SAFETY DATA SHEET

Tungsten 1% Zirconium welding electrode (EWZr-1)

Section 1. Identification

GHS product identifier : Tungsten 1% Zirconium welding electrode (EWZr-1)
Other means of identification : Not available.
Product code : RAD64001986, RAD64001987, RAD64001988, RAD64001989, RAD64001990,
RAD64001991, RAD64001992, RAD64001993, RAD64001994, RAD64001995, RAD64001999

Identified uses
Welding and cutting of metals.

Supplier/Manufacturer : Shandong Weldstone Tungsten Industry Co., LTD.
188 Zhoulong Rd
Zhoucun District, Zibo City
Shandong Province, PR China 255300
Tel : 865336824658
Fax : 865336823685

Supplier's details : Radnor Products
PO Box 6675
Radnor, PA 19087

Product Information
(666) 924-7427

In case of emergency
(666) 734-3438

Emergency telephone number (with hours of operation)
(24/7)

Section 2. Hazards identification

OSHA/HCS status : While this material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200), this SDS contains valuable information critical to the safe handling and proper use of the product. This SDS should be retained and available for employees and other users of this product.

Classification of the substance or mixture : Not classified.

GHS label elements
Signal word : No signal word.
Hazard statements : No known significant effects or critical hazards.
Precautionary statements
Prevention : Not applicable.
Response : Not applicable.
Storage : Not applicable.
Disposal : Not applicable.

Hazards not otherwise classified (HNOC)
Section 2. Hazards identification

**Physical hazards not otherwise classified (PHNOC)**: None known.

**Health hazards not otherwise classified (HHNOC)**: None known.

Section 3. Composition/information on ingredients

**Substance/mixture**: Mixture

**Other means of identification**: Not available.

**CAS number/other identifiers**

**CAS number**: Not applicable.

**Product code**: Not available.

There are no ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Section 4. First aid measures

**Description of necessary first aid measures**

**Eye contact**: Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Get medical attention if irritation occurs.

**Inhalation**: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur.

**Skin contact**: Flush contaminated skin with plenty of water. Get medical attention if symptoms occur.

**Ingestion**: Wash out mouth with water. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Do not induce vomiting unless directed to do so by medical personnel. Get medical attention if symptoms occur.

**Notes to physician**: Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

**Specific treatments**: No specific treatment.
Section 4. First aid measures

Protection of first-aiders: No action shall be taken involving any personal risk or without suitable training.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media
Suitable extinguishing media: Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media: None known.

Specific hazards arising from the chemical
Hazardous thermal decomposition products: Decomposition products may include the following materials: metal oxide/oxides

No specific fire or explosion hazard.

Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures
For non-emergency personnel: No action shall be taken involving any personal risk or without suitable training. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Put on appropriate personal protective equipment.

For emergency responders: If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions: Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up
Small spill: Move containers from spill area. Vacuum or sweep up material and place in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor.

Large spill: Move containers from spill area. Prevent entry into sewers, water courses, basements or confined areas. Vacuum or sweep up material and place in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.
Section 7. Handling and storage

**Precautions for safe handling**

**Protective measures**
- Put on appropriate personal protective equipment (see Section 8).

**Advice on general occupational hygiene**
- Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. See also Section 8 for additional information on hygiene measures.

