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 (NMIJ)
Person in Charge	:	Person in Charge of Certified Reference Materials
Telephone No.	:	+81-29-861-4059 Fax No. : +81-29-861-4009
Emergency Contact	:	Same as above
		Prepared on : December 21, 2010
		Revised on : August 31, 2022
		ID Number : 4014001
Identity of Substance/Mixture	:	Certified reference material NMIJ CRM 4014-a 1,1-Dichloroethylene
Recommended Use of the Chemical and Restriction on Use	:	This CRM is primarily intended for use in calibrating analytical instruments. It is also intended for 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:	Flammable liquid	:	Hazard Category 1
	Acute Toxicity (Oral)	:	Hazard Category 4
	Acute Toxicity (inhalation, vapor)	:	Hazard Category 3
	Reproductive toxicity	:	Hazard Category 2
	Specific Target Organ Toxicity/Systemic Toxicity (Single Exposure)	:	Hazard Category 1 (Liver, kidney, respiratory organ) Hazard Category 3 (anesthetic action)
	Specific Target Organ Toxicity/Systemic Toxicity (Repeated Exposure)	:	Hazard Category 1 (Liver) Hazard Category 2 (kidney)
	Respiratory system toxicity, if inhaled	:	Hazard Category 2
	Water environment toxicity (Acute)	:	Hazard Category 3

GHS Label Element:

Signal Word: Danger

Hazards Statement:
Highly flammable liquid and vapor
Harmful if swallowed.
Harmful if inhaled.
Suspected of damaging fertility or the unborn child
May cause damage to organ (Liver, kidney, respiratory system)
May cause drowsiness or dizziness
Causes damage to organ (liver) through prolonged or repeated exposure
May cause damage to organ (kidney) through prolonged or repeated exposure
May be harmful if swallowed and enters airways
Harmful to aquatic life

Precautionary Statement:
［Precaution］
Do not eat, drink or smoke when using this product.
Do not handle until all safety precautions have been read and understood.
Use only outdoors or in a well-ventilated area.
Use only non-sparking tools.
Avoid release to the environment.
Wash personal protective equipment thoroughly after use.
Take precautions against electrostatic discharge and use explosion-proof electrical/ventilating/lighting equipment.
Keep away from ignition sources such as heat/sparks/open flames/hot surfaces. – No smoking.
Use personal protective equipment if necessary.
Do not breathe dust, fume, mist, vapors, spray, etc.
Use protective gloves, protective glasses and face mask.
Use explosion-proof electrical/ventilating/lighting equipment.
Ground container and receiving equipment.
Seal tightly after use.
［First-aid Action］
If swallowed: Rinse mouth. Do not induce vomiting. Immediately get medical advice/attention.
Get medical advice/attention if you feel unwell.
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 all contaminated clothing and adhered materials. Rinse skin and hair with running water. Immediately get medical advice/attention.
If exposed or concerned: Get medical advice/attention.
［Storage］

Store this CRM in dark, cool (about -20 °C), clean and well ventilated place, and seal tightly after use.

［Disposal］

Incinerate 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.

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

3. Composition/Information on Ingredients

Substance/Mixture	:	Single substance
Chemical Identity	:	1,1-dichloroethylene
Synonym	:	Vinylidene chloride, unsym- dichloroethylene
Content	:	99.99%
Chemical Formula or Structural Formula	:	CCl_2CH_2
Molecuar Weight	:	96.94
Reference Number in Gazetted List in Japan	:	Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. : (2)-103 Industrial Safety and Health Act : Published
CAS Number	:	75-35-4
Hazardous Ingredient	:	1,1-dichloroethylene

4. First-aid Measures

If inhaled	:	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Then get medical advice/attention immediately.
If on skin	:	Rinse thoroughly and immediately with plenty of clean water. Then get medical advice/attention immediately.
If in eyes	:	Rinse with plenty of water immediately for 15 minutes or more. Turn eyelids with clean fingers to rinse their inside. Then get medical advice/attention immediately.
If swallowed	:	Rinse mouse with water and have victim drink plenty of water to dilute. Get medical advice/attention immediately. Do not induce vomiting.
Expected Acute and Delayed Symptom	:	If inhaled: Causes dizziness, lethargy, headache, nausea and loss of consciousness If on skin: Causes red flare and skin burns If in eyes: Causes red flare and pain If ingested: Causes stomachache, pharyngodynia and chemical pneumonitis (which may be delayed symptoms)
Most Critical Characteristic and Symptom	:	-

Protection of First-Aid Responder	:	Use appropriate protective equipment, if necessary.

5.Fire-fighting Measures

Extinguishing Media	:	Powder, foam, carbon dioxide, water spray (rod-like water injection prohibited).
Fire-Specific Hazards	:	May form irritating or toxic fume (or gas) at the time of fire. Extinguish from windward, Use personal protective equipment to avoid inhaling fume or toxic gases.
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-Fighters	:	Carry out fire-fighting from the windward in order to avoid 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 Personal Protective Equipment	:	Remove ignition source in the vicinity immediately. Prepare fire-fighting equipment for the possibility of fires.
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	:	Strict ban on fire. Use appropriate personal protective equipment. Adsorb spillage with waste clothes or wiping clothes, and collect in empty containers. 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	:	Strict ban on fire.

