

Flue dust, zinc-refining

Waelz oxide; Zinc rich flue dust.

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## SAFETY DATA SHEET

### SECTION 1. IDENTIFICATION

Product identifier used on the label

: **Flue dust, zinc-refining**

Product Code(s) : Waelz oxide; Zinc rich flue dust.

Recommended use of the chemical and restrictions on use

: Raw material for production of zinc metal.

Chemical family : Zinc oxide enriched flue dust (Waelz oxide) (Inorganic substances in powdered form)

Name, address, and telephone number of the manufacturer:

Name, address, and telephone number of the supplier:

**American Zinc Recycling**

Refer to manufacturer

4955 Steubenville Pike, Suite 405  
Pittsburgh, PA, USA  
15205

Manufacturer's Telephone # : (724) 773-2223

24 Hr. Emergency Tel # : Chemtrec 1-800-424-9300 (Within Continental U.S.); Chemtrec 703-527-3887 (Outside U.S.).

### SECTION 2. HAZARDS IDENTIFICATION

Classification of the chemical

White / grey solid (powder). Odorless.

*Most important hazards:*

Continuous long-term exposure above the permissible exposure limits are suspected to cause sterility, cancer, and/or organ damage. Occupational exposure to the substance or mixture may cause adverse effects. For further information, please refer to section 11 of the SDS.

Harmful to aquatic life with long lasting effects. Avoid release to the environment. See Section 12 for more environmental information.

This material is classified as hazardous under U.S. OSHA regulations (29CFR 1910.1200) (Hazcom 2012) and Canadian WHMIS regulations (Hazardous Products Regulations) (WHMIS 2015). Classification:

Germ cell mutagenicity - Category 2

Carcinogenicity - Category 1A

Reproductive toxicity - Category 1A

Specific target organ toxicity, repeated exposure - Category 1

Label elements

Hazard pictogram(s)



Signal Word  
DANGER!

Hazard statement(s)

Suspected of causing genetic defects.

May cause cancer.

May damage fertility or the unborn child.

Causes damage to organs through prolonged or repeated exposure.

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### Precautionary statement(s)

Obtain special instructions before use.  
Do not handle until all safety precautions have been read and understood.  
Do not breathe dust or fume.  
Wash exposed skin thoroughly after handling.  
Do not eat, drink or smoke when using this product.  
Wear protective gloves/clothing and eye/face protection.

IF exposed or concerned: Get medical advice/attention.

Store locked up.

Dispose of contents/container in accordance with local regulation.

### Other hazards

*Other hazards which do not result in classification:*

Inhalation of fumes may result in metal fume fever, a flu-like illness. Dusts may cause irritation of the mucous membranes and respiratory tract. May cause gastrointestinal irritation.

## SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Zinc oxide enriched flue dust (Waelz oxide)

| <u>Chemical name</u>             | <u>Common name and synonyms</u>              | <u>CAS #</u> | <u>Concentration (% by weight)</u> |
|----------------------------------|--|--------------|------------------------------------|
| Flue dust, zinc-refining         | Waelz oxide                                  | 69012-63-1   | 100%                               |
| <b>Waelz oxide constituents:</b> |  |              |                                    |
| Zinc oxide                       | Zinc monoxide                                | 1314-13-2    | 68.0 - 85.0                        |
| Franklinite                      | Zinc ferrite                                 | 12063-19-3   | 0.0 - 10.0                         |
| Potassium chloride               | Potassium muriate                            | 7447-40-7    | 4.0 - 6.0                          |
| Laurionite                       | Basic lead chloride                          | 15860-78-3   | 0.0 - 6.0                          |
| Sodium chloride                  | Salt   | 7647-14-5    | 3.0 - 5.0                          |
| Matlockite                       | Lead fluorochloride                          | 14639-92-0   | 0.0 - 5.0                          |
| Magnetite                        | Ferrous-ferric oxide<br>Iron (II, III) oxide | 1317-61-9    | 0.0 - 3.0                          |
| Cadmium oxide                    | Cadmium monoxide                             | 1306-19-0    | 0.1 - 2.5                          |
| Manganese oxide                  | Manganese compounds                          | 1344-43-0    | 0.15 - 1.5                         |
| Silicon dioxide                  | Amorphous silica                             | 7631-86-9    | 0.2 - 1.0                          |
| Carbon                           | N/Av   | 7440-44-0    | 0.05 - 0.7                         |

## SECTION 4. FIRST-AID MEASURES

### Description of first aid measures

- Ingestion* : Do NOT induce vomiting. Rinse mouth. Never give anything by mouth to an unconscious person. IF exposed or concerned: Get medical attention/advice.
- Inhalation* : If inhaled, move to fresh air. If breathing is difficult, give oxygen by qualified medical personnel only. If breathing has stopped, give artificial respiration. IF exposed or concerned: Get medical attention/advice.
- Skin contact* : For skin contact, wash with soap and water while removing contaminated clothing. IF exposed or concerned: Get medical advice/attention. Launder clothing before reuse.
- Eye contact* : Immediately flush eye(s) with plenty of water. IF exposed or concerned: Get medical advice/attention.

