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 Telephone No. : +81-29-861-4059
Emergency Contact	:	Same as above
		Prepared on : February 22, 2010
		Revised on : August 31, 2022
		ID Number : 4006001
Identity of Substance/Mixture	:	Certified reference material NMIJ CRM 4006-a Carbon Tetrachloride
Recommended Use of the Chemical and Restriction on Use	:	This CRM is intended for use in calibration of analytical instruments, quality control of analytical instruments, and validation of analytical techniques and instruments. 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:	Skin corrosion/irritation	:	Hazard Category 2
	Serious Eye Damage/ Eye Irritation	:	Hazard Category 2A
	Acute Toxicity(Oral)	:	Hazard Category 5
	Carcinogenicity	:	Hazard Category 2
	Reproductive toxicity	:	Hazard Category 2
	Specific Target Organ Toxicity/Systemic Toxicity (Single Exposure)	:	Hazard Category 1 (central nervous system, Liver, kidney)
	Specific Target Organ Toxicity/Systemic Toxicity (Repeated Exposure)	:	Hazard Category 1 (Liver, blood, kidney, respiratory organ)
	Water environment toxicity (Acute)	:	Hazard Category 1
	Water environment toxicity (Prolonged)	:	Hazard Category 1

GHS Label Element:

Signal Word: Danger

Hazards Statement:
Causes skin irritation.
Causes serious eye irritation.
Harmful if swallowed.
Suspected of potency of carcinogenic action.
Suspected of damaging fertility or the unborn child.
Causes damage to organs (central nerve system, liver and kidney)
Causes damage to organs (liver, blood, kidney and respiratory organ) through prolonged or repeated exposure.
Harmful to aquatic life
May cause damage to aquatic life through prolonged or repeated exposure

Precautionary Statement:
［Precaution］
Do not handle until all safety precautions have been read and understood.
Do not breathe dust, fume, mist, vapors, spray, etc.
Do not eat, drink or smoke when using this product.
Use personal protective equipment or local ventilation equipment to avoid contact or breathing dust/fume/gas/mist/vapors/spray.
Use protective gloves, protective glasses and face mask.
Do not breathe dust, fume, mist, vapors, spray, etc.
Wash hands thoroughly after handling.
Avoid release to the environment.
Seal tightly after use.
［First-aid Action］
If swallowed: Rinse his/her mouse with plenty of water. Get medical advice/attention if you feel unwell.
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.
If inhaled: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
If on skin (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with plenty of soap and water/shower.
If skin irritation occurs: Get medical advice/attention. Wash the contaminated clothing before re-used.
Get medical advice/attention if you feel unwell.
If exposed or concerned: Get medical advice/attention.
In case of leakage, collect the spillage.
［Storage］
Store this CRM in dark, cool (about −20 °C), clean and well ventilated place, and seal tightly after use.

Store in a locked area.
［Disposal］
Incinerate contents/containers in an incinerator equipped with scrubber. When the above-mentioned treatments are not possible, entrust disposal of residual waste to a professional waste disposal company licensed by prefectural governor.

Hazards not mentioned above are either not classifiable or not applicable.

3. Composition/Information on Ingredients

Substance or Mixture	:	Single substance
Chemical Identity	:	Carbon tetrachloride
Synonym	:	Tetrachloromethane
Content	:	100 %
Chemical Formula	:	CCl_4
Molecuar Weight	:	153.82
Reference Number in Gazetted List in Japan	:	Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. : (2)-38 Industrial Safety and Health Act : 2-(13)-47
CAS Number	:	56-23-5
Hazardous Ingredient	:	Carbon tetrachloride

4. First-aid Measures

If swallowed	:	Rinse mouth thoroughly with water. Get medical advice/attention immediately.
If in Eyes	:	Rinse away thoroughly with clean water. Get medical advice/attention.
If on skin	:	Wash with plenty of soap and water immediately. If skin irritation and/or rash occur(s): Get medical advice/attention.
If inhaled	:	Remove victim to fresh air immediately. Have victim blow his/her nose. Rinse mouth. Get medical advice/attention.

