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 5, 2013
		Revised on : August 31, 2022
		ID Number : 8137001
Identity of Substance/Mixture	:	Certified reference material: NMIJ CRM 8137-a PP Resin Pellet for Bromine Analysis
Recommended Use of the Chemical and Restriction on Use	:	This reference material can be used for quality control of analysis and validation of analysis method/equipment. 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	:	Not classifiable
GHS Label Element	:	Not classifiable
Signal Word	:	－
Hazard and toxicity	:	－
Other hazard and toxicity	:	Decabrominated diphenyl ether (DBDE) is contained. (Class 1 Specified Chemical Substances No.33)
Precautionary Statement	:	［Precaution］ Do not handle until all safety precautions have been read and understood. Obtain special instructions before use. Do not use this reference material for other purposes than testing/research. Wear protective gloves, eye protector and face protection as necessary. ［Action］ If swallowed: Rinse mouth thoroughly with water. Get medical advice/attention when swallowed in large amount and/or when feeling unwell. 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 on skin: Wash with soap water or water. Get medical advice/attention if there are any problems. ［Storage］ Store in clean environment at 15 °C to 35 °C, and avoid direct

sunlight.
Store in a locked area.
［Disposal］
This CRM contains the class I specified chemicals, therefore handle this CRM in accordance with Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. and Wastes Disposal and Public Cleansing Act.

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

3. Composition/Information on Ingredients

Substance/Mixture	:	Mixture
Ingredient 1		
Chemical name	:	Polypropylene resin
Synonym	:	PP resin
Chemical formula	:	$(C_3H_6)x$
Molecular weight	:	-
CAS number	:	9003-07-0
Content	:	>99 %
Reference Number in Gazetted List in Japan	:	Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. : (6)-402 Industrial Safety and Health Act : Published
Ingredient 2		
Chemical name	:	Decabrominated diphenyl ether (DBDE)
Synonym	:	Deca bromo diphenyl ether
Chemical formula	:	$C_{12}Br_{10}O$
Molecular weight	:	959.17
CAS number	:	1163-19-5
Content	:	303 mg/kg (as Br)
Reference Number in Gazetted List in Japan	:	Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. : (3)-2846 Industrial Safety and Health Act : Published
Ingredient 3		
Chemical name	:	Cadmium oxide
Synonym	:	CdO
Chemical formula	:	CdO
Molecular weight	:	128.41
CAS number	:	1306-19-0
Content	:	about 10 mg/kg (as Cd)
Reference Number in Gazetted List in Japan	:	Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. : (1)-202 Industrial Safety and Health Act : Published

Ingredient 4

Chemical name	:	Lead (II) chromate
Synonym	:	Chrome yellow
Chemical formula	:	$PbCrO_4$
Molecular weight	:	323.2
CAS number	:	1344-37-2
Content	:	About 100 mg/kg (as Pb), about 25 mg/kg (as Cr(VI))
Reference Number in Gazetted List in Japan	:	Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. : (5)-5161 Industrial Safety and Health Act : Published

Ingredient 5

Chemical name	:	Chromium(III) acetylacetonate
Synonym	:	tris(acetylacetonato)chromium (III)
Chemical formula	:	$C_{15}H_{21}CrO_6$
Molecular weight	:	349.32
CAS number	:	13681-82-8
Content	:	About 75 mg/kg (as Cr(Ⅲ))
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 : -

Ingredient 6

Chemical name	:	Mercury sulfide(II)
Synonym	:	-
Chemical formula	:	HgS
Molecular weight	:	232.66
CAS number	:	1344-48-5
Content	:	100 mg/kg (as Hg)
Reference Number in Gazetted List in Japan	:	Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. : (1)-438 Industrial Safety and Health Act : Published

Hazardous Ingredient	:	Cadmium oxide, Lead (II) chromate

4. First-aid Measures

If inhaled	:	Few hazards in normal conditions of handling
If on skin	:	Wash with soap water or water. Get medical advice/attention if there are any problems.
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 swallowed	:	Rinse mouth thoroughly with water. Get medical advice/attention when swallowed in large amount and/or when feeling unwell.
Expected Acute and Delayed Symptom	:	-

Most Critical Characteristic and Symptom	:	-
Protection of First-Aid Responder	:	Use personal protective equipment.

