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 : Sept. 22, 2010
		Revised on : August 31, 2022
		Reference No. : 4005001
Identity of Substance/Mixture	:	Certified Reference Material NMIJ CRM 4005-a Dichloromethane
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 :	Acute toxicity (Oral)	:	Class 4
	Skin corrosivity/irritation	:	Class 2
	Severe damage to eye/eye irritation	:	Class 2A
	Carcinogenicity	:	Class 2
	Particular target organ/systemic toxicity (Single exposure)	:	Class 1 (Central nervous system, espiratory organ) Class 3 (Anesthetic action)
	Particular target organ/systemic toxicity (Repeated exposure)	:	Class 1 (Central nervous system, liver)
	Water environment toxicity (Acute)	:	Class 2
	Water environment toxicity (Chronicle)	:	Class 2

GHS Label element:

Signal word: Danger

Hazard and toxicity: Skin irritant
Severe eye irritant
Toxic if swallowed
Potential carcinogenicity
Damages to organs (central nervous system, respiratory organ)
Possible drowsiness or dizziness
Damages to organs due to long-term or repeated exposure (central nervous System, liver)
Harmful to aquatic organisms
Harmful to aquatic organisms due to long-term effect

Precautionary statement : [Preventive measures]
Prior to using this material, obtain the instruction manual. Do not handle the material before understanding the safety precautions fully. Avoid inhaling vapor. Install local ventilation system.
Wash hands well after the handling.
Do not eat, drink or smoke when handling this material.
Use designated personal protective equipment, gloves, eyeglasses/mask.
Avoid discharging to the environment.
[Response]
If swallowed : Rinse mouth well. If feeling ill, get medical assistance
If on skin : Rinse with plenty of water using soap. In case of irritation, get medical assistance/treatment.
Take off the contaminated clothes. If reusing them, wash them before using.
If in eyes : Rinse carefully with water for several minutes. If using contact lenses, take them out if possible and continue rinsing.
If the irritation persists, get medical assistance.
If inhaled : Move to get a fresh air, take a comfortable posture to ease breathing and rest. Get medical assistance.
[Storage]
Keep the container airtight. Keep in a locked cabinet in a well ventilated place at the temperature of about −20 °C
[Disposal]
The content or container should be outsourced to a professional industrial waste disposal contractor licensed by the prefectural governor.

Hazardous and toxic properties not specified in the above are neither the object of the classification nor classifiable.

3. Composition/Information on Ingredients

Substance or mixture : Single product

Chemical name	:	Dichloromethane
Other name	:	Methylene chloride、methylene dichloride
Content	:	100%
Chemical formula or structural formula	:	CH_2Cl_2
Molecular weight		84.93
Authorization value	:	100 %
Reference Number in Gazetted List in Japan	:	Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. : (2)-36 Industrial Safety and Health Act : Published
CAS No.	:	75-09-2
Hazardous component	:	Dichloromethane

4. First-aid Measures

If in eye	:	Rinse carefully with water for several minutes. If using contact lenses, take them out if possible and continue rinsing. If the irritation persists, get medical assistance.
If on skin	:	Rinse with plenty of water and soap. In case of irritation, get medical assistance. Take off the contaminated clothes, wash them before reusing.
If inhaled	:	Move to a fresh air, take a comfortable posture to ease the breathing and rest. Get medical assistance.
If swallowed	:	Wash mouth well with water. If feeling ill, get medical assistance.
Anticipated acute and delayed symptoms	:	Inflammation, pain, chemical burn in contact with eyes or skin, or sleepiness, drowsiness, headache, nausea, weakness, loss of consciousness by inhalation.
Most important characteristics and symptoms	:	Not specified.
Measures to be taken to protect the person applying emergency first aid	:	Beware of fire. Use protective mask, etc. on the spot to avoid inhaling the gas.

