SAFETY DATA SHEET

1. Identification

Product identifier: Cadmium (Cd) powder

Other means of identification
- SDS number: C-MSDS0001

Manufacturer/Importer/Supplier/Distributor information

Manufacturer
- Company name: Materion Advanced Chemicals Inc.
- Address:
  407 N 13th Street
  1316 W. St. Paul Avenue
  Milwaukee, WI 53233
  United States
- Telephone: 414.212.0257
- E-mail: advancedmaterials@materion.com
- Contact person: Noreen Atkinson
- Emergency phone number: Chemtrec 800.424.9300

2. Hazard(s) identification

Physical hazards
- Not classified.

Health hazards
- Acute toxicity, oral: Category 3
- Acute toxicity, inhalation: Category 1
- Germ cell mutagenicity: Category 2
- Carcinogenicity: Category 1
- Reproductive toxicity: Category 2
- Specific target organ toxicity, repeated exposure: Category 1

Environmental hazards
- Hazardous to the aquatic environment, acute hazard: Category 1
- Hazardous to the aquatic environment, long-term hazard: Category 1

OSHA defined hazards
- Not classified.

Label elements

Signal word
- Danger

Hazard statement
- Toxic if swallowed. Toxic if swallowed. May cause cancer. Fatal if inhaled. Suspected of causing genetic defects. May cause cancer. Suspected of damaging fertility or the unborn child. Causes damage to organs ( ). Causes damage to organs (respiratory system) through prolonged or repeated exposure. Very toxic to aquatic life. Very toxic to aquatic life with long lasting effects.

Precautionary statement
- Prevention: Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe dust/fume. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Avoid release to the environment. Wear protective gloves/protective clothing/eye protection/face protection. Wear respiratory protection.
3. Composition/information on ingredients

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Common name and synonyms</th>
<th>CAS number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cadmium</td>
<td></td>
<td>7440-43-9</td>
<td>100</td>
</tr>
</tbody>
</table>

*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

4. First-aid measures

**Inhalation**
Remove victim to fresh air and keep at rest in a position comfortable for breathing. Oxygen or artificial respiration if needed. Do not use mouth-to-mouth method if victim inhaled the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Call a physician or poison control center immediately.

**Skin contact**
Wash off with soap and water. Get medical attention if irritation develops and persists.

**Eye contact**
Do not rub eyes. Rinse with water. Get medical attention if irritation develops and persists.

**Ingestion**
Call a physician or poison control center immediately. Rinse mouth. Do not induce vomiting without advice from poison control center. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Do not use mouth-to-mouth method if victim ingested the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.

**Most important symptoms/effects, acute and delayed**

**Indication of immediate medical attention and special treatment needed**
Provide general supportive measures and treat symptomatically. Keep victim warm. Keep victim under observation. Symptoms may be delayed.

**General information**
In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). IF exposed or concerned: Get medical advice/attention. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance.

5. Fire-fighting measures

**Suitable extinguishing media**
Powder. Dry sand.

**Unsuitable extinguishing media**
None known.

**Specific hazards arising from the chemical**
During fire, gases hazardous to health may be formed.

**Special protective equipment and precautions for firefighters**
Wear suitable protective equipment.

**Fire fighting equipment/instructions**
Use water spray to cool unopened containers. Water runoff can cause environmental damage.

**Specific methods**
Use standard firefighting procedures and consider the hazards of other involved materials.

**General fire hazards**
No unusual fire or explosion hazards noted.
6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Immediately evacuate personnel to safe areas. Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Do not breathe dust. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

Methods and materials for containment and cleaning up

Avoid dispersal of dust in the air (i.e., clearing dust surfaces with compressed air). The product is immiscible with water and will spread on the water surface. Stop the flow of material, if this is without risk. Cover with plastic sheet to prevent spreading. Absorb in vermiculite, dry sand or earth and place into containers.

Large Spills: Wet down with water and dike for later disposal. Shovel the material into waste container. Prevent entry into waterways, sewer, basements or confined areas. Following product recovery, flush area with water.

Small Spills: Sweep up or vacuum up spillage and collect in suitable container for disposal. Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Environmental precautions

Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.

7. Handling and storage

Precautions for safe handling

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Minimize dust generation and accumulation. Do not breathe dust. Avoid prolonged exposure. Do not taste or swallow. When using, do not eat, drink or smoke. Pregnant or breastfeeding women must not handle this product. Should be handled in closed systems, if possible. Use only outdoors or in a well-ventilated area. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Avoid release to the environment. Do not contaminate water. Avoid discharge into drains, water courses or onto the ground. Inform appropriate managerial or supervisory personnel of all environmental releases.

