



# SAFETY DATA SHEET

**MATERION**

## SECTION 1: Identification of the substance/mixture and of the company/undertaking

### 1.1. Product identifier

**Trade name or designation of the mixture** Cadmium-Zinc-Tellurium (Cd-Zn-Te)  
**Registration number** -  
**Document number** 1ON  
**Synonyms** None.  
**Materion Code** 1ON  
**Issue date** 26-May-2015  
**Revision date** 11-January-2018

### 1.3. Details of the supplier of the safety data sheet

#### Supplier

**Company name** Materion Advanced Chemicals Inc.  
**Address** 407 N. 13th Street  
1316 W. St. Paul Avenue  
Milwaukee, WI 53233  
United States  
**Division** Milwaukee  
**Telephone** 414.212.0257  
**e-mail** advancedmaterials@materion.com  
**Contact person** Laura Hamilton

### 1.4. Emergency telephone number

**Supersedes date** 21-January-2016  
**Version number** 03

### 1.2. Relevant identified uses of the substance or mixture and uses advised against

**Identified uses** Not available.  
**Uses advised against** None known.

## SECTION 2: Hazards identification

### 2.1. Classification of the substance or mixture

The mixture has been assessed and/or tested for its physical, health and environmental hazards and the following classification applies.

#### Classification according to Regulation (EC) No 1272/2008 as amended

##### Health hazards

|                      |             |  |
|----------------------|-------------|--|
| Acute toxicity, oral | Category 3  | H301 - Toxic if swallowed.<br>H301 - Toxic if swallowed. |
| Carcinogenicity      | Category 1A | H350 - May cause cancer.<br>H350 - May cause cancer.     |

##### Environmental hazards

|  |            |  |
|--|------------|--|
| Hazardous to the aquatic environment, acute aquatic hazard     | Category 1 | H400 - Very toxic to aquatic life.                           |
| Hazardous to the aquatic environment, long-term aquatic hazard | Category 1 | H410 - Very toxic to aquatic life with long lasting effects. |

**Hazard summary** Toxic if swallowed. Toxic if swallowed. Harmful in contact with skin. Harmful if inhaled. May cause cancer. May cause cancer. Prolonged exposure may cause chronic effects. Dangerous for the environment if discharged into watercourses.

### 2.2. Label elements

#### Label according to Regulation (EC) No. 1272/2008 as amended

**Contains:** Cadmium, Tellurium, Zinc

## Hazard pictograms



## Signal word

Danger

## Hazard statements

|      |   |
|------|---|
| H301 | Toxic if swallowed.                                   |
| H312 | Harmful in contact with skin.                         |
| H301 | Toxic if swallowed.                                   |
| H350 | May cause cancer.                                     |
| H332 | Harmful if inhaled.                                   |
| H350 | May cause cancer.                                     |
| H400 | Very toxic to aquatic life.                           |
| H410 | Very toxic to aquatic life with long lasting effects. |

## Precautionary statements

### Prevention

|      |  |
|------|--|
| P201 | Obtain special instructions before use.                                    |
| P202 | Do not handle until all safety precautions have been read and understood.  |
| P261 | Avoid breathing dust/fume.   |
| P264 | Wash thoroughly after handling.  |
| P270 | Do not eat, drink or smoke when using this product.                        |
| P271 | Use only outdoors or in a well-ventilated area.                            |
| P273 | Avoid release to the environment.  |
| P280 | Wear protective gloves/protective clothing/eye protection/face protection. |

### Response

|             |  |
|-------------|--|
| P301 + P310 | IF SWALLOWED: Immediately call a POISON CENTRE/doctor. |
| P308 + P313 | IF exposed or concerned: Get medical advice/attention. |
| P321        | Specific treatment (see this label).                   |
| P330        | Rinse mouth.   |
| P363        | Wash contaminated clothing before reuse.               |
| P391        | Collect spillage.                                      |

### Storage

|      |                  |
|------|------------------|
| P405 | Store locked up. |
|------|------------------|

### Disposal

|      |   |
|------|---|
| P501 | Dispose of contents/container in accordance with local/regional/national/international regulations. |
|------|---|

## Supplemental label information

20 % of the mixture consists of component(s) of unknown acute oral toxicity. % of the mixture consists of component(s) of unknown acute dermal toxicity. 50 % of the mixture consists of component(s) of unknown acute hazards to the aquatic environment. 50 % of the mixture consists of component(s) of unknown long-term hazards to the aquatic environment.

## 2.3. Other hazards

None known.

## SECTION 3: Composition/information on ingredients

### 3.2. Mixtures

#### General information

| Chemical name          | %  | CAS-No. / EC No.        | REACH Registration No. | Index No.    | Notes |
|------------------------|--|-------------------------|------------------------|--------------|-------|
| Tellurium              | 50   | 13494-80-9<br>236-813-4 | -                      | -            |       |
| <b>Classification:</b> | Acute Tox. 3;H301  |                         |                        |              |       |
| Cadmium                | 12,5 -<br>47,5   | 7440-43-9<br>231-152-8  | -                      | 048-011-00-X |       |
| <b>Classification:</b> | Acute Tox. 3;H301, Carc. 1A;H350, Aquatic Acute 1;H400, Aquatic Chronic 1;H410 |                         |                        |              |       |
| Zinc                   | 2,5 - 37,5   | 7440-66-6<br>231-175-3  | -                      | 030-001-01-9 |       |
| <b>Classification:</b> | Water-React. 3;H261  |                         |                        |              | T     |

## List of abbreviations and symbols that may be used above

CLP: Regulation No. 1272/2008.

