

ZIRCON: SAFETY DATA SHEET [TEMPLATE]

Reference:

Date of issue:

GHS (5th revision) compliant

1. IDENTIFICATION OF THE SUBSTANCE AND OF THE COMPANY/UNDERTAKING

1.1 Product identification:

Name: Zircon
Other names: Zircon sand, Zircon flour *[include trade name if applicable]*
CAS number: not applicable
EU EINECS number: not applicable
REACH registration
number: this product is exempt from registration according to the provisions of Article 2(7)(b) and Annex V (7) of REACH

1.2 Relevant identified uses of the substance and uses advised against:

Industrial applications: ceramics, refractories and foundry products, abrasives.
Feedstock for the production of zirconia /zirconium and associated products

Uses advised against: none known

1.3 Details of the supplier of the safety data sheet:

Company name: *[Full legal entity name]*
Address: *[full postal address, not a PO Box]*
Telephone number: *[of a SDS-responsible person]*
E-mail address: *[of a SDS-responsible person or suitable generic email]*
Website: *(if applicable)*

1.4 Emergency telephone number:

Telephone number – Country/EU Specific *and / or*
Telephone number (worldwide): *(indicate hours of operation)*

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture:

Not classified according to EU: EC 1272/2008 (CLP/GHS) or UN GHS

- Physical and chemical hazards: not classified
- Human health hazards: not classified
- Environmental hazards: not classified

2.2 Label elements

Not classified: pictogram is not required
Not classified: signal word, hazard statements, precautionary statement are not applicable.

2.3 Other hazards not leading to classification

The principal hazard is due to inhalation of dust. The normal grain size of zircon precludes it from being an inhalation hazard. Avoid the creation of dust during handling and processing.

With some products, certain processes (e.g. grinding, drying), airborne respirable

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crystalline silica (quartz) may be generated. Prolonged and/or massive inhalation of respirable crystalline silica may cause lung fibrosis, commonly referred to as silicosis. Principal symptoms of silicosis are cough and breathlessness. Occupational exposure to respirable crystalline silica dust should be monitored and controlled.

US Specific: for Crystalline Silica >0.1%: Statement regarding IARC classification Contains >0.1% crystalline silica which in the form of quartz or cristobalite dust is regarded by IARC as carcinogenic to humans (Group 1).

US Specific: Additional consideration is need from radionuclides (section 3).

3. COMPOSITION / INFORMATION ON INGREDIENTS

3.1 Substances

Name	EC No.	Typical content	GHS classification
ZrSiO ₄ (zircon)	239-019-6	>95 %	Not classified
TiO ₂ (rutile)	215-282-2	<0.5 %	Not classified
Crystalline silica (quartz) [respirable fraction <0.1%]	238-878-4	0.5 %	Not classified

(US Specific: for Crystalline Silica: Carcinogen classification may be necessary – this is still under discussion)

Additional information:

Zircon is a naturally-occurring radioactive material (NORM) and is considered a radioactive product (IAEA radioactive material if above 1 Bq/g); however, it is not considered a radioactive product for transportation purpose - limit of 10 Bq/g for NORM. Some countries may use different limits; therefore, local regulations should be consulted.

Uranium (U-238): 150-300 ppm (2 - 4 Bq/g)
Thorium (Th-232): 150-250 ppm (0.5 - 1.0 Bq/g)
Other daughter nuclides: in secular equilibrium

The contact dose rate from bulk quantities is in the order of 1 to 2µSv/h above the background. A person may work in dust concentrations of 3 mg/m³ for a full year without exceeding the maximum dose for a worker.

Respirable dust levels in typical zircon processing operations are reported in IAEA Safety Report No 51, and are less than 25% of the maximum dose to workers of 1 mSv/y (ICRP).

For downstream users, the thermal production of zirconia can generate risks associated with worker exposure to radioactive dust; and the chemical production of zirconia can generate risks associated with disposal of radionuclide containing wastes. It is recommended that regulatory guidance be obtained by the producers of zirconia, when using zircon.

