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 : March 11, 2008
		Revised on : April 25, 2018
		ID Number : 8133001
Identity of Substance/Mixture	:	Certified reference material: NMIJ CRM 8133-a Heavy Metals(Cd, Cr, Hg, Pb) in PP Resin Pellet-High Concentration
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.

2. Hazards Identification

GHS Classification : Carcinogenicity : Hazard Category 1A
Reproductive toxicity : Hazard Category 2

GHS Label Element:

Signal Word : Danger

Hazard and toxicity : May have adverse effects on reproductive function and embryo
Possible carcinogen

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.
Toxic if ingested.
［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.
If exposed or may have been exposed: Get medical advice/attention.
［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	:	PPresine
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	:	Cadmium oxide
Synonym	:	-
Chemical formula	:	CdO
Molecular weight	:	128.41
CAS number	:	1306-19-0
Content	:	94.26 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 3		
Chemical name	:	Lead (II) chromate
Synonym	:	Chrome yellow

Chemical formula	:	$PbCrO_4$
Molecular weight	:	323.2
CAS number	:	1344-37-2
Content	:	About0.6 % (as $PbCrO_4$) , about 1000 mg/kg (as Pb), about 250 mg/kg (as Cr(V))
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 4

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 750 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. : (1)-286 Industrial Safety and Health Act : Published

Ingredient 5

Chemical name	:	Mercury sulfide(II)
Synonym	:	-
Chemical formula	:	HgS
Molecular weight	:	232.66
CAS number	:	1344-48-5
Content	:	About 0.1 % (AS HgS), 949.2 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

Ingredient 6

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	:	Approximately 0.01 %
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

Hazardous Ingredient : Cadmium oxide, Lead (II) chromate

4. First-aid Measures

If in eyes : Rinse thoroughly with clean water. Get medical advice/attention.

If on skin	:	Rinse thoroughly with clean water. Remove/Take off contaminated clothing, shoes, etc. 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 inhaled	:	Few hazards in normal conditions of handling
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 extinguishers, etc.
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.
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	:	Remove potential ignition sources from the vicinity promptly.
Personal Protective Equipment and Emergency Procedures	:	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 in empty containers. Rinse away the remains with 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	:	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	:	Store in clean environment 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 (Cadmium oxide (CdO))

・ACGIH TLV-TWA	:	0.01 mg/m^3 (Total dust; as Cd) 0.002 mg/m^3 (Repirable 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)

Permissible Concentration (Decabrominated diphenyl ether (DBDE))

・Not established

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	【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:＞12 g/kg 【Chromium(III) acetylacetonate】 Oral Rat LD50:3360 mg/kg 【Mercury sulfide(II)】 Oral Mouse TDLo: 195 mg/kg/4 weeks Oral Rat TDLo: 25 gm/kg/5D
Germ Cell Mutagenicity	【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) 【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)	【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.

Others
The Toxicological Information is based on the information of raw materials, because there is not the available information as the mixture. This reference material is stable under the normal condition, and there is not the danger that a harmful additive ingredient elutes, however, when handling this reference material under special conditions such as the use under the high temperature etc., it is recommended to take safety precautions appropriate to use.

12. Ecological Information

Persistence and Degradability
・Cadmium oxide: Not degradable by microorganism etc.
Bioaccumulative Potential
・Cadmium oxide: No or low bioaccumulative potential in the body of fish and shellfishi
Not highly bioaccumulative
Ecotoxicity
・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 : Dispose of this CRM in accordance with applicable legislation and local

Container and Package	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

◇Industrial Safety and Health Act
- Article 57-2 (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. 142 (Chrome and its compounds), No. 411 (Lead and its inorganic compounds), No. 315 (Mercury and its inorganic compounds)

◇Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof
- Specific Class I Designated Chemical Substance No. 88 (Chromium (VI) compounds)

◇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.