DSD: Directive 67/548/EEC.

M: M-factor

vPvB: very persistent and very bioaccumulative substance.

PBT: persistent, bioaccumulative and toxic substance.

#: This substance has been assigned Community workplace exposure limit(s).

**Composition comments** The full text for all R- and H-phrases is displayed in section 16.

## SECTION 4: First aid measures

**General information** 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. Wash contaminated clothing before reuse.

### 4.1. Description of first aid measures

**Inhalation** Remove victim to fresh air and keep at rest in a position comfortable for breathing. 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 POISON CENTRE or doctor/physician if you feel unwell.

**Skin contact** Wash off with soap and plenty of water. Call a POISON CENTRE or doctor/physician if you feel unwell. Get medical attention if irritation develops and persists. For minor skin contact, avoid spreading material on unaffected skin.

**Eye contact** Get medical attention if irritation develops and persists.

**Ingestion** Call a physician or poison control centre 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.

**4.2. Most important symptoms and effects, both acute and delayed** Headache. Nausea, vomiting. Diarrhoea.

**4.3. Indication of any 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.

## SECTION 5: Firefighting measures

**General fire hazards** No unusual fire or explosion hazards noted.

### 5.1. Extinguishing media

**Suitable extinguishing media** Foam. Dry powder. Dry sand. Carbon dioxide (CO<sub>2</sub>).

**Unsuitable extinguishing media** Water. Do not use water jet as an extinguisher, as this will spread the fire.

**5.2. Special hazards arising from the substance or mixture** During fire, gases hazardous to health may be formed.

### 5.3. Advice for firefighters

**Special protective equipment for firefighters** Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

**Special firefighting procedures** Water runoff can cause environmental damage.

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

## SECTION 6: Accidental release measures

### 6.1. Personal precautions, protective equipment and emergency procedures

**For non-emergency personnel** Immediately evacuate personnel to safe areas. Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate personal protective equipment. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained.

**For emergency responders** Keep unnecessary personnel away.

**6.2. Environmental precautions** Avoid release to the environment. Prevent further leakage or spillage if safe to do so. Do not contaminate water. Avoid discharge into drains, water courses or onto the ground. Inform appropriate managerial or supervisory personnel of all environmental releases.

### 6.3. Methods and material for containment and cleaning up

Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Absorb in vermiculite, dry sand or earth and place into containers. Prevent product from entering drains. Following product recovery, flush area with water.

Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Never return spills to original containers for re-use.

### 6.4. Reference to other sections

Not available.

## SECTION 7: Handling and storage

### 7.1. Precautions for safe handling

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Minimise dust generation and accumulation. Avoid breathing dust. Avoid prolonged exposure. Avoid contact with clothing. Do not taste or swallow. When using, do not eat, drink or smoke. 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 empty into drains. Wash contaminated clothing before reuse. Observe good industrial hygiene practices.

### 7.2. 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.

### 7.3. Specific end use(s)

Not available.

## SECTION 8: Exposure controls/personal protection

### 8.1. Control parameters

#### Occupational exposure limits

##### Austria. MAK List, OEL Ordinance (GwV), BGBl. II, no. 184/2001

| Components                 | Type | Value                 | Form                |
|----------------------------|------|-----------------------|---------------------|
| Tellurium (CAS 13494-80-9) | MAK  | 0,1 mg/m <sup>3</sup> | Inhalable fraction. |
|                            | STEL | 0,5 mg/m <sup>3</sup> | Inhalable fraction. |

##### Austria. TRK List, OEL Ordinance (GwV), BGBl. II, no. 184/2001

| Components              | Type | Value                   | Form                |
|-------------------------|------|-------------------------|---------------------|
| Cadmium (CAS 7440-43-9) | STEL | 0,06 mg/m <sup>3</sup>  | Inhalable fraction. |
|                         | TWA  | 0,015 mg/m <sup>3</sup> | Inhalable fraction. |

##### Belgium. Exposure Limit Values.

| Components                 | Type | Value                   | Form                  |
|----------------------------|------|-------------------------|-----------------------|
| Cadmium (CAS 7440-43-9)    | TWA  | 0,01 mg/m <sup>3</sup>  | Inhalable particles.  |
|                            |      | 0,002 mg/m <sup>3</sup> | Respirable particles. |
| Tellurium (CAS 13494-80-9) | TWA  | 0,1 mg/m <sup>3</sup>   |                       |

##### Bulgaria. OELs. Regulation No 13 on protection of workers against risks of exposure to chemical agents at work

| Components                 | Type | Value                  |
|----------------------------|------|------------------------|
| Cadmium (CAS 7440-43-9)    | TWA  | 0,05 mg/m <sup>3</sup> |
| Tellurium (CAS 13494-80-9) | TWA  | 0,1 mg/m <sup>3</sup>  |