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

- : Suspected of causing genetic defects.  
May cause cancer. Symptoms may include persistent coughing, shortness of breath, coughing up blood and wheezing.  
May damage the unborn child. Suspected of damaging fertility. Symptoms may include spontaneous abortion, pre-term delivery, stillbirths, alterations in sperm, decreased male fertility, and effects on neurological development including decreased intelligence, shortened attention span, and slowed reaction times.
- Causes damage to organs through prolonged or repeated exposure. Contains: lead and lead compounds; Manganese compounds; Cadmium.  
Lead accumulates in body tissues and prolonged overexposure to even low levels may eventually result in lead toxicity syndrome which may result in permanent damage or death. Lead poisoning is characterized by a metallic taste in the mouth, loss of appetite, indigestion, nausea, vomiting, constipation, abdominal cramps, disturbance of rest and sleep, and weakness. Additional symptoms may include a blue "lead line" on the gums and an accumulation of lead in the blood resulting in shock, coma and death.
- Manganese can attack the central nervous system, causing symptom's similar to Parkinson's Disease. Chronic manganese exposures can lead to neurological problems such as apathy, drowsiness, weakness, spastic gait, paralysis, and other neurological problems resembling Parkinsonism. These symptoms can become progressive and permanent if not treated.
- Evidence from experimental animal systems indicates a potential neurotoxic hazard for cadmium.
- Inhalation of fumes may result in metal fume fever, a flu-like illness. Symptoms of metal fume fever may include fever, fatigue, vomiting, muscle aches and shortness of breath. Inhalation of dusts may cause respiratory irritation. May cause coughing and breathing difficulties.
- May cause slight eye and skin irritation. Symptoms may include stinging and tearing. Direct skin contact may cause temporary redness.
- Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

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

- : Provide general supportive measures and treat symptomatically.

## SECTION 5. FIRE-FIGHTING MEASURES

### Extinguishing media

*Suitable extinguishing media*

- : Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

*Unsuitable extinguishing media*

- : None known.

### Special hazards arising from the substance or mixture / Conditions of flammability

- : Not considered flammable.

### Flammability classification (OSHA 29 CFR 1910.106)

- : Not classified as flammable.

### Hazardous combustion products

- : Metal oxides

### Special protective equipment and precautions for firefighters

*Protective equipment for fire-fighters*

- : Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA. Firefighters should wear proper protective equipment and self-contained breathing apparatus with full face piece operated in positive pressure mode.

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### *Special fire-fighting procedures*

- : Move containers from fire area if safe to do so. Cool closed containers exposed to fire with water spray.  
For bulk quantities, use water mist or fog to prevent dispersal of airborne dusts.  
Do not allow run-off from fire fighting to enter drains or water courses. Dike for water control.

## SECTION 6. ACCIDENTAL RELEASE MEASURES

### Personal precautions, protective equipment and emergency procedures

- : Wear suitable protective equipment. Keep people away from and upwind of spill/leak. Restrict access to area until completion of clean-up. Refer to protective measures listed in sections 7 and 8.

**Environmental precautions** : Do not allow material to contaminate ground water system. Discharge into the environment must be avoided.

### Methods and material for containment and cleaning up

- : Ventilate the area. Prevent further leakage or spillage if safe to do so. Sweep up and shovel into suitable containers for disposal. Avoid dust formation. Contact the proper local authorities. Clean contaminated floors and objects thoroughly while observing environmental regulations. For waste disposal, see Section 13 of the SDS.

### Special spill response procedures

- : If a spill/release in excess of the EPA reportable quantity is made into the environment, immediately notify the national response center in the United States (phone: 1-800-424-8802).  
US CERCLA Reportable quantity (RQ): Zinc (1000 lbs / 454 kg); Lead (10 lbs / 4.54 kg); Cadmium (10 lbs / 4.54 kg)

In Canada: Contact appropriate local and provincial environmental authorities for assistance and/or reporting requirements.

## SECTION 7. HANDLING AND STORAGE

### Precautions for safe handling

- : Do not handle until all safety precautions have been read and understood. Obtain special instructions before use.  
Use only in well-ventilated areas. Wear suitable protective equipment during handling. Wear protective gloves/clothing and eye/face protection. Do not breathe dust or fume. Do not ingest. Avoid contact with skin, eyes and clothing. Keep away from heat. Keep away from acids and other incompatibles. Avoid and control operations which create high vapor or dust concentrations. Wash thoroughly after handling.

**Conditions for safe storage** : Store in a well-ventilated area. Inspect periodically for damage or leaks. Storage area should be clearly identified, clear of obstruction and accessible only to trained and authorized personnel. Store locked up. Keep away from incompatibles.

**Incompatible materials** : Acids; Halogenated compounds; Nitrogen compounds; Oxidizing agents.

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### SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

