

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 : Certified Reference Material NMIJ CRM 5401-a
 Cyclohexane for Thermal Analysis
 Recommended Use of the Chemical and Restriction on Use : This CRM is intended for use in the calibration, quality control and validation of thermal analyzers such as differential scanning calorimeters and differential thermal analyzers.
 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:

Flammable liquid	:	Class 2
Skin corrosivity/irritant	:	Class 2
Severe eye damage/eye irritant	:	Class 2A
Reproductive toxicity	:	Class 2
Particular target organ/systemic toxicity (Single exposure)	:	Class 2 (Blood system) Class 3 (Respiratory tract irritant, anesthetic action)
Aspiration hazard	:	Class 2
Water environment toxicity (Acute)	:	Class 1

GHS label element:



Signal word: Danger
 Hazard and toxicity: Highly flammable liquid and vapor.

Precautionary statement	<p>Skin irritation.</p> <p>Severe eye irritation.</p> <p>May have adverse effects on reproductive function and embryo.</p> <p>May damage organs (blood system, respiratory tract irritation, anesthetic action).</p> <p>May irritate respiratory organ.</p> <p>May cause drowsiness or dizziness.</p> <p>May be harmful by swallowing or entering respiratory tract.</p> <p>Severely toxic to aquatic organisms.</p> <p>[Preventive measures]</p> <p>Obtain an instruction manual, read and understand the safety precautions fully before handling.</p> <p>Use protective eyeglasses, protective mask .and protective gloves.</p> <p>Handle the material in outdoor or in well ventilated area.</p> <p>Keep away from heat, sparks, open flame, high temperature matters. No smoking.</p> <p>Take preventive measures against electrostatic discharge.</p> <p>Wash hands well after handling.</p> <p>Avoid inhaling mist, vapor.</p> <p>Avoid discharging to the environment.</p> <p>Keep the container airtight.</p> <p>[Response]</p> <p>If swallowed : Seek medical advice immediately.</p> <p style="padding-left: 40px;">If in eyes : Rinse carefully with water for several minutes. If contact lenses are inserted, take them out if possible and continue to rinse.</p> <p style="padding-left: 40px;">If eye irritation persists, seek medical advice.</p> <p>If feeling unwell : Seek medical advice.</p> <p>If inhaled : Move to a fresh air, take a comfortable posture to ease breathing and rest.</p> <p>If on skin : Take off all contaminated clothing immediately. Wash with soap and a large amount of water (running water/shower).</p> <p style="padding-left: 40px;">In case of skin irritation, seek medical advice.</p> <p>Exposure or possible exposure: Seek medical advice.</p> <p>[Storage]</p> <p>Keep the container airtight and store in a cool and well ventilated place.</p> <p>Lock up the container in a safety cabinet.</p> <p>[Disposal]</p> <p>This material or its container should be outsourced to a professional industrial waste disposal contractor licensed by relevant authorities (national, local).</p> <p>Hazardous and toxic properties not specified in the above are neither the object of the classification nor classifiable.</p>
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3. Composition/Information on Ingredients

Single or compound product	: Single product
Chemical name	: Cyclohexane
Other name	: Hexahydrobenzene
Purity (mass fraction)	: 0.9999 mol/mol
Chemical formula	: C ₆ H ₁₂
Molecular weight	: 84.16
Reference Number in Gazetted List in Japan	: Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. : (3)-2233 Industrial Safety and Health Act : Published
CAS No.	: 110-82-7
Hazardous component	: Cyclohexane

4. First-aid Measures

If in eyes	: Rinse carefully with water for several minutes. If contact lenses are inserted, take them out if possible, and continue to rinse. If the irritation persists, seek medical advice
If on skin	: Take off all contaminated clothing immediately. Wash with soap and a large amount of water (running water/shower) In case of skin irritation, seek medical advice
If inhaled	: Move to a fresh air, take a comfortable posture to ease breathing. Keep warm and rest. Seek medical advice.
If swallowed	: Rinse the mouth well with water, and take activated charcoal mixed with water (activated charcoal suspension). Do not induce vomiting. Seek medical advice immediately.

