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 (NMIJ)
Person in Charge: Person in Charge of Certified Reference Materials
Telephone No.: +81-29-861-4059
Fax No.: +81-29-861-4009
Emergency Contact: Same as above

Prepared on: July 1, 2009
Revised on: April 25, 2018
ID Number: 8123001

Identity of Substance/Mixture: Certified Reference Material NMIJ CRM 8123-a Heavy Metals (Cd, Cr, Hg, Pb) in PVC Resin Pellet –High concentration

Recommended Use and Restriction on Use: This reference material can be used for controlling the precision of analysis or confirming the validity of analytical methods for chemical analysis of Heavy Metals (Cd, Cr, Hg, Pb) in PVC resin or similar polymers. Do not use this reference material for other purposes than testing/research.

2. Hazards identification

GHS Classification:
- Acute oral toxicity: Class 4
- Acute dermal toxicity: Class 5
- Serious eye damages/eye irritant: Class 2B
- Carcinogenicity: Class 1A
- Reproductive toxicity: Class 2

GHS Label element:

Signal word: Danger
Hazard communication:
- Hazard if ingested: Harmful if ingested
- Hazard if contacted on the skin: Irritates the eye. Carcinogenic
- Adverse effect or may affect reproductive function or fetus: Decabrominated diphenyl ether (DBDE) is contained.
- Other hazard and toxicity: (Class 1 Specified Chemical Substances No.33)
- Precautionary statement: [Preventative Measures]

Handle after going through and understand all the precautionary instructions.
Use protective gloves/protective eyewear/protective mask when
Do not eat, drink or smoke while handling the product. Wash the hands after handling.

[Response]
If swallowed: Drink large amount of water and induce vomit. Seek medical advice.
If in eye: Rinse carefully with water for few minutes. Then if using contact lens, take it off if possible, and continue rinsing the eye. If eye irritation persists, seek medical advice.
If on skin: Flush with soap and water. If any abnormality, seek medical advice.

[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

<table>
<thead>
<tr>
<th>Substance or mixture</th>
<th>Ingredient 1</th>
<th>Ingredient 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical name</td>
<td>Polyvinyl chloride</td>
<td>Diisononyl phthalate</td>
</tr>
<tr>
<td>Synonym</td>
<td>PVC</td>
<td>-</td>
</tr>
<tr>
<td>Chemical formula</td>
<td>(C_2H_3Cl)_x</td>
<td>C_6H_4(COOC_9H_19)_2</td>
</tr>
<tr>
<td>Molecular weight</td>
<td>-</td>
<td>418.62</td>
</tr>
<tr>
<td>CAS number</td>
<td>9002-86-2</td>
<td>28553-12-0</td>
</tr>
<tr>
<td>Content</td>
<td>Approximately 74 %</td>
<td>About 20 %</td>
</tr>
<tr>
<td>Reference Number in Gazette List in Japan</td>
<td>Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc.</td>
<td>Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc.</td>
</tr>
<tr>
<td></td>
<td>: (6)-66</td>
<td>: (3)-1307</td>
</tr>
</tbody>
</table>
Ingredient 3
Chemical name : Epoxidized soybean oil
Synonym : -
Chemical formula : -
Molecular weight : -
CAS number : 8013-07-8
Content : Approximately 2.2 %
Reference Number in Gazetted List in Japan : Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. : Published

Ingredient 4
Chemical name : Zinc stearate
Synonym : -
Chemical formula : C_{36}H_{70}O_{4}Zn
Molecular weight : 316.16
CAS number : 557-05-1
Content : Approximately 0.6 %
Reference Number in Gazetted List in Japan : Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. : (2)-615

Ingredient 5
Chemical name : Cadmium oxide
Synonym : -
Chemical formula : CdO
Molecular weight : 128.41
CAS number : 1306-19-0
Content : Approximately 0.01 %
Reference Number in Gazetted List in Japan : Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. : (1)-202

Ingredient 6
Chemical name : Mercury sulfide(II)
Synonym : -
Chemical formula : HgS
Molecular weight : 232.66
CAS number : 1344-48-5
Content : Approximately 0.11 %
Reference Number in Gazetted List in Japan : Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. : (1)-438

Ingredient 7
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 : Approximately 0.48 %
Reference Number in Gazetted List in Japan : Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc.

Ingredient 8
Chemical name : Lead (II) chromate
Synonym : Chrome yellow
Chemical formula : PbCrO_{4}
Molecular weight : 323.2
CAS number : 1344-37-2
Content : Approximately 0.15 %
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 9
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

4. First-aid Measures
◇ If in eyes : Flush with plenty of clean water, carefully
If using contact lens, take it out if possible, keep rinsing.
If the irritation persists, seek medical advice.
◇ If on skin : Flush with soap and plenty of clean water. In case of abnormality, seek medical advice
◇ If swallowed : Drink a lot of water and induce vomit, wash the mouth thoroughly with water. Seek medical advice.
◇ Measures to be taken to protect the person applying first aid : Use personal protective equipment.

5. Fire-fighting Measures
Extinguishing media : Water, dry chemical, foam
Specific hazards at the time of fire: Generates toxic gas by combustion (HCl, CO, CO₂)

Specific extinguishing measures:

Protecting fire-fighting personnel: Extinguish from windward. Use personal protective equipment such as fire-resistant clothing, self-contained compressed air breathing apparatus, etc.