5. Fire-fighting Measures

Extinguishing media	:	Powder、foam、carbon dioxide、dry-chemical extinguishing system in the early stages. Alcohol-resistant aqueous film forming foams, carbon dioxide, powder, sand, water
Specific hazards at the time of fire	:	Flammable liquid in oxygen/air-mixture. When heated vigorously, notably decomposes in contact with open flame and produces toxic phosgene and hydrogen chloride gas.
Specific extinguishing measures	:	If possible, transfer the container away from the fire area If impossible to transfer, spray the container and its periphery with

water to cool down. Continue to cool the container well with plenty of water for a while even after the fire is extinguished.

Protecting fire-fighting personnel : Extinguishing activities on windward side, avoid inhaling toxic gases.
Use protective equipment such as fire-resistant clothing, heat-resistant protective clothing, protective clothing, air-breathing apparatus, closed-circuit self-contained oxygen breathing apparatus, rubber gloves, rubber boots, etc.

6. Accidental Release Measures

Personal precautions Protective equipment and emergency procedure : Do not touch or walk on the spilled material. Designate the spilled area appropriately to keep people away from the area. Prohibit unauthorized persons entering the area.
Use appropriate protective equipment to avoid contact with eyes, skin and to prevent inhaling gases. If there is no fire after the spill, use airtight impermeable protective clothing. Remain on the windward.
Move out from lower ground. Ventilate well before entering the closed area.

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 : If the spill/leak is of a small amount, absorb it to dry soil, sand or nonflammable material or cover it up and collect it in an empty airtight container. When collecting small amount spill, use clean antistatic tool to collect the absorbed material.
If the spill is of a large amount, surround the spillage by banking to prevent the overflow, and steer the spill toward a safe area. Water spray lowers the vapor density. But it may not be possible to control combustion in a closed area.

Containment and purification methods and equipment : If there is no risk, stop the spill/leak. All the equipment that will be used to handle the spill/leak should be earthed. Vapor compression foam should be used to lower the vapor concentration.

Measures to prevent secondary accident : Remove all sources of fire promptly (smoking, fire work, open flame prohibited nearby). Prevent the spill to flow into sewage, drainage or basement and into closed area.

7. Handling and Storage

Handling

Technological counter measures : Open flame or other source of ignition prohibited. Avoid contact with high temperature matter, sparks, strong oxidants, etc.

Local ventilation/ : Use local exhaust ventilation system, general ventilation

general ventilation system.

Precautions for safe handling : Do not treat the container roughly, no dropping, knocking down or dragging that causes shock.
Prevent leakage, spillage or overflow that causes fume to form.
Obtain the instruction manual before handling. Do not handle the material before understanding the safety precautions fully.
Close the container airtight after handling.
Wash hands, face, etc. well and gargle after the handling
Handle in outside work place or in a well ventilated area only.
Do not eat, drink or smoke when handling.
Take off the gloves or other contaminated protective equipment when going to resting areas.
Entering the handling area only by the authorized persons.
Use appropriate protective equipment to prevent inhaling, coming in contact with eyes, skin and the clothing

Storage

Appropriate condition : Close the container airtight, separate it from fire sources such as heat, spark, open flame.
Store in a well ventilated, locked place at the temperature of about −20 °C

Material for safe packing : Glass

8. Exposure Controls/Personal Protection

Administrative levels

Working Environment Evaluation Standards : 50 ppm

Occupational exposure limit (Chemical name)

・ACGIH TLV-TWA (2004) : TWA 50 ppm, 174 mg/m^3

・Japan Society for Occupational Health Recommended Reference Value (1998) : 50 ppm, 170 mg/m^3 (Dermal absorption)
100 ppm 340 mg/m^3(Maximum exposure limit; always maintain below this exposure limit)

・OSHA PEL TWA : TWA 25 ppm, STEL 125 ppm,
action level=12.5 ppm Skin hazard

Facility Engineering

Ventilation, exhaust : Local exhaust ventilation system or general ventilation system

Safety management, gas detection : Measuring instrument, detector

Storage precaution : Ventilate along the floor surface. Seal. Separate from flammable material, reducing agents and strong oxidizers.

