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 22, 2010
		Revised on : August 31, 2022
		ID Number : 4220001
Identity of Substance/Mixture	:	Certified reference material NMIJ CRM 4220-a Potassium Perfluorooctanesulfonate in Methanol
Recommended Use of the Chemical and Restriction on Use	:	This CRM can be used for the calibration of instruments, or confirming the validity of analytical methods or instruments during quantification of Perfluorooctanesulfonates (PFOS). 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 2
	Serious eye damage/ Eye irritation	:	Hazard Category 2A
	Acute toxicity (Oral)	:	Hazard Category 5
	Reproductive toxicity		Hazard Category 1B
	Specific target organ toxicity/Systemic toxicity (Single exposure)	:	Hazard Category 1 (Central nerve system, Visual organ, Systemic toxicity) Hazard Category 3 (Airway irritation, Anesthetic action)
	Specific target organ toxicity/Systemic toxicity (Repeated exposure)	:	Hazard Category 1 (Central nerve system, Visual organ)

GHS Label Element :

Signal Word : Danger

Hazards Statement : Highly flammable liquid and vapor
May be harmful if swallowed (Oral)
Causes strong eye irritation
May damage fertility or unborn child
May irritate respiratory organ
May cause drowsiness or dizziness
Causes damage to organs 1 (Central nerve system, Visual organ, Systemic toxicity)
Causes damage to organs through prolonged or repeated exposure (Central nerve system, Visual organ)

Precautionary Statement : ［Precaution］
Do not handle until all safety precautions have been read and understood.
Do not drink, eat or smoke when handling this reference material.
Use only outdoors or in a well-ventilated area.
Keep away from ignition sources such as heat, sparks, open flame and hot surfaces.
Use explosion-proof electrical/ventilating/lighting equipment.
Take precautions against electrostatic discharge.
Avoid breathing of mist/vapor/spray.
Use eye protector/face protector/protective gloves.
Use personal protective equipment as required.
Wash hands thoroughly after handling this reference material.
［First-Aid Measure］
If in eyes: Rinse cautiously with water for several minutes.
Get medical advice/attention.
If inhaled: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
If ingested: Rinse mouth. Make victim drink plenty of water to induce vomiting. Get medical advice/attention immediately.
If feeling unwell: Get medical advice/attention.
If on skin: Wash with plenty of soap and water.
If exposed or concerned: Get medical advice/attention.
［Storage］
Store this reference material in a dark room-temperature environment (15 °C to 25 °C).
Store in a locked area.
［Disposal］
As this reference material contains substances designated as Class 1 Specified Chemical Substance, it must be handled in accordance with Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc., and stored and disposed of in accordance with Waste Disposal and Public Cleaning Act.

※ Giving considerations to the fact that Class 1 Specified Chemical

Substances are persistent, highly accumulative, toxic to human for long time or eco-toxic to high-level predator flora and fauna in the human living environment, ensure rational use by making a handling place tightly closed, carrying out collection, etc.
Regularly check containers, storage tanks, etc. for potential leakage.
Take precautions to prevent scattering or spill when handling it.

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

3. Composition/Information on Ingredients

Substance/Mixture	:	Mixture
・Ingredient 1		
Chemical Identity	:	Potassium Perfluorooctanesulfonate (Class 1 Specified Chemical Substances, No. 17)
Chemical Formula or Structural Formula	:	$C_8F_{17}SO_3K$
Content	:	10 mg/kg
Molecular Weight	:	538.22
Reference Number in Gazetted List in Japan	:	Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. : 2-2810 Industrial Safety and Health Act : Published
CAS Number	:	2795-39-3
・Ingredient 2		
Chemical Identity	:	Methanol
Chemical Formula or Structural Formula	:	CH_3OH
Content	:	99.9 %
Molecular Weight	:	32.04
Reference Number in Gazetted List in Japan	:	Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. : 2-201 Industrial Safety and Health Act : Published
CAS Number	:	67-56-1
Hazardous Ingredient	:	Potassium Perfluorooctanesulfonate, Methanol

4. First-aid Measures

If in Eyes	:	Rinse away thoroughly with clean water. Get medical advice/attention.
If on Skin	:	Rinse away thoroughly with clean water. Take off/Remove contaminated clothing, shoes, etc. Get medical advice/attention.
If Inhaled	:	Remove victim to fresh air and keep at rest and warm. Get medical advice/attention.