**Conditions for safe storage, including any incompatibilities**
- Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

**Control parameters**

**United States**

**Occupational exposure limits**
- None.

**Canada**

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>TWA (8 hours)</th>
<th>STEL (15 mins)</th>
<th>Ceiling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tungsten, as W</td>
<td>US ACGIH 3/2012</td>
<td>5 ppm</td>
<td>10 ppm</td>
</tr>
<tr>
<td>Tungsten</td>
<td>AB 4/2009</td>
<td>5 ppm</td>
<td>10 ppm</td>
</tr>
<tr>
<td>Zirconium dioxide, as Zr</td>
<td>BC 4/2012</td>
<td>5 ppm</td>
<td>10 ppm</td>
</tr>
<tr>
<td></td>
<td>US ACGIH 4/2014</td>
<td>5 ppm</td>
<td>10 ppm</td>
</tr>
<tr>
<td></td>
<td>BC 7/2013</td>
<td>5 ppm</td>
<td>10 ppm</td>
</tr>
<tr>
<td></td>
<td>ON 1/2013</td>
<td>5 ppm</td>
<td>10 ppm</td>
</tr>
<tr>
<td></td>
<td>QC 1/2014</td>
<td>5 ppm</td>
<td>10 ppm</td>
</tr>
</tbody>
</table>

[3] Skin sensitization
Form: [a] Insoluble

**Mexico**

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>Exposure limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tungsten</td>
<td>NOM-010-STPS (Mexico, 9/2000). LMPE-CT: 10 mg/m³ (W) 15 minute(s). LMPE-PPT: 5 mg/m³ (W) 8 hour(s).</td>
</tr>
<tr>
<td>Zirconium dioxide</td>
<td>NOM-010-STPS (Mexico, 9/2000). LMPE-CT: 10 mg/m³ (Zr) 15 minute(s). LMPE-PPT: 5 mg/m³ (Zr) 8 hour(s).</td>
</tr>
<tr>
<td>Welding fumes</td>
<td>ACGIH TLV (United States). TWA: 5 mg/m³ 8 hour(s). Form: Particulate.</td>
</tr>
</tbody>
</table>

**Appropriate engineering controls**
- Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

**Environmental exposure controls**
- Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation.

**Individual protection measures**
Section 8. Exposure controls/personal protection

Hygiene measures: Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection: Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

Hand protection: Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Body protection: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection: Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection: Use a properly fitted, particulate filter respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state: Solid.
Color: Gray.
Odor: Odorless.
Odor threshold: Not available.
P H: Not available.
Melting point: <3400°C (<6152°F)
Boiling point: Not available.
Flash point: Not available.
Evaporation rate: Not available.
Flammability (solid, gas): Not available.
Lower and upper explosive limits: Not available.
Vapor pressure: Not available.
Vapor density: Not available.
Relative density: 18.2 to 18.97
Solubility: Insoluble in the following materials: cold water and hot water.
Partition coefficient: n-octanol/water: Not available.
Auto-ignition temperature: Not available.
Decomposition temperature: Not available.
Viscosity: Not available.
Volatile: Not available.
Section 9. Physical and chemical properties

VOC (w/w) : Not available.

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : No specific data.

Incompatible materials : Incompatible with some strong acids.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity
There is no data available.

Irritation/Corrosion
There is no data available.

Sensitization
There is no data available.

Carcinogenicity

Classification

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>OSHA</th>
<th>IARC</th>
<th>NTP</th>
<th>ACGIH</th>
<th>EPA</th>
<th>NIOSH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zirconium dioxide</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>A4</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Specific target organ toxicity (single exposure)
There is no data available.

Specific target organ toxicity (repeated exposure)
There is no data available.

Aspiration hazard
There is no data available.

Information on the likely routes of exposure : Dermal contact. Eye contact. Inhalation. Ingestion.

Potential acute health effects

Eye contact : No known significant effects or critical hazards.
Inhalation : No known significant effects or critical hazards.
Skin contact : No known significant effects or critical hazards.
Ingestion : No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics
Section 11. Toxicological information

