Safety Data Sheet

National Institute of Advanced Industrial Science and Technology
AIST

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 : August 29, 2007
		Revised on : May 10, 2018
		ID Number : 4019001
Identity of Substance/Mixture	:	Certified reference material NMIJ CRM 4019-a Bromoform (Tribromomethane)
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.

2. Hazards Identification

GHS Classification:	Acute Toxicity(Oral)	:	Hazard Category 4
	Skin corrosion/irritation	:	Hazard Category 2
	Serious Eye Damage/ Eye Irritation	:	Hazard Category 2A
	Germ cell mutagenicity	:	Hazard Category 2
	Carcinogenicity	:	Hazard Category 2
	Reproductive toxicity	:	Hazard Category 2
	Specific Target Organ Toxicity/Systemic Toxicity (Single Exposure)	:	Hazard Category 1 (Liver) Hazard Category 1 (nervous system) Hazard Category 1 (Respiratory organ) Hazard Category 3 (anesthetic action)
	Specific Target Organ Toxicity/Systemic Toxicity (Repeated Exposure)	:	Hazard Category 1 (Liver) Hazard Category 2 (kidney) Hazard Category 2 (thyroid gland) Hazard Category 2 (anesthetic action)

	Water environment toxicity (Acute)	: Hazard Category 2
	Water environment toxicity (Prolonged)	: Hazard Category 2

GHS Label Element:

Signal Word: Danger

Hazards Statement:
Skin irritancy
Strong eye irritancy
Harmful if swallowed.
Suspected of causing genic disorder
Suspected of causing cancer
Suspected of damaging fertility or the unborn child
Suspected of damaging fertility or the unborn child
Causes damage to organs (liver, nerve system and respiratory organ)
May cause drowsiness or dizziness
Causes damage to organ (liver) through prolonged or repeated exposure
May cause damage to organs (kidney, thyroid gland and nerve system) through prolonged or repeated exposure
Harmful to aquatic life
May cause damage to aquatic life through prolonged or repeated exposure

Other hazard and: toxicity: -

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.
Avoid release to the environment.
Wash hands thoroughly after handling.
Do not breathe dust, fume, mist, vapors, spray, etc.
Use protective gloves, protective glasses and face mask.
Use personal protective equipment if necessary.
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.
If exposed or concerned: Get medical advice/attention.
In case of leakage, collect the spillage.
［Storage］
This CRM should be kept in locked and keyed.
Store this CRM in dark, cool (about −20 °C), clean and well ventilated place, and seal tightly after use.
［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.

The other hazards than the above do not result in classification or are not classifiable.
［Storage］
Store this CRM in dark, cool (about −20 °C), clean and well ventilated place.
［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.

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

3. Composition/Information on Ingredients

Substance or Mixture	:	Single substance
Chemical Identity	:	Bromoform
Synonym	:	Tribromomethane
Content	:	99.96 %
Chemical Formula or Structural Formula	:	$CHBr_3$
Molecuar Weight	:	252.73
Reference Number in Gazetted List in Japan	:	Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. : (2)-40 Industrial Safety and Health Act : Published
CAS Number	:	75-25-2
TSCA	:	Listed
EINECS	:	2008546
Hazardous Ingredient	:	Bromoform Stabilizer: 2-methyl-2-butene

4. First-aid Measures

If in Eyes	:	Rinse away thoroughly with clean water. Get medical advice/attention.
If on skin	:	Remove/Take off all contaminated clothing. Wash skin with plenty of soap and water/shower. If skin irritation occurs: Get medical advice/attention.
If Inhaled	:	Remove victim to fresh air, rest, and keep warm. Get medical advice/attention.
If swallowed	:	Rinse his/her mouse with plenty of water. Get medical advice/attention in case of abnormalities.
Expected Acute and Delayed Symptom	:	-
Most Critical Characteristic and Symptom	:	-
Protecting Personnel in emergency measures	:	Wear protective equipment such as rubber gloves, and goggles.

5.Fire-fighting Measures

Extinguishing Media	:	This material is incombustible. Use a fire extinguishing agent suitable for surrounding fire.
Fire-Specific Hazards	:	May form irritating or toxic fume or gas (Hydrogen bromide, bromine, bromine oxide, etc.) at the time of fire.
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	:	Remove ignition source in the vicinity immediately. Prepare fire-fighting equipment for the possibility of fires.
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 waste cloth, wiping close, dry sand, earth or non-active adsorbent, and collect in empty containers the seal tightly.

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 : Avoid contact with strong oxidizers and strong alkalis. Strict ban on fire.

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.
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 closed container in a cool and dark place at temperatures around −20 °C.
Store away from strong oxidizer and strong alkali.

