

# Safety Data Sheet



## 1. Identification of the Substance/Mixture and the Supplier

Supplier : National Institute of Advanced Industrial Science and Technology (AIST)  
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 Office in Charge : Reference Materials Office, Center for Quality Management of Metrology, National Metrology Institute of Japan  
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 Emergency Contact : Same as above

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Identity of Substance/Mixture : Certified reference material: NMIJ CRM 3682-a  
 Iron Isotope Standard Solution  
 Recommended Use and Restrictions on Use : This reference material can be used for calibration of abundance ratio of iron isotopes in the measurement of isotopic abundance of iron isotopes. Do not use this reference material for other purposes than testing/research.  
 This CRM is a reference material (specified in the Japanese Industrial Standard (JIS) Q 0030).

## 2. Hazards Identification

GHS Classification : Metal corrosion : Category 1  
 Skin corrosion/irritation : Category 1A  
 Serious eye damage/ eye irritation : Category 1  
 Respiratory sensitization : Category 1  
 Specific target organ toxicity (Single exposure) : Category 2  
 Specific target organ toxicity (Repeated exposure) : Category 2  
 Hazard to the aquatic environment (Acute) : Category 3

GHS Label Element :



Signal Word : Danger  
 Hazards Statement : May be corrosive to metals  
 Causes severe skin chemical burns and eye damage  
 Causes serious eye damage  
 May cause allergy or asthma symptoms or breathing difficulties if

inhaled  
 Harmful to aquatic life  
 May cause damage to the following organ: Respiratory system  
 May cause damage to the following organs through prolonged or repeated exposure: Respiratory system and teeth

Precautionary Statement : [Safety Precaution]  
 Do not breathe dust/mist/vapors etc.  
 Avoid release to the environment.  
 Do not eat, drink or smoke when using this reference material.  
 Wear appropriate personal protective equipment.  
 Wash personal protective equipment thoroughly after use.  
 Wash hands thoroughly after handling.

[First-Aid Measures]  
 If inhaled: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical advice/attention if you feel unwell.  
 If swallowed: Rinse mouth. Do not induce vomiting. Immediately get medical advice/attention.  
 If in eyes: Rinse with running water for several minutes. Get medical advice/attention.  
 If on skin: Remove/Take off all contaminated clothing and adhered materials. Rinse skin with running water. Immediately get medical advice/attention.  
 If exposed: Get medical advice/attention.

[Storage]  
 Keep high-density polyethylene container sealed in plastic bag. Store in a clean place at temperatures not exceeding 10 °C while keeping this reference material unfrozen.

[Disposal]  
 Dispose of this reference material in accordance with applicable legislation and local government ordinance.  
 Entrust disposal of this reference material to a professional waste disposal company licensed by prefectural governor.

The other hazards than the above do not result in classification or are not classifiable.

### 3. Composition/Information on Ingredients

Substance/Mixture : Mixture

Ingredient 1 : Iron (Mixture of <sup>54</sup>Fe, <sup>56</sup>Fe, <sup>57</sup>Fe, and <sup>58</sup>Fe)  
 Amount : 0.1 %(Total concentraion of <sup>54</sup>Fe, <sup>56</sup>Fe, <sup>57</sup>Fe, and <sup>58</sup>Fe as Fe)  
 Chemical or structural formula : Fe  
 Molecular weight : 55.85 (Average of total iron isotopes)

Official Gazette Reference No.	Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. : - Industrial Safety and Health Act : -
CAS No.	: 7439-89-6
Ingredient 2	: Nitric acid
Amount	: 1.4 %
Chemical or structural formula	: HNO <sub>3</sub>
Molecular weight	: 63.01
Official Gazette Reference No.	Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. : (1)-394 Industrial Safety and Health Act : -
CAS No.	: 7697-37-2
Ingredient 3	: Water
Amount	: 98.5 %
Chemical or structural formula	: H <sub>2</sub> O
Molecular weight	: 18.02
Official Gazette Reference No.	Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. : - Industrial Safety and Health Act : -
CAS No.	: 7732-18-5

#### 4. First-aid Measures

If on Skin	: Remove/Take off all contaminated clothing immediately. Rinse skin with water. Wash contaminated clothing before reuse.
If Inhaled	: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a doctor/physician.
If in Eyes	: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a doctor/physician.
If Ingested	: Rinse mouth. Do not induce vomiting. Call a doctor/physician if you feel unwell.
Most Critical Characteristic and Symptom of Expected Acute and Delayed Symptom	: If breathing vapor of nitric acid: Causes burning sensation in throat, sore throat, coughing, breathing difficulty, pulmonary edema, etc., which may be delayed symptoms. If on skin: Causes flare, pain, bleary eye or severe thermal burns.
Protection of First-Aid Responder	: Wear personal protective equipment such as rubber gloves and enclosed goggles.

