

## Material Safety Data Sheet Zirconium Oxide

### Section 1 - Product Identification

Chemical Formula :  $ZrO_2 + Y_2O_3$   
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### Section 2 – Hazards Identification

#### 2.1. Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

#### 2.2. Label elements

##### Signal Word

Warning

##### Hazard Statement

Causes serious eye irritation

May cause respiratory irritation

Causes skin irritation

#### 2.5. Precautionary Statements Storage

##### Prevention

Wash face, hands and any exposed skin thoroughly after handling

##### Wear eye/face protection

Avoid breathing dust/fume/gas/mist/vapors/spray

Use only outdoors or in a well-ventilated area

##### Inhalation

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing

Call a POISON CENTER or doctor/physician if you feel unwell

##### Skin

IF ON SKIN: Wash with plenty of soap and water

If skin irritation occurs: Get medical advice/attention

Take off contaminated clothing and wash before reuse

##### Eyes

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing

If eye irritation persists: Get medical advice/attention

Store in a well-ventilated place. Keep container tightly closed

Store locked up

##### Disposal

Dispose of contents/container to an approved waste disposal plant

## 2.6. Other hazards

N.A.

## Section 3 – Composition/Information on Ingredients

### 3.1 Composition comments

Common Name Zirconium Oxide

CAS Number 1314-23-4

Chemical Name	EC No/CAS No	Purity, %
Zirconium Oxide	1314-23-4	max. 99.9

## Section 4 – First-Aid Measures

### 4.1. Description of first aid measures

#### Eye Contact

Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

#### Skin Contact

Wash off immediately with plenty of water for at least 15 minutes. Get medical attention immediately if symptoms occur.

#### Inhalation

Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention immediately if symptoms occur.

#### Ingestion

Do not induce vomiting. Obtain medical attention.

### 4.2. Most important symptoms and effects, both acute and delayed

N.A.

### 4.3. Indication of any immediate medical attention and special treatment needed

Treat symptomatically

## Section 5 – Fire Fighting Measures

### 5.1. Suitable Extinguishing media

Co-ordinate fire-fighting measures to the fire surroundings  
water spray, foam, dry extinguishing powder, carbon dioxide (CO<sub>2</sub>)

### 5.2. Unsuitable Extinguishing media

Water jet

### 5.3. Specific hazards arising from the chemical

Non-combustible.

#### **5.4. Special protective actions for fire-fighters**

Use personal protective equipment including self-contained breathing apparatus when fighting fire in enclosed area.

### **Section 6 – Accidental Release Measures**

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

Wear respiratory protection. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

#### **6.2. Environmental precautions**

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

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

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

### **Section 7 – Handling and Storage**

#### **7.1. Precautions for safe Handling**

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed.

#### **7.2. Conditions for safe storage, including any incompatibilities**

Keep container tightly closed in a dry and well-ventilated place. Store in cool place.

### **Section 8 – Exposure Controls/Personal Protection**

#### **8.1. Appropriate engineering controls**

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

#### **8.2. Individual protection measures, such as personal protective equipment (PPE)**

##### **Eye/face protection**

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

##### **Skin protection**

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands. The selected protective gloves have to satisfy the specifications of Regulation (EU) 2016/425 and the standard EN 374 derived from it.

##### **Body Protection**

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

#### **Respiratory protection**

Where risk assessment shows air-purifying respirators are appropriate use a fullface particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

#### **Control of environmental exposure**

Do not let product enter drains.

## **Section 9 – Physical and Chemical Properties**

### **9.1. Information on basic physical and chemical properties**

**Physical State** Solid

**Appearance** White

**Odor** No information available

**Odor Threshold** No information available

**Melting Point/Range** > 2500 °C

**Evaporation Rate** No information available

**Flammability (solid,gas)** No information available

**Flammability or explosive limits**

Upper No data available

Lower No data available

**Vapor Pressure** No information available

**Vapor Density** No information available

**Specific Gravity** No information available

**Solubility** Insoluble in water

**Partition coefficient; n-octanol/water** No data available

**Autoignition Temperature** No information available

**Decomposition Temperature** No information available

**Viscosity** No information available

**Molecular Formula** ZrO<sub>2</sub>

**Molecular Weight** 123.2188

## **Section 10 – Stability and Reactivity**

### **10.1. Reactivity**

This material is not reactive under normal ambient conditions.

### **10.2. Chemical stability**

The material is stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

### **10.3. Possibility of hazardous reactions**

N.A.

#### **10.4. Conditions to avoid:**

Keep containers dry and tightly closed to avoid moisture absorption and contamination.

#### **10.5. Incompatible materials**

N.A.

#### **10.6. Hazardous decomposition products**

N.A.

### **Section 11 – Toxicological Information**

#### **11.1 Health effects associated with ingredients**

**Routes of Entry:** Inhalation. Ingestion.

##### **Toxicity to Animals:**

LD50: Not available.

LC50: Not available.

##### **Chronic Effects on Humans**

May cause damage to the following organs: upper respiratory tract.

##### **Other Toxic Effects on Humans**

Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

##### **Special Remarks on Toxicity to Animals**

Not available.

##### **Special Remarks on Chronic Effects on Humans**

Not available.

##### **Special Remarks on other Toxic Effects on Humans**

Acute Potential Health Effects:

Skin: Dust may cause mechanical irritation.

Eyes: Dust may cause mechanical irritation.

Inhalation: Dust irritating to the respiratory tract.

Ingestion: May cause gastrointestinal tract irritation with nausea, vomiting, and diarrhea.