| <u>Exposure Limits:</u>  |  |                                   |   |  |             |
|--------------------------|--|-----------------------------------|---|--|-------------|
|                          | <u>Chemical Name</u>   | <u>ACGIH TLV</u>                  |   | <u>OSHA PEL</u>  |             |
|                          |  | <u>TWA</u>                        | <u>STEL</u>   | <u>PEL</u>   | <u>STEL</u> |
| Flue dust, zinc-refining | N/Av   | N/Av                              | N/Av  | N/Av   |             |
| Zinc oxide               | 2 mg/m <sup>3</sup> (respirable)   | 10 mg/m <sup>3</sup> (respirable) | 5 mg/m <sup>3</sup> (fume); 15 mg/m <sup>3</sup> (total dust); 5 mg/m <sup>3</sup> (respirable) | N/Av   |             |
| Franklinite              | N/Av   | N/Av                              | N/Av  | N/Av   |             |
| Potassium chloride       | N/Av   | N/Av                              | N/Av  | N/Av   |             |
| Laurionite               | 0.05 mg/m <sup>3</sup> (as Pb)   | N/Av                              | 50 µg/m <sup>3</sup> (as Pb)  | N/Av   |             |
| Sodium chloride          | N/Av   | N/Av                              | N/Av  | N/Av   |             |
| Matlockite               | 0.05 mg/m <sup>3</sup> (as Pb)   | N/Av                              | 50 µg/m <sup>3</sup> (as Pb)  | N/Av   |             |
| Magnetite                | 5 mg/m <sup>3</sup> (respirable) (as Ferric oxide)   | N/Av                              | 10 mg/m <sup>3</sup> (iron oxide fume)  | N/Av   |             |
| Cadmium oxide            | 0.01 mg/m <sup>3</sup> ; 0.002 mg/m <sup>3</sup> (respirable particles) (as Cd)                            | N/Av                              | 0.2 mg/m <sup>3</sup> (dust); 0.1 mg/m <sup>3</sup> (fume) (as Cd)                              | 0.6 mg/m <sup>3</sup> (dust); 0.3 mg/m <sup>3</sup> (fume) (as Cd) (Ceiling) |             |
| Manganese oxide          | 0.02 mg/m <sup>3</sup> (respirable); 0.1 mg/m <sup>3</sup> (inhalable) (Manganese and inorganic compounds) | N/Av                              | 5 mg/m <sup>3</sup> (Ceiling) (Manganese compounds)   | N/Av   |             |
| Silicon dioxide          | 10 mg/m <sup>3</sup> (inhalable); 3 mg/m <sup>3</sup> (respirable) (as PNOS)                               | N/Av                              | 20 mppcf  | N/Av   |             |
| Carbon                   | 2 mg/m <sup>3</sup> (respirable)   | N/Av                              | 15 mg/m <sup>3</sup> (total dust); 5 mg/m <sup>3</sup> (respirable) (PNOR)                      | N/Av   |             |

#### Exposure controls

##### Ventilation and engineering measures

- : Use in a well-ventilated area. Apply technical measures to comply with the occupational exposure limits. Where reasonably practicable this should be achieved by the use of local exhaust ventilation and good general extraction. The local exhaust ventilation system should be high efficiency (84%). Recommended cyclone/filter (for minimizing dust emissions) efficiency:
  - 70-90% (cyclones);
  - 50-80% (dust filters);
  - 85-95% (double stage, cassette filters)
 Process enclosure should be considered, especially in potentially dusty units  
 In case of insufficient ventilation wear suitable respiratory equipment.

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- Respiratory protection** : Respirator must be worn if exposed to dust. The filter class for the respirator must be suitable for the maximum expected contaminant concentration (gas/vapor/aerosol/particulates) that may arise when handling the product. If this concentration is exceeded, self-contained breathing apparatus must be used.  
Recommended Filter type:  
dust filter-half mask P1 (efficiency 75%)  
dust filter-half mask P2 (efficiency 90%)  
dust filter-half mask P3 (efficiency 95%)  
dust filter-full mask P1 (efficiency 75%)  
dust filter-full mask P2 (efficiency 90%)  
dust filter-full mask P3 (efficiency 97.5%).  
Respirators should be selected based on the form and concentration of contaminants in air, and in accordance with OSHA (29 CFR 1910.134) or CSA Z94.4-02.
- Skin protection** : Wear protective gloves/clothing. The suitability for a specific workplace should be discussed with the producers of the protective gloves. Choose body protection according to the amount and concentration of the dangerous substance at the work place. Gloves are recommended to be  $\geq 90\%$  efficient.
- Eye / face protection** : Wear as appropriate: Goggles; Safety glasses with side shields.
- Other protective equipment** : Ensure that eyewash stations and safety showers are close to the workstation location. Other equipment may be required depending on workplace standards.
- General hygiene considerations** : Avoid contact with skin, eyes and clothing. Do not breathe dust or fume. Do not eat, drink or smoke when using this product. Wash hands and face before breaks and immediately after handling the product. Wash contaminated clothing before reuse. Handle in accordance with good industrial hygiene and safety practice.

### SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

- Appearance** : White / grey solid (powder).
- Odor** : Odorless
- Odor threshold** : N/Av
- pH** : N/Av
- Melting/Freezing point** :  $> 1000^{\circ}\text{C}$  ( $1830^{\circ}\text{F}$ )
- Initial boiling point and boiling range** : N/Av
- Flash point** : N/Av
- Flashpoint (Method)** : N/Av
- Evaporation rate (BuAe = 1)** : N/Av
- Flammability (solid, gas)** : The product is not flammable.
- Lower flammable limit (% by vol.)** : N/Av
- Upper flammable limit (% by vol.)** : N/Av
- Oxidizing properties** : None known.
- Explosive properties** : Not explosive
- Vapor pressure** : N/Av
- Vapor density** : N/Av
- Relative density / Specific gravity** : 4.83
- Solubility in water** : insoluble
- Other solubility(ies)** : N/Av
- Partition coefficient: n-octanol/water or Coefficient of water/oil distribution** : N/Av
- Auto-ignition temperature** : N/Av

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Decomposition temperature : N/Av  
Viscosity : N/Av  
Volatiles (% by weight) : N/Av  
Volatile organic Compounds (VOC's)  
: N/Av  
Absolute pressure of container  
: N/Av  
Flame projection length : N/Av  
Other physical/chemical comments  
: No additional information.

### SECTION 10. STABILITY AND REACTIVITY

Reactivity : Not normally reactive.  
Chemical stability : Stable under normal conditions.  
Possibility of hazardous reactions  
: Hazardous polymerization does not occur.  
Conditions to avoid : Incompatible products. Do not use in areas without adequate ventilation.  
Incompatible materials : Acids; Halogenated compounds; Nitrogen compounds; Oxidizing agents  
Hazardous decomposition products  
: None known, refer to hazardous combustion products in section 5.