Conditions for safe storage, including any incompatibilities

Store locked up. Store in a cool, dry place out of direct sunlight. Store in original tightly closed container. Store in a well-ventilated place. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

<table>
<thead>
<tr>
<th>Material</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cadmium (CAS 7440-43-9)</td>
<td>TWA</td>
<td>0.005 mg/m³</td>
</tr>
<tr>
<td>US. OSHA Table Z-2 (29 CFR 1910.1000)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cadmium (CAS 7440-43-9)</td>
<td>Ceiling</td>
<td>0.6 mg/m³</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.3 mg/m³</td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>0.2 mg/m³</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.1 mg/m³</td>
</tr>
</tbody>
</table>

US. ACGIH Threshold Limit Values

<table>
<thead>
<tr>
<th>Material</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cadmium (CAS 7440-43-9)</td>
<td>TWA</td>
<td>0.01 mg/m³</td>
</tr>
</tbody>
</table>
### Biological limit values

<table>
<thead>
<tr>
<th>Material (CAS 7440-43-9)</th>
<th>Value</th>
<th>Determinant</th>
<th>Specimen</th>
<th>Sampling Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cadmium</td>
<td>5 µg/g</td>
<td>Cadmium</td>
<td>Creatinine in urine</td>
<td>*</td>
</tr>
<tr>
<td></td>
<td>5 µg/l</td>
<td>Cadmium</td>
<td>Blood</td>
<td>*</td>
</tr>
</tbody>
</table>

* - For sampling details, please see the source document.

### Individual protection measures, such as personal protective equipment

**Eye/face protection**
- If contact is likely, safety glasses with side shields are recommended.

**Skin protection**
- **Hand protection**
  - Wear appropriate chemical resistant gloves. Suitable gloves can be recommended by the glove supplier.
- **Other**
  - Wear suitable protective clothing. Use of an impervious apron is recommended.

**Respiratory protection**
- Wear positive pressure self-contained breathing apparatus (SCBA).

**Thermal hazards**
- Wear appropriate thermal protective clothing, when necessary.

### General hygiene considerations
- Keep away from food and drink. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

### 9. Physical and chemical properties

**Appearance**
- **Physical state**: Solid.
- **Form**: Solid.
- **Color**: Not available.
- **Odor**: Not applicable.
- **Odor threshold**: Not available.
- **pH**: Not available.

**Melting point/freezing point**
- 609.8 °F (321 °C)

**Initial boiling point and boiling range**
- 1409 °F (765 °C)

**Flash point**: Not available.

**Evaporation rate**: Not available.

**Flammability (solid, gas)**
- Not available.

**Upper/lower flammability or explosive limits**
- **Flammability limit - lower (%)**: Not available.
- **Flammability limit - upper (%)**: Not available.
- **Explosive limit - lower (%)**: Not available.
- **Explosive limit - upper (%)**: Not available.

**Vapor pressure**
- < 0.0000001 kPa at 25 °C

**Vapor density**: Not available.

**Relative density**: Not available.

**Solubility(ies)**
- **Solubility (water)**: Insoluble

**Partition coefficient**
- (n-octanol/water): Not available.

**Auto-ignition temperature**
- 482 °F (250 °C)
Decomposition temperature: Not available.
Viscosity: Not available.

Other information
Density: 8.65 g/cm3 at 25 °C
Explosive properties: Not explosive.
Molecular formula: Cd
Molecular weight: 112.41 g/mol
Oxidizing properties: Not oxidizing.
Specific gravity: 8.65

10. Stability and reactivity
Reactivity: The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability: Material is stable under normal conditions.
Possibility of hazardous reactions: Not available.
Conditions to avoid: Contact with incompatible materials.
Incompatible materials: Strong oxidizing agents.
Hazardous decomposition products: No hazardous decomposition products are known.

11. Toxicological information
Information on likely routes of exposure
Inhalation: Fatal if inhaled.
Skin contact: Due to lack of data the classification is not possible.
Eye contact: Due to lack of data the classification is not possible.
Ingestion: Toxic if swallowed.

Symptoms related to the physical, chemical and toxicological characteristics:

Information on toxicological effects
Acute toxicity: Fatal if inhaled. Toxic if swallowed. Toxic if swallowed.

<table>
<thead>
<tr>
<th>Product</th>
<th>Species</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cadmium (CAS 7440-43-9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Acute</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inhalation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LC50</td>
<td>Rat</td>
<td>0.025 mg/l, 900 Days</td>
</tr>
<tr>
<td>Oral</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LD50</td>
<td>Mouse</td>
<td>890 mg/kg</td>
</tr>
<tr>
<td></td>
<td>Rat</td>
<td>225 mg/kg</td>
</tr>
</tbody>
</table>

* Estimates for product may be based on additional component data not shown.

Skin corrosion/irritation: Due to lack of data the classification is not possible.
Serious eye damage/eye irritation: Due to lack of data the classification is not possible.
Respiratory or skin sensitization
   Respiratory sensitization: Due to lack of data the classification is not possible.
   Skin sensitization: Due to lack of data the classification is not possible.
Germ cell mutagenicity: Suspected of causing genetic defects.
Carcinogenicity

12. Ecological information

Ecotoxicity

<table>
<thead>
<tr>
<th>Product</th>
<th>Species</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cadmium (CAS 7440-43-9)</td>
<td>Aquatic</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Crustacea</td>
<td>EC50 Water flea (Daphnia magna)</td>
</tr>
<tr>
<td></td>
<td>Fish</td>
<td>LC50 Rainbow trout,donaldson trout, Oncorhynchus mykiss</td>
</tr>
</tbody>
</table>

* Estimates for product may be based on additional component data not shown.

