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 : April 1, 2021
		Revised on :
		Reference No. : 4076001
Identity of substance/mixture	:	Reference Material, NMIJ RM 4076-a Short-Chain Chlorinated Paraffins
Recommended use of the chemical and restriction on use	:	This substance is CRM which is intended for use in the calibration of concentration in quantification of short-chain chlorinated paraffin (SCCP) or in the validation of analytical methods or instruments for SCCP. Do not use this reference material for other purposes than testing/research.

2. Hazard Identification

GHS classification

Health hazards

Severe eye damages/eye irritation	:	Hazard Category 2B
Carcinogenicity	:	Hazard Category 2
Specific target organ toxicity (single exposure)	:	Hazard Category 3 (Anesthesia)

Environmental hazards

Hazardous to the aquatic environment (acute)	:	Hazard Category 1
Hazardous to the aquatic environment (long-term)	:	Hazard Category 1

GHS-labeling element :

Signal word	:	Warning
Hazard statement	:	Causes eye irritation Suspected of causing cancer May cause drowsiness or dizziness Very toxic to aquatic life

Precautionary statement : ［Precaution］
Wash hands thoroughly after handling.
Obtain instruction manual before use. Do not handle until all safety precautions have been read and understood.
Use appropriate personal protective equipment.
Do not breathe spray, mist, vapors, etc.
Use only outdoors or in well-ventilated areas.
Avoid release to the environment.
［Response］
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 exposed or concerned: Get medical advice/attention.
If inhaled: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical advice/attention if you feel unwell.
In case of leakage: Collect spillage.
［Storage］
Store in a clean place at temperature of 15 ˚C to 25 ˚C.
［Disposal］
Dispose of this reference material in accordance with applicable legislation and local government ordinance.
Entrust disposal of this reference material 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 : Mixture

Ingredient 1

Chemical name : Short-chain chlorinated paraffins (C_{10}－C_{13})
Synonym : Chloroparaffin (C_{10}－C_{13}), Chloroalkanes (C_{10}－C_{13}), Alkane (C_{10}－C_{13}) chlorinated
Chemical formula : －
Molecular weight : －
CAS number : 85535-84-8
Content : Approximately 99 %
Reference number in gazetted list in Japan : Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. : (2)-68
Industrial Safety and Health Act : (2)-68

Ingredient 2

Chemical name : Short-chain paraffins (C_{10}－C_{13}) as impurities in short chain chlorinated paraffins
Synonym : －

Chemical formula	:	—
Molecular weight	:	—
CAS number	:	—
Content	:	Approximately 1 %
Reference number in gazetted list in Japan	:	Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. : — Industrial Safety and Health Act : —
Impurities and stabilizing additives	:	Short-chain Chlorinated Paraffins

4. First-Aid Measures

If inhaled	:	Remove victim to fresh air and keep at rest and warm. Get medical advice/attention if you feel unwell.
If on skin	:	Wash thoroughly with soap and clean water. Remove/Take off contaminated clothing, etc. If skin irritation or rash occurs, get medical advice/attention.
If in eyes	:	Rinse cautiously with clean water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists, get medical advice/attention.
If swallowed	:	Rinse mouth thoroughly with water. Get medical advice/attention.
Protection of first-aiders	:	Use personal protective equipment.

5. Fire-Fighting Measures

Suitable extinguishing media	:	Powder, Foam, Carbon dioxide, Dry sand
Unsuitable extinguishing media	:	Direct water jet, Water spray
Fire-specific hazards	:	May catch fire if exposed to heat, sparks and flames. Intensive heating causes a fire. In case of fire, irritating, corrosive and toxic gas and fume may be emitted.
Specific fire-fighting method	:	Eliminate ignition sources at the origin of fire and put out fire by using extinguishing media. Move movable containers promptly to a safe place. If containers are immovable, cool their surroundings with water spray.
Protection of fire-fighters	:	Fight fire from upwind to avoid breathing toxic gas. Use personal protective equipment such as fireproof clothing, heat resistant clothing, protective clothing, air respirators, circulating oxygen respirators, rubber gloves, and rubber boots.