Protective equipment

Respiratory organ : Chemical cartridge respirator for organic gas, breathing

		apparatus
Hand	:	Protective gloves
Eye	:	Protective eyeglasses
Skin and body	:	Protective clothing, protective boots
Sanitary measures	:	Do not eat, drink or smoke when handling. Wash hands well after the handling

9. Physical and Chemical Properties

・Appearance, etc.	:	Clear liquid
・Color	:	Colorless
・Odor	:	Peculiar odor
・pH	:	No data
・Melting point	:	−95.1 °C
・Boiling point	:	40 °C
・Flashing point	:	No data
・Explosive range	:	Lower limit 12 vol %, higher limit 25 vol %
・Vapor pressure	:	27.4 kPa (20 °C)
・Relative vapor density(Air=1)	:	2.93 (Calculated value)
・Specific gravity or bulk specific gravity	:	1.3255 (20 °C/4 °C)
・Solubility	:	1.3g/100ml (20 °C)
・*n*-Octanol/water partition coefficient (Log Po/w)	:	1.25 (Calculated value)
・Auto-ignition temperature	:	556 °C
・Flammability	:	Flammability increases dramatically when a small amount of flammable substance is added or due to the increase in oxygen concentration in the air.

10. Stability and Reactivity

◇Stability

・Not stable in heat or humidity. Decomposes when heated or by combustion and produces toxic gases (chloroethylene, hydrogen chloride, phosgene and carbon monoxide).

◇Reactivity

・May cause fire or explosion by reacting violently with metals such as strong oxidizers, strong base
aluminum powder, magnesium powder and sodium, calcium.

◇Conditions to avoid

・Exposure to high temperature, in contact with strong oxidizers, strong base, alkali metal, metallic powder

◇Incompatible materials

・Strong oxidizers, strong base, alkali metal, metallic powder

◇Hazardous decomposition products

・Toxic gases such as hydrogen chloride, phosgene, etc.

11. Toxicological Information

Acute toxicity	Oral rat Class 4 Taken the lower value based on LD50=2100 mg/kg (CERI Hazard Data 96-2 (1997)) and 1600 mg/kg (Ministry of the Environment, Risk Assessment, Volume 2 (2003))
Skin corrosivity/irritation	Class 2 Based on the description of the results of skin irritation tests using rabbits "shown moderate irritation, but no skin corrosivity"(CERI・NITE Hazard Assessment Report No.15 (2004))
Severe damage to eyes/ eye irritation	Class 2A Based on the description of the results of eye irritation tests using rabbits, "shown moderate to severe inflammation in eyelids"(CERI・NITE Hazard Assessment ReportNo.15 (2004))
Carcinogenicity	Class 2 Based on the classifications, R by NTP (2005)、Group 2B by IARC (1999)、A3 by ACGIH (2001), B2 by EPA (1993)
Particular target organ/ systemic toxicity (Single exposure)	Class 1 (Central nervous system, respiratory organ) Class 3 (Anesthetic action) The above organs are considered target organs based on the human evidence including "cyanosis", "headache, chest pain, disorientation, progressive loss of alertness, increased feeling of fatigue and psychological inertia, loss of memory, loss of time sense", "decrease in critical flicker frequency in visual function tests", "neurobehavioral effects (confusion of wariness or failures of various guarding actions)", "edema associated with pulmonary hemorrhage, pneumonia associated with skin inflammation/induration, cerebral edema associated with tonsillar herniation", etc. (CERI・NITE Hazard Assessment Report No.15 (2004)) and the evidence from animal studies including "necrosis of bronchial/bronchiolar epithelial cells, swelling/vacuolation of clara cells, slight increase in cell division rates" and "changes in somatosensory reactions and brain waves" (CERI・NITE Hazard Assessment Report No.15 (2004)). The effects on experimental animals were observed at dosing levels within the guidance value ranges for Category 2
Particular target organ/ systemic toxicity (Repetitive exposure)	Classified as Class 1 (Central nervous system, liver) Based on the human evidence including "intermittent headache, nausea, flickering vision, breathlessness, temporary memory disorder and right brain damage found in electroencephalography" (CERI・NITE Hazard Assessment Report No.15 (2004)), "cerebropathy associated with auditory/visionary hallucinations after exposure", "memory disorder associated with intellectual impairment, loss and balance, temporary bilateral degeneration of temporal lobe (HSDB (2000)) etc. described. The evidence from animal studies including "hepatocytes positively stained fat, mild vacuolation of hepatocytes" and "mutant hepatocytes (CERI・NITE Hazard Assessment Report No.15 (2004)) etc. The effects on experimental animals were observed at dosing