##### Croatia. Dangerous Substance Exposure Limit Values in the Workplace (ELVs), Annexes 1 and 2, Narodne Novine, 13/09

| Components                 | Type | Value                   |
|----------------------------|------|-------------------------|
| Cadmium (CAS 7440-43-9)    | MAC  | 0,025 mg/m <sup>3</sup> |
| Tellurium (CAS 13494-80-9) | MAC  | 0,1 mg/m <sup>3</sup>   |

##### Cyprus. OELs. Control of factory atmosphere and dangerous substances in factories regulation, PI 311/73, as amended.

| Components              | Type | Value                  | Form  |
|-------------------------|------|------------------------|-------|
| Cadmium (CAS 7440-43-9) | TWA  | 0,05 mg/m <sup>3</sup> | Dust. |

##### Czech Republic. OELs. Government Decree 361

| Components              | Type    | Value                 |
|-------------------------|---------|-----------------------|
| Cadmium (CAS 7440-43-9) | Ceiling | 0,1 mg/m <sup>3</sup> |

**Czech Republic. OELs. Government Decree 361 Components**

| Components                 | Type    | Value                  |
|----------------------------|---------|------------------------|
| Tellurium (CAS 13494-80-9) | TWA     | 0,05 mg/m <sup>3</sup> |
|                            | Ceiling | 0,5 mg/m <sup>3</sup>  |
|                            | TWA     | 0,1 mg/m <sup>3</sup>  |

**Denmark. Exposure Limit Values Components**

| Components                 | Type | Value                   | Form           |
|----------------------------|------|-------------------------|----------------|
| Cadmium (CAS 7440-43-9)    | TLV  | 0,005 mg/m <sup>3</sup> | Dust and fume. |
| Tellurium (CAS 13494-80-9) | TLV  | 0,1 mg/m <sup>3</sup>   | Dust.          |

**Estonia. OELs. Occupational Exposure Limits of Hazardous Substances. (Annex of Regulation No. 293 of 18 September 2001)**

| Components                 | Type | Value                  | Form             |
|----------------------------|------|------------------------|------------------|
| Cadmium (CAS 7440-43-9)    | TWA  | 0,05 mg/m <sup>3</sup> | Total dust.      |
|                            |      | 0,01 mg/m <sup>3</sup> | Respirable dust. |
| Tellurium (CAS 13494-80-9) | TWA  | 0,1 mg/m <sup>3</sup>  |                  |

**Finland. Workplace Exposure Limits Components**

| Components                 | Type | Value                   | Form        |
|----------------------------|------|-------------------------|-------------|
| Cadmium (CAS 7440-43-9)    | TWA  | 0,004 mg/m <sup>3</sup> | Respirable. |
| Tellurium (CAS 13494-80-9) | STEL | 0,3 mg/m <sup>3</sup>   |             |
|                            | TWA  | 0,1 mg/m <sup>3</sup>   |             |

**France. Threshold Limit Values (VLEP) for Occupational Exposure to Chemicals in France, INRS ED 984 Components**

| Components  | Type | Value                  |
|---|------|------------------------|
| Cadmium (CAS 7440-43-9)<br><b>Regulatory status:</b> Indicative limit (VL)    | VME  | 0,05 mg/m <sup>3</sup> |
|   |      |                        |
| Tellurium (CAS 13494-80-9)<br><b>Regulatory status:</b> Indicative limit (VL) | VME  | 0,1 mg/m <sup>3</sup>  |
|   |      |                        |

**Germany. DFG MAK List (advisory OELs). Commission for the Investigation of Health Hazards of Chemical Compounds in the Work Area (DFG)**

| Components           | Type | Value                 | Form                 |
|----------------------|------|-----------------------|----------------------|
| Zinc (CAS 7440-66-6) | TWA  | 2 mg/m <sup>3</sup>   | Inhalable fraction.  |
|                      |      | 0,1 mg/m <sup>3</sup> | Respirable fraction. |

**Greece. OELs (Decree No. 90/1999, as amended) Components**

| Components                 | Type | Value                   |
|----------------------------|------|-------------------------|
| Cadmium (CAS 7440-43-9)    | STEL | 0,1 mg/m <sup>3</sup>   |
|                            | TWA  | 0,025 mg/m <sup>3</sup> |
| Tellurium (CAS 13494-80-9) | TWA  | 0,1 mg/m <sup>3</sup>   |

**Hungary. OELs. Joint Decree on Chemical Safety of Workplaces Components**

| Components              | Type    | Value                   |
|-------------------------|---------|-------------------------|
| Cadmium (CAS 7440-43-9) | Ceiling | 0,015 mg/m <sup>3</sup> |

**Iceland. OELs. Regulation 154/1999 on occupational exposure limits Components**

| Components                 | Type | Value                  | Form           |
|----------------------------|------|------------------------|----------------|
| Cadmium (CAS 7440-43-9)    | TWA  | 0,01 mg/m <sup>3</sup> | Dust and fume. |
| Tellurium (CAS 13494-80-9) | TWA  | 0,1 mg/m <sup>3</sup>  | Dust.          |

**Ireland. Occupational Exposure Limits Components**

| Components                 | Type | Value                   |
|----------------------------|------|-------------------------|
| Cadmium (CAS 7440-43-9)    | TWA  | 0,025 mg/m <sup>3</sup> |
| Tellurium (CAS 13494-80-9) | TWA  | 0,1 mg/m <sup>3</sup>   |