5. Fire-fighting Measures

Extinguishing Media	:	Water sprinkling, Dry chemical extinguisher, Foam
Fire-Specific Hazards	:	If it burns, this reference material emits hazardous gases (CO, CO_2, CN, etc.). Carry out fire-fighting from the windward as much as possible in order to avoid breathing the hazardous 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. Carry out fire-fighting from the windward in order to avoid breathing hazardous gas.
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 and Emergency Procedures	:	Remove potential ignition sources from the vicinity promptly. Get fire-fighting kit ready to be prepared for ignition. 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	:	Collect spillage. Rinse away the remains with plenty of water.
Prevention of Secondary Disaster	:	-

7. Handling and Storage

Handling

Engineering Precautions	:	No risk of ignition or explosion at room temperature. Do not use fires carelessly in the vicinity of this reference material, however, as it is Designated Combustible Material stipulated in the Fire Service Act.
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 use.

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.
Use appropriate personal protective equipment to avoid inhalation and contact with eyes, skin and clothing.
Use local ventilation system in indoor handling area.

Storage

Appropriate Storage Conditions	:	Protect from direct sunlight. Store in a clean place at room temperature.
Engineering Precautions	:	Store in clean and well-ventilated area at 15 °C to 35 °C, and avoid direct sunlight. Lock and store strictly.
Incompatible Materials	:	Strong acids, Strong bases, Organic solvents dissolving resin This reference material is resin. Do not store it together with acids (sulfuric acid, nitric acid, etc.), bases (sodium hydroxide, etc.) or organic solvents (tetrahydrofuran, etc.) in order to prevent corrosion and deterioration.
Safe Container Packaging Material	:	Brown glass

8. Exposure Controls/Personal Protection

Threshold Limit Value

Not specified

Permissible Concentration (Polypropylene)

- ACGIH TLV-TWA : Not specified
- Value recommended by Japan Society for Occupational Health : Not specified

Permissible Concentration (Decabrominated diphenyl ether (DBDE))

- ACGIH TLV-TWA : Not specified
- Value recommended by Japan Society for Occupational Health : Not specified

Permissible Concentration (Cadmium oxide (CdO))

- ACGIH TLV-TWA : 0.01 mg/m^3 (Total dust; as Cd)
  0.002 mg/m^3 (Respirable fraction; as Cd)
- Value recommended by Japan Society for Occupational Health : 0.05 mg/m^3 (as Cd)

Permissible Concentration (Lead (II) chromate ($PbCrO_4$))

- ACGIH TLV-TWA : 0.05 mg/m^3 (as Pb)
  0.012 mg/m^3 (as Cr)
- Value recommended by Japan Society for Occupational Health : 0.1 mg/m^3 (as Pb)
  0.05 mg/m^3 (as Cr(VI))

Permissible Concentration (Chromium(III) acetylacetonate (Cr-acac))

- ACGIH TLV-TWA : 0.012 mg/m^3 (as Cr)
- Value recommended by Japan Society for Occupational Health : 0.5 mg/m^3 (as Cr(Ⅲ))

Permissible Concentration (Mercury sulfide(II))

- ACGIH TLV-TWA : 0.01 mg/m^3 (as Hg)
- Value recommended by Japan Society for Occupational Health : 0.025 mg/m^3 (as Hg)

Engineering Controls

Ventilation/Exhaust : Local ventilation system or General ventilation system
Storage Precaution : Store in a light-shielded clean area.

Personal Protective Equipment (PPE)

Respiratory System : Protective mask
Hands : Protective gloves
Eyes : Eye protector
Skin and Body : Protective clothing

9. Physical and Chemical Properties

- Appearance, etc. : Solid (in pellet form)
- Color : Light yellow
- Odor : No data
- pH : No data
- Melting point : 150 °C to 165 °C (Polypropylene)
- Boiling point : No data
- Flashing point : 350 °C to 400 °C (Polypropylene)
- Explosive range : No data
- Vapor pressure : No data
- Relative vapor density(Air=1) : No data
- Specific gravity or bulk specific gravity : No data
- Solubility : Insoluble in water
- *n*-Octanol/water partition coefficient (Log Po/w) : No data
- Auto-ignition temperature : No data

10. Stability and Reactivity

◇Chemical Stability
- Stable under normal conditions

◇Reactivity
- Combustible
- Not ignitable (Not auto-ignitable, Not react with water)

◇Conditions to Avoid
- Elevated temperature of 300 °C or higher will induce decomposition.
- Damaged by strong acids and strong bases.