If Ingested	:	Rinse mouth with water thoroughly. Make victim drink plenty of water to induce vomiting. Get medical advice/attention immediately.
Expected Acute and Delayed Symptom	:	Cough, Headache, Dizziness, Panting, Vomit, Stomachache, Unconsciousness
Measures to be taken to protect the person applying first aid	:	Use personal protective equipment.

5. Fire-fighting Measures

Extinguishing Media	:	Dry chemical extinguishing agent, Alcohol-resistant foam, Carbon dioxide (CO_2), Water spray
Fire-Specific Hazards	:	As irritating or toxic gas is generated in the case of fire, use respiratory protective equipment to avoid breathing it.
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 compressed air open-circuit self-contained breathing apparatus.

6. Accidental Release Measures

Personal Precaution	:	Eliminate potential ignition sources in the vicinity promptly. Get fire-fighting kit ready to be prepared for ignition.
Personal Protective 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	:	Strict ban on fire. Collect spillage in empty containers by getting it adsorbed to wiping cloth, rag or earth and sand, etc. Wipe out thoroughly and collect spillage in tightly-closed 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 Precautions	:	Strict ban on fire. Keep away from hot surfaces and sparks. Avoid contact with strong oxidizers.
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. 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 to avoid inhalation and contact with eyes, skin and clothing.

Storage

Appropriate Storage Conditions	:	Use only explosion-proof electrical equipment in the storage. Make all equipment grounded. Strict ban on fire. Store in a light-shielded clean environment at room temperature (15 °C to 25 °C). Store in a locked area. Do not store near strongly oxidizing substances or ignition sources.
Safe Container Packaging Material	:	Glass

※ Please refer to the certificate regarding details of appropriate storage conditions and precautions for use as reference material.

8. Exposure Controls/Personal Protection

Threshold Limit Value

Working Environment Evaluation Criteria: 200 ppm (Methanol)

Permissible Concentration

- ACGIH TLV-TWA : 200 ppm (Methanol)
- Value recommended by Japan Society for Occupational Health : 200 ppm (Methanol)
- OSHA PEL TWA : air TWA 200 ppm (Methanol)

Engineering Controls

- Install facilities to rinse eyes and to wash hands and body in the vicinity of a place handling this reference material and label them.
- Keep container tightly closed or install local ventilation system if this reference material is handled in indoor environment.

Personal Protective Equipment (PPE)

Respiratory System	:	Chemical cartridge respirator for organic gas, Compressed air open-circuit self-contained breathing apparatus
Hands	:	Protective gloves
Eyes	:	Eye protector
Skin and Body	:	Protective clothing

Hygiene measure

Treat in accordance with rules on Industrial hygiene and Industrial safety.

9. Physical and Chemical Properties

・Appearance, etc.	:	Liquid
・Color	:	Clear and colorless
・Odor	:	Characteristic odor
・pH	:	No data
・Melting point	:	−98 °C
・Boiling point	:	65 °C
・Flashing point	:	11 °C
・Explosive range	:	5.5 vol% to 44 vol%
・Vapor pressure	:	12.3 kPa (20°C)
・Relative vapor density(Air=1)	:	1.1 (Air＝1)
・Specific gravity or bulk specific gravity	:	0.79 g/ml (20 °C)
・Solubility	:	Soluble in water, acetone, ether and benzene
・*n*-Octanol/water partition coefficient (Log Po/w)	:	−0.82, −0.66
・Auto-ignition temperature	:	464 °C

10. Stability and Reactivity

Stability

・Stable in normal conditions

Reactivity

・Severely react with oxidizers, inducing risk of fire and/or explosion

Conditions to Avoid

・Sunlight, heat, open flame, high temperature, sparks, static electricity, other ignition sources

