

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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Identity of Substance/Mixture : Reference material: NMIJ RM 1401-a
Reference material for thermal conductivity (Isotropic graphite)
Recommended Use of the Chemical and Restriction on Use : This reference material (RM) is intended to use in calibration and evaluation of thermal conductivity measurements. Do not use this reference material for other purposes than testing/research.

2. Hazards Identification

GHS Classification : Not classified
GHS label element : -
Signal Word : -
Other Hazards Statement : Flammable Solid (Powder form)
Toxic if inhaled or swallowed.
If in eyes or on mucous membranes, it causes a stimulatory effect.
May cause such symptoms as discomfort, nausea and headache through prolonged exposure.
Precautionary Statement : [Precaution]
A low risk in normal handling. Use appropriate personal protective equipment.
Avoid release to the environment.
When dust is generated, seal the source, and wear respiratory protection equipment.
[First Aid Measure]
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
If eye irritation persists: Get medical advice/attention.
[Storage]
Keep away from strong oxidizers.
Avoid direct sun light and stored at a clean, dry and well ventilated

place at normal room temperature.

[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

Single substance/Mixture	:	Single
Chemical name	:	Graphite
Chemical Formula or	:	C
Structural Formula		
Amount		99.99 %
Reference Number in	:	Act on the Evaluation of Chemical Substances and Regulation
Gazetted List in Japan		of Their Manufacture, etc. :-
		Industrial Safety and Health Act :-
CAS No.	:	7782-42-5 (Graphite)

4. First-aid Measures

If in Eyes	:	Wash eyes with plenty of clean water. Seek medical attention, if necessary.
If on skin	:	Wash with a large amount of water and soap.
If Inhaled	:	Rinse mouth thoroughly with water. Seek medical attention, if necessary.
If Ingested	:	Rinse mouth thoroughly with water. Do not induce vomiting, if it is not the instructions from a doctor. Get medical advice/attention when feeling unwell.
Protecting Personnel in emergency measures	:	Wear protective equipment such as rubber gloves, eye protective goggles.

5. Fire-fighting Measures

Extinguishing Media	:	Water spray, Dry chemical extinguishing agent, Foam extinguishing agent, Carbon dioxide (CO ₂)
Fire-Specific Hazards	:	In the case of fire, irritating or toxic gas (CO) may be generated.
Specific Fire-Fighting Method	:	Carry out fire-fighting from the windward in order to avoid breathing hazardous gas. Eliminate ignition sources at the origin of a fire and put out fire by using appropriate extinguishing media. It is necessary to

- perform the appropriate action not to spill substances which have adverse influences, into the environment by water cannon, etc. for firefighting.
- Eliminate ignition sources at the origin of a fire and put out fire by using extinguishing media. Remove movable containers promptly to a safe place. In the case of immovable containers, cool their surroundings with sprayed water.
- Protection of Fire-Fighters : Carry out fire-fighting from the windward in order to avoid breathing hazardous gas. Use personal protective equipment such as fire protection clothing, heat-resistant clothing, protective clothing, breathing apparatus, circulating oxygen respirator, rubber gloves, and rubber boots.
- Ignition temperature is 500 to 600 °C or more in the air. And it can cause a spontaneous ignition when it is in a large amount. It may cause a dust explosion when the powder is suspended above a certain amount in the air.

6. Accidental Release Measures

- Personal Precaution : Remove ignition source in the vicinity immediately. Prepare fire-fighting equipment for the possibility of fires.
- 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 in order to prevent untreated wastewater from being released into the surrounding environment.
- Recovery and Neutralization : Collect the contaminated items in an empty container that can be sealed. If it is possible, use with wet waste clothes, wet wiping clothes to collect spillage. Then rinse 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 windward and make people on the leeward side evacuate.

7. Handling and Storage

- Handling
- Engineering Precautions : Do not handle with bare hands.
- Local and General Ventilation : In the case of handling in indoor workplaces, use local exhaust ventilation.
- Precautions for Safe Handling : Avoid rough handling such as turning over, dropping, giving a shock to or dragging containers.
Prevent spill, overflow and scattering, and avoid vapor generation.