5.Fire-fighting Measures

Extinguishing Media	:	This material is incombustible. Use a fire extinguishing agent suitable for surrounding fire.
Fire-Specific Hazards	:	Wear respiratory protective equipment as toxic gases (carbon monoxide, etc.) are generated due to combustion or high temperature.
Specific Fire-Fighting Method	:	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-	:	Carry out fire-fighting from the windward in order to avoid

Fighters	breathing hazardous gas. Use personal protective equipment such as fireproof clothing, heat-resistant clothing, protective clothing, compressed air open-circuit self-contained breathing apparatus, compressed oxygen closed-circuit self-contained breathing apparatus, rubber gloves and rubber boots.

6. Accidental Release Measures

Personal Precaution/ 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	:	Adsorb spillage with dry sand, earth or non-active adsorbent, and collect in empty containers the seal tightly. Use appropriate personal protective equipment during the operation to avoid skin contact of splash etc. and inhalation of dust and gas. Carry out the clean-up operation from the windward and make people on the leeward side evacuate.
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	:	Use appropriate personal protective equipment to avoid inhalation and contact with eyes, skin and clothing. Use this CRM in a closed chamber to avoid release to air as far as possible.
Local and General Ventilation	:	Use local ventilation system in indoor handling areas.
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. 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.
Use appropriate personal protective equipment during the operation to avoid skin contact of splash etc. and inhalation of dust and gas.

Storage

Appropriate Storage Conditions	:	Store in a locked area. Store in a closed container in a clean light-shielded place at temperatures around −20 °C.
Safe Container Packaging Material	:	Glass

※Please refer CRM certificate about storage conditions as reference material.

8. Exposure Controls/Personal Protection

Threshold Limit Value Work environment evaluation criteria Permissible Concentration

・ACGIH	:	5 ppm(TLV-TWA) 10 ppm(TLV-STEL) Percutaneous absorption
・Value recommended by Japan Society for Occupational Health	:	5 ppm, 31 mg/m^3

Engineering Controls

・Keep container tightly closed or use local ventilation system in indoor handling area.
・Install safety shower and facilities to rinse eyes and to wash hands in the vicinity of a place handling this reference material and label them clearly.

Personal Protective Equipment (PPE)

Respiratory System	:	Protective gas mask for organic vapors, Self-contained compressed air breathing apparatus.
Hands	:	Protective gloves
Eyes	:	Eye protector with side plates (or Goggle type)
Skin and Body	:	Protective clothing, protection boots

9. Physical and Chemical Properties

・Appearance, etc.	:	Clear liquid
・Color	:	Colorless
・Odor	:	Sweet irritating odor, Chloroform odor
・pH	:	No data
・Melting point	:	−23 °C
・Boiling point	:	76.8 °C
・Flashing point	:	No data
・Explosive range	:	No data
・Vapor pressure	:	12.2 kPa（20 °C）
・Relative vapor	:	No data

density(Air=1)

- Specific gravity or bulk specific gravity : 1.59 g/ml (20 °C)
- Solubility : Insoluble in water (0.08g/100ml,20 °C)
  Miscible with many organic solvents such as alcohol and ether
- *n*-Octanol/water partition coefficient (Log Po/w) : 2.64
- Auto-ignition temperature : No data

10. Stability and Reactivity

◇Stability

Heat-labile

◇Reactivity

Reacts with aluminum, magnesium, zinc, etc. violently to generate toxic and explosive gases.

◇Conditions to Avoid

・Sunlight, Heat.

◇Hazardous Decomposition Products

・Carbon monoxide, chlorine, hydrogen chloride, phosgene

11. Toxicological Information

Acute toxicity	Inhalation Rat LC50:8000 ppm/4H Oral Rat LD50:2350 mg/m^3/4H Skin Rat LD50:5070 mg/kg Dermal Rabbit LDLo:3000 mg/kg Oral Human Female TDLo: 1800 mg/kg Contraction of the pupil, Coma Oral Human Male TDLo: 1700 mg/kg Trembling, Changes in respiratory organ, chest, lungs, digestive organs, etc. (RTECS) Oral Human Male LDLo: 429 mg/kg Changes in pulse, Cyanosis, Invasive nephritis (RTECS) Inhalation Human LCLo: 1000 ppm (RTECS) Oral administration test using rats: LD50 = 2350 mg/kg (Ministry of Environment "Risk Assessment vol.1 (2002)"): 2821 mg/kg, 10054 mg/kg. The calculation equation of EHC 208 (1999) is applied.
Skin Corrosion/ Irritation	Skin irritation Rabbit 4 mg Mild In the skin irritation test using rabbits, "moderate irritation was observed." (CERI・NITE Hazard Assessment Report No.67 (2005))
Serious Eye Damage/ Eye Irritation	Eye irritation Rabbit 2200 µg/30 seconds Mild The results of the eye irritation test using rabbits: "Irritation reaction was observed, but it disappeared completely by the 14th day after application of this reference material ("CERI・NITE Hazard Assessment Report No.67 (2005)").
Germ Cell	No trans-generation mutagenicity test conducted. No germ cell in