**Eye contact** : No known significant effects or critical hazards.

**Inhalation** : No known significant effects or critical hazards.

**Skin contact** : No known significant effects or critical hazards.

**Ingestion** : No known significant effects or critical hazards.

**Delayed and immediate effects and also chronic effects from short and long term exposure**

**Short term exposure**

**Potential immediate effects** : No known significant effects or critical hazards.

**Potential delayed effects** : No known significant effects or critical hazards.

**Long term exposure**

**Potential immediate effects** : No known significant effects or critical hazards.

**Potential delayed effects** : No known significant effects or critical hazards.

**Potential chronic health effects**

**General** : No known significant effects or critical hazards.

**Carcinogenicity** : No known significant effects or critical hazards.

**Mutagenicity** : No known significant effects or critical hazards.

**Teratogenicity** : No known significant effects or critical hazards.

**Developmental effects** : No known significant effects or critical hazards.

**Fertility effects** : No known significant effects or critical hazards.

**Numerical measures of toxicity**

**Acute toxicity estimates**

There is no data available.

Section 12. Ecological information

**Toxicity**

There is no data available.

**Persistence and degradability**

There is no data available.

**Bioaccumulative potential**

There is no data available.

**Mobility in soil**

**Soil/water partition coefficient (K_{oc})** : Not available.

**Other adverse effects** : No known significant effects or critical hazards.
Section 13. Disposal considerations

**Disposal methods**
- The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

<table>
<thead>
<tr>
<th>DOT</th>
<th>TDG / NOM-003-SCT</th>
<th>IMDG</th>
<th>IATA</th>
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<tbody>
<tr>
<td><strong>UN proper shipping name</strong></td>
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<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Transport hazard class(es)</strong></td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Packing group</strong></td>
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<td>-</td>
<td>-</td>
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<tr>
<td><strong>Environmental hazards</strong></td>
<td>No.</td>
<td>No.</td>
<td>No.</td>
</tr>
<tr>
<td><strong>Additional information</strong></td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

[AERG]: Not applicable.

**Special precautions for user**
- **Transport within user’s premises**: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code**: Not available.

Section 15. Regulatory information

**U.S. Federal regulations**
- **TSCA 8(a) PAIR**: Tungsten
- **United States inventory (TSCA 8b)**: All components are listed or exempted.
- **Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs)**: Not listed
- **Clean Air Act Section 602 Class I Substances**: Not listed
- **Clean Air Act Section 602 Class II Substances**: Not listed
Section 15. Regulatory information

**DEA List I Chemicals**  
(Precursor Chemicals)  
: Not listed

**DEA List I Chemicals**  
( Precursor Chemicals)  
: Not listed

**SARA 302/304**

- **Composition/information on ingredients**
  
  No products were found.

**SARA 304 RQ**  
: Not applicable.

**SARA 311/312**

- **Classification**
  
  No products were found.

**State regulations**

- **Massachusetts**
  : The following components are listed: Tungsten; Zirconium dioxide

- **New York**
  : None of the components are listed.

- **New Jersey**
  : The following components are listed: Tungsten

- **Pennsylvania**
  : The following components are listed: Tungsten

- **California Prop. 65**
  : None of the components are listed.

**Canada**

- **Canadian lists**
  : None of the components are listed.

- **Canadian NPRI**
  : None of the components are listed.

- **CEPA Toxic substances**
  : None of the components are listed.

- **Canada inventory**
  : All components are listed or exempted.

**International lists**

- **National inventory**
  : All components are listed or exempted.

  - **Australia**
    : All components are listed or exempted.

  - **China**
    : All components are listed or exempted.

  - **Europe**
    : All components are listed or exempted.

  - **Japan**
    : Not determined.

  - **Malaysia**
    : Not determined.

  - **New Zealand**
    : All components are listed or exempted.

  - **Philippines**
    : All components are listed or exempted.

  - **Republic of Korea**
    : All components are listed or exempted.

  - **Taiwan**
    : Not determined.

Section 16. Other information

**History**

- **Date of issue mm/dd/yyyy**  
  : 05/15/2015

- **Date of previous issue**  
  : 09/15/2014

- **Version**  
  : 6

- **Prepared by**  
  : KMK Regulatory Services Inc.
Section 16. Other information

Notice to reader
To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.