Hazardous to aquatic environment (acute)	levels within the guidance value ranges for Category 1. Classified into Category 2 from 96-hour LC50=5.2 mg/L in fish (Fathead minnows)(EHC164、1996)
Hazardous to aquatic environment (chronic)	Classified into Category 2 based on no rapid degeneration observed (decomposition by BOD:13 %, Safety Inspection Data of Existing Chemical Substances) even though it was classified into acute toxicity Category 2 and is low in bio-accumulation (BCF=40(Safety Inspection Data of Existing Chemical Substances)).

12. Ecological Information

Degradability, concentration

・Extent of degradation 5 % to 26 % by BOD

Bioaccumulation

・Concentration rate (BCF) 2.0 to 5.4 (Concentration 250 mg/L)；＜ 6.4 ～40 (Concentration 25 mg/L)

Ecotoxicity

・Red killifish LC50/48H:331 mg/L

・Fathead minnow LC50/96H:5.2 mg/L

13. Disposal Considerations

Waste from residues	:	The waste should be disposed of according to the related laws and regulations as well as according to the standards of local government. If there are professional waste disposal contractors licensed by the prefectural governor or a local public agency, the waste treatment shall be outsourced to one of them. When outsourcing the waste treatment, the hazard and toxicity of the waste should be informed fully. This material is a specially-controlled industrial waste that should be disposed of according to the specially-controlled industrial waste treatment stipulated in Waste Management and Public Cleansing Act. Prevent discharging the liquid waste and detergent drain that contain this material into river, etc. directly or landfilling or dumping before treating it appropriately. Incinerate in the afterburner and incinerator equipped with scrubber.
Contaminated container and package	:	Before disposing the container, dispose of the content completely.

14. Transport Information

UN Number	:	1593
UN Classification	:	Class 6.1 (Poisonous substance)
Material name	:	Dichloromethane
Container grade	:	PG III

ICAO/IATA	: Class 6.1 Grade Ⅲ
Marine pollutant	: Not applicable
Precautions	: Avoid direct sunlight. Transport carefully, prevent the container from falling or dropping that may cause leak/spill. Keep away from fire sources.

15. Regulatory Information

◇Industrial Safety and Health Act (Law)

・Article 57, 2 of the Law (Article 18, 2 of the Order) , Toxic substances of which the names etc. are subject to the notification (No. 257)

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

・Ordinance on the Prevention of Organic Solvent Poisoning, Class 2

・Chemical substances publicized in the Guidelines for the Prevention of Health Impairment

・Existing chemical substance that has been proven positive in a mutagenicity test

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

・Type II Monitoring Chemical Substances

◇Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof (PRTR system Pollutant Release and Transfer Register)

・Class 1 Designated chemical substances (No. 186)

◇Ship Safety Act

・Poisonous substances・poisonous substance

◇Civil Aeronautic Act

・Poisonous substances・poisonous substance

◇Water Pollution Control Act

・Harmful substance

◇Soil Contamination Countermeasures Act

・Designated Hazardous Substances

◇Labour Standards Act

・Disease causing chemical substances

◎ 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.