**Italy. Occupational Exposure Limits Components**

| Components              | Type | Value                  | Form |
|-------------------------|------|------------------------|------|
| Cadmium (CAS 7440-43-9) | TWA  | 0,01 mg/m <sup>3</sup> |      |

**Italy. Occupational Exposure Limits Components**

| Components                 | Type | Value                   | Form                 |
|----------------------------|------|-------------------------|----------------------|
| Tellurium (CAS 13494-80-9) | TWA  | 0,002 mg/m <sup>3</sup> | Respirable fraction. |
|                            |      | 0,1 mg/m <sup>3</sup>   |                      |

**Latvia. OELs. Occupational exposure limit values of chemical substances in work environment Components**

| Components                 | Type | Value                  |
|----------------------------|------|------------------------|
| Cadmium (CAS 7440-43-9)    | STEL | 0,05 mg/m <sup>3</sup> |
|                            | TWA  | 0,01 mg/m <sup>3</sup> |
| Tellurium (CAS 13494-80-9) | TWA  | 0,01 mg/m <sup>3</sup> |

**Lithuania. OELs. Limit Values for Chemical Substances, General Requirements Components**

| Components                 | Type | Value                  | Form                 |
|----------------------------|------|------------------------|----------------------|
| Cadmium (CAS 7440-43-9)    | TWA  | 0,05 mg/m <sup>3</sup> | Inhalable fraction.  |
|                            |      | 0,01 mg/m <sup>3</sup> | Respirable fraction. |
| Tellurium (CAS 13494-80-9) | TWA  | 0,1 mg/m <sup>3</sup>  |                      |

**Netherlands. OELs (binding) Components**

| Components              | Type | Value                   |
|-------------------------|------|-------------------------|
| Cadmium (CAS 7440-43-9) | TWA  | 0,004 mg/m <sup>3</sup> |

**Norway. Administrative Norms for Contaminants in the Workplace Components**

| Components                 | Type | Value                  |
|----------------------------|------|------------------------|
| Cadmium (CAS 7440-43-9)    | TLV  | 0,05 mg/m <sup>3</sup> |
| Tellurium (CAS 13494-80-9) | TLV  | 0,1 mg/m <sup>3</sup>  |

**Ordinance of the Minister of Labour and Social Policy on 6 June 2014 on the maximum permissible concentrations and intensities of harmful health factors in the work environment, Journal of Laws 2014, item 817 Components**

| Components                 | Type | Value                   | Form                 |
|----------------------------|------|-------------------------|----------------------|
| Cadmium (CAS 7440-43-9)    | TWA  | 0,01 mg/m <sup>3</sup>  | Inhalable fraction.  |
|                            |      | 0,002 mg/m <sup>3</sup> | Respirable fraction. |
| Tellurium (CAS 13494-80-9) | STEL | 0,03 mg/m <sup>3</sup>  |                      |
|                            | TWA  | 0,01 mg/m <sup>3</sup>  |                      |

**Portugal. VLEs. Norm on occupational exposure to chemical agents (NP 1796) Components**

| Components                 | Type | Value                   | Form                 |
|----------------------------|------|-------------------------|----------------------|
| Cadmium (CAS 7440-43-9)    | TWA  | 0,01 mg/m <sup>3</sup>  | Respirable fraction. |
|                            |      | 0,002 mg/m <sup>3</sup> |                      |
| Tellurium (CAS 13494-80-9) | TWA  | 0,1 mg/m <sup>3</sup>   |                      |

**Romania. OELs. Protection of workers from exposure to chemical agents at the workplace Components**

| Components                 | Type | Value                  |
|----------------------------|------|------------------------|
| Cadmium (CAS 7440-43-9)    | TWA  | 0,05 mg/m <sup>3</sup> |
| Tellurium (CAS 13494-80-9) | STEL | 0,15 mg/m <sup>3</sup> |
|                            | TWA  | 0,05 mg/m <sup>3</sup> |

**Slovakia. OELs. Regulation No. 300/2007 concerning protection of health in work with chemical agents Components**

| Components                 | Type | Value                 | Form                 |
|----------------------------|------|-----------------------|----------------------|
| Tellurium (CAS 13494-80-9) | TWA  | 0,1 mg/m <sup>3</sup> |                      |
| Zinc (CAS 7440-66-6)       | TWA  | 2 mg/m <sup>3</sup>   | Inhalable fraction.  |
|                            |      | 0,1 mg/m <sup>3</sup> | Respirable fraction. |

**Slovenia. OELs. Regulations concerning protection of workers against risks due to exposure to chemicals while working (Official Gazette of the Republic of Slovenia) Components**

| Components                 | Type | Value                   | Form                     |
|----------------------------|------|-------------------------|--------------------------|
| Cadmium (CAS 7440-43-9)    | TWA  | 0,015 mg/m <sup>3</sup> | Dust/aerosol, inhalable. |
| Tellurium (CAS 13494-80-9) | TWA  | 0,1 mg/m <sup>3</sup>   | Inhalable fraction.      |

**Spain. Carcinogens and Mutagens with Limit Values (Table 2)**

| Components              | Type | Value                   | Form                 |
|-------------------------|------|-------------------------|----------------------|
| Cadmium (CAS 7440-43-9) | TWA  | 0,01 mg/m <sup>3</sup>  | Inhalable fraction.  |
|                         |      | 0,002 mg/m <sup>3</sup> | Respirable fraction. |

