Safety Data Sheet

1. Identification of the Substance/Mixture and the Supplier

Supplier	:	National Institute of Advanced Industrial Science and Technology (AIST)
Address	:	1-3-1 Kasumigaseki, Chiyoda, Tokyo, Japan
Office in Charge	:	Reference Materials Office, Center for Quality Management of Metrology, National Metrology Institute of Japan
Person in Charge	:	Certified Reference Material Staff
Telephone No.	:	+81-29-861-4059 Fax No. : +81-29-861-4009
Emergency Contact	:	Same as above
		Prepared on : July 07, 2009
		Revised on : August 31, 2022
		Reference No. : 4203001
Identity of Substance/Mixture	:	Certified Reference Material NMIJ CRM 4203-a γ-HCH in 2,2,4-Trimethylpentane
Recommended Use of the Chemical and Restriction on Use	:	This reference material can be used for calibration of γ-HCH concentration in 2,2,4-Trimethylpentane or similar solvents. 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 :

Ignitable liquid	:	Class 2
Skin corrosivity/irritant	:	Class 2
Severe damage to eye/eye irritant	:	Class 2A
Particular target organ/systemic toxicity (Single exposure)	:	Class 1 (Central nervous system)
	:	Class 3 (Narcotic action)
	:	Class 3 (Respiratory tract irritant)
Toxicity to respiratory organs by aspiration	:	Class 1
Toxicity to aquatic environment (acute)	:	Class 1
Toxicity to aquatic environment (chronic)	:	Class 1

GHS Label element :

Signal word	:	Danger
Hazard and toxicity	:	Highly ignitable liquid and fume Skin damage Severe eye irritant Damage to central nervous system Potential respiratory organ irritation Potential drowsiness and dizziness Life-threatening if swallowed and invade respiratory tract Highly toxic to aquatic organisms Damage to aquatic organisms due to long-term influence
Other hazard and toxicity information	:	1,2,3,4,5,6-hexachlorocyclohexane (HCH) is a carcinogenic substance
Precautionary Statement	:	[Preventive Measures] ・Keep away from open flames or other source of ignition ・No eating, drinking or smoking when handling ・Do not handle before reading and understanding the instructions on the safety precautions to observe when handling the material fully ・Handle the substance outdoors or at well ventilated area ・Prevent the material from being released into the environment ・Wash hands well after the handling ・Avoid inhaling mist, vapor, fume, spray ・Use appropriate protective gloves, eyeglasses, protective mask, Use protective equipment for personal use as necessary [Response] <If swallowed> ・Wash mouth thoroughly. Do not induce vomit. Get medical assistance <If in eye> ・Flush carefully with plenty of water for few minutes. If using contact lenses, take them out if possible, and continue rinsing. ・Get medical treatment if the irritation persists <If inhaled> ・Move to get a fresh air and ease breathing/respiration <If contact with skin> ・Take off all the contaminated clothes and flush the skin with plenty of water using soap ・Get medical assistance/treatment <If exposed or possibility of the exposure> ・Get medical assistance/treatment ・Take off the contaminated clothes. Wash the clothes well before using the next time.

・Recover the leakage promptly.

[Storage]

・Keep in a locked cabinet

・Protect from light, at normal temperatures (15 °C to 25 °C)

[Disposal]

・This reference material contains the substance designated as Class 1 specified substance, thus the handling should be in compliance with Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc., and the disposal should be in compliance with Wastes Disposal and Public Cleansing Act.

※By paying careful attention to the Class 1 specified chemical substances having properties such as persistence, bioaccumulation, long-term toxicity to humans and ecotoxicity to apex predators and plants, ensure that the facilities and equipment, etc. involving the substances should be closed and sealed tightly and the collection be taken measures to prevent the substances from dispersing, etc.
The containers and storage tanks, etc. should be inspected periodically for the leakage.
Pay special attention not to disperse or spill the substances when handling.

Hazardous and toxic properties not specified in the above are not subject to the classification nor classifiable.