### SECTION 11. TOXICOLOGICAL INFORMATION

#### Information on likely routes of exposure:

Routes of entry inhalation : YES  
Routes of entry skin & eye : YES  
Routes of entry Ingestion : YES  
Routes of exposure skin absorption  
: NO

#### Potential Health Effects:

##### Signs and symptoms of short-term (acute) exposure

###### *Sign and symptoms Inhalation*

: Dusts may cause irritation of the mucous membranes and respiratory tract. Inhalation of dust may cause shortness of breath, tightness of the chest, a sore throat and cough. Inhalation of fumes may result in metal fume fever, a flu-like illness. Symptoms of metal fume fever may include fever, fatigue, vomiting, muscle aches and shortness of breath.

###### *Sign and symptoms ingestion*

: Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

###### *Sign and symptoms skin*

: Direct skin contact may cause slight or mild, transient irritation. Direct skin contact may cause temporary redness.

###### *Sign and symptoms eyes*

: Direct eye contact may cause slight or mild, transient irritation. Symptoms may include stinging and tearing.

##### Potential Chronic Health Effects

: Pneumoconiosis, or "dusty lung" disease, may result from chronic exposure to any dust. Repeated or prolonged inhalation of fine dusts may cause an increase in mucous production.



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- Mutagenicity** : This material is not classified as hazardous under U.S. OSHA regulations (29CFR 1910.1200) (Hazcom 2012) and Canadian WHMIS regulations (Hazardous Products Regulations) (WHMIS 2015).  
Contains: Cadmium; lead and lead compounds.  
Lead compounds are known to cause certain degrees of mutagenicity.  
Cadmium may cause irreversible effects in non-reproductive (somatic) cells, based on animal data.
- Carcinogenicity** : This material is classified as hazardous under U.S. OSHA regulations (29CFR 1910.1200) (Hazcom 2012) and Canadian WHMIS regulations (Hazardous Products Regulations) (WHMIS 2015). Classification:  
Carcinogenicity - Category 1A. May cause cancer. Symptoms may include persistent coughing, shortness of breath, coughing up blood and wheezing.  
Contains: lead and lead compounds; Cadmium.  
Lead is classified as possibly carcinogenic by IARC (Group 2A), the ACGIH (Category A3), the NTP (reasonably anticipated) and OSHA.  
Cadmium and Cadmium compounds are classified as carcinogenic by IARC (Group 1), the ACGIH (Category A2), the NTP (Known human carcinogen) and OSHA.
- Reproductive effects & Teratogenicity** : This material is classified as hazardous under U.S. OSHA regulations (29CFR 1910.1200) (Hazcom 2012) and Canadian WHMIS regulations (Hazardous Products Regulations) (WHMIS 2015). Classification:  
Reproductive toxicant: Category 1A. May damage fertility or the unborn child. Symptoms may include spontaneous abortion, pre-term delivery, stillbirths, alterations in sperm, decreased male fertility, and effects on neurological development including decreased intelligence, shortened attention span, and slowed reaction times.  
Contains: lead compounds; Cadmium compounds.  
Lead compounds are known to cause certain reproductive effects in both males and females. Lead compounds are known to cause embryotoxicity.  
Cadmium and Cadmium compounds are known to cause reproductive effects in both males and females based on animal studies.
- Sensitization to material** : Not expected to be a skin or respiratory sensitizer.
- Specific target organ effects** : This material is classified as hazardous under U.S. OSHA regulations (29CFR 1910.1200) (Hazcom 2012) and Canadian WHMIS regulations (Hazardous Products Regulations) (WHMIS 2015). Classification:  
Specific target organ toxicity, repeated exposure - Category 1. Causes damage to organs through prolonged or repeated exposure. Contains lead and lead compounds. Prolonged overexposure may result in lead toxicity syndrome which may result in permanent damage or death. Lead poisoning is characterized by a metallic taste in the mouth, loss of appetite, indigestion, nausea, vomiting, constipation, abdominal cramps, disturbance of rest and sleep, and weakness. Additional symptoms may include a blue "lead line" on the gums and an accumulation of lead in the blood resulting in shock, coma and death.  
This product also contains: Cadmium compounds; Manganese.  
Evidence from experimental animal systems indicates a potential neurotoxic hazard for cadmium.  
Manganese can attack the central nervous system, causing symptom's similar to Parkinson's Disease. Chronic manganese exposures can lead to neurological problems such as apathy, drowsiness, weakness, spastic gait, paralysis, and other neurological problems resembling Parkinsonism. These symptoms can become progressive and permanent if not treated.
- According to the classification criteria of U.S. OSHA regulations (29CFR 1910.1200) (Hazcom 2012) and Canadian WHMIS regulations (Hazardous Products Regulations) (WHMIS 2015), this product is not expected to cause target organ toxicity through single exposures.

**Medical conditions aggravated by overexposure**

- : Pre-existing eye, skin, respiratory, liver, kidney and central nervous system disorders.

**Synergistic materials**

- : None known or reported by the manufacturer.