Precautions		Keep away from hot surfaces, sparks and contact with an oxidizing agent.
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. 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 to avoid inhalation and contact with eyes, skin and clothing. Restrict drinking, eating and smoking to a designated area. Use local ventilation system in indoor handling areas. Electrical equipment to be used in the storage location should be explosion-proof structure, and grounded, if necessary. Use electrically-conductive work clothing and work shoes.
Storage		
Appropriate Storage Conditions	:	Use explosion-proof electrical equipment and ground all equipment in storage area. Store in a closed container in a clean light-shielded place at temperatures around -20 °C.
Engineering Controls	:	Store in a closed container in a well-ventilated place. Strict ban on fire. Protect from sunlight.
Incompatible Materials	:	Keep away from strong oxidizer and ignition source.
Safe Container Packaging Material	:	Glass

8. Exposure Controls/Personal Protection

Threshold Limit Value

Not specified

Permissible Concentration (1,1-dichloroethylene)

・ACGIH TLV-TWA (2000)	:	5ppm(20mg/m^3)
・Value recommended by Japan Society for Occupational Health (1998)	:	Not specified
・OSHA PEL TWA	:	Not specified

Facility engineering

Ventilation, exhaust	:	Local exhaust ventilation system or general ventilation system
Safety management/gas detector	:	Measuring instrument、detector tube
Storing precaution	:	Ventilate along floor surface. Seal. Keep away from flammable substances, reducing agents and strong oxidizers.
Personal Protective equipment		
Respiratory protection		Protective gas mask for organic vapors, Self-contained compressed air breathing apparatus,
Hands	:	Protective gloves
Eyes	:	Eye protector (Goggle type as necessary)
Skin and Body	:	Protective clothing, Protective mask

9. Physical and Chemical Properties

・Appearance, etc.	:	Clear liquid
・Color	:	Colorless
・Odor	:	Sweet smell
・pH	:	No data
・Melting point	:	-122.5 °C
・Boiling point	:	31.7 °C
・Flashing point	:	-25 °C (closed cup method)
・Explosive range	:	Lower limit ; 5.6%, upper limit ; 16 %
・Vapor pressure	:	960 hPa(30 °C)
・Relative vapor density(Air=1)	:	3.4
・Specific gravity or bulk specific gravity	:	1.2129
・Solubility	:	0.25g/100ml(in water at 25 °C) Soluble in many organic solvents
・*n*-Octanol/water partition coefficient (Log Po/w)	:	1.32
・Auto-ignition temperature	:	No data

10. Stability and Reactivity

◇Stability

- ・Easily get polymerized by heating and effects of oxygen , sunlight, copper and aluminum to pose a danger such as fire and explosion.
- ・Easily generates explosive peroxide.
- ・Generates peroxide when contacting with oxygen and get polymerized by heat, light and free radical polymerization catalyst.

◇Reactivity

- ・Extremely reactive with oxidizer

◇Conditions to Avoid

- ・Exposure to sunlight, ignition source, air and ozone, Overheating, Contact with

incompatible substances

◇Conditions to Avoid

・Exposure to sunlight, ignition source, air and ozone, Overheating, Contact with incompatible substances

11. Toxicological Information

Acute Toxicity	Oral – Rat　LD50＝200 mg/kg (RTECS) Mouse　LD50＝194 mg/kg (RTECS) Inhalation – Rat　LC50＝6,350 ppm/4H (RTECS) Human　TCLo＝25 ppm (RTECS) Oral: Classified as Category 4, based on LD50＝1,500 mg/kg obtained by applying the calculation equation, referring to LD50 1,550 mg/kg, 1,800 mg/kg and 1,500 mg/kg obtained in the oral administration test using rats (CICAD 51 (2003)). Inhalation: The results of the inhalation exposure test (vapor) using rats are as follows: LC50 1.66 mg/L (4 hours) ("CERI・NITE Hazard Assessment Report No.48 (2004)"), 26.18 mg/L (4 hours) ("CERI・NITE Hazard Assessment Report No.48 (2004)"), 25 mg/L (CICAD 51 (2003)), 25.4 mg/L (4 hours) (EHC 100 (1990)), 60 mg/L (4 hours) (EHC 100 (1990)) and 28.4 mg/L (4 hours) (EHC 100 (1990)).　LC50 (four-hour equivalent value) = 2,300 ppm is obtained by applying the calculation equation based on the above test results.　Saturated water vapor pressure concentration at saturated vapor pressure of 78.79 kPa (25°C) is 780,000 ppm.　Since the calculated LC50 is lower than 90% of the saturated water vapor pressure concentration, this reference material is regarded as "vapor containing almost no mist."　Based on the above, the ppm-based reference value instead of the mg/L-based reference value is applied and classified as Category 3.
Skin Corrosion/ Irritation	not specified
Serious eye damage/ Eye irritation	not specified
Germ Cell Mutagenicity	No classification
Carcinogenicity	Group 3（not specified for human Carcinogenicity）（IARC） A 4（not specified）（ACGIH）
Reproductive Toxicity	At the doses which have general toxicity against mother animals, effects on the next generation were observed ("CERI・NITE Hazard Assessment Report No.48 (2005)" and CICAD 51 (2003)). In the experiment reported by Dawson et.al (1993), at the doses which had no effects on mother animals, mutation of the heart was observed in the next generation.　CICAD 51 (2003), however, commented that biological significance of this experiment result was not clear and that it was impossible to