6. Accidental Release Measures

Personal precautions, personal protective equipment and emergency procedure	:	Remove all ignition sources in the vicinity. Immediately designate restricted leakage area with appropriate distance taken in every direction. 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.
Environmental precautions	:	Take precautions to prevent spillages from draining into rivers etc. to adversely impact the environment. Take precautions to prevent untreated wastewater from being released into the surrounding environment. If it flows into sewages or rivers, contact relevant organizations immediately.
Recovery and neutralization	:	Absorb spillages with liquid absorbent (wiping cloth, rag or earth and sand, etc.), and collect contaminated items in an empty container. Rinse away the remains with plenty of water.
Prevention of secondary disaster	:	Remove ignition sources in the vicinity immediately. (No smoking, sparks or flames in the vicinity.) Mark the restricted area with rope etc. to keep out unauthorized people. Carry out the clean-up operation from the upwind side and make people on the downwind side evacuate.

7. Handling and Storage

Handling

Engineering precautions/Local and general ventilation	:	Strict ban on fire. Keep away from hot surfaces, sparks and strong oxidizers. Provide local exhaust ventilation. When vapor or mist is emitted, seal the source and provide local exhaust ventilation.
Precautions for safe handling	:	Wash hands thoroughly after handling. Obtain an instruction manual before use. Do not handle until all safety precautions have been read and understood. Avoid breathing dust, fume, gas, mist, vapors and spray. Use only outdoors or in a well-ventilated area. Avoid contact with skin and eyes.
Incompatible substances or mixtures	:	No data available
Hygiene controls	:	Handle this reference material in accordance with industrial health and safety codes.

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.
Keep out unauthorized people.
Use appropriate personal protective equipment to avoid inhalation and contact with eyes, skin, and clothing.

Storage

Appropriate storage conditions	:	Store in a clean place at temperature of 15 ˚C to 25 ˚C.
Safe container packaging material	:	Glass

※Refer to the Certificate for appropriate storage conditions and instructions for use as a reference material.

8. Exposure Controls/Personal Protection

Threshold limit value :
Not specified
Permissible concentration (Short-chain Chlorinated Paraffins)

・ACGIH TLV-TWA	:	Not specified
・Values recommended by Japan Society for Occupational Health	:	Not specified
・OSHA PEL TWA	:	No data available

Engineering control

・Ventilation/Exhaust	:	Use only in an enclosed system or install a local exhaust system to prevent any exposure.
・Safety control/Gas detection	:	Install eye washers and safety showers in workplaces where this reference material is handled.
・Storage precautions	:	Ventilate along floor surface. Keep container tightly closed.

Personal protective equipment

・Respiratory system	:	Appropriative protective mask
・Hands	:	Protective gloves
・Eyes	:	Safety goggle
・Skin and body	:	Protective clothing, Face protection

9. Physical and Chemical Properties and Safety Characteristics

Appearance, etc.	:	Liquid
Color	:	No data available
Odor	:	No data available

Melting point	:	−30 ˚C to −10 ˚C
Boiling point	:	No data available
Flammability	:	No data available
Explosive range	:	No data available
Flashing point	:	166 °C or higher (Closed type)
Auto-ignition temperature	:	No data available
pH	:	No data available
Kinematic viscosity		No data available
Solubility	:	No data available
n-Octanol/water partition coefficient (log Po/w)	:	No data available
Vapor pressure	:	No data available
Density and/or relative density	:	No data available
Relative vapor density (air=1)	:	No data available
Particle characteristics	:	No data available

10. Stability and Reactivity

Reactivity	:	No data available
Stability	:	Stable under recommended storage conditions
Possibility of hazardous reactions	:	No data available
Conditions to avoid	:	Sunlight, Heat
Incompatible materials	:	Strong oxidizers
Hazardous decomposition products	:	Hydrogen chloride, Carbon monoxide, Chlorides, Chlorine

11. Toxicological Information

Acute toxicity : Oral : In an oral administration test using rats, there was no case of death either at a dose of 10,000 mg/kg (carbon number C_{10} to C_{13} / chlorination rate of41－50 %, 51－60 %, or 1－70 %) or at a dose of 13,600 mg/kg (carbon number C_{12} / chlorination rate of 60 %) (EU-RAR(1999)). Classified as “No classification” based on the above report.
Ingestion of large amounts may cause nausea and vomiting.
Skin : The LD_{50} value of 13,500 mg/kg (carbon number C_{12} / chlorination rate of 59 %) (EU-RAR (1999)) was obtained in the transdermal administration test using rabbits. Classified as “No classification” based on the above report.
Prolonged contact causes dry skin and cracks.
Inhalation(gas/mist)Inhalation(vapor): In an inhalation exposure test using rats, there was no case of death either at an exposure rate of 3.3 mg/L in one-hour exposure (carbon number

of C_{12} / chlorination rate of 59 %) or at exposure rate of 48 mg/L (carbon number C_{10} to C_{13} / chlorination rate of 50 %) (EU-RAR (1999)). Since the saturated vapor pressure concentration at 25 °C is 0.000037－0.00014 mg/L (carbon number C_{10} to C_{13} / chlorination rate of 50 %), the mist standard is applied. The four-hour LC_{50} values are estimated to be > 0.83 mg/L and > 12 mg/L, respectively Classified as “No classification” based on the above report.