**Spain. Occupational Exposure Limits Components**

| Components                 | Type | Value                 |
|----------------------------|------|-----------------------|
| Tellurium (CAS 13494-80-9) | TWA  | 0,1 mg/m <sup>3</sup> |

**Sweden. OELs. Work Environment Authority (AV), Occupational Exposure Limit Values (AFS 2015:7)**

| Components                 | Type | Value                   | Form             |
|----------------------------|------|-------------------------|------------------|
| Cadmium (CAS 7440-43-9)    | TWA  | 0,02 mg/m <sup>3</sup>  | Total dust.      |
|                            |      | 0,002 mg/m <sup>3</sup> | Respirable dust. |
| Tellurium (CAS 13494-80-9) | TWA  | 0,1 mg/m <sup>3</sup>   | Total dust.      |

**Switzerland. SUVA Grenzwerte am Arbeitsplatz Components**

| Components                 | Type | Value                   | Form                |
|----------------------------|------|-------------------------|---------------------|
| Cadmium (CAS 7440-43-9)    | TWA  | 0,015 mg/m <sup>3</sup> | Inhalable dust.     |
|                            |      | 0,004 mg/m <sup>3</sup> | Respirable dust.    |
| Tellurium (CAS 13494-80-9) | STEL | 0,2 mg/m <sup>3</sup>   | Inhalable fraction. |
|                            | TWA  | 0,1 mg/m <sup>3</sup>   | Inhalable fraction. |

**UK. EH40 Workplace Exposure Limits (WELs) Components**

| Components                 | Type | Value                   |
|----------------------------|------|-------------------------|
| Cadmium (CAS 7440-43-9)    | TWA  | 0,025 mg/m <sup>3</sup> |
| Tellurium (CAS 13494-80-9) | TWA  | 0,1 mg/m <sup>3</sup>   |

**Biological limit values****Croatia. BLV. Dangerous Substance Exposure Limit Values at Workplace, Annexes 4 (as amended) Components**

| Components              | Value          | Determinant | Specimen            | Sampling Time |
|-------------------------|----------------|-------------|---------------------|---------------|
| Cadmium (CAS 7440-43-9) | 10 µg/g        | Cadmium     | Creatinine in urine | *             |
|                         | 10 µg/l        | Cadmium     | Blood               | *             |
|                         | 0,09 µmol/l    | Cadmium     | Blood               | *             |
|                         | 10,06 µmol/mol | Cadmium     | Creatinine in urine | *             |

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

**Czech Republic. Limit Values for Indicators of Biological Exposure Tests in Urine and Blood, Annex 2, Tables 1 and 2, Government Decree 432/2003 Sb.**

| Components              | Value           | Determinant | Specimen            | Sampling Time |
|-------------------------|-----------------|-------------|---------------------|---------------|
| Cadmium (CAS 7440-43-9) | 0,045 µmol/l    | Cadmium     | Blood               | *             |
|                         | 0,005 µmol/mmol | Cadmium     | Creatinine in urine | *             |
|                         | 0,005 mg/g      | Cadmium     | Creatinine in urine | *             |
|                         | 0,005 mg/l      | Cadmium     | Blood               | *             |

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

**Finland. HTP-arvot, App 2., Biological Limit Values, (BRA/BGV) , Social Affairs and Ministry of Health Components**

| Components              | Value     | Determinant | Specimen | Sampling Time |
|-------------------------|-----------|-------------|----------|---------------|
| Cadmium (CAS 7440-43-9) | 20 nmol/l | Cadmium     | Urine    | *             |

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

**France. Biological indicators of exposure (IBE) (National Institute for Research and Security (INRS, ND 2065) Components**

| Components              | Value  | Determinant | Specimen            | Sampling Time |
|-------------------------|--------|-------------|---------------------|---------------|
| Cadmium (CAS 7440-43-9) | 5 µg/g | Cadmium     | Creatinine in urine | *             |
|                         | 5 µg/l | Cadmium     | Blood               | *             |

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

**Hungary. Chemical Safety at Workplace Ordinance Joint Decree No. 25/2000 (Annex 2): Permissible limit values of biological exposure (effect) indices**

| Components              | Value          | Determinant | Specimen            | Sampling Time |
|-------------------------|----------------|-------------|---------------------|---------------|
| Cadmium (CAS 7440-43-9) | 10 µg/l        | cadmium     | Blood               | *             |
|                         | 0,01 mg/g      | cadmium     | Creatinine in urine | *             |
|                         | 0,09 µmol/l    | cadmium     | Blood               | *             |
|                         | 0,01 µmol/mmol | cadmium     | Creatinine in urine | *             |

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

**Slovakia. BLVs (Biological Limit Value). Regulation no. 355/2006 concerning protection of workers exposed to chemical agents, Annex 2**

| Components              | Value    | Determinant | Specimen            | Sampling Time |
|-------------------------|----------|-------------|---------------------|---------------|
| Cadmium (CAS 7440-43-9) | 4,7 µg/g | Cadmium     | Creatinine in urine | *             |
|                         | 7 µg/l   | Cadmium     | Urine               | *             |