3. Composition/Information on Ingredients

Single or compound product	:	Compound product
・Component 1		
Chemical name	:	1,2,3,4,5,6-hexachlorocyclohexane (Clss I specified chemical substance)
Other name	:	γ-BHC, Lindane, HCH
Content	:	Approximately 10 mg/kg
Chemical formula or structural formula	:	$C_6H_6Cl_6$(γ-HCH)
Molecular weight	:	290.83
Reference Number in Gazetted List in Japan	:	Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. : (9)-1652, (3)-2250 Industrial Safety and Health Act : Published
CAS No.	:	58-89-9

・Component 2

Chemical name	:	2,2,4-Trimethylpentane
Other name	:	Isooctane
Chemical formula or structural formula	:	$CH_3C(CH_3)_2CH_2CH(CH_3)CH_3$ (2,2,4-Trimethylpentane)
Content	:	99.9 %
Molecular weight	:	114.23
Reference Number in Gazetted List in Japan	:	Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. : (2)-8 Industrial Safety and Health Act : Published
CAS No	:	540-84-1

4. First-aid Measures

If in eye	:	Flush carefully with plenty of clean water. Get medical assistance
If on skin	:	Flush with plenty of clean water using soap. Take off all the contaminated clothes and shoes. Get medical assistance.
If inhaled	:	Move to get some fresh air and ease the breathing/ respiration. Rest and keep warm. Get medical assistance
If swallowed	:	Wash the mouth throughly, drink one or two glasses of water. Do not induce vomit. Get medical assistance
Possible acute symptoms	:	Irritation of eye, skin, respiratory tract; inflammation of eye, skin; dry skin, defatting of skin; nausea, headache, drowsiness, dizziness, confusion, feeling of smothering, losing consciousness, coughing, soar throat. Exposure to high concentration fume/vapor causes loss of consciousness, cardiac-rhythm disturbance
Delayed symptoms	:	Pulmonary edema, chemical pneumonia
Most important characteristics and symptoms	:	Not specified
Measures to protect the person who give first aid	:	Use personal protective equipment.

5. Fire-fighting Measures

Extinguishing media	:	Fire-extinguishing powder, fire extinguishing foam, carbon dioxide, sand. Absolutely do not use straight stream firefighting nozzle..
Specific hazards at the time of fire	:	May generate irritant or toxic fume (or gas)
Specific extinguishing	:	May generate irritant, corrosive or poisonous gas and fume

measures		depending on the condition of the fire. If impossible to move, cool the periphery with water spray.
Protecting fire-fighting personnel.	:	Extinguishing activity from windward to avoid inhaling toxic gas Use protective equipment such as fire-safe clothing、air-breathing apparatus, etc.

6. Accidental Release Measures

Personal precaution, protective equipment and emergency procedure	:	Rope-off the leaked area and restrict the access to authorized personnel only. Evacuate the people on the leeward and extinguish from the windward. If released indoor, ventilate well until the treatment is completed. Use appropriate protective equipment to protect the skin from the airborne droplets and avoid inhaling dust and 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.
Recovery, neutralization	:	The spilled liquid should be adsorbed to waste cloth or to sand and soil and wiped off completely. Everything used to clean up the spillage should be collected in an airtight container.
Measures to prevent secondary accident	:	If there is an accidental leakage or spillage, in order to take proactive measures against an accident or further spreading, promptly report the incident to the relevant organs.

7. Handling and Storage

Handling

Technological countermeasures	:	Open flames or other source of ignition prohibited
Local ventilation/ general ventilation	:	Use local exhaust ventilation when handling indoor
Precautions for safe	:	The container should not be dropped, knocked down or dragged handling roughly. Prevent leakage or spillage that causes the fume generation Seal the container tightly after the use Wash hands and face, etc. well and gargle after handling Eating, drinking or smoking should be only at the designated areas. Entering the handling place only by relevant persons Use appropriate protective equipment to prevent inhaling, coming in contact with eye, skin and the clothing. Equipment used should be of explosion-proof structure. Antistatic measures should be taken for the equipment.

Storage

Appropriate condition	:	Store in a dark place at normal temperature (15 °C to 25 °C) in a well-ventilated place in airtight container. Open flames or other source of ignition prohibited where the container is stored.
Material for safe packing	:	Glass

8. Exposure Controls/Personal Protection

Administrative levels	:	Not established
Occupational exposure limit (1,2,3,4,5,6-hexachlorocyclohexane)		
・ACGIH TLV-TWA	:	0.5 mg/m3; skin
・Japan Society for Occupational Health Recommended Reference Value	:	Not established
・OSHA PEL TWA	:	8H TWA , 0.5 mg/m^3; skin
Facility engineering control		
Ventilation, exhaust	:	Local exhaust system or general ventilation system
Safety management gas detection	:	-
Storage precaution	:	-
Protective equipment		
Respiratory organ	:	Chemical cartridge respirator for organic gas
Hand	:	Protective gloves
Eyes	:	Safety goggle
Skin and body	:	Protective clothing
Sanitary measures	:	Masks, etc. used to adsorb the substances, etc. should be changed periodically or every time of use.