#### 5. Fire-fighting Measures

- Extinguishing Media : This reference material does not burn.
- Fire-Specific Hazards : In case of fire: May emit irritating or toxic fume (or gas).
- Specific Fire-Fighting Method : Eliminate combustion sources at the origin of fire and put out fire by using extinguishing media.  
Move movable containers promptly to a safe place. If containers are immovable, cool their surroundings with water fog.
- Protection of Fire-Fighters : Fight fire upwind to avoid breathing hazardous gases. Use personal protective equipment such as fire protection clothing, heat-resistant clothing, protective clothing, compressed air open-circuit self-contained breathing apparatus, circulating oxygen respirator, rubber gloves, and rubber boots.

## 6. Accidental Release Measures

- Personal Precaution : Use appropriate personal protective equipment to avoid contact with skin and eyes and contamination of personal clothes.
- Personal Protective Equipment and Emergency Procedures : Ventilate the affected areas thoroughly, if it is in an indoor environment, until the clean-up operation is completed. Use appropriate personal protective equipment during the operation to avoid skin contact of splash etc. and inhalation of dust and gas.
- Environmental Precautions : Take precautions to prevent spillage from draining into rivers etc. to adversely impact the environment. Make it sure to appropriately treat contaminated wastewater to prevent untreated wastewater from being released into the surrounding environment.
- Recovery and Neutralization : Collect spillage in empty containers by getting it adsorbed to wiping cloth, rag or earth and sand, etc. Then wash away the remains with plenty of water.
- Prevention of Secondary Disaster : Mark the restricted area with rope etc. to keep out unauthorized people. Carry out the clean-up operation from the upwind side and make people on the downwind side evacuate.

## 7. Handling and Storage

- Handling Engineering Precautions : Use appropriate personal protective equipment to avoid contact on skin and inhalation of vapor.
- Local and General Ventilation : If vapor/mist is emitted: Seal the emission source and install local ventilation system.
- Precautions for Safe Handling : Avoid rough handling such as knocking over, dropping, giving a shock to and dragging container.  
Prevent this reference material from leaking, overflowing and splashing. Do not allow vapor to be emitted.  
Keep container tightly closed after using this reference material.  
Wash hands, face, etc. thoroughly and gargle after handling.  
Restrict drinking, eating and smoking to a designated area.  
Do not bring gloves and other contaminated personal protective

equipment into staff room.

Make a place handling this reference material a restricted area to keep out unauthorized people.

Wear appropriate personal protective equipment to avoid inhalation and contact with eyes, skin and clothing.

Use local ventilation equipment in indoor handling areas.

#### Storage

Appropriate Storage : Keep high-density polyethylene container sealed in plastic bag.  
Conditions : Store in a clean place at temperatures not exceeding 10 °C while keeping this reference material unfrozen.  
Keep away from alkaline substances.

Safe Container : Polyethylene

Packaging Material

※ See the Certificate for the details on appropriate storage conditions and instructions for use as a reference material.

## 8. Exposure Controls/Personal Protection

#### Threshold Limit Value

- Not specified

#### Permissible Concentration (Nitric acid)

- ACGIH : STEL:4 ppm, TWA:2 ppm
- Values recommended by Japan : 2 ppm, 5.2 mg/m<sup>3</sup>

#### Society for Occupational Health

- OSHA PEL TWA : 8H TWA 2 ppm, 5 mg/m<sup>3</sup>

#### Facility engineering

- Ventilation, exhaust : Local ventilation system or general ventilation system
- Safety Control/Gas : Measuring equipment, Detecting tube

#### Detection

- Storage Precautions : Ventilation along floor surface. Keep this reference material sealed.

#### Personal Protective equipment

- Respiratory Organ : Protective mask
- Hand : Impervious protective gloves
- Eye : Goggle-type eye protection
- Skin and Body : Protective clothing (Work clothing with long sleeves), Protective boots, Protective garment, etc.

#### Hygiene measure

Handle this reference material in accordance with the industrial health and safety codes.

## 9. Physical and Chemical Properties

- Appearance, etc. : Liquid
- Color : Colorless
- Odor : Odorless
- pH : Strong acid
- Melting Point : Ca. 0 °C

- Boiling Point : Ca. 100 °C
- Flash Point : Non-flammable
- Explosive Range : No data available
- Vapor Pressure : No data available
- Relative vapor density : No data available  
(Air = 1)
- Specific Gravity or Bulk Specific Gravity : No data available
- Solubility : Freely mixed in water and soluble in ethanol
- n-octanol/water partition coefficient log Po/w : No data available
- Spontaneous ignition temperature : No data available
- Decomposition temperature : No data available
- Combustibility : No data available

## 10. Stability and Reactivity

### Stability

- Stable in normal conditions

### Reactivity

- React with Alkaline substances.