Keep container tightly closed after using this reference material.
Wash hands, face etc. thoroughly and gargle after handling this reference material.
Do not eat, drink, or smoke during handling
Restrict drinking, eating and smoking to a designated area.
Use appropriate personal protective equipment to avoid inhalation and contact with eyes, skin and clothing.
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.

Storage

Appropriate Storage Conditions : Avoid direct sun-light and store in clean and dry place such as a desiccator at normal room temperature. This RM should be kept at room temperature ($23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$), at relative humidity (50% or less).
Safe Container Packaging Material : Polyethylene

8. Exposure Controls/Personal Protection

Threshold Limit Value

No data

Permissible Concentration (Nickel)

- ACGIH TLV-TWA (2000) : 2 mg/m^3
- Values recommended by Japan Society for Occupational Health (2000) : Not assigned

Society for Occupational Health (2000)

- OSHA PEL TWA : Not assigned

Facility engineering

• Install facilities to rinse eyes and to wash hands and body in the vicinity of a place handling this reference material and label them.

Personal Protective equipment

Respiratory protection : Protective dust mask, respiratory protection equipment.
Hands : Protective gloves
Eyes : Eye protector (Goggle type as necessary)
Skin and Body : Protective clothing, face mask
Hygiene measure : Treat in accordance with rules on Industrial hygiene and Industrial safety.

9. Physical and Chemical Properties

- Appearance, etc. : Solid
Black-steel gray opaque crystal with a metallic luster.
Consisting of fine graphite crystal.

This RM consists of 2 disks with diameter of 10 mm and the thickness of each piece is 1.0 mm or 2.0 mm.

• Color	: Glossy black
• Odor	: No data
• pH	: No data
• Melting point	: 3338 °C
• Boiling point	: 3700 to 4300 °C
• Flashing point	: No data
• Explosive range	: Powdered material is flammable; there is a possibility of dust explosion.
• Vapor pressure	: 0.001 Pa (at 2000 °C)
• Relative vapor density(Air=1)	: No data
• Specific gravity or bulk specific gravity	: 1.7 to 1.9
• Solubility	: No data
• <i>n</i> -Octanol/water partition coefficient (Log Po/w)	: No data
• Auto-ignition temperature	: No data

10. Stability and Reactivity

◇Stability

- Stable in normal conditions

◇Reactivity

- Reacts with fluorine at room temperature.
- Flammable in a certain condition
- Explosive in a fine powdered form.

◇Conditions to Avoid

- Contact with strong oxidizing substances

◇Hazardous Decomposition Products

- Carbon monoxide (CO)

11. Toxicological Information

Note: The information about the toxicity related to this product has been investigated in the forefront of the way, but pay enough attention to the handling as those with an unknown toxic.

Acute Toxicity	Oral Mouse LD50: 440 mg/kg
Serious Eye Damage/ Eye Irritation	No-data
Carcinogenicity	No-data
Reproductive Toxicity	No-data
Teratogenicity	No-data
Specific target organ / systemic toxicity (repeated exposure)	No-data

12. Ecological Information

Persistence and Degradability

- No data available

Bioaccumulative Potential

- No data available

Ecotoxicity

- No data available
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13. Disposal Considerations

- Dispose in accordance with applicable regional, national and local laws and regulations.
- Dispose of containers after thoroughly removing their contents.

14. Transport Information

UN Number : Not applicable

UN Classification : Not applicable

Shipping Name : Graphite

Packing Group : -

ICAO/IATA : -

Marine Pollutant : Not applicable

Precautions :

Transport this reference material carefully while keeping it away from direct sunlight and humidity, and preventing accidental release due to falling, overturning, etc.

15. Regulatory Information

◇Industrial Safety and Health Act

- Article 57-2 (Enforcement Order: Article 18-2) Hazardous substance whose name, etc. must be notified, No.130.

◇Ship Safety Law

- Dangerous Material Rule article 3, Hazardous class 4.2 Flammable substances (container grade 2, 3)

◇Act on Port Regulations

- Ordinance for Enforcement of the Act on Port Regulations, Article 12: spontaneously combustible substances (except class III)

◇TSCA(Toxic Substances Control Act (a United States federal government law))

- Assigned
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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.
