | Specific target organ toxicity (single exposure)   | Category 3 (narcosis)                                                                      |
|                       | Specific target organ toxicity (single exposure)   | Category 3 (respiratory tract irritation.)                                                 |
| Environmental hazards | Specific target organ toxicity (repeated exposure) | Category 1 (central nervous system, respiratory organs, heart, liver, reproductive organs) |
|                       | Aquatic acute                                      | Category 1                                                                                 |
|                       | Aquatic chronic                                    | Category 1                                                                                 |



Hazard  
pictograms



Signal word

: Danger

Hazard statements

: Combustible liquid  
Toxic if swallowed or if inhaled  
Fatal in contact with skin  
Causes severe skin burns and eye damage  
May cause an allergic skin reaction  
May cause respiratory irritation  
May cause drowsiness or dizziness  
Suspected of causing genetic defects  
May cause cancer  
Suspected of damaging fertility or the unborn child  
Causes damage to organs (central nervous system, liver)  
Causes damage to organs (central nervous system, respiratory organs, heart, liver, reproductive organs) through prolonged or repeated exposure  
Very toxic to aquatic life  
Very toxic to aquatic life with long lasting effects

Precautionary statements

Prevention

: Do not handle until all safety precautions have been read and understood.  
Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.  
Do not breathe mist/vapors.  
Do not get in eyes, on skin, or on clothing.  
Wash hands, forearms and face thoroughly after handling.  
Do not eat, drink or smoke when using this product.  
Use only outdoors or in a well-ventilated area.  
Contaminated work clothing should not be allowed out of the workplace.  
Avoid release to the environment.  
Wear protective gloves/protective clothing/eye protection/face protection.

Response

: IF SWALLOWED: Immediately call a POISON CENTER or doctor.  
IF SWALLOWED: Rinse mouth. Do not induce vomiting.  
IF ON SKIN: Wash with plenty of water.  
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water .  
IF INHALED: Remove person to fresh air and keep comfortable for breathing.  
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
IF exposed or concerned: Call a POISON CENTER or doctor.  
IF exposed or concerned: Get medical advice/attention.  
Immediately call a POISON CENTER or doctor.  
Call a POISON CENTER or doctor.  
Call a POISON CENTER or doctor if you feel unwell.  
Get medical advice/attention if you feel unwell.



|          |                                                                                                                                                               |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
|          | Rinse mouth.                                                                                                                                                  |
|          | If skin irritation or rash occurs: Get medical advice/attention.                                                                                              |
|          | Take off immediately all contaminated clothing and wash it before reuse.                                                                                      |
|          | Take off contaminated clothing and wash it before reuse.                                                                                                      |
|          | Collect spillage.                                                                                                                                             |
| Storage  | : Store in a well-ventilated place.                                                                                                                           |
|          | Store in a well-ventilated place. Keep container tightly closed.                                                                                              |
|          | Store locked up.                                                                                                                                              |
| Disposal | : Dispose of contents/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation. |

### 3. Composition/information on ingredients

|                                     |                         |
|-------------------------------------|-------------------------|
| Distinction of substance or mixture | : Substance             |
| Synonyms                            | : Hydrazinium hydroxide |

| Chemical name         | Concentration (%) | Formula  | TSCA   | EC-No.    | CAS RN    |
|-----------------------|-------------------|----------|--------|-----------|-----------|
| Hydrazine monohydrate | ≥ 98              | H4N2·H2O | Listed | 206-114-9 | 7803-57-8 |

### 4. First aid measures

#### First aid measures

|                                       |                                                                                                                                                   |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| First-aid measures after inhalation   | : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately get medical treatment.                         |
| First-aid measures after skin contact | : Wash the affected areas under running water, get medical treatment as soon as possible.                                                         |
| First-aid measures after eye contact  | : Wash the affected areas under running water for at least 15 minutes. Get medical treatment.                                                     |
| First-aid measures after ingestion    | : Rinse mouth with water. Give the victim one or two glasses of water or milk. Do not induce vomiting. Get medical treatment as soon as possible. |
| Self protection of the first-aiders   | : Rescuers should wear proper protective equipment like rubber gloves, goggles.                                                                   |

### 5. Fire fighting measures

|                                          |                                                                                                                                                          |
|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Suitable extinguishing media             | : Water spray, dry chemical powder, carbon dioxide, dry sand, alcohol resistant foam                                                                     |
| Unsuitable extinguishing media           | : Foam extinguisher                                                                                                                                      |
| Firefighting instructions                | : Move containers from fire area if it can be done without risk, if not possible, apply water from a safe distance to cool and protect surrounding area. |
|                                          | Fight fire from windward.                                                                                                                                |
|                                          | Dry chemical powder, carbon dioxide or dry sand should be used for small fires. Alcohol-resistant foam extinguisher is effective for a large scale fire. |
| Personal protection (Emergency response) | : Wear breathing apparatus.                                                                                                                              |



## 6. Accidental release measures

### Personal Precautions, Protective Equipment and Emergency Procedures

General measures : Wear proper protective equipment and avoid contact with skin and inhalation of vapor. Conduct operations from upwind and evacuate people downwind. Remove all sources of ignition. Keep away personnel except for authorized ones from spillage area by stretching ropes.