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

**Spain. Biological Limit Values (VLBs), Occupational Exposure Limits for Chemical Agents, Table 4**

| Components              | Value  | Determinant | Specimen            | Sampling Time |
|-------------------------|--------|-------------|---------------------|---------------|
| Cadmium (CAS 7440-43-9) | 5 µg/g | Cadmio      | Creatinine in urine | *             |
|                         | 5 µg/l | Cadmio      | Blood               | *             |

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

**Switzerland. BAT-Werte (Biological Limit Values in the Workplace as per SUVA)**

| Components              | Value  | Determinant | Specimen            | Sampling Time |
|-------------------------|--------|-------------|---------------------|---------------|
| Cadmium (CAS 7440-43-9) | 5 µg/g | Cadmium     | Creatinine in urine | *             |

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

**Recommended monitoring procedures** Follow standard monitoring procedures.

**Derived no effect levels (DNELs)** Not available.

**Predicted no effect concentrations (PNECs)** Not available.

**8.2. Exposure controls**

**Appropriate engineering controls** Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

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

**General information** Use personal protective equipment as required. Personal protection equipment should be chosen according to the CEN standards and in discussion with the supplier of the personal protective equipment.

**Eye/face protection** Wear eye/face protection.

**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. Wear protective gloves. Personal protection equipment should be chosen according to the CEN standards and in discussion with the supplier of the personal protective equipment.

**Respiratory protection** In case of insufficient ventilation, wear suitable respiratory equipment.

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

**Hygiene measures** Avoid contact with eyes. Avoid contact with clothing. Avoid contact with skin. 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.



**Environmental exposure controls**

Contain spills and prevent releases and observe national regulations on emissions. Inform appropriate managerial or supervisory personnel of all environmental releases.

**SECTION 9: Physical and chemical properties****9.1. Information on basic physical and chemical properties****Appearance**

|   |                             |
|---|-----------------------------|
| <b>Physical state</b>                               | Solid.                      |
| <b>Form</b>   | Solid.                      |
| <b>Colour</b>                                       | Not available.              |
| <b>Odour</b>  | Not available.              |
| <b>Odour threshold</b>                              | Not available.              |
| <b>pH</b>   | Not available.              |
| <b>Melting point/freezing point</b>                 | 321 °C (609,8 °F) estimated |
| <b>Initial boiling point and boiling range</b>      | 765 °C (1409 °F) estimated  |
| <b>Flash point</b>                                  | Not available.              |
| <b>Evaporation rate</b>                             | Not available.              |
| <b>Flammability (solid, gas)</b>                    | Not available.              |
| <b>Upper/lower flammability or explosive limits</b> |                             |
| <b>Flammability limit - lower (%)</b>               | Not available.              |
| <b>Flammability limit - upper (%)</b>               | Not available.              |
| <b>Vapour pressure</b>                              | 0,00001 hPa estimated       |
| <b>Vapour density</b>                               | Not available.              |
| <b>Relative density</b>                             | Not available.              |
| <b>Solubility(ies)</b>                              |                             |
| <b>Solubility (water)</b>                           | Not available.              |
| <b>Partition coefficient (n-octanol/water)</b>      | Not available.              |
| <b>Auto-ignition temperature</b>                    | 250 °C (482 °F) estimated   |
| <b>Decomposition temperature</b>                    | Not available.              |
| <b>Viscosity</b>                                    | Not available.              |
| <b>Explosive properties</b>                         | Not explosive.              |
| <b>Oxidising properties</b>                         | Not oxidising.              |

**9.2. Other information**

|                         |                                  |
|-------------------------|----------------------------------|
| <b>Density</b>          | 7,08 g/cm <sup>3</sup> estimated |
| <b>Specific gravity</b> | 7,08 estimated                   |

**SECTION 10: Stability and reactivity**

|   |   |
|---|---|
| <b>10.1. Reactivity</b>                         | Not available.  |
| <b>10.2. Chemical stability</b>                 | Material is stable under normal conditions.                 |
| <b>10.3. Possibility of hazardous reactions</b> | No dangerous reaction known under conditions of normal use. |
| <b>10.4. Conditions to avoid</b>                | Contact with incompatible materials.                        |
| <b>10.5. Incompatible materials</b>             | Strong oxidising agents. Chlorine.                          |
| <b>10.6. Hazardous decomposition products</b>   | No hazardous decomposition products are known.              |

**SECTION 11: Toxicological information**

**General information** Occupational exposure to the substance or mixture may cause adverse effects.

**Information on likely routes of exposure**

|                     |   |
|---------------------|---|
| <b>Inhalation</b>   | Harmful if inhaled.                                     |
| <b>Skin contact</b> | Harmful in contact with skin.                           |
| <b>Eye contact</b>  | Due to lack of data the classification is not possible. |
| <b>Ingestion</b>    | Toxic if swallowed.                                     |

**Symptoms** Headache. Nausea, vomiting. Diarrhoea.

### 11.1. Information on toxicological effects

**Acute toxicity** Toxic if swallowed. Toxic if swallowed. Harmful if inhaled. Harmful in contact with skin.

| Product                           | Species        | Test Results                     |
|-----------------------------------|----------------|----------------------------------|
| Cadmium-Zinc-Tellurium (Cd-Zn-Te) |                |                                  |
| <b>Acute</b>                      |                |                                  |
| <b>Inhalation</b>                 |                |                                  |
| LC50                              | Rat            | 0,08333 mg/l, 900 Days estimated |
| <b>Oral</b>                       |                |                                  |
| LD50                              | Guinea pig     | 90 mg/kg estimated               |
|                                   | Mouse          | 2967 mg/kg estimated             |
|                                   | Rabbit         | 134 mg/kg estimated              |
|                                   | Rat            | 136 mg/kg estimated              |
| <b>Components</b>                 | <b>Species</b> | <b>Test Results</b>              |

