



OREGON RESOURCES
CORPORATION

Material Safety Data Sheet

FOR INDUSTRIAL USE ONLY

ORC Zircon

1. Product and company identification

Product name	ORC Zircon
MSDS Number	001
Product Type	Zircon Sand
Product use	Foundry Sand
Manufacturer, Importer, Supplier	Oregon Resources Corporation 63776 Mullen Road Coos Bay, OR 97420
Print date	10-DEC-2011
Telephone	For Emergency Medical Assistance Call Health & Safety Information Services, 541-217-4696

2. Hazards identification

Form	Free flowing granules
Odor	Odorless/Odourless
OSHA/HCS status	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Emergency overview

MAY CAUSE RESPIRATORY TRACT IRRITATION.

Potential acute health effects

Inhalation	Slightly irritating to the respiratory system. The product as shipped, poses a minimal health hazard because the bulk of the particles are in the non-inhalable size range. However handling of bulk materials may generate some dust. This is normally regarded as general nuisance dust but can be irritating if inhaled at high concentrations. May cause symptoms such as coughing or sneezing.
Ingestion	Not expected to be harmful under normal conditions of use.
Skin	May cause irritation on prolonged or repeated contact.
Eyes	Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the eyes.

Potential Health Effects

Chronic effects	Contains material that can cause target organ damage.
Carcinogenicity	Quartz: This material is known as a human carcinogen. May cause cancer after repeated inhalation of spray or dust. Adverse effects from repeated inhalation may include: Fibrosis with altered lung function or difficulty breathing.
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.
Target organs	Contains material which causes damage to the following organs: kidneys, lungs, immune system, skin, eye, lens or cornea Review Section 2 and 11 for any additional assessments.

Over-exposure signs/symptoms

Inhalation	Adverse symptoms may include the following: respiratory tract irritation, coughing,
Ingestion	No specific data.
Skin	No specific data.
Eyes	No specific data.
Medical conditions aggravated by over-exposure	Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See section 11 for more detailed information on health effects and symptoms.

3. Composition/Information on ingredients

<u>Ingredient name</u>	<u>CAS number</u>	<u>WT %</u>
Zircon	14940-68-2	81.0 - 88.0
Chromite	1308-38-9	2.0 - 4.0
Garnet	1302-62-1	1.25 - 2.5
Quartz	14808-60-7	1.0 - 5.0
Rutile	1317-80-2	1.5 - 2.5
Leucoxene/Ilmenite	103170-28-1	0.2 - 0.8

*** Any applicable Canadian trade secret numbers will be listed in Section 15.*

4. First aid measures

Eye contact	Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Get medical attention if irritation occurs.
Skin contact	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Get medical attention. Wash clothing before reuse. Clean

shoes thoroughly before reuse.

Inhalation	Move exposed person to fresh air. Blow nose to remove particles from nasal passages. If any adverse reaction develops, seek medical attention.
Ingestion	Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.
First aid personnel	No action shall be taken involving any personal risk or without suitable training.
Notes to physician	No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

See section 11 for more detailed information on health effects and symptoms.

5. Fire-fighting measures

Flammability of the product	No specific fire or explosion hazard.
<u>Extinguishing media</u>	
Suitable	Use an extinguishing agent suitable for the surrounding fire.
Not suitable	None known.
Special exposure hazards	Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
Hazardous combustion products	Decomposition products may include the following materials: metal oxide/oxides,
Special protective equipment for fire-fighters	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6. Accidental release measures

Personal precautions	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. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).
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).
Large spill	Move containers from spill area. Approach release from upwind. 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.
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.

7. Handling and storage

Handling

Put on appropriate personal protective equipment (see section 8). 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. Do not get in eyes or on skin or clothing. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Storage

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.

8. Exposure controls/personal protection

Ingredient name

Occupational exposure limits

Zircon

OSHA PEL Time Weighted Average (TWA)
5 mg/m³ (as Zr)

ACGIH TLV Time Weighted Average (TWA)
5 mg/m³ (as Zr)

ACGIH TLV STEL
10 mg/m³ (as Zr)

Chromite

ACGIH TLV Time Weighted Average (TWA)
0.5 mg/m³
(Inorganic, calculated as Cr)

OSHA PEL Time Weighted Average (TWA)
0.5 mg/m³

Quartz (SiO₂)

ACGIH TLV Time Weighted Average (TWA)
0.025 mg/m³
(respirable fraction)

OSHA PEL Z3 Time Weighted Average (TWA)

10 mg/m³
(divided by %SiO₂+2 , respirable)

OSHA PEL Z3 Time Weighted Average (TWA)

30 mg/m³
(divided by %SiO₂+2 , total dust)

Consult local authorities for acceptable exposure limits.