Mutagenicity	vivo mutagenicity test conducted. Negative in the somatic cell in vivo mutagenicity test (the chromosome abnormality test and the micronucleus test).
Carcinogenicity	The Industrial Safety and Health Law: Article 28-3 "Chemical substances designated by Minister of Health, Labor and Welfare" NTP: Group b (Reasonably anticipated to be human carcinogen) IARC: Group 2B (Possible carcinogenic to humans) Japan Society for Occupational Health: Group 2B; Substance which may be human carcinogen (with relatively insufficient evidences)
Reproductive Toxicity	The description in "CERI・NITE Hazard Assessment Report No.67 (2005)," ATSDR (2005) and EHC 208(1999) indicates death of embryo and effects on male genital organs at the doses which have general toxicity against parent animals.
Specific Target Organ Toxicity/Systemic Toxicity (Single Exposure)	For humans, "vomit, diarrhea, vertigo, headache and coma, hypohepatia, jaundice, enlargement of the liver, nephropathy and acute renal failure were reported ("CERI・NITE Hazard Assessment Report No.67 (2005)") etc. For laboratory animals, "centrilobular necrosis of the liver" was reported (EHC 208 (1999)) etc. Based on the above, central nerve system, liver and kidney are considered to be the target organs.
Specific Target Organ Toxicity/Systemic Toxicity (Repeated Exposure)	For humans, "significant increase of ALT and γ-GTP and hepatic cirrhosis" were reported ("CERI・NITE Hazard Assessment Report No.67 (2005)") etc. The animal tests revealed "centrilobular hepatocyte vacuolation, histological changes of liver (fatty degeneration, hepatocyte degeneration, ceroid pigmentation, bile duct proliferation, mitosis of hepatocyte and polymorphic and cellular foci increase), thrombus and necrosis of the liver, increase of spleen hemosiderin deposition, hematological changes, abnormal urinalysis results, protein cast in kidney, progressive glomerulopathy and eosinophilic change of nasal cavity mucosal epithelium" ("CERI・NITE Hazard Assessment Report No.67 (2005)") etc.

12. Ecological Information

Degradability, bioacumulation properties

・Degree of decomposition: 0 %(by BOD)

Bioaccumulative Potential

・Bio-concentration factor (BCF): 3.2 to 7.4(10μg/L), 3.8 to 11.0(1μg/L)

Ecotoxicity

・Olyzias latipes　LC50:45 mg/L/48hr

・Algae (Green algae) ErC50=0.46 mg/L/72hr

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	:	1846
UN Classification	:	Class 6.1 (poisonous substance) Class Ⅱ
Shipping Name	:	Carbon Tetrachloride
Packing Group	:	Ⅱ
Marine Pollutant	:	Specified (Class P substance)
Precautions	:	Transport this reference material carefully while keeping it away from direct sunlight and fire and preventing accidental release due to falling, overturning, etc.

15. Regulatory Information

Poisonous and Deleterious Substances Control Act

・Poisonous substance Container grade class 2

Industrial Safety and Health Act

・Article 28-3 Substances listed in the published guideline for prevention of health hazards

・Ordinance on Prevention of Organic Solvent Poisoning Class 1 Organic Solvent

・Article 57-2 (Enforcement Order: Article 18-2) Hazardous substance whose name, etc. must be notified

Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc.

・Type II Monitoring Chemical Substances

Pollutant Release and Transfer Register (PRTR) Law

・Class 1 Designated Chemical Substance No.149

Water Pollution Control Act

・Hazardous substance (Article 2, Enforcement Order: Article 2)

Soil Contamination Countermeasures Act

・Specified Hazardous Substances (Article 2-1, Enforcement Order: Article 1)

Ship Safety Law (Dangerous Material Rule)

・Article 2,3 Annex class 1 Poisonous material

Civil Aeronautics Act

・Ordinance for Enforcement of the Civil Aeronautics Act, Article 194 Poisonous 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.

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.