Inhalation of vapor causes irritation of airway mucosa and nausea.

Skin corrosion/irritation : It was reported that erythema and slight edema were observed in rabbits when they were exposed (carbon number C_{10} to C_{13} / chlorination rate of 70 %) but that the symptoms disappeared by Day 7 (EU-RAR (1999)). In this report, 2 out of 3 cases of erythema scored 1 (maximum 4) and 2 of 3 cases of edema scored 1 (maximum 4, up to 24 hours after application). In addition, in humans, slight erythema and dry skin were observed (carbon number C_{12}/chlorination rate of 59 %) but the effect was similar to that of the control group (carbon number C_{10} to C_{13} / chlorination rate of 50 % and 63 %), or there were some cases of no symptoms. For rabbits, no irritation was observed (carbon number C_{10} to C_{13} / chlorination rate of 59 %) (EU-RAR (1999)).

Classified as “No classification” based on the above report.

Serious eye damage/eye irritation : It was reported that, in tests using rabbits, mild redness was observed (carbon number C_{12} / chlorination rate of 59 %) and that redness and chemosis were observed and continued for 24 hours (carbon number C_{10} to C_{13} / chlorination rate of 63 %, with additives or stabilizers used). Based on the report of hyperemia and conjunctival redness (carbon number C_{10} to C_{13} / chlorination rate of 40 % and 52 %, with additives or stabilizers used), EU-RAR (1999) concluded that this reference material causes "mild" eye irritation.

Classified as Category 2B based on the above report.

Respiratory sensitization /Skin sensitization : Not classifiable due to no data available on humans or animals. EU-RAR (1999), however, concluded that this reference material has no respiratory sensitization as there are no reports of respiratory sensitization though it is widely used, and it plays an important role in the industrial fields.

For humans, it is not possible to draw a conclusion based on the report of EU-RAR (1999): 1) application on human skin caused no allergic reaction (carbon number C_{12} / chlorination rate of 59 %) and 2) no workers manufacturing cutting coolants were found positive (no information on carbon number or chlorination rate). For guinea pigs, EU-RAR (1999) concluded that this reference material is not likely to cause sensitization

based on the following data: 1) no skin reaction (carbon number C_{10} to C_{13} / chlorination rate of 50 %, with stabilizer used) and 2) no sensitization (carbon number C_{10} to C_{13} / chlorination rate of 56 %, with stabilizer used), etc.
Classified as "No classification" based on the above.

Germ cell mutagenicity : A germ cell in vivo transgenerational mutagenicity test (dominant lethality test using rats) showed no change in the number or position of surviving embryos, dead embryos, early absorption embryos and pre-implantation embryo loss (carbon number C_{10} to C_{12} / chlorination rate of 58 %) (EU-RAR (1999)). Somatic cell in vivo mutagenicity tests (chromosomal aberration tests using rat bone marrow cells) showed no increase in frequency of chromosomal aberrations (carbon number C_{10} to C_{12} / chlorination rate of 58 %) (EU-RAR (1999)). Classified as "No classification" based on the above reports.
In vitro reverse mutation tests using bacteria (carbon number C_{12} / chlorination rate of 57 % and 60 %; carbon number C_{10} to C_{13} / chlorination rate of 50 %) gave negative results (EU-RAR (1999)). An in vitro mutation test using Chinese hamster cultured cells (carbon number C_{10} to C_{13} / chlorination rate 56 %) gave negative results (EU-RAR (1999)).

Carcinogenicity : Classified as Category 2 because this reference material is classified as IARC Group 2B (IARC 48 (1990)) and as Category 3 in R40 (EU- Annex I).
"Chlorinated Paraffins (C_{12}, 60 % Chlorine)" (CAS 108171-26-2), though it does not match the CAS number (85535-84-8) of this reference material, is classified as R in NTP RoC 11th, 2005. Chlorinated paraffins are classified as 2B in Japan Society for Occupational Health Recommendation (2007). Both of them are equivalent to GHS Category 2.