5. Fire-fighting Measures

Extinguishing media	: Powder, carbon dioxide, foam, water spray (do not use strait jet nozzle)
Specific hazards at the time of fire	: Use breathing apparatus to protect against toxic gases (carbon monoxide, etc.) formed due to combustion or high temperature.
Specific extinguishing measures	: Remove combustible sources from the seat of fire and extinguish using appropriate extinguishing agent. Transfer the movable container to a safe place promptly. If impossible to transfer, use water spray to cool the periphery.
Protecting fire-fighting personnel	: Extinguishing activities on windward side, avoid inhaling toxic gases Use protective equipment such as self-contained compressed air breathing apparatus, etc.

6. Accidental Release Measures

Personal precautions	: Promptly remove any ignition sources from around the material. Ready for a fire by keeping an appropriate extinguisher at hand
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- If released indoor, ventilate well until the treatment is completed.
- Protective equipment and emergency procedure : Use suitable protective equipment to protect the skin from airborne droplets and avoid inhaling gas.
- Environmental precaution : To prevent causing environmental impact, do not release the spilled material into rivers, etc. directly. Treat the contaminated waste water appropriately before discharging to the environment.
- Recovery, neutralization : Fire sources prohibited. Use suitable protective equipment and collect the spillage as much as possible. Wipe the contaminated area completely, and then wash away with a large amount of water.
- Measures to prevent secondary accident : Rope-off the spilled area and restrict access only to the authorized persons. Evacuate the people on the leeward and work on the windward side.

7. Handling and Storage

Handling

- Technological counter measures : Keep away from fire sources.
Keep away from high temperature matter , sparks, and strong oxidizers.
- Local ventilation/ general ventilation : Use local exhaust ventilation system when handling indoor.
- Precautions for safe handling : Do not handle the container roughly. No dropping, falling or dragging, etc.
Prevent from forming vapor due to leakage, spillage or scatter
Keep the container airtight after handling.
Wash hands, face, etc. well and gargle after handling.
Do not eat, drink or smoke when handling.
Do not leave the work area with the contaminated protective clothing, gloves, etc. on and go to rest areas.
Entering the handling area only by the authorized persons.
Use suitable protective equipment to avoid inhaling or in contact with eyes, skin and clothing.

Storage

- Appropriate condition : Avoid direct sunlight. Well ventilated, cool place
Keep the container airtight.
Use explosion proof structured electric equipment in the storage.
Ground all equipment.
Keep away from strong oxidizing substances and fire sources.

- Safe packaging material : Glass

※The precautions pertaining to appropriate storage condition and handling as a reference material can be referred to the authentication certificate.

8. Exposure Controls/Personal Protection

Administrative level Working environment assessment standard

Not established

Occupational exposure level

- OSHA PEL : Air TWA 300ppm
- ACGIH TLV : TWA 300ppm
- Japan Society for Occupational Health Recommended Reference Value : 150 ppm, 520 mg/m³

Facility engineering

- Ventilation, exhaust : When handling in the indoor work area, seal the source or install local exhaust ventilation system.
Install safety shower, hand/eye washer, and indicate their location conspicuously.

Protective equipment

- Respiratory organ : Chemical cartridge respirator for organic gas, respiratory protective equipment.
- Hands : Protective gloves
- Eyes : Protective eyeglasses
- Skin and body : Protective clothing, protective boots

9. Physical and Chemical Properties

- Appearance, etc. : Volatile liquid
- Color : Clear and transparent
- Odor : Odor of petroleum benzine
- pH : No data
- Melting point : 6.0 °C to 7.0 °C
- Boiling point : 80.7 °C
- Flashing point : -20 °C
- Explosive range : 1.33 %(v/v) to 8.35 %(v/v)
- Vapor pressure : 13.0kPa(25 °C)
- Relative vapor density(Air=1) : 2.9(Air=1)
- Specific gravity or bulk specific gravity : 0.777 to 0.781 (25/20 °C)
- Solubility : Water-insoluble (0.36 g/100 mL Water, 16 °C), soluble in many organic solvents.
- *n*-Octanol/water partition coefficient (Log Po/w) : No data
- Auto-ignition temperature : 245 °C

10. Stability and Reactivity

◇Stability

- Stable under normal condition

◇Reactivity

- May explode or ignite in contact with oxidizers and peroxidative agent.