### Environmental precautions

Environmental precautions : Attention should be given to avoid discharge of spilled product into rivers and resulting environmental damage. When diluting spill with large amounts of water, discharge of untreated wastewater into the environment must be avoided.

### Methods and Equipment for Containment and Cleaning up

For containment : Absorb spill with inert material (e.g, diatomaceous earth, sand) and flush spillage area with copious amounts of water.

Prevention Measures for Secondary Accidents : Remove nearby sources of ignition and prepare extinguishing media.

## 7. Handling and storage

### Handling

Technical measures : Wear proper protective equipment to avoid contact with skin or inhalation of vapor. Fire is strictly prohibited.

Ventilate well at working places.

Precautions for safe handling : Avoid formation of vapor and aerosols.

Do not allow contact with acids or oxidizing substances.

### Storage

Storage conditions : Store the bottle tightly closed in a cool, dark place because the substance is hygroscopic.

Material used in packaging/containers : Fluorine resin, polyethylene, polypropylene etc.

## 8. Exposure controls / Personal protection equipment

|                 |                         |
|-----------------|-------------------------|
| ACGIH TWA       | 0.01 ppm (as hydrazine) |
| Remark (ACGIH®) | Skin                    |

Appropriate engineering controls : Use with an enclosed system or a local exhaust ventilation.

### Protective equipment

Respiratory protection : Chemical cartridge respirator or airline respirator

Hand protection : Impervious protective gloves

Eye protection : Safety goggles

Skin and body protection : Protective clothing, protective boots

## 9. Physical and chemical properties

Physical state : Liquid

Color : Colorless.



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|                                                 |                                                                                                    |
|-------------------------------------------------|----------------------------------------------------------------------------------------------------|
| Odor                                            | : Characteristic amine odor                                                                        |
| pH                                              | : Strong alkalinity                                                                                |
| Melting point                                   | : No data available                                                                                |
| Freezing point                                  | : -51.7 ° C                                                                                        |
| Boiling point                                   | : 121 ° C                                                                                          |
| Flash point                                     | : 74 ° C (C.C.)                                                                                    |
| Auto-ignition temperature                       | : No data available                                                                                |
| Decomposition temperature                       | : No data available                                                                                |
| Flammability                                    | : Flammable                                                                                        |
| Vapor pressure                                  | : 12 hPa (25°C)                                                                                    |
| Relative density                                | : 1.032 (25°C)                                                                                     |
| Density                                         | : No data available                                                                                |
| Relative gas density                            | : No data available                                                                                |
| Solubility                                      | : Water: Miscible.<br>Organic solvent: Soluble in ethanol. Insoluble in chloroform, diethyl ether. |
| Partition coefficient n-octanol/water (log Pow) | : -2.07                                                                                            |
| Explosive limits (Vol-%)                        | : No data available                                                                                |
| Viscosity, kinematic                            | : 1.47 mm <sup>2</sup> /s (25°C)                                                                   |
| Particle characteristics                        | : No data available                                                                                |

## 10. Stability and reactivity

|                                    |                                                                                                 |
|------------------------------------|-------------------------------------------------------------------------------------------------|
| Reactivity                         | : Has strong reducing property. The aqueous solution is strongly alkaline and highly corrosive. |
| Chemical stability                 | : Stable under normal conditions. Has strong hygroscopicity.                                    |
| Possibility of hazardous reactions | : Contact with oxidants or heavy metals may cause a rapid reaction and cause an explosion.      |
| Conditions to avoid                | : Light, heat.                                                                                  |
| Incompatible materials             | : Acids, oxidizing substances.                                                                  |
| Hazardous decomposition products   | : Nitrogen oxides, ammonia.                                                                     |