Hazardous Decomposition Products

・Carbon monoxide (CO), Carbon dioxide (CO_2), Hydrogen fluoride, Sulfur oxide

11. Toxicological Information

＜Methanol＞

Acute Toxicity : Inhalation – Human TCLo:300 ppm Eye-vision change, Headache (RTECS)
Oral – Human (Female) LDLo:10 mL/kg Hypopnea, Inducing oxygen inhibition or Change at blood/cell level, Change in

type/function of pancreas endocrine secretion (RTECS)
Inhalation – Rat LC50:64000 ppm/4H (RTECS)
Oral - Mouse LD50:7300 mg/kg (RTECS)
Inhalation – Human TCLo:408 ppm Lung, chest or breathing – focal fibrosis (pneumoconiosis) (RTECS)
Oral – Rat LD50
Calculated value was 7939 mg/kg, based on 6200 mg/kg (EHC196(1997), ACGIH(7th,2001), DFGOT vol.16(2001), PATTY(4th,1994)), 9100 mg/kg (EHC196 (1997), PATTY(4th (1994))), 12900mg/kg (EHC 196 (1997), DFGOT vol.16 (2001), PATTY (4th (1994))), and 13000 mg/kg (EHC 196 (1997), ACGIH(7th (2001)), PATTY(4th (1994))).
Meanwhile it is reported that 1) toxicity of methanol is more strongly observed in primate than rodent (EHC 196 (1997)) and 2) LD50 of humans is 1400 mg/kg (DFGOT ver.16).

Skin Corrosion/ Irritation : It is reported that medium irritation was observed in rabbits due to delipidation after 24-hour exposure while it is reported that no irritation was observed when rabbits were exposed for 20 hours in a closed environment (DFGOT vol.16 (2001)). No data has been available for exposure of four hours or less.

Serious Eye Damage/Eye Irritation : It is reported that light or medium eye irritation was observed in the studies using rabbits in EHC 196 (1997), DFGOT vol.16 (2001) and PATTY (4th (1994)). There is no explicit report on reversibility. For humans, damage to cornea and strong chemosis were observed transiently (DFGOT vol.16 (2001)).

Germ Cell Mutagenicity : Negative result was reported in micronucleus studies using red cells of mice (EHC 196 (1997), DFGOT vol.16 (2001), PATTY (4th (1994)).

Reproductive Toxicity : It is reported in EHC 196 (1997), ACGIH (7th (2001)), DFGOT vol.16 (2001) and PATTY (4th (1994)) that increase in fetal malformations and death were observed in oral/inhalation exposure studies using pregnant rats and mice. There is no reliable data, however, for human exposure cases.
It is reported in EHC 196 (1997), DFGOT vol.16 (2001) and PATTY (4th (1994)) that drop of testosterone concentration or deformation of testis was observed in male rats.

Specific target organ toxicity/ Systemic toxicity (Single exposure) : It is reported that suppression of central nerve system and damage to visual organ were observed in humans due to acute oral/inhalation exposure (EHC 196 (1997), ACGIH (7th (2001), DFGOT vol.16 (2001) and PATTY(4th (1994)).
There is the recommendation of Japan Society for Occupational Health (1993).
It is also reported that metabolic acidosis was observed in human exposure cases (ACGIH (7th (2001)) and DFGOT vol.16 (2001)).
Airway irritation and anesthetic action are observed, based on 1) the report of air irritation observed in repeated inhalation exposure studies using rats (EHC 196 (1997) and PATTY (4th (1994))), 2) the

	report that mucous membrane irritation symptoms were observed in humans (the recommendation of Japan Society for Occupational Health), and 3) the report that anesthetic action was observed in rats, mice, rhesus, etc. (EHC 196 (1997) and PATTY(4th (1994))).
Specific target organ toxicity/Systemic toxicity (Repeated exposure)	It is reported that suppression of central nerve system and damage to visual organ were observed in humans due to prolonged exposure (EHC 196 (1997), ACGIH (7th (2001)) and DFGOT vol.16(2001)).