◇Incompatible Materials

Strong acids, Strong bases, Organic solvents dissolving resin
This reference material is resin. Do not store it together with acids (sulfuric acid, nitric acid, etc.), bases (sodium hydroxide, etc.) or organic solvents (tetrahydrofuran, etc.) in order to prevent corrosion, deterioration and production of decomposition products (CO, CO_2, CN, etc.).

◇Hazardous Decomposition Products
- Emits carbon dioxide, carbon monoxide, etc. when this reference material is burnt.

11. Toxicological Information

Acute Toxicity	【Decabrominated diphenyl ether (DBDE)】 Oral　Rat: LDLo: 500 mg/kg Dermal Rat: LD:＞3 g/kg 【Cadmium oxide】 Oral Mouse: LD50:72 mg/kg Inhalation　Rat: LC50:780 mg/m^3/10 months Mouse: LC50:340 mg/m^3/10 months Rabbit: LC50:3 g/m^3/10 months Abdominal cavity　Rat: LD50:12 mg/kg 【Lead (II) chromate】 Oral　Mouse: LD50:＞12g/kg 【Chromium(III) acetylacetonate】 Oral　Rat LD50:3360 mg/kg 【Mercury sulfide(II)】 Oral Mouse　TDLo: 195mg/kg/4 weeks Oral Rat TDLo: 25gm/kg/5D
Skin Corrosion/ Irritation	【Decabrominated diphenyl ether (DBDE)】 In the skin irritation test using rabbits (EHC 162 (1994)), it was reported “Initially no irritation was observed, but mild erythema and edema were observed in some rabbits after 72 hours of observation.”
Serious Eye Damage/ Eye Irritation	【Decabrominated diphenyl ether (DBDE)】 Eye-Rabbit: 100 µL : Severe In the eye irritation test using rabbits (EHC 162 (1994) and CERI・NITE Hazard Assessment Report No.56 (2005)), it was reported “transient hyperemia and edema were observed in conjunctiva but they disappeared in 24 hours,” and “24 hours after exposure, extremely mild flare (4/6 rabbits), extremely mild edema (2/6 rabbits) and extremely mild discharge (1/6 rabbits) were observed in conjunctiva.”　Based on the above, it is considered that this reference material causes mild eye irritation.
Germ Cell Mutagenicity	【Decabrominated diphenyl ether (DBDE)】 In accordance with “NITE Initial Risk Assessment Report No.56 (2005),” “CERI・NITE Hazard Assessment Report No.56 (2005),” “EU-RAR No.17 (2002)” and “NTP DB (Access on April 2006),” no inter-generation mutagenicity test conducted, no germ cell in vivo mutagenicity test conducted, positive in the somatic cell in vivo mutagenicity test (micronucleus test), and no germ cell in vivo genotoxicity test conducted. 【Cadmium oxide】 Positive in the somatic cell in vivo mutagenicity test (test for chromosome of human peripheral lymphocytes) 【Lead (II) chromate】 No positive results in the inter-generation mutagenicity test Positive results obtained in the in vivo mutagenicity test (micronucleus test) but not clear whether germ cell or somatic cell was tested. For the in vitro tests, however, there were quite a few findings obtained from mutagenicity tests and genotoxicity tests, most of which yielded positive results.
Carcinogenicity	【Polypropylene】 IARC: Group C (Not classifiable as to carcinogenicity to humans) 【Decabrominated diphenyl ether (DBDE)】 EPA: Group C (Suspected human carcinogenicity) IARC : Group 3 (Not classifiable as to carcinogenicity to humans)