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**Toxicological data** : See below for toxicological data on the substance.

| <u>Chemical name</u>             | <u>LC<sub>50</sub> (4hr)</u><br><u>inh, rat</u>               | <u>LD<sub>50</sub></u>                       |  |
|----------------------------------|---|--|--|
|                                  |   | <u>(Oral, rat)</u>                           | <u>(Rabbit, dermal)</u>                      |
| Flue dust, zinc-refining         | > 5.371 mg/L  | > 2000 mg/kg                                 | > 2000 mg/kg                                 |
| <b>Waelz oxide constituents:</b> |   |  |  |
| Zinc oxide                       | > 5.7 mg/L (dust) (No mortality)                              | > 5000 mg/kg                                 | > 2000 mg/kg (No mortality)                  |
| Franklinite                      | N/Av  | N/Av   | N/Av   |
| Potassium chloride               | N/Av  | 3020 mg/kg                                   | N/Av   |
| Laurionite                       | > 5.05 mg/L (dust) (No mortality)<br>(Read-across)            | > 1947 mg/kg (No mortality)<br>(Read-across) | > 2000 mg/kg (No mortality)<br>(Read-across) |
| Sodium chloride                  | > 10.5 mg/L (dust)  | 3000 mg/kg                                   | > 10,000 mg/kg                               |
| Matlockite                       | N/Av  | N/Av   | N/Av   |
| Magnetite                        | N/Av  | > 5000 mg/kg                                 | N/Av   |
| Cadmium oxide                    | 0.125 mg/L (dust) (mouse)<br>0.01 - 0.0125 mg/L (fumes) (rat) | 72 mg/kg                                     | N/Av   |
| Manganese oxide                  | > 5.35 mg/L (dust) (No mortality)                             | > 2000 mg/kg (No mortality)                  | N/Av   |
| Silicon dioxide                  | N/Av  | 3160 mg/kg                                   | > 5000 mg/kg                                 |
| Carbon                           | > 64.4 mg/L (dust)  | > 2000 mg/kg (No mortality)                  | N/Av   |

### Other important toxicological hazards

- : Overexposure to lead dust and fumes adversely affects blood and blood forming tissues, kidneys, liver and the central/peripheral nervous systems and male/female reproductive organs.

## SECTION 12. ECOLOGICAL INFORMATION

**Ecotoxicity** : Harmful to aquatic life with long lasting effects. The product should not be allowed to enter drains, water courses or the soil.

The following tables list individual ingredient ecotoxicity data for fish, daphnia and algae.

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**Ecotoxicity data:**

| <u>Ingredients</u>       | CAS No     | Toxicity to Fish                          |   |          |
|--------------------------|------------|---|---|----------|
|                          |            | LC50 / 96h                                | NOEC / 21 day                             | M Factor |
| Flue dust, zinc-refining | 69012-63-1 | > 100 mg/L (Zebra fish)                   | N/Av                                      | None.    |
| Zinc oxide               | 1314-13-2  | 1.1 mg/L (Rainbow trout)                  | N/Av                                      | None.    |
| Franklinite              | 12063-19-3 | N/Av                                      | N/Av                                      | None.    |
| Potassium chloride       | 7447-40-7  | 880 mg/L (Fathead minnow)                 | N/Av                                      | None.    |
| Laurionite               | 15860-78-3 | N/Av                                      | N/Av                                      | None.    |
| Sodium chloride          | 7647-14-5  | 5480 mg/L (Bluegill sunfish)              | 252 mg/L (33 days) (Fathead minnow)       | None.    |
| Matlockite               | 14639-92-0 | N/Av                                      | N/Av                                      | None.    |
| Magnetite                | 1317-61-9  | N/Av                                      | N/Av                                      | None.    |
| Cadmium oxide            | 1306-19-0  | 4.48 mg/L (Channel catfish (Read-across)) | 0.0013 mg/L (Rainbow trout) (Read-across) | 10       |
| Manganese oxide          | 1344-43-0  | > 100 mg/L (Rainbow trout)                | N/Av                                      | None.    |
| Silicon dioxide          | 7631-86-9  | N/Av                                      | N/Av                                      | None.    |
| Carbon                   | 7440-44-0  | > 100 mg/L (Zebra fish)                   | N/Av                                      | None.    |

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| <u>Ingredients</u>       | CAS No     | Toxicity to Daphnia                                 |                                     |          |
|--------------------------|------------|---|-------------------------------------|----------|
|                          |            | EC50 / 48h  | NOEC / 21 day                       | M Factor |
| Flue dust, zinc-refining | 69012-63-1 | > 100 mg/L (Daphnia magna)                          | N/Av                                | None.    |
| Zinc oxide               | 1314-13-2  | 0.098 mg/L (Daphnia magna)                          | N/Av                                | 10       |
| Franklinite              | 12063-19-3 | N/Av  | N/Av                                | None.    |
| Potassium chloride       | 7447-40-7  | 177 mg/L (Daphnia magna)                            | 130 mg/L                            | None.    |
| Laurionite               | 15860-78-3 | N/Av  | N/Av                                | None.    |
| Sodium chloride          | 7647-14-5  | 4136 mg/L (Daphnia magna)                           | 314 mg/L Daphnia pulex (Water flea) | None.    |
| Matlockite               | 14639-92-0 | N/Av  | N/Av                                | None.    |
| Magnetite                | 1317-61-9  | N/Av  | N/Av                                | None.    |
| Cadmium oxide            | 1306-19-0  | 0.042 mg/L Daphnia pulex (Water flea) (Read-across) | N/Av                                | 10       |
| Manganese oxide          | 1344-43-0  | > 100 mg/L (Daphnia magna)                          | N/Av                                | None.    |
| Silicon dioxide          | 7631-86-9  | N/Av  | N/Av                                | None.    |
| Carbon                   | 7440-44-0  | > 100 mg/L (Daphnia magna)                          | N/Av                                | None.    |