##### **Chronic Potential Health Effects:**

Inhalation: Prolonged or repeated inhalation may cause chronic bronchitis or pulmonary fibrosis.

The toxicological properties of this substance have not been fully investigated.

### **Section 12 – Ecological Information**

#### **12.1. Ecotoxicity**

acc. to 1272/2008/EC: Shall not be classified as hazardous to the aquatic environment.

#### **12.2. Bioaccumulative potential**

N.A.

#### **12.3. Mobility in soil**

N.A.

#### **12.4. Persistence and Degradability**

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

#### 12.4. Other adverse effects

N.A.

### Section 13 – Disposal Considerations

#### 13.1. Disposal methods

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

### Section 14 – Transport Information

#### 14.1 UN number

ADR/RID: -                      IMDG: -                      IATA: -

#### 14.2 UN proper shipping name

ADR/RID: Not dangerous goods

IMDG: Not dangerous goods

IATA: Not dangerous goods

#### 14.3 Transport hazard class(es)

ADR/RID: -                      IMDG: -                      IATA: -

#### 14.4 Packaging group

ADR/RID: -                      IMDG: -                      IATA: -

#### 14.5 Environmental hazards

ADR/RID: no                      IMDG Marine pollutant: yes                      IATA: no

#### 14.6 Special precautions for user

No data available

### Section 15 – Regulatory Information

#### 15.1. Safety, health and environmental regulations

U.S. Department of Transportation

Reportable Quantity (RQ): N

DOT Marine Pollutant N

DOT Severe Marine Pollutant N

### Section 16 : Additional Information

## 16.1. List of abbreviation and acronyms used in this MSDS

**SDS** : Safety Data Sheets

**Index N°** : atomic number of the element most characteristic of the properties of the substance

**CAS No** : Chemical Abstracts Service number

**EC No** : EINECS Number : European Inventory of Existing Commercial Substances

**Repr. Cat. 2** : Substance presumed human reproductive toxicant

**Acute Oral Cat. 5** : Substance which is of relatively low acute oral toxicity.

**GHS** : Globally Harmonised System of Classification and Labelling

**LD<sub>50</sub>** : Median Lethal Dose

**LC<sub>50</sub>** : Lethal Concentration, 50%

**N.A.** : Not Applicable

**OSHA** : Occupational Safety & Health Administration

**Cal OSHA** : The State of California Division of Occupational Safety and Health (DOSH)

**PEL** : Permissible Exposure Limits

**ACGIH** : American Conference of Governmental Industrial Hygienists

**TLV** : Threshold Limit Value

**Japanese MITI** : Japanese Ministry of International Trade and Industry

**EC<sub>50</sub>** : Half maximal effective concentration

**UN** : United Nations

**U.S. EPA TSCA Inventory**: Inventory of the chemical substances manufactured or processed in the United States according to Toxic Substances Control Act compiled and published under the authority of the Environmental Protection Agency

**Canadian DSL**: Canadian Domestic Substances List

## 16.2. List of relevant hazard statements and precautionary statements used in this MSDS

### Hazard Statement

**H361 d**: Suspected of damaging the unborn child

**H319**: Causes serious eye irritation

**H303**: May be harmful if swallowed

### Precautionary Statements

#### Prevention

**P201**: Obtain special instructions before use.

**P202**: Do not handle until all safety precautions have been read and understood.

**P281**: Use personal protective equipment as required.

**P264**: Wash eyes thoroughly after handling.

**P280**: Wear protective gloves/ protective clothing/ eye protection/ face protection.

#### Response

**P308 + P313**: If exposed or concerned: get medical advice/attention.

**P305+P351+P338**: IF IN EYES: Rinse cautiously with water for several minutes.

Remove contact lenses, if present and easy to do. Continue rinsing.

**P337+P313**: If eye irritation persists: Get medical advice/attention.

#### Storage

**P405**: Store locked up.

#### Disposal

**P501**: Dispose of contents/container to in accordance with local regulations.

### **16.3. References**

1. Litovitz T L, Norman S A, Veltri J C, Annual Report of the American Association of Poison Control Centers Data Collection System. Am. J. Emerg. Med. (1986), 4, 427-458
  2. Denton SM (1996). Acute oral toxicity study in the rat: anhydrous boric acid. Final report. Report no.: 1341/7-1032.
  3. National Toxicology Program (NTP) – Technical Report Series No. TR324, NIH Publication No. 88 2580 (1987), PB88 213475/XAB
  4. Fail et al., Fund. Appl. Toxicol. (1991) 17, 225-239
  5. Heindel et al., Fund. Appl. Toxicol. (1992) 18, 266-277
  6. Birge W J, Black J A, EPA-560/-76-008 (April 1977) PB 267 085
  7. Scialli AR, Bonde JP, Brüske-Hohlfeld I, Culver D, Li Y, Sullivan FM; ELSEVIER 2009
  8. Robbins WA, Xun L, Jia J, Kennedy N, Elashoff DA, Ping L. ;ELSEVIER 2009;(Reproductive Toxicology)
  9. Hansveit and Oldersma, 2000; TNO Nutrition and Food Research Institute. Report No. V99.157.
  10. Gersich, FM (1984a). Environ.Toxicol.Chem., 3 #1, 89-94 (1984)
  11. Soucek et al., 2010. Illinois Natural History Survey, University of Illinois.
- For general information on the toxicology of borates see ECETOC Technical Report No. 63 (1995); Patty's Industrial Hygiene and Toxicology, 4th Edition Vol. II, (1994) Chap. 42, 'Boron'.

### **16.4. Disclaimer of Liability**

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