	【Cadmium oxide】 ※as cadmium compounds The Japanese Society for Hygiene: Group 1 (Known human carcinogenicity) 【Lead (II) chromate】 ※as hexavalent chromium compounds IARC: Group 1 (Carcinogenic) Japan Society for Occupational Health: Group 1 (Known human carcinogenicity) 【Mercury sulfide(II)】 ※as inorganic mercury compounds IARC: Group 3 (Not classifiable as to carcinogenicity to humans) ACGIH: A4 (Not classifiable as to carcinogenicity)
Reproductive Toxicity	【Cadmium oxide】 In the rat developmental toxicity test, weight loss was observed in fetuses at a dose causing general toxicity. 【Lead (II) chromate】 For lead, inorganic lead compounds and lead (II) chromate, their effects on reproduction were observed. Lead (II) chromate may present reproductive developmental toxicity to humans.
Specific Target Organ Toxicity/Systemic Toxicity (Single Exposure)	【Cadmium oxide】 For humans, pneumonia, dyspnea, cough, myalgia and pyrexia were observed. In chest X-ray, consolidation was observed. Even in nine years after exposure, progressive pulmonary fibrosis existed and no improvement was observed in pulmonary function. 【Lead (II) chromate】 For humans, nerve system is considered to be a target organ since “food refusal, vomiting, discomfort, convulsions, irreversible brain damage, etc.” were reported (HSDB (2002)). As for acute toxicity of inorganic lead, “effects on hematogenous function, hemoglobin synthesis inhibition, anemia due to reduction of erythrocyte lifetime, albuminuria, hematuria, urinary casts, proximal tubule disorder presenting Fanconi syndromes such as glycosuria and aminoaciduria, actions on peripheral nervous system and effects on central nervous system” were observed.
Specific Target Organ Toxicity/Systemic Toxicity (Repeated Exposure)	【Decabrominated diphenyl ether (DBDE)】 As for experimental animals, “centrilobular hepatocyte hypertrophy and vacuolation of liver, hyaline degeneration of renal tubules and hyperplasia of thyroid gland” were reported (Ministry of Environment “Risk Assessment vol. 2 (2003)”). Based on the above, liver, kidneys and thyroid gland are considered to be target organs. 【Cadmium oxide】 For humans, decline of glomerular filtration function, decrease of forced vital capacity in the group with high exposure, direct effects on bone metabolism, etc. were reported. For experimental animals, disorder in intercalated disk of cardiac muscle, neutrophilia, lymphopenia, anemia, etc. were reported. 【Lead (II) chromate】 As for chronic toxicity of inorganic lead, “effects on hematogenous function, hemoglobin synthesis inhibition, anemia due to reduction of erythrocyte lifetime, albuminuria, hematuria, urinary casts, proximal tubule disorder presenting Fanconi syndromes such as glycosuria and aminoaciduria, actions on peripheral nervous system and effects on central

nervous system" were observed.

12. Ecological Information

Ecotoxicity

・No data available

Persistence and Degradability

・No data available

Bioaccumulative Potential

・(Cadmium oxide)
No or low bioaccumulative potential in the body of fish and shellfishi
Not highly bioaccumulative
・(Decabrominated diphenyl ether)
No or low bioaccumulative potential in the body of fish and shellfishi
Not highly bioaccumulative

Mobility in Soil

・No data available

13. Disposal Considerations

Residual Waste	:	・This standard substance contains decabrominated diphenyl ether and should be handled appropriately, taking into account that it is Class I Specified Chemical Substance of the Law Concerning the Examination and Regulation of Manufacture, etc. ・It corresponds to industrial waste and waste plastics of "Waste Disposal and Public Cleaning Law" (Waste Disposal Law). In accordance with the waste disposal method, Disposal of this reference material should be entrusted to a professional waste disposal company licensed by a 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	:	Not applicable
UN Classification	:	-
Shipping Name	:	-
Packing Group	:	-
ICAO/IATA	:	Not applicable
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

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

(Chemical Substances Control Law)

· Type 1 Specific Compound (Decabrominated diphenyl ether, No. 33)

Act on grasping emission amount of specified chemical substances to the environment and promoting improvement of management

· Class I designated chemical substances (Decabrominated diphenyl ether, No. 1 - 255)

◇ **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.