## 11. Toxicological information

|                             |                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Acute toxicity (oral)       | : Toxic if swallowed<br>rat LD50=60 mg/kg (as hydrazine)                                                                                                                                                                                                                                                                                                                                                                  |
| Acute toxicity (dermal)     | : Fatal in contact with skin<br>rabbit LD50=91 mg/kg (as hydrazine)                                                                                                                                                                                                                                                                                                                                                       |
| Acute toxicity (inhalation) | : No classification (gas)<br>Toxic if inhaled (vapor)<br>rat LC50=570 ppm/4h (as hydrazine)<br>Classification not possible (dust, mist)                                                                                                                                                                                                                                                                                   |
| Skin corrosion/irritation   | : Causes severe skin burns<br>Hydrazine : There are descriptions that irritation in application sites was observed in a skin irritation test (4-hour application) using rabbits, and severe irritation was seen in animal experiments using several animal species (dogs, guinea pigs) including rabbits. Moreover, skin irritation was reported also in humans. Therefore, this substance was classified in Category 1B. |



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|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Serious eye damage/irritation | : Causes serious eye damage<br>Hydrazine : It is reported that severe eye damage was observed in eye irritation tests in rabbits. Moreover, severe eye irritation has also been reported. Since eye irritation is also known in humans, this substance was classified into Category 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Respiratory sensitization     | : Classification not possible                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Skin sensitization            | : May cause an allergic skin reaction<br>Hydrazine : Since this substance was classified in Group 1 of occupational skin sensitizers in the Recommendation of Occupational Exposure Limits (Japan Society For Occupational Health) and, allergic contact dermatitis was observed in humans, it was classified into Category 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Germ cell mutagenicity        | : Suspected of causing genetic defects<br>Hydrazine : As for in vivo, there are negative data on dominant lethal studies in mice, negative data on unscheduled DNA synthesis test in mouse sperm, positive and negative data on micronucleus assay in mouse marrow cells, negative data on sister chromatid exchange test in mouse marrow cells, and positive data on DNA damage tests in mouse liver and lung. As for in vitro, there are many positive data on reverse mutation test in bacteria, gene mutation examination, mouse lymphoma assay, micronucleus assay, chromosome aberration tests, and sister chromatid exchange test in cultured mammalian cells. Based on the above, it was classified into Category 2.                                                                                                                                                                                                                                         |
| Carcinogenicity               | : May cause cancer<br>Hydrazine : In humans, there are only small cohort epidemiological studies, and no increases in tumor occurrence have been reported. As for experimental animals, it was reported that oral administration (drinking water) to rats or hamsters caused increases in liver tumors, and inhalation exposure caused increases in nasal polypoid adenoma in rats. According to classification results by domestic and international organizations, it was classified in Group 2A by the IARC, B2 by the EPA, R by NTP, Carc. 1B by the EU, A3 by ACGIH, and Group 2B by the Japan Society For Occupational Health (JSOH). Based on the above, this substance was classified into Category 1B.                                                                                                                                                                                                                                                      |
| Reproductive toxicity         | : Suspected of damaging fertility or the unborn child<br>Hydrazine : There is no information in humans. As for experimental animals, it has been described that in tests using rats given this substance by oral administration (drinking water) for 6 months or by inhalation for 4 months, embryotoxicity (decreased live embryos and increased resorptions) was observed, that as the result of oral administration of the hydrochloride of this substance to pregnant rats during gestation (8 mg/kg/day), fetal toxicity (reduced fetal weight, pale skin, and edema) was seen at the dose at which decreased body weight gain and mortality were observed in dams, and that as the result of oral administration of this substance to pregnant rats (Gestation days 6-15, at 5 or 10 mg/kg/day), developmental delays as fetus toxicity were observed at doses at which maternal toxicity was observed. Based on the above, it was classified into Category 2. |