Persistence and degradability
No data is available on the degradability of this product.

Bioaccumulative potential
No data available.

Mobility in soil
No data available.

Other adverse effects
No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions
Collect and reclaim or dispose in sealed containers at licensed waste disposal site. This material and its container must be disposed of as hazardous waste. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations
Dispose in accordance with all applicable regulations.

Hazardous waste code
The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products
Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging
Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT
UN number UN3089
UN proper shipping name | Metal powders, flammable, n.o.s.
---|---
Transport hazard class(es) | 4.1
    Class | 4.1
    Subsidiary risk | -
    Label(s) | 4.1
Packing group | III
Special precautions for user | Read safety instructions, SDS and emergency procedures before handling.
Special provisions | IB6, T1, TP33
Packaging exceptions | 151
Packaging non bulk | 213
Packaging bulk | 240

IATA
UN number | UN3089
UN proper shipping name | Metal powders, flammable, n.o.s.
Transport hazard class(es) | 4.1
    Class | 4.1
    Subsidiary risk | -
    Label(s) | 4.1
Packing group | III
Environmental hazards | No.
Special precautions for user | Read safety instructions, SDS and emergency procedures before handling.
Other information | Forbidden.
    Passenger and cargo aircraft | Forbidden.
Cargo aircraft only | Forbidden.

IMDG
UN number | UN3089
UN proper shipping name | Metal powders, flammable, n.o.s.
Transport hazard class(es) | 4.1
    Class | 4.1
    Subsidiary risk | -
    Label(s) | 4.1
Packing group | III
Environmental hazards | No.
    Marine pollutant | No.
EmS | Not available.
Special precautions for user | Read safety instructions, SDS and emergency procedures before handling.

DOT
15. Regulatory information

US federal regulations

All components are on the U.S. EPA TSCA Inventory List.
This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)
Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Cadmium (CAS 7440-43-9) Listed.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Cadmium (CAS 7440-43-9)
- Cancer
- Lung
- Kidney
- Acute toxicity

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories
- Immediate Hazard - Yes
- Delayed Hazard - Yes
- Fire Hazard - No
- Pressure Hazard - No
- Reactivity Hazard - No

SARA 302 Extremely hazardous substance
Not listed.

SARA 311/312 Hazardous chemical
Yes

SARA 313 (TRI reporting)

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS number</th>
<th>% by wt.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cadmium</td>
<td>7440-43-9</td>
<td>100</td>
</tr>
</tbody>
</table>

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List
Cadmium (CAS 7440-43-9)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)
Not regulated.

Clean Water Act (CWA) Section 112(r) (40 CFR 68.130)
- Priority pollutant
- Toxic pollutant
- Safe Drinking Water Act (SDWA) 0.005 mg/l
- 0.005 mg/l

US state regulations

WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

US - New Jersey RTK - Substances: Listed substance
Cadmium (CAS 7440-43-9)
US - Pennsylvania RTK - Hazardous Substances: All compounds of this substance are considered environmental hazards
  Cadmium (CAS 7440-43-9)
US - Pennsylvania RTK - Hazardous Substances: Special hazard
  Cadmium (CAS 7440-43-9)
US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)
  Not listed.
US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))
  Cadmium (CAS 7440-43-9)
US. Massachusetts RTK - Substance List
  Cadmium (CAS 7440-43-9)
US. New Jersey Worker and Community Right-to-Know Act
  Cadmium (CAS 7440-43-9)
US. Pennsylvania RTK - Hazardous Substances
  Cadmium (CAS 7440-43-9)
US. Pennsylvania Worker and Community Right-to-Know Law
  Cadmium (CAS 7440-43-9)
US. Rhode Island RTK
  Cadmium (CAS 7440-43-9)

US. California Proposition 65
  WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance
  Cadmium (CAS 7440-43-9) Listed: October 1, 1987
US - California Proposition 65 - CRT: Listed date/Developmental toxin
  Cadmium (CAS 7440-43-9) Listed: May 1, 1997
US - California Proposition 65 - CRT: Listed date/Male reproductive toxin
  Cadmium (CAS 7440-43-9) Listed: May 1, 1997

16. Other information, including date of preparation or last revision

Issued date: 02-10-2014
Revision date: 07-14-2015
Version #: 03

Disclaimer
Materion - Milwaukee cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user’s responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. This document has been prepared using data from sources considered to be technically reliable and the information is believed to be correct. Materion makes no warranties, expressed or implied, as to the accuracy of the information contained herein. Materion cannot anticipate all conditions under which this information and its products may be used and the actual conditions of use are beyond its control. The user is responsible to evaluate all available information when using this product for any particular use and to comply with all Federal, State, Provincial and Local laws, statutes and regulations.

Material name: Cadmium (Cd) powder