Exposure Standards	Dust TWA – 10mg/m ³ (inhalable general nuisance dust)
Recommended monitoring procedures	Review ASTM E 1132-99, "Standard Practice for Health Requirements Relating to Occupational Exposure to Respirable Crystalline Silica," as well as other guidelines such as NIOSH publications.
Engineering measures	Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.
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.
Respiratory	Maintain respirable dust exposure levels below 2.8 mg/m ³ to ensure the internal radiation dose will not exceed 10% of the Annual Limits on Intake (ALI) specified in 10 CFR 20.1502(b) and Nuclear Regulatory Commission (NRC) standards for protection against radiation for thorium, radium, and radioactive daughter decay products. Zircon sands generally contain low levels of particles in the respirable fraction.
Hands	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.
Eyes	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 or dusts.
Skin	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.
Environmental exposure controls	Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9. Physical and chemical properties

Form	Free flowing granules, off white to brownish
Flash point	Not applicable.
Auto-ignition temperature	Not applicable.
Flammable limits	
Lower:	Not applicable.

Upper:	Not applicable.
Color	White to brownish
Odor	Odorless/Odourless
pH	5 to 7.5
Melting point	2100 to 2300 C
Relative density	4.2 - 4.8
Vapor pressure	Not Volatile
Odor threshold	Not available
Viscosity	Dynamic- Not available
Solubility	Insoluble
Partition coefficient: n-octanol/water	Not available
Evaporation rate	Not available
Vapor density	Not available

10. Stability and reactivity

Stability	The product is stable. Under normal conditions of storage and use, hazardous polymerization will not occur.
Conditions to avoid	Avoid exposure - obtain special instructions before use.
Materials to avoid	No specific data.
Hazardous decomposition products	Under normal conditions of storage and use, hazardous decomposition products should not be produced.

11. Toxicological information

Other Toxicological Information

Carcinogenicity

Conclusion/Summary

Classification

Ingredient name

Quartz (SiO₂)

ACGIH	Suspected human carcinogen.
IARC	The agent (mixture) is carcinogenic to humans. (Group 1)
NTP	Known to be a human carcinogen.
OSHA	Not regulated
EU	Not classified

12. Ecological information

Environmental effects

No known significant effects or critical hazards.

Other adverse effects

No known significant effects or critical hazards.

13. Disposal considerations

Waste disposal

The NORM content of this product may activate radiation detection sensors in place at some scrap metal processing and waste disposal sites, ports, and other transportation infrastructure facilities. However, zircon is exempt from NRC regulations for source material at 10 CFR

40.13(b) since it falls under the definition of unprocessed materials containing less than 0.05% uranium or thorium. As such the use of this product, and disposal of wastes derived from this product, is not regulated in most jurisdictions. Check local and state regulations regarding NORM (naturally-occurring radioactive material) to determine any additional requirements potentially applicable to the use, handling or disposal of this product. Disclose and review these issues with the receiving facility prior to disposal of product, packaging, spill residues, or wastes containing residues of this product. The generation of waste should be avoided or minimized wherever possible. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

14. Transport information

The data provided in this section is for information only and may not be specific to your package size or mode of transport. You will need to apply the appropriate regulations to properly classify your shipment for transportation.

International transport regulations

Regulatory information	UN/NA number	Proper shipping name	Classes/*PG	Reportable Quantity (RQ)
CFR		Non-regulated		
TDG		Non-regulated		
IMO/IMDG		Non-regulated		
IATA (Cargo)		Non-regulated		

*PG : Packing group

15. Regulatory information

US regulations

HCS Classification Carcinogen, Target organ effects

U.S. Federal regulations **SARA 311/312 Classification** Delayed (chronic) health hazard

SARA 313 - Supplier Notification

This product contains the following toxic chemical(s) subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986, and Subpart C-Supplier Notification Requirement of 40 CFR Part 372.
None required.

SARA 302 Extremely Hazardous Substances None required.

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants None required.

State regulations **Massachusetts RTK Substances** The following components are listed: , Quartz (SiO₂),

New Jersey RTK Hazardous Substances The following components are listed: , Quartz (SiO₂),

Pennsylvania RTK Hazardous Substances The following components are listed: ,
Quartz (SiO₂),

California Prop. 65: WARNING: This product contains a chemical known to the State of California to cause cancer. Quartz (SiO₂) - 14808-60-7

Canada

WHMIS (Canada) Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

Canadian lists **Canadian NPRI:** None required.

International regulations

Chemical inventories Australia inventory (AICS) All components are listed or exempted.
Canada inventory All components are listed or exempted.
Japan inventory All components are listed or exempted.
China inventory (IECSC) All components are listed or exempted.
Korea inventory All components are listed or exempted.
New Zealand Inventory (NZIoC) Not determined.
Philippines inventory (PICCS) All components are listed or exempted.
United States inventory (TSCA 8b) All components are listed or exempted.

16. Other information

Hazardous Material Information System III (U.S.A.)	Health : 2 Flammability: 0 Physical hazards : 0 Chronic : *
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Caution: HMIS[®] ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS[®] ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS[®] ratings are to be used with a fully implemented HMIS[®] program. HMIS[®] is a registered mark of the National Paint & Coatings Association (NPCA). HMIS[®] materials may be purchased exclusively from J. J. Keller (800) 327-6868. The customer is responsible for determining the PPE code for this material.

Prepared by	Oregon Resources Corporation Safety Department, 541-217-4696
Date of issue	11-MAY-2011
Date of printing	12-MAY-2011
Version	1.0

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