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|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| STOT-single exposure   | : Causes damage to organs (central nervous system, liver)<br>May cause drowsiness or dizziness<br>May cause respiratory irritation<br>Hydrazine : Human studies have shown that incidental ingestion of the substance caused vomiting, neurological symptoms (e.g. confusion, ataxia) and large increases in hepatotoxicity-related enzyme (AST, LDH) levels. In addition, lethargy was noted. Moreover, incidental inhalation of the substance (vapor) caused nausea, vomiting, local irritation of upper airways, and large increases in hepatotoxicity-related enzyme levels. Thus, it was classified into Category 1 (central nervous system, liver) and Category 3 (respiratory tract irritation, narcosis).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| STOT-repeated exposure | : Causes damage to organs (central nervous system, respiratory organs, heart, liver, reproductive organs) through prolonged or repeated exposure<br>Hydrazine : Human studies have shown that a 38-year-old water treatment engineer (male) (exposure concentrations are unknown, but assumed at 3-4 mg/m <sup>3</sup> because odor was felt) developed continuous neurobehavioral abnormalities. In this case, it is considered that he received anhydrous hydrazine and hydrazine monohydrate via respiratory exposure and percutaneous absorption. A 12-month inhalation exposure toxicity test in rats, hamsters, and dogs was carried out. Regarding rats, at 0.066 mg/m <sup>3</sup> and over, within the guidance value range of Category 1, respiratory effects (squamous metaplasia and inflammation of larynx and trachea, alveolar epithelial hyperplasia, etc.), at 1.33 mg/m <sup>3</sup> and over, effects on the liver (hepatocellular hyperplasia) in females, effects on the heart (myocardial degeneration) in males, and at 6.65 mg/m <sup>3</sup> , testicular effects (Leydig cell hyperplasia in the testis), effects on the uterus (endometrial hyperplasia, endometritis), and effects on the ovaries (ovarian atrophy, salpingitis) were observed. Regarding hamsters, at 0.33 mg/m <sup>3</sup> and over, within the guidance value range of Category 1, hemosiderosis (liver) and testicular atrophy were observed. Regarding dogs, at 1.33 mg/m <sup>3</sup> , with the dose of the guidance value range of Category 1, effects on the liver (increased ALT and hepatocellular vacuolisation) were observed. Thus, it was classified into Category 1 (central nervous system, respiratory organs, heart, liver, reproductive organs). |
| Aspiration hazard      | : Classification not possible                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

## 12. Ecological information

### Ecotoxicity

|                 |                                                                                                                              |
|-----------------|------------------------------------------------------------------------------------------------------------------------------|
| Aquatic acute   | : Very toxic to aquatic life<br>Pseudokirchneriella subcapitata EC50=0.006 mg/L/72h (as hydrazine)                           |
| Aquatic chronic | : Very toxic to aquatic life with long lasting effects<br>Pseudokirchneriella subcapitata NOEC=0.001 mg/L/72h (as hydrazine) |

### Persistence and degradability

Not readily biodegradable  
BOD : 2% (as hydrazine)



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**Bioaccumulative potential**

Low bioconcentration

BCF : 316 (as hydrazine)

**Mobility in soil**

No additional information available

**Hazardous to the ozone layer**

Hazardous to the ozone layer : Classification not possible

**13. Disposal considerations**

Ecological waste information : Disposal should be made by one of following methods. Or entrust approved waste disposal companies with the disposal.

Combustion method :

Dilute to about twice with water and burn in a chemical incinerator equipped with an afterburner and a scrubber.

Oxidation method :

Dilute with a large amount of water, add an aqueous solution of an oxidizing agent (sodium hypochlorite, etc.) in small portions and oxidatively decompose, then neutralize with dilute sulfuric acid.

&lt;Note&gt;

\*Be careful as it may explode during combustion if not diluted twice with water.

\*A sodium hydroxide aqueous solution is used as a scrubber cleaning solution.

\*Be careful not to add oxidizer or acid rapidly, as it may generate heat and scatter.

Contaminated container and packaging : In case of disposal of empty bottles, dispose bottles after removing the content thoroughly.

**14. Transport information****International Regulations****Transport by sea(IMDG)**

UN-No. (IMDG) : 2030  
Proper Shipping Name (IMDG) : HYDRAZINE, AQUEOUS SOLUTION  
Packing group (IMDG) : II  
Transport hazard class(es) : 8 (6.1)

(IMDG)

**Air transport(IATA)**

UN-No. (IATA) : 2030  
Proper Shipping Name (IATA) : Hydrazine, aqueous solution  
Packing group (IATA) : II  
Transport hazard class(es) : 8 (6.1)

(IATA)

Marine pollutant : Applicable

MFAG-No : 153

**15. Regulatory information**

Regulatory information with regard to this substance in your country or region should be examined by



your own responsibility.

## 16. Other information

Data sources : NITE Chemical Risk Information Platform (NITE-CHRIP), National Institute of Technology and Evaluation.  
Handbook of Poisonous and Deleterious substances, revised and enlarged edition, Yakumu Kohosa (2000) .  
Handbook of Dangerous Substances Springer-Verlag Tokyo (1991) .  
ECHA (European Chemicals Agency).

The information contained herein is based on several references and the present state of our knowledge. However the SDS does not always cover all information about the product, handle the product carefully. The information is intended to ordinary usage, in case of particular handlings, conduct appropriate safety measurements. The information herein is only provision of information, and it does not represent a guarantee the properties of the product. The Safety Data Sheet (SDS) is prepared based on JIS Z 7253:2019.