### Possibility of hazardous reaction

- Corrodes metals to emit hydrogen gas.

### Conditions to Avoid

- Sunlight, Heat

### Incompatible materials

- Alkaline substance

### Hazardous Decomposition Products

- Nitrogen oxides (NO<sub>x</sub>)

## 11. Toxicological Information

Acute Toxicity	(as nitric acid) Oral Human: LD50= 430 mg/kg Inhalation Rat: LC50=130 mg/m <sup>3</sup> /4 h Dermal Rat: TDLo= 150 mL/kg
Skin Corrosion/ Irritation	Nitric acid was reported to corrode human skin. (ICSC (1994) and HSDB (2005)).
Serious Eye Damage/ Eye Irritation	Nitric acid may cause severe thermal burns to induce corneal opacity, visual impairment and eventually loss of vision if in eyes.
Specific Target Organ Toxicity/Systemic Toxicity (Single Exposure)	If breathing vapor emitted from nitric acid: Causes irritation in upper airway, coughing, breathing difficulty, chest pain, and, depending on exposure concentration and duration, pulmonary edema. (ACGIH (2001), DFGOT vol.3 (1991), ICSC (J) (1994),

and HSDB (2005))

Specific Target Organ      It was reported that occupational exposure to vapor emitted  
Toxicity/Systemic          from nitric acid or mist caused chronic bronchitis (ACGIH  
Toxicity (Repeated          (2001)) and erosion of teeth (ACGIH (2001) and DFGOT vol.3  
Exposure)                      (1994)).

※ The toxicological information is prepared based on the information on the raw materials since the information on the mixture is not available.

Under normal conditions, this reference material is stable and has no such risk as elution of hazardous additives. In case of special handling such as handling at high temperatures, however, sufficient safety precautions must be taken.

## 12. Ecological Information

### Ecotoxicity

- Crustacea (Daphnia magna); 48 hours EC50 = 0.492 mg/l

### Persistence and Degradability

- No data available

### Bioaccumulation Potential

- No data available

### Mobility in Soil

- No data available

### Harmful Effects on Ozone Layer

- No data available

## 13. Disposal Considerations

Residual Waste      :    Dispose of this reference material in accordance with applicable legislation and local government ordinance.  
Entrust disposal of residual waste to a professional waste disposal company licensed by prefectural governor etc., or to a local government if it provides disposal services.

If entrusting disposal of residual waste, make a waste disposal company etc. fully understand relevant risks and hazards.

Contaminated        :    Dispose of containers after thoroughly removing their contents.  
Container and  
Package

## 14. Transport Information

UN Number          :    UN2031

UN Classification   :    Class 8

Shipping Name      :    Nitric acid, except fuming nitric acid, whose concentration is 20 % or less

Container grade    :    PG II

Marine pollutant   :    Not applicable

Precautions         :    Transport this reference material carefully while keeping it away from direct sunlight and preventing accidental release due to falling,

being knocked over, etc.

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## 15. Regulatory Information

- ◇ Poisonous and Deleterious Substances Control Act
  - Not applicable
- ◇ Industrial Safety and Health Law
  - Enforcement Order: Article 18; Hazardous substance whose name, etc. must be indicated
  - Enforcement Order: Article 18-2; Hazardous substance whose name, etc. must be notified No.307
  - Specified chemical substance; Class 3 substance
- ◇ Water Pollution Prevention Law
  - Not applicable
- ◇ Soil Contamination Counter- measures Act
  - Not applicable
- ◇ Act for the Prevention of Marine Pollution and Maritime Disasters
  - Enforcement Order Appendix 1; Hazardous liquid substance (Class Y)
- ◇ Ship Safety Law
  - Dangerous Material Rule: Article 3; Dangerous Material Announcement Appendix 1; Corrosive substance
- ◇ Civil Aeronautics Act
  - Enforcement Regulation: Article 194; Dangerous Material Announcement Appendix 1; Corrosive substance
- ◎ **This SDS is originally prepared for the use of the material in Japan, thus the stated laws and regulations are stipulated and carried out in Japan. The use of the material in other countries should be referred to and by application of the relevant laws and regulations of the country in which the material will be used.**

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## 16. Other Information

### Others

The information in this document is not intended to be exhaustive and is based on currently available information and data. The measures given in this document are applicable only to normal handling conditions. When handling this reference material under special conditions etc., it is recommended to take safety measures appropriate to each specific application and context of use. This document is intended to provide information and not intended to guarantee anything in handling this reference material.

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