	conclude the reported effect was attributed to this reference material. The experimental result, therefore, was not used as the grounds for the classification.
Specific Target Organ Toxicity/Systemic Toxicity (Single Exposure)	For humans, it was reported that “depression or excitation of central nerve system was observed and, when the symptom was serious, developed into unconsciousness” and that “irritation was caused through several-minute exposure” (“CERI・NITE Hazard Assessment Report No.48(2005)”) etc. In the animal tests, “damage in capillary blood vessel and proximal renal tubule, centrilobular necrosis of liver and congestive edema in lungs” were reported (“CERI・NITE Hazard Assessment Report No.48 (2005)”) etc. Based on the above, it is considered that the target organs are liver, kidney and respiratory organ and that this reference material features anesthetic action. The effects on the laboratory animals were within the range of the Guidance values equivalent to Category 1.
Specific Target Organ Toxicity/Systemic Toxicity (Repeated Exposure)	For humans, “disorder of liver function” was reported (“CERI・NITE Hazard Assessment Report No.48 (2005)”) etc. In the animal tests, “swelling of hepatocyte with mild centrilobular fatty degeneration, minor regressive kidney degeneration, ulcer and fatty degeneration and focal necrosis of liver” were reported (“CERI・NITE Hazard Assessment Report No.48 (2005)”) etc. Based on the above, liver and kidney are considered to be the target organs. The effects on the laboratory animals were within the range of the Guidance values equivalent to Category 1 while the effects on kidney were within the range of Guidance values equivalent to Category 2.
Toxicity to Respiratory Organ (Aspiration)	There are several descriptions: “If humans swallow the liquid, they may develop chemical pneumonia due to aspiration” (ICSC (J) (2000)). “If humans ingest vinylidene chloride, it is better to rinse mouth with water. Do not induce vomiting. Vomiting may result in aspiration, and vinylidene chloride may enter throat and/or lungs” (EHC 100 (1990)).
Others	EPA: Group C (Possibly carcinogenic to humans)

12. Ecological Information

Persistence and Degradability

・Not degradable by-microorganisms
  0% by BOD

Bioaccumulative Potential

・Bio-concentration factor (BCF); 2.5 ～ 6.4 (Concentration 0.5 mg/L);
  13 (Concentration 0.05 mg/L)

Ecotoxicity

・Oryzias latipes LC50/48H: 20 mg/L

・Crustacea (Daphnia magna) EC50＝11.6 mg/L (“CERI･NITE Hazard Assessment Report (2005)”)

13. Disposal Considerations

Residual Waste	:	Incineration method Dissolve this reference material in combustible solvent. Spray it into an incinerator equipped with scrubber and incinerate it. Purify wastewater containing this reference material by treating it with activated carbon etc. before discharging it. Dispose in accordance with applicable legislation (Waste Disposal and Public Cleaning Act) and local government codes. When the above-mentioned treatments are not possible, entrust disposal of residual waste to a professional waste disposal company licensed by prefectural governor.
Contaminated Container and Package	:	Dispose of containers after thoroughly removing their contents.

14. Transport Information

UN Number	:	1303
UN Classification	:	Class 3(Flammable Liquid)
Shipping Name	:	1,1-Dichloroethylene (Vinylidene chloride)
Packing Group	:	PG Ⅰ
ICAO/IATA	:	-
Marine Pollutant	:	Specified
Precautions	:	Check before transport if containers are free from leakage. Load in a way to avoid overturning, falling and being broken, and take all necessary measures to prevent collapsing.

15. Regulatory Information

◇ Fire Service Act
- ・Type 4 Hazardous Substance, special inflammable substances (Water-insoluble)

◇Industrial Safety and Health Act
- ・Article 57 (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.241
- ・Enforcement Order Appendix 1-4 Dangerous substance (Flammable goods)

◇Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc.
- ・Type II Monitoring Chemical Substances

◇Ship Safety Law (Dangerous Material Rule)
- ・Flammable Liquids

◇Civil Aeronautics Act
・Flammable Liquid
◇Act for the Prevention of Marine Pollution and Maritime Disasters
・Enforcement Order Appendix 1 Hazardous Liquid Substance Class P Substance
◇Pollutant Release and Transfer Register (PRTR) Law
・Class 1 Designated chemical substances No.158
◇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)

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.