6. Accidental Release Measures
- Sweep up the spilled material and collect them in an empty container
- Prevent this reference material from flowing into drain sewers and public waterways.

7. Handling and Storage

Handling:
- Use protective eyewear/protective clothing
- Avoid contact with eyes, skin
- Do not eat, drink or smoke while handling
- Wash hands thoroughly after handling
- Avoid fire close to the product.
- Installing ground wire, etc. preferable as antistatic device
- Lock and store strictly.

Storage Condition for safe storage: Store in clean environment at 15 °C to 35 °C, and avoid direct sunlight. Lock and store strictly.

※ Refer to the Certificate for the appropriate condition of the certified reference materials storage and the usage precautions.

8. Exposure Controls/Personal Protection

Permissible concentration (Cadmium Oxide)
- ACGIH TLV-TWA (2000) : 0.01 mg/m³ (total powder dust, as Cd)
- Japan Society for Occupational Health recommended reference value (1998) : 0.05 mg/m³ (as Cd)
- OSHA PEL TWA : 0.2 mg/m³ (as Cd)

Permissible concentration (Lead chromate)
- ACGIH TLV-TWA (2000) : 0.05 mg/m³ (as Pb)
- Japan Society for Occupational Health recommended reference value (1998) : 0.05 mg/m³ (as Cr(VI))
(Acetylacetonate Chromium)
  - ACGIH TLV-TWA (2007) : 0.5 mg/m³ (as Cr(III))
  - Japan Society for Occupational Health recommended reference value (2007)
Permissible concentration
(Mercuric sulphide)
  - ACGIH TLV-TWA (2001) : 0.025 mg/m³ (as Hg)
  - Japan Society for Occupational Health recommended reference value (2001)
Permissible Concentration (Decabrominated diphenyl ether (DBDE))
  - Not established
Facility equipment installation
  - Installation of local ventilation equipment preferable if using the product indoor
  - Install hand and eye wash station close to the working place, and mark the location conspicuously
Protective equipment
  - Protective eyewears
  - Protective polyethylene gloves
  - Use appropriate self-contained compressed air breathing apparatus, etc. in case of fire.

9. Physical and Chemical Properties
  - Appearance, etc. : Solid
  - Color : Milky white
  - Odor : No data
  - pH : No data
  - Melting point : No data
  - Boiling point : No data
  - Flashing point : No data
  - Explosive range : No data
  - Vapor pressure : No data
  - Relative vapor density (Air=1) : No data
  - Specific gravity or bulk specific gravity : No data
  - Solubility : Polyvinyl chloride
    - Not soluble in water. Not soluble in most organic solvents, but soluble in ketone types, THF types
    - Di-isonoyl phthalate
      - Water solubility 0.006 mg/L (20 °C). Soluble in organic solvents such as alcohol, ether, etc.
  - n-Octanol/water partition coefficient (Log Po/w) : No data
  - Auto-ignition temperature : No data
  - Decomposition temperature : No data
  - Flammability : Do not ignite at normal temperature
10. Stability and Reactivity

◇ Stability
  • Stable under normal condition

◇ Reactivity
  • Stable under normal condition

◇ Condition to avoid
  • Fire, static

◇ Hazardous decomposition products
  • Generate toxic gases (HCl, CO, CO2) if combusted.

11. Toxicological Information

Acute toxicity (Oral)
  • Polyvinyl chloride: LD50(rat) 2000mg/kg and over
  • Di-isononyl phthalate: LD50(rat) 10 g/kg and over
  • Cadmium oxide: oral mouse LD50: 72 mg/kg, rat LD50: 72 mg/kg
  • Lead chromate: oral mouse LD50: >12 g/kg
  • Acetylacetone Chromium: oral rat LD50: 3360 mg/kg
  • Mercuric sulphide: no data
  • Additive component(epoxidized soybean oil, about 2.2 %) designated as Class 4 based on LD50 (rat) 22.5 mL/kg

Acute toxicity (Dermal)
  • Additive component(epoxidized soybean oil, about 2.2 %) designated as Class 5 due to local effect described as ‘may cause minor inflammation upon contact with human skin etc. though rare’

Serious damage to the eye/eye irritant
  • Di-isononyl phthalate
    - Rabbit 0.1ml/72H mild irritation
    - Designated as Class 2B containing Class 2B Di-isononyl phthalate about 20 %, Class 2B Zinc stearate about 0.6 %, Class 2B Decabromodiphenylether about 0.01 %

Carcinogenicity
  • Designated as Class 1A containing Class 1A Lead chromate 0.15 %

Reproductive toxicity
  • Designated as Class 2 containing Class 2 Lead chromate 0.15 %

Other toxicological information
  • Japan Society for Occupational Health classifies Chrome as ‘Group 2’ respiratory sensitizer
  • Japan Society for Occupational Health classifies Chrome as ‘Group 1’ dermal sensitizer

※ Lacking information of this CRM as composite, the toxicological information is based on the raw materials. This product is stable under normal conditions and does not elute toxic additive components; however, when handling under particular condition such as at high temperature, appropriate safety measures should be taken.

12. Ecological Information

Degradability, concentration
  • No data available

Bioaccumulation
  • No data available

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 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 :
Store in a clean environment at room temperature, avoid direct sunlight.
Handle carefully, avoid fall or drop, etc., prevent collapse or damages to containers

15. Regulatory Information

◇ Industrial Safety and Health Law
· 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 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 product in other countries should be referred to and by application of the relevant laws and regulations of the country in which the product 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.