9. Physical and Chemical Properties (As 2,2,4- Trimethylpentane)

・Appearance, etc.	:	Liquid
・Color	:	Clear and colorless
・Odor	:	Similar to gasoline
・pH	:	No data
・Melting point	:	−107.5 °C
・Boiling point	:	99.3 °C
・Flashing point	:	−8 °C (Tag closed cup method)
・Explosive range	:	Lower limit; 1.1% upper limit; 6.0 %
・Vapor pressure	:	5.1 kPa (20 °C)
・Relative vapor density(Air=1)	:	3.97 (Air=1)
・Specific gravity or bulk specific gravity	:	0.692 (20/4°C)
・Solubility	:	Dissolves readily in ethanol and diethyl ether,

slightly soluble in water

- *n*-Octanol/water partition coefficient (Log Po/w) : No data
- Auto-ignition temperature : 410 °C

10. Stability and Reactivity

◇Stability
- No data available

◇Reactivity
- No data available

◇Conditions to avoid
- Sunlight, heat, open flames, high temperature, spark, static electricity, other source of ignition

◇Hazardous decomposition products
- Carbon monoxide、halide

11. Toxicological information

Acute toxicity

(1,2,3,4,5,6-hexachlorocyclohexane)

Oral Rat	LD50: 76 mg/kg (RTECS)
Skin Rat	LD50: 414 mg/kg (RTECS)
Abdominal Cavity Rat	LD50: 35 mg/kg (RTECS)
Oral Mouse	LD50: 44 mg/kg (RTEC)
Abdominal Cavity Mouse	LD50: 125 mg/kg (RTECS)

(2,2,4- Trimethylpentane)

Oral Rat	TDLo: 2500 mg/kg/5D-I (RTECS)
Oral Rat	TDLo: 10 mg/kg/4W-I (RTECS)

Carcinogenicity

(1,2,3,4,5,6-hexachlorocyclohexane)
Classified as Group 2B by IARC (IARC Suppl.7, 1987)
2B by Japan Society for Occupational Health (Recommended value, 2005)、
A3 by ACGIH (ACGIH 7th, 2001) and
R by NTP (NTP RoC 11th, 2005)

12. Ecological Information

Degradability, concentration
- 0 % by BOD(Existing Chemical Substances Safety Data by METI)

Bioaccumulation
- (2,2,4- Trimethylpentane)
  Concentration rate:440 to 580(density 10 μg/l):460 to 650(density 1 μg/l)
  (Existing Chemical Substances Safety Data by METI)

Ecotoxicity
- (2,2,4- Trimethylpentane)
  Acute toxicity to orange kilifish LC50: 0.561 mg/L/96hr
- (1,2,3,4,5,6-hexachlorocyclohexane)
  Acute toxicity to orange killifish LC50:0.18 mg/L/48hr; Crustacean(pink shrimp):96 hr LC50=0.00017 mg/L (EHC124、1991)。
  Acute toxicity Class 1、no rapid degradability (degradability according to BOD:0 % (Existing
  Chemical Substances Safety Data), having bioaccumulation potential.(BCF=893 (Existing Chemical Substances Safety Data))

13. Disposal Considerations

・ Incinerate in the incinerator equipped with after burner and scrubber.

14. Transport Information

UN Number	:	1262
UN Classification	:	Class 3 (Ignitable liquid)
Material name	:	Octane
Container grade	:	PG II
ICAO/IATA	:	Class 3　grade II
Marine pollutant	:	Not applicable
Precautions	:	Transfer with care avoiding direct sunlight, leakage or spill due to fall or drop. Keep the container away from fire sources and transfer carefully by maintaining the temperature at about −20 °C.

15. Regulatory Information

◇Fire Service Act
・Hazardous material Category 4　Class I petroleum (water-insoluble)　Hazard class 2
◇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. 115
◇Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc.
・Class 1 specified chemical substance
◇Law Relating to the Prevention of Marine Pollution and Maritime Disaster
・Enforcement Order Appended Table No. 1 Toxic liquid substance (Group C)

◎ **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

References cited
・International Chemical Safety Cards (ICSC) Japanese Version, The Chemical Daily (1992)
・Dictionary of Organic Compounds, by Japan Association for International Chemical Information, Kodansha (1985)
・Existing Chemical Substances Safety Data, Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. Chemical Examination and Research Institute (1992)
・National Institute of Technology and Evaluation

Other
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