Cadmium (CAS 7440-43-9)

**Acute**

**Oral**

LD50 Rat 225 mg/kg

Tellurium (CAS 13494-80-9)

**Acute**

**Oral**

LD50 Rat 83 mg/kg

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

**Skin corrosion/irritation** Due to partial or complete lack of data the classification is not possible.

**Serious eye damage/eye irritation** Due to partial or complete lack of data the classification is not possible.

**Respiratory sensitisation** Due to partial or complete lack of data the classification is not possible.

**Skin sensitisation** Due to partial or complete lack of data the classification is not possible.

**Germ cell mutagenicity** Due to partial or complete lack of data the classification is not possible.

**Carcinogenicity** May cause cancer. May cause cancer.

**Hungary. 26/2000 EüM Ordinance on protection against and preventing risk relating to exposure to carcinogens at work (as amended)**

Cadmium (CAS 7440-43-9)

**IARC Monographs. Overall Evaluation of Carcinogenicity**

Cadmium (CAS 7440-43-9) 1 Carcinogenic to humans.

**Reproductive toxicity** Due to partial or complete lack of data the classification is not possible.

**Specific target organ toxicity - single exposure** Due to partial or complete lack of data the classification is not possible.

**Specific target organ toxicity - repeated exposure** Due to partial or complete lack of data the classification is not possible.

**Aspiration hazard** Due to partial or complete lack of data the classification is not possible.

**Mixture versus substance information** No information available.

**Other information** Not available.

### SECTION 12: Ecological information

**12.1. Toxicity** Very toxic to aquatic life with long lasting effects. Accumulation in aquatic organisms is expected.

| Product                           | Species      | Test Results                     |
|-----------------------------------|--------------|----------------------------------|
| Cadmium-Zinc-Tellurium (Cd-Zn-Te) |              |                                  |
| <b>Aquatic</b>                    |              |                                  |
| Crustacea                         | EC50 Daphnia | 0,7503 mg/l, 48 hours estimated  |
| Fish                              | LC50 Fish    | 25,9083 mg/l, 96 hours estimated |

| Components              | Species |  | Test Results                   |
|-------------------------|---------|--|--------------------------------|
| Cadmium (CAS 7440-43-9) |         |  |                                |
| <b>Aquatic</b>          |         |  |                                |
| Crustacea               | EC50    | Water flea (Daphnia magna)                             | 0,0491 mg/l, 48 hours          |
| Fish                    | LC50    | Rainbow trout,donaldson trout<br>(Oncorhynchus mykiss) | 0,0024 - 0,0029 mg/l, 96 hours |

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

|  |   |
|--|---|
| <b>12.2. Persistence and degradability</b>             | No data is available on the degradability of this product.  |
| <b>12.3. Bioaccumulative potential</b>                 | No data available.  |
| <b>Partition coefficient n-octanol/water (log Kow)</b> | Not available.  |
| <b>Bioconcentration factor (BCF)</b>                   | Not available.  |
| <b>12.4. Mobility in soil</b>                          | No data available.  |
| <b>12.5. Results of PBT and vPvB assessment</b>        | Not a PBT or vPvB substance or mixture.   |
| <b>12.6. Other adverse effects</b>                     | No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component. |
| <b>12.7. Additional information</b>                    |   |

#### Estonia Dangerous substances in groundwater Data

|                         |   |
|-------------------------|---|
| Cadmium (CAS 7440-43-9) | CADMIUM (CD) 1 ug/l<br>CADMIUM (CD) 10 ug/l |
| Zinc (CAS 7440-66-6)    | Zinc (Zn) 50 ug/l<br>Zinc (Zn) 5000 ug/l    |

#### Estonia Dangerous substances in soil Data

|                         |   |
|-------------------------|---|
| Cadmium (CAS 7440-43-9) | CADMIUM (CD) 1 mg/kg<br>CADMIUM (CD) 20 mg/kg<br>CADMIUM (CD) 5 mg/kg |
| Zinc (CAS 7440-66-6)    | Zinc (Zn) 1000 mg/kg<br>Zinc (Zn) 200 mg/kg<br>Zinc (Zn) 500 mg/kg    |

## SECTION 13: Disposal considerations

### 13.1. Waste treatment methods

|                                     |  |
|-------------------------------------|--|
| <b>Residual waste</b>               | 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).   |
| <b>Contaminated packaging</b>       | 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.   |
| <b>EU waste code</b>                | The Waste code should be assigned in discussion between the user, the producer and the waste disposal company.   |
| <b>Disposal methods/information</b> | 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. |
| <b>Special precautions</b>          | Dispose in accordance with all applicable regulations.   |

## SECTION 14: Transport information

### ADR

|   |  |
|---|--|
| <b>14.1. UN number</b>                  | UN3288                                   |
| <b>14.2. UN proper shipping name</b>    | Toxic solid, inorganic, n.o.s. (Cadmium) |
| <b>14.3. Transport hazard class(es)</b> |  |
| <b>Class</b>                            | 6.1(PGIII)                               |
| <b>Subsidiary risk</b>                  | -  |
| <b>Label(s)</b>                         | 6.1                                      |
| <b>Hazard No. (ADR)</b>                 | 60                                       |

**Tunnel restriction code** E  
**14.4. Packing group** III  
**14.5. Environmental hazards** Yes  
**14.6. Special precautions for user** Not available.