| <u>Ingredients</u>       | CAS No     | Toxicity to Algae             |                   |          |
|--------------------------|------------|-------------------------------|-------------------|----------|
|                          |            | EC50 / 96h or 72h             | NOEC / 96h or 72h | M Factor |
| Flue dust, zinc-refining | 69012-63-1 | 12.3 mg/L/72hr (Green algae)  | N/Av              | None.    |
| Zinc oxide               | 1314-13-2  | 0.044 mg/L/72hr (Green algae) | N/Av              | 10       |
| Franklinite              | 12063-19-3 | N/Av                          | N/Av              | None.    |
| Potassium chloride       | 7447-40-7  | > 100 mg/L/72hr (Green algae) | ≥ 100 mg/L/72hr   | None.    |
| Laurionite               | 15860-78-3 | N/Av                          | N/Av              | None.    |
| Sodium chloride          | 7647-14-5  | N/Av                          | N/Av              | None.    |
| Matlockite               | 14639-92-0 | N/Av                          | N/Av              | None.    |
| Magnetite                | 1317-61-9  | N/Av                          | N/Av              | None.    |
| Cadmium oxide            | 1306-19-0  | 0.09 mg/L/72hr (Green algae)  | N/Av              | 10       |
| Manganese oxide          | 1344-43-0  | > 100 mg/L/72hr (Green algae) | 32 mg/L/72hr      | None.    |
| Silicon dioxide          | 7631-86-9  | N/Av                          | N/Av              | None.    |
| Carbon                   | 7440-44-0  | > 100 mg/L/72hr (Green algae) | ≥ 100 mg/L/72hr   | None.    |

### Persistence and degradability

: Biodegradation is not applicable to metals/inorganic substances.

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**Bioaccumulation potential** : Zinc is a natural, essential element, which is needed for the optimal growth and development of all living organisms, including man. All living organisms have homeostasis mechanisms that actively regulate zinc uptake and absorption/excretion from the body; due to this regulation, zinc and zinc compounds do not bioaccumulate or biomagnify. See the following data for ingredient information.

| <u>Components</u>                  | <u>Partition coefficient n-octanol/water (log Kow)</u> | <u>Bioconcentration factor (BCF)</u> |
|------------------------------------|--|--------------------------------------|
| Zinc oxide (CAS 1314-13-2)         | - 1.53 (estimated)                                     | N/Av                                 |
| Potassium chloride (CAS 7447-40-7) | - 0.46 (calculated)                                    | N/Av                                 |
| Sodium chloride (CAS 7647-14-5)    | - 0.46   | N/Av                                 |

**Mobility in soil** : For metals, the transport and distribution over the different environmental compartments e. g. the water (dissolved fraction, fraction bound to suspended matter), soil (fraction bound or complexed to the soil particles, fraction in the soil pore water...) is described and quantified by the metal partition coefficients between these different fractions. In the CSR, a solids-water partitioning coefficient of 158.5 l/kg (log value 2.2) was applied for zinc in soils (CSR zinc 2010).

**Other Adverse Environmental effects**

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

### SECTION 13. DISPOSAL CONSIDERATIONS

**Handling for Disposal** : Handle in accordance with good industrial hygiene and safety practice. Refer to protective measures listed in sections 7 and 8.  
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.

**Methods of Disposal** : Dispose in accordance with all applicable federal, state, provincial and local regulations.

**RCRA** : If this product, as supplied, becomes a waste in the United States, it may meet the criteria of a hazardous waste as defined under RCRA, Title 40 CFR 261. It is the responsibility of the waste generator to determine the proper waste identification and disposal method. For disposal of unused or waste material, check with local, state and federal environmental agencies.

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### SECTION 14. TRANSPORT INFORMATION

| Regulatory Information                  | UN Number  | UN proper shipping name                                | Transport hazard class(es) | Packing Group | Label   |
|---|--|--|----------------------------|---------------|---|
| 49CFR/DOT                               | NA3077   | Other regulated substances, solid, n.o.s. (Zinc, Lead) | 9                          | III           |    |
| <b>49CFR/DOT Additional information</b> | May be shipped as Limited Quantity when transported in containers no larger than 5.0 kg; in packages not exceeding 30 kg gross mass. RQ should be added before the shipping name. Refer to Section 15 for information on Reportable Quantities (RQ's) for ingredients. This product may be shipped as non-regulated material when transported in containers with a capacity of < 167 lbs (75.7 kg). No RQ's are exceeded at this quantity. |  |                            |               |   |
| TDG                                     | None.  | Not regulated.   | not regulated              | none          |    |
| <b>TDG Additional information</b>       | None.  |  |                            |               |   |
| ICAO/IATA                               | None.  | Not regulated.   | not regulated              | none          |  |
| <b>ICAO/IATA Additional information</b> | None.  |  |                            |               |   |
| IMDG                                    | None.  | Not regulated.   | not regulated              | none          |  |
| <b>IMDG Additional information</b>      | None.  |  |                            |               |   |

**Special precautions for user** : Avoid and control operations which create dust. Avoid release to the environment. Appropriate advice on safety must accompany the package.

**Environmental hazards** : Although this product does not meet the criteria for an environmentally hazardous mixture, according to the IMDG Code, this product does contain substances toxic for the environment. Harmful to aquatic life with long lasting effects. This product contains marine pollutants. See ECOLOGICAL INFORMATION, Section 12.

**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code**

: This information is not available.