Safe Container Packaging Material : Glass

8. Exposure Controls/Personal Protection

Threshold Limit Value

Not specified

Permissible Concentration

- ACGIH TLV-TWA : TWA 0.5 ppm (skin)
- Value recommended by Japan Society for Occupational Health : Not specified
- OSHA PEL TWA : air TWA 0.5 ppm (skin)

Engineering Controls

Ventilation/Exhaust	:	Local ventilation system or General ventilation system
Safety Control/ Gas Detection	:	-
Storage Precaution	:	-

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

9. Physical and Chemical Properties

・Appearance, etc.	:	Liquid
・Color	:	Colorless and clear
・Odor	:	Specific odor
・pH	:	No data
・Melting point	:	6.9 °C
・Boiling point	:	149 °C to 152 °C
・Flashing point	:	No data
・Explosive range	:	No data
・Vapor pressure	:	0.67 kPa (20 °C)
・Relative vapor density(Air=1)	:	4.5
・Specific gravity or bulk specific gravity	:	2.9
・Solubility	:	Slightly soluble in water (0.1 g/100mlin water at 20 °C), soluble in methanol and ether.
・*n*-Octanol/water partition coefficient (Log Po/w)	:	2.40
・Auto-ignition temperature	:	No data

10. Stability and Reactivity

◇Stability

・Stable under normal conditions.　Gets decomposed by heat or light to generate toxic gas.

◇Reactivity

・React violently with alkali, alkali earth metal, various metal powders, strong oxidizer and strong base.

◇Conditions to Avoid

・Direct sunlight, heat and contact with oxidizer.

◇Hazardous Decomposition Products

・Hydrogen bromide, bromine

11. Toxicological Information

Acute toxicity　　Oral　Human　　LDLo : 143 mg/kg

	Oral Rat LD50 : 933 mg/kg (RTECS) Abdominal cavity Rat LD50 : 414 mg/kg (RTECS) Oral Mouse LD50 : 1072 mg/kg Abdominal cavity Mouse LD50 : 1274 mg/kg (RTECS) Dermal Mouse LD50 : 1820 mg/kg (RTECS)
Skin Corrosion/ Irritation	In the skin irritation test using rabbits, moderate irritation was observed ("CERI Hazard Data Collection 2000-11 (2001)").
Serious Eye Damage/ Eye Irritation	In the eye irritation test using rabbits, moderate irritation was observed ("CERI Hazard Data Collection 2000-11 (2001)").
Germ Cell Mutagenicity	No data available in the trans-generation mutagenicity test / the germ cell in vivo mutagenicity test. Positive result was presented by the somatic cell in vivo mutagenicity test. There was no positive result in the germ cell in vivo hereditary test. ("CERI・NITE Hazard Assessment Report No.37 (2004)").
Carcinogenicity	Classified as Group 3 in IARC (2002), but as Group B2 in EPA (2002) and Group A3 in ACGIH (2001).
Reproductive Toxicity	Classified as Group 3 in IARC (2002), but as Group B2 in EPA (2002) and Group A3 in ACGIH (2001).
Specific Target Organ Toxicity/Systemic Toxicity (Single Exposure)	At the doses which were found toxic to mother animals, all embryos died ("CERI・NITE Hazard Assessment Report No.38 (2004)").
Specific Target Organ Toxicity/Systemic Toxicity (Repeated Exposure)	For humans, strong hepatic disorder, depression of central nerve system and pulmonary edema were reported ("CERI・NITE Hazard Assessment Report No.38 (2004)"). For laboratory animals, the target organs are liver, kidney, central nerve and respiratory organ, but the doses to induce effects are relatively high.

12. Ecological Information

Degradability, bioacumulation properties

・Degree of decomposition: 0% by GC analysis

Bioaccumulative Potential

・Bio-concentration factor (BCF): 7.1～21 (Concentration: 0.1 mg/l; 7.7～19 (Concentration: 0.01 mg/l)

Ecotoxicity

・Olyzias latipes LC50: 40.4 mg/L/48 hours
Fishes (Sheepshead Minnow): 96 hours LC50=7100 µg/L (Ministry of Environment "Risk Assessment vol.2 (2003)")
Acute Toxicity: Category 2; Although bioaccumulation is limited (BCF=21 ("Existing Chemical Substance Safety Check Data")), this reference material is not degraded rapidly (Directly-measured degradability (GC): 0 % ("Existing Chemical Substance Safety Check Data")).

13. Disposal Considerations

・Incinerate this reference material in an incinerator equipped with afterburner and scrubber.

14. Transport Information

UN Number	:	2515
UN Classification	:	Class 6.1
Shipping Name	:	Bromoform (Tribromomethane)
Packing Group	:	PG Ⅲ
ICAO/IATA	:	Class 6 Type Ⅲ
Marine Pollutant	:	P
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

◇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

◇Ship Safety Law

・Poisonous substances

◇Pollutant Release and Transfer Register (PRTR) Law

・Class 2 Designated chemical substances No. 66

◇Industrial Safety and Health Act

・Article 57-2 (Enforcement Order: Article 18-2) Hazardous substance whose name, etc. must be notified No. 401

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.