#### RID

**14.1. UN number** UN3288  
**14.2. UN proper shipping name** Toxic solid, inorganic, n.o.s. (Cadmium)  
**14.3. Transport hazard class(es)**  
**Class** 6.1(PGIII)  
**Subsidiary risk** -  
**Label(s)** 6.1  
**14.4. Packing group** III  
**14.5. Environmental hazards** Yes  
**14.6. Special precautions for user** Not available.

#### ADN

**14.1. UN number** UN3288  
**14.2. UN proper shipping name** Toxic Solid, N.o.s. (Cadmium)  
**14.3. Transport hazard class(es)**  
**Class** 6.1(PGIII)  
**Subsidiary risk** -  
**Label(s)** 6.1  
**14.4. Packing group** III  
**14.5. Environmental hazards** Yes  
**14.6. Special precautions for user** Not available.

#### IATA

**14.1. UN number** UN3288  
**14.2. UN proper shipping name** Toxic solid, inorganic, n.o.s. (Cadmium)  
**14.3. Transport hazard class(es)**  
**Class** 6.1(PGIII)  
**Subsidiary risk** -  
**14.4. Packing group** III  
**14.5. Environmental hazards** Yes  
**ERG Code** 6L  
**14.6. Special precautions for user** Not available.

#### Other information

**Passenger and cargo aircraft** Allowed with restrictions.  
**Cargo aircraft only** Allowed with restrictions.

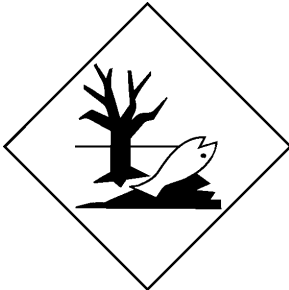
#### IMDG

**14.1. UN number** UN3288  
**14.2. UN proper shipping name** TOXIC SOLID, INORGANIC, N.O.S. (Cadmium), MARINE POLLUTANT  
**14.3. Transport hazard class(es)**  
**Class** 6.1(PGIII)  
**Subsidiary risk** -  
**14.4. Packing group** III  
**14.5. Environmental hazards**  
**Marine pollutant** Yes  
**EmS** F-A, S-A  
**14.6. Special precautions for user** Not available.

ADN; ADR; IATA; IMDG; RID



Marine pollutant



## SECTION 15: Regulatory information

### 15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

#### EU regulations

**Regulation (EC) No. 1005/2009 on substances that deplete the ozone layer, Annex I and II, as amended**  
Not listed.

**Regulation (EC) No. 850/2004 On persistent organic pollutants, Annex I as amended**  
Not listed.

**Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 1 as amended**

Cadmium (CAS 7440-43-9)

**Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 2 as amended**

Not listed.

**Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 3 as amended**

Not listed.

**Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex V as amended**

Not listed.

**Regulation (EC) No. 166/2006 Annex II Pollutant Release and Transfer Registry, as amended**

Cadmium (CAS 7440-43-9)

Zinc (CAS 7440-66-6)

**Regulation (EC) No. 1907/2006, REACH Article 59(10) Candidate List as currently published by ECHA**

Cadmium (CAS 7440-43-9)

#### Authorisations

**Regulation (EC) No. 1907/2006, REACH Annex XIV Substances subject to authorization, as amended**

Not listed.

#### Restrictions on use

**Regulation (EC) No. 1907/2006, REACH Annex XVII Substances subject to restriction on marketing and use as amended**

Cadmium (CAS 7440-43-9)

Zinc (CAS 7440-66-6)

**Directive 2004/37/EC: on the protection of workers from the risks related to exposure to carcinogens and mutagens at work, as amended.**

Cadmium (CAS 7440-43-9)

#### Other EU regulations

**Directive 2012/18/EU on major accident hazards involving dangerous substances, as amended**

Cadmium (CAS 7440-43-9)

Zinc (CAS 7440-66-6)

|   |   |
|---|---|
| <b>Other regulations</b>                | The product is classified and labelled in accordance with EC directives or respective national laws. This Safety Data Sheet complies with the requirements of Regulation (EC) No 1907/2006.                       |
| <b>National regulations</b>             | Young people under 18 years old are not allowed to work with this product according to EU Directive 94/33/EC on the protection of young people at work. Follow national regulation for work with chemical agents. |
| <b>15.2. Chemical safety assessment</b> | No Chemical Safety Assessment has been carried out.   |

## SECTION 16: Other information

|                              |   |
|------------------------------|---|
| <b>List of abbreviations</b> | Not available.  |
| <b>References</b>            | Not available.  |
| <b>Training information</b>  | Follow training instructions when handling this material.   |
| <b>Disclaimer</b>            | Materion Advanced Chemicals Inc. 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. |