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### SECTION 15 - REGULATORY INFORMATION

**US Federal Information:**

Components listed below are present on the following U.S. Federal chemical lists:

| <u>Ingredients</u>       | CAS #      | TSCA Inventory          | CERCLA Reportable Quantity(RQ) (40 CFR 117.302): | SARA TITLE III: Sec. 302, Extremely Hazardous Substance, 40 CFR 355: | SARA TITLE III: Sec. 313, 40 CFR 372, Specific Toxic Chemical |                          |
|--------------------------|------------|-------------------------|--|--|---|--------------------------|
|                          |            |                         |  |  | Toxic Chemical  | de minimus Concentration |
| Flue dust, zinc-refining | 69012-63-1 | Yes                     | None.  | None.  | No  | N/Ap                     |
| Zinc oxide               | 1314-13-2  | Yes                     | 1000 lbs / 454 kg (as Zn)                        | None.  | Yes   | 1%                       |
| Franklinite              | 12063-19-3 | Yes                     | None.  | None.  | No  | N/Ap                     |
| Potassium chloride       | 7447-40-7  | Yes                     | None.  | None.  | No  | N/Ap                     |
| Laurionite               | 15860-78-3 | Not specifically listed | 10 lbs / 4.54 kg (as Pb)                         | None.  | Yes   | 0.1%                     |
| Sodium chloride          | 7647-14-5  | Yes                     | None.  | None.  | No  | N/Ap                     |
| Matlockite               | 14639-92-0 | Not specifically listed | 10 lbs / 4.54 kg (as Pb)                         | None.  | Yes   | 0.1%                     |
| Magnetite                | 1317-61-9  | Yes                     | None.  | None.  | No  | N/Ap                     |
| Cadmium oxide            | 1306-19-0  | Yes                     | 10 lbs / 4.54 kg (as Cd)                         | 100 lbs  | Yes   | 0.1%                     |
| Manganese oxide          | 1344-43-0  | Yes                     | None.  | None.  | Yes   | 1%                       |
| Silicon dioxide          | 7631-86-9  | Yes                     | None.  | None.  | No  | N/Ap                     |
| Carbon                   | 7440-44-0  | Yes                     | None.  | None.  | No  | N/Ap                     |

SARA TITLE III: Sec. 311 and 312, SDS Requirements, 40 CFR 370 Hazard Classes:

Health hazards (Germ cell mutagenicity; Carcinogenicity; Reproductive toxicity; Specific target organ toxicity, repeated exposure)

Under SARA Sections 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

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### US State Right to Know Laws:

The following chemicals are specifically listed by individual States:

| <u>Ingredients</u>       | CAS #      | California Proposition 65 |   | State "Right to Know" Lists |     |     |     |     |     |
|--------------------------|------------|---------------------------|---|-----------------------------|-----|-----|-----|-----|-----|
|                          |            | Listed                    | Type of Toxicity  | CA                          | MA  | MN  | NJ  | PA  | RI  |
| Flue dust, zinc-refining | 69012-63-1 | No                        | N/Ap  | No                          | No  | No  | No  | No  | No  |
| Zinc oxide               | 1314-13-2  | No                        | N/Ap  | Yes                         | Yes | Yes | Yes | Yes | Yes |
| Franklinite              | 12063-19-3 | No                        | N/Ap  | No                          | No  | No  | No  | No  | No  |
| Potassium chloride       | 7447-40-7  | No                        | N/Ap  | No                          | No  | No  | No  | No  | No  |
| Laurionite               | 15860-78-3 | Yes                       | Cancer;<br>Developmental;<br>female; male<br>(Listed under Lead<br>and Lead<br>compounds) | No                          | No  | No  | No  | No  | No  |
| Sodium chloride          | 7647-14-5  | No                        | N/Ap  | No                          | No  | No  | No  | No  | No  |
| Matlockite               | 14639-92-0 | Yes                       | Cancer;<br>Developmental;<br>female; male<br>(lead and lead<br>compounds)                 | No                          | No  | No  | Yes | Yes | No  |
| Magnetite                | 1317-61-9  | No                        | N/Ap  | No                          | No  | No  | No  | No  | No  |
| Cadmium oxide            | 1306-19-0  | Yes                       | Cancer;<br>Developmental;<br>male   | Yes                         | Yes | Yes | Yes | Yes | Yes |
| Manganese oxide          | 1344-43-0  | No                        | N/Ap  | No                          | No  | No  | No  | No  | No  |
| Silicon dioxide          | 7631-86-9  | No                        | N/Ap  | Yes                         | Yes | Yes | No  | Yes | No  |
| Carbon                   | 7440-44-0  | No                        | N/Ap  | No                          | No  | No  | No  | No  | Yes |

### Canadian Information:

Canadian Environmental Protection Act (CEPA) information: All ingredients listed appear on the Domestic Substances List (DSL).

Canadian National Pollutant Release Inventory (NPRI): This product contains the following substances listed on the NPRI:

- Zinc (Part 1, Group A Substance)
- Manganese (Part 1, Group A Substance)
- Lead (Part 1, Group B Substance)
- Cadmium (Part 1, Group B Substance)

WHMIS information: Refer to Section 2 for a WHMIS Classification for this product.



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### International Information:

Components listed below are present on the following International Inventory list:

| <u>Ingredients</u>       | <u>CAS #</u> | <u>European EINECS</u>   | <u>Australia AICS</u>    | <u>Philippines PICCS</u> | <u>Japan ENCS</u>        | <u>Korea KECI/KECL</u>   | <u>China IECSC</u>       | <u>New Zealand IOC</u>   |
|--------------------------|--------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--|
| Flue dust, zinc-refining | 69012-63-1   | 273-760-6                | Present                  | Not listed               | Not listed               | Not listed               | Not listed               | Not listed   |
| Zinc oxide               | 1314-13-2    | 215-222-5                | Present                  | Present                  | (1)-561                  | KE-35565                 | Present                  | HSR003104  |
| Franklinite              | 12063-19-3   | 235-052-5                | Present                  | Present                  | (1)-351; (1)-561         | KE-10901                 | Present                  | May be used as a component in a product covered by a group standard, but is not approved for use as a chemical in its own right. |
| Potassium chloride       | 7447-40-7    | 231-211-8                | Present                  | Present                  | (1)-228                  | KE-29086                 | Present                  | HSR003261  |
| Laurionite               | 15860-78-3   | Not specifically listed. | Not specifically listed. | Not specifically listed. | Not specifically listed. | Not specifically listed. | Not specifically listed. | Not specifically listed.   |
| Sodium chloride          | 7647-14-5    | 231-598-3                | Present                  | Present                  | (1)-236                  | KE-31387                 | Present                  | HSR002722  |
| Matlockite               | 14639-92-0   | Not specifically listed. | Not specifically listed. | Not specifically listed. | Not specifically listed. | Not specifically listed. | Not specifically listed. | Not specifically listed.   |
| Magnetite                | 1317-61-9    | 215-277-5                | Present                  | Present                  | (1)-357                  | KE-34314                 | Present                  | May be used as a single component chemical under an appropriate group standard.  |
| Cadmium oxide            | 1306-19-0    | 215-146-2                | Present                  | Present                  | (1)-202                  | KE-04417                 | Present                  | HSR004390  |
| Manganese oxide          | 1344-43-0    | 215-695-8                | Present                  | Present                  | (1)-475                  | KE-23031                 | Present                  | HSR003775  |
| Silicon dioxide          | 7631-86-9    | 231-545-4                | Present                  | Present                  | (1)-548                  | KE-31032                 | Present                  | May be used as a single component chemical under an appropriate group standard.  |
| Carbon                   | 7440-44-0    | 231-153-3                | Present                  | Present                  | Not listed               | KE-04671                 | Present                  | HSR001271  |

### SECTION 16. OTHER INFORMATION

#### Legend

- : ACGIH: American Conference of Governmental Industrial Hygienists
- AICS: Australian Inventory of Chemical Substances
- CA: California
- CAS: Chemical Abstract Services
- CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act of 1980
- CFR: Code of Federal Regulations
- CSA: Canadian Standards Association
- DOT: Department of Transportation
- EC50: Effective Concentration 50%
- EINECS: European Inventory of Existing Commercial chemical Substances

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ENCS: Existing and New Chemical Substances  
EPA: Environmental Protection Agency  
HSDB: Hazardous Substances Data Bank  
IARC: International Agency for Research on Cancer  
IATA: International Air Transport Association  
IBC: Intermediate Bulk Container  
ICAO: International Civil Aviation Organisation  
IECSC: Inventory of Existing Chemical Substances  
IMDG: International Maritime Dangerous Goods  
Inh: Inhalation  
IOC: Inventory of Chemicals  
ISHL: Industrial Safety Health Law  
KECI: Korean Existing Chemicals Inventory  
KECL: Korean Existing Chemicals List  
LC: Lethal Concentration  
LD: Lethal Dose  
MA: Massachusetts  
MN: Minnesota  
N/Ap: Not Applicable  
N/Av: Not Available  
NIOSH: National Institute of Occupational Safety and Health  
NJ: New Jersey  
NOEC: No observable effect concentration  
NTP: National Toxicology Program  
OECD: Organisation for Economic Co-operation and Development  
OSHA: Occupational Safety and Health Administration  
PA: Pennsylvania  
PEL: Permissible exposure limit  
PICCS: Philippine Inventory of Chemicals and Chemical Substances  
PNOR: Particulates Not Otherwise Regulated  
PNOS: Particles Not Otherwise Specified  
RCRA: Resource Conservation and Recovery Act  
RI: Rhode Island  
RTECS: Registry of Toxic Effects of Chemical Substances  
SARA: Superfund Amendments and Reauthorization Act  
SCBA: Self-Contained Breathing Apparatus  
SDS: Safety Data Sheet  
STEL: Short Term Exposure Limit  
TDG: Canadian Transportation of Dangerous Goods Act & Regulations  
TLV: Threshold Limit Values  
TWA: Time Weighted Average  
WHMIS: Workplace Hazardous Materials Identification System

### References

1. ACGIH, Threshold Limit Values for Chemical Substances and Physical Agents & Biological Exposure Indices for 2017.
2. International Agency for Research on Cancer Monographs, searched 2018.
3. Canadian Centre for Occupational Health and Safety, CCIInfoWeb databases, 2018 (Chempendium, HSDB and RTECs).
4. Material Safety Data Sheets from manufacturer.
5. US EPA Title III List of Lists - March 2015 version.
6. California Proposition 65 List - December 29, 2017 version.
7. OECD - The Global Portal to Information on Chemical Substances - eChemPortal, 2018.

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**Revision Information** : (M)SDS sections updated:  
2. HAZARDS IDENTIFICATION;  
3. COMPOSITION/INFORMATION ON INGREDIENTS;  
4. FIRST AID MEASURES;  
8. EXPOSURE CONTROLS / PERSONAL PROTECTION;  
11. TOXICOLOGICAL INFORMATION;  
12. ECOLOGICAL INFORMATION;  
15. REGULATORY INFORMATION

**Other special considerations for handling**

: Provide adequate information, instruction and training for operators.

|  |   |
|--|---|
| <p><b>Prepared for:</b><br/>American Zinc Recycling<br/>4955 Steubenville Pike, Suite 405<br/>Pittsburgh, PA, USA, 15205<br/>Website: <a href="http://azr.com/american-zinc">http://azr.com/american-zinc</a><br/>Telephone: (724) 773-2223<br/>Direct all enquiries to: American Zinc Recycling</p> |   |
| <p><b>Prepared by:</b><br/>ICC The Compliance Center Inc.<br/>Telephone: (888) 442-9628 (U.S.); (888) 977-4834 (Canada)<br/><a href="http://www.thecompliancecenter.com">http://www.thecompliancecenter.com</a></p>  |  |

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