Reproductive toxicity : According to EU-RAR (1999), ovarian weight loss was observed at a dose of 3,000 mg/kg in a 14-day repeated oral administration study using rats (carbon number C_{10} to C_{12} / chlorination rate of 58 %) while no effect was observed on the fertility of male and female rats in a 13-day oral administration study using rats at a dose of 5,000 mg/kg (carbon number C_{12} / chlorination rate of 60 %). In addition, in a developmental toxicity test (carbon number C_{10} to C_{13} / chlorination rate of 58 %) in which this reference material was orally administered to 25 pregnant rats per group reported in EU-RAR (1999), eight pregnant rats of 25 died and debility, sialorrhea, and hypoactivity were observed. Post-implantation embryo loss increased and surviving fetuses per mother decreased at a dose of 2,000 mg/kg/day. AIST Detailed Risk Assessment Report 5 (2005) reported that the observed reproductive toxicity was considered to be a secondary effect due to maternal toxicity and

		that no effect on development was observed at a dose of 500 mg/kg/day. Classified as "No classification" based on the above reports.
Specific target organ toxicity (single exposure)	:	Classified as Category 3 (Anesthesia) In a 90-day oral administration test using rats (carbon number C_{12} / chlorination rate of 60 %), dullness and ataxia were observed (EU-RAR (1999)).
Specific target organ toxicity (repeated exposure)	:	Classified as "No classification" In a 90-day oral administration test using rats, weight of liver and kidney increased and mild nephritis was observed in male rats at a dose of 100 mg/kg (carbon number C_{10} to C_{12} / chlorination rate of 58 %) (EU-RAR (1999)). EU-RAR (1999), however, reported "Increased liver weight reflects peroxisome proliferation. This effect is not relevant to human health as humans are not sensitive to peroxisome proliferation". EU-RAR (1999) also reported "It is uncertain whether the effects on kidney are toxicologically significant" and "Dosages to induce other effects in rats are greater than 100 mg/kg".
Aspiration hazards	:	No data available

※ Section "Toxicological Information" is prepared based on the information on the raw materials because no information on the mixture is available.

12. Ecological Information

Ecotoxicity	:	No data available
Persistence and degradability	:	Classified as Category 1 as this reference material is not rapidly degradable (EU-RAR (2000): Crustaceans (Daphnia magna), 21d -NOEC=0.02 mg/L.
Bioaccumulative potential	:	No data available
Mobility in soil	:	No data available
Harmful effects on ozone layer	:	No data available

13. Disposal Considerations

Residual wastes	:	Dispose of this reference material in accordance with applicable legislation and local government ordinance. 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

International regulations

UN number	:	3082
Shipping name	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (CDHLORINATED PARAFFINNS(C10～C13))
UN classification	:	Class 9, Miscellaneous dangerous substances and articles
Packing group	:	PG III
Marine pollutant	:	N/A
Precautions	:	Do not transport with food or feed. Transport this reference material carefully while keeping it away from direct sunlight and preventing accidental release due to dropping, falling, etc.

Japanese domestic regulations

Transport by road/rail	:	Comply with Fire Service Act, Poisonous and Deleterious Substances Control Act, and High-Pressure Gas Safety Act
Transport by sea	:	Hazardous Material (Regulations for the Carriage and Storage of Dangerous Goods by Ships, Article 3, Appendix 1) UN number 3082, Environmental hazardous material (Liquid)
Transport by air	:	Comply with Civil Aeronautics Act

15. Regulatory Information

◇Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc.
- Class I specified chemical substance (Article 2-2, Enforcement Order Article 1): 【No.32 Polychlorinated Paraffins】

◇Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof (PRTR Law)
- Class 1 Newly-Designated Chemical Substances Polychlorinated paraffins (limited to C_{10}~C_{13} and the mixtures】(Cabinet Order:1-72)

◇Air Pollution Control Act
- Substances that may be hazardous air pollutants（HAPs）(Central Environment Council, 9th Report)【No.36 Polychlorinated paraffins (C_{10}~C_{13}) and the mixtures】

◇Act for Prevention of Marine Pollution and Maritime Disaster
- Class X Liquid hazardous substances (Enforcement Order Appendix 1): 【No.15 Polychlorinated paraffins (C_{10}~C_{13}) and the mixtures】

◎ This SDS was originally prepared for the use of the reference material in Japan, and therefore Section 15 "Regulatory Information" covers only those laws and regulations which are enacted and enforced in Japan. In case of using this reference material, it is necessary to refer to and apply relevant laws and regulations of the country in which it is 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.