＜Potassium Perfluorooctanesulfonate＞

Acute Toxicity	Inhalation LC50:5.2 mg/m^3 (Based on the report of four-hour equivalent: 1.3 mg/m^3 (Ministry of Environment "Risk Assessment Book Vol.6" (2008))
Skin Corrosion/ Irritation Serious Eye Damage/ Eye Irritation	It is reported that eye irritation was observed but skin irritation was not observed in rabbits (Ministry of Environment "Risk Assessment Book Vol.6" (2008))
Germ Cell Mutagenicity :	It is reported that micronucleus was not induced in somatic cell in-vivo mutagenicity study (micronucleus test using mice's marrow) (Ministry of Environment "Risk Assessment Book Vol.6" (2008)).
Carcinogenicity :	It is reported that hepatic adenoma showed a significant dose-dependent increase both in male and female rats when they were fed this reference material together with feed for 104 weeks (Ministry of Environment "Risk Assessment Book Vol.6" (2008)).
Specific target organ toxicity/Systemic toxicity (Repeated exposure)	It is reported that, in 90-day oral administration study using rats, 1) a significant increase of relative weight of liver, a significant decrease of absolute and relative weights of adrenal gland and a significant decrease of absolute weight of thyroid gland, accessory thyroid gland and pituitary gland were observed in male rats, 2) a significant increase of absolute and relative weights of liver was observed in female rats and 3) a significant increase of relative weight of kidney, decrease of body weight, a significant decrease of red cell count, hemoglobin concentration, hematocrit value and leukocyte count, discoloration and/or swelling of liver, discoloration of mucous membrane of gastric gland and hypertrophy and localized necrosis of hepatocyte were observed both in male and female rats. It is also reported that as change of organ weight in male rats was not observed in the high-dose group, biological significance is not clear (Ministry of Environment "Risk Assessment Book Vol.6" (2008)).

12. Ecological Information

Persistence and Degradability

・Methanol

Degree of degradation:92 % by BOD (METI Existing Chemical Substance Safety Check)

Degree of degradation: 99 % by TOC (METI Existing Chemical Substance Safety Check)

・Potassium Perfluorooctanesulfonate

Degree of degradation: 0 % by BOD(METI Existing Chemical Substance Safety Check)

Degree of degradation: 6 % by TOC(METI Existing Chemical Substance Safety Check)

Bioaccumulative Potential

・Potassium Perfluorooctanesulfonate

Concentration rate:210 to 850 (Concentration: 20μg/L), 200 to 1500 (Concentration: 2 μg/L) (METI Existing Chemical Substance Safety Check)

Ecotoxicity

・Methanol

Brine shrimp　LC50:900.73 mg/L/24H (EHC 196(1997))

・Potassium Perfluorooctanesulfonate

Oryzias latipes　LC50: 89.1 mg/L/96hr

13. Disposal Considerations

Residual Waste	:	Dispose of this CRM in accordance with applicable legislation and local government ordinance. Entrust disposal of this CRM to a professional waste disposal company licensed by the prefectural governor.
Contaminated Container and Package	:	Dispose of this CRM in accordance with applicable legislation and local government ordinance. Entrust disposal of this CRM to a professional waste disposal company licensed by the prefectural governor.

14. Transport Information

UN Number	:	1230
UN Classification	:	Class 3 (Flammable liquid)
Shipping Name	:	Methanol
Packing Group	:	PG Ⅱ
ICAO/IATA	:	Class 3 Grade Ⅱ
Marine Pollutant	:	Not Applicable
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

Fire Defense Law

・Dangerous substance Class 4　Alcohols (Soluble to water) Danger Rating 2

Poisonous and Deleterious Substances Control Law

・Deleterious substance Packing Grade 3

Industrial Safety and Health Law

・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.560

・Enforcement Order Appendix 1-4, Dangerous materials, Flammables

・Ordinance on the Prevention of Organic Solvent Poisoning: Type 2 organic solvent

Ship Safety Law

・Flammable liquid

Act for the Prevention of Marine Pollution and Marine Disasters

・Enforcement Order Appendix 1　Hazardous liquid substance　Class Y substance

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

・Class 1 Specified Chemical Substances, No. 17

◇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.