- ◇Conditions to avoid
 - Sunlight, heat, open flame, high temperature, sparks, static electricity, other fire sources
- ◇Hazardous decomposition products
 - Carbon monoxide

11. Toxicological Information

Acute toxicity	Intravenous rabbit LDLo:77 mg/kg Oral mouse LD50: 813 mg/kg
Skin corrosivity/irritation	Skin irritation to rabbits and humans (DFGOT vol.13(1999)), EU-RAR(2004), ACGIH(2002),ICSC(J)(1994)
Severe damage to eyes/eye irritation	Observed reversibly generated cornea opacity, iris inflammation, conjunctival congestion and chemosis in rabbits (EU-RAR(2004)). Also eye irritation to animals and humans described (PATTY(5th,2001), EU-RAR(2004),ICSC(J)(1994),HSDB(2005))
Germ cell mutagenicity	DNA damage: Bacillus coli 10 µmol/L Germ cell mutagenicity test in microorganisms : Negative
Reproductive toxicity	At a dose having adverse effect of weight reduction to parent animal or unspecified dose that has no general toxicity to parent animal, observed low weight during early infancy of offspring or weight reduction of embryo and adverse effect on male sex organ (testicle atrophy, toxicity to sperm) (ACGIH(2002),EU-RAR(2004),DFGOT vol.13(1999)).
Particular target organ/systemic toxicity (Single exposure)	Many studies in animal report a central inhibition, therefore anesthetic action, but no data of exposure dose. Oral administration to rabbits at a dose within Category 2 guidance value range observed vascular damage (ACGIH(2001)). As for humans, irritation of respiratory tract (ACGIH(2001), ICSC(J)(1994)). Also, observed dizziness, feeling of sickness, lapse of consciousness, paralysis reflex which are the symptoms of central inhibition that may be fatal (PATTY(5th,2001)).
Aspiration hazards	When swallowed the liquid, it may cause chemical pneumonia due to aspiration. (ICSC(J)(1994)).

12. Ecological Information

- Degradability, concentration
- No data available
- Bioaccumulation
- No data available
- Ecotoxicity
- Red killifish Acute toxicity LC50:9 mg/L·48H
 - Crustacean (Daphnia magna):48H EC50=0.9 mg/L(EU-RAR,(2004))

13. Disposal Considerations

- Dispose of in compliance with the related laws and regulations and the ordinances of the local governments.
- Before disposing of the empty container, remove the content completely.

14. Transport Information

UN No.	: 1145
UN classification	: Class 3 (Flammable liquid)
Material name	: Cyclohexane
Container grade	: PG II
ICAO/IATA	: Class 3 Grade II PCA305 Y305 CAO307
Marine pollutant	: Not applicable
Precautions	: Avoid sunlight. Prevent the container from falling, dropping, etc. to cause leakage. Keep away from fire sources.

15. Regulatory Information

- ◇ Fire Service Act
 - Hazardous material Category 4 No 1 Petroleum (water insoluble) Hazard class II
 - ◇ Industrial Safety and Health Act
 - Article 57-2 (Enforcement Order: Article 18) Hazardous substance whose name, etc. must be labeled.
 - Article 57-2 (Enforcement Order: Article 18-2) Hazardous substance whose name, etc. must be notified No.232
 - Enforcement Order Appended Table No 1, 4 Hazardous material flammable material
 - ◇ Ship Safety Act
 - Flammable liquid
 - ◇ Civil Aeronautic Act
 - Flammable liquid
 - ◇ Law Relating to the Prevention of Marine Pollution and Maritime Disaster
 - Enforcement Order Appended Table No. 1 Toxic liquid substance Category Y
- ◎ **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.**

16. Other Information

Other

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.