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4. FIRST AID MEASURES

4.1 Description of first aid measures:

- Inhalation:** Remove person to fresh air and keep comfortable for breathing. Get medical attention if symptoms occur
- Skin Contact:** If on skin or hair, brush off loose particles and wash with soap and water. If on clothing, brush off loose particles.
Use a vacuum cleaner to collect particles from the floor
Get medical attention if symptoms occur
- Eye Contact:** Rinse gently with water for several minutes. Remove contact lenses if applicable. Get medical attention if irritation occurs
- Ingestion:** If swallowed, rinse mouth with water. Get medical attention if symptoms occur

Self-protection of the first aider: No special protection is required. See Section 8 for information on appropriate personal protective equipment.

4.2 Most important symptoms and effects, both acute and delayed

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

Over-exposure signs/symptoms

- Eye contact: no specific data
Inhalation: no specific data
Skin contact: no specific data
Ingestion: no specific data

4.3 Indications of any immediate medical attention and special treatment needed

Notes to physician: no specific treatment – treat symptomatically
Specific treatments: no specific treatment.

5. FIREFIGHTING MEASURES:

5.1 Suitable extinguishing media:

Dry chemical, carbon dioxide, water spray or foam, aiming not to create dust.

Unsuitable extinguishing media:

Avoid high pressure media that could cause the formation of dust or a dust / air mixture

5.2 Special exposure hazards arising from substance or mixture:

The product is not flammable and has no known fire or explosion risk

Hazardous combustion products: none known

5.3 Advice for fire-fighters:

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No fire or explosion hazard exists.
Firefighters should wear appropriate protective equipment to minimise inhalation of dust.

6. ACCIDENTAL RELEASE MEASURES:

6.1 Personal precautions, protective equipment and emergency procedures

6.1.1 For non-emergency personnel: wear personal protective equipment (PPE) as detailed in section 8. Clear the area of unprotected personnel. Contact emergency services if appropriate

6.1.2 For emergency responders: wear personal protective equipment (PPE) as detailed in section 8.

6.2 Environmental precautions:

Prevent spilled product from entering sewers, drains and waterways

6.3 Methods and material for containment and cleaning up

Wear safety equipment as for normal handling. Avoid generating dust. Vacuum up if possible, otherwise carefully sweep up small spills and re-cycle. If the spilled product is not suitable for re-use, damp down, collect and where possible return to manufacturer for reprocessing. If necessary, dispose of to an approved landfill site in accordance with applicable local regulations.

6.4 Reference to other sections

See sections 8 and 13 for exposure controls (PPE) and waste disposal

7. HANDLING AND STORAGE:

7.1 Precautions for safe handling:

Avoid the creation of dust and prevent wind dispersal. Use of safe work practices are recommended to avoid inhalation, eye or skin contact. Observe good personal hygiene at all times, including washing hands before eating. Prohibit eating, drinking and smoking in contaminated areas. Avoid breathing dust. Avoid contact with eyes. Wash hands thoroughly after handling the product. If handling zircon flour, it is advisable to use gloves and wash hands before eating, drinking or smoking.

7.2 Conditions for safe storage, including any incompatibilities:

Store in accordance with local regulations where applicable
Store in a cool, dry, well ventilated area, to avoid dust generation and dispersal and removed from foodstuffs. Ensure bags are adequately labelled, protected from physical damage and sealed when not in use.

7.3 Specific end uses(s):

See Section 1.2

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8. EXPOSURE CONTROLS / PERSONAL PROTECTION:

8.1 Control parameters:

Product / ingredient name	Exposure limit values
Zircon (ZrSiO ₄)	<p>Generic OEL: ACGIH TLV (United States, 1/2009). TWA: 5 mg/m³, (as Zr) 8 hour(s). STEL: 10 mg/m³, (as Zr) 15 minute(s).</p> <p>US specific: NIOSH REL (United States, 6/2009). TWA: 5 mg/m³, (as Zr) 10 hours. STEL: 10 mg/m³, (as Zr) 15 minutes. OSHA PEL (United States, 11/2006). TWA: 5 mg/m³, (as Zr) 8 hours.</p>
Quartz (SiO ₂)	<p>Generic OEL: ACGIH TLV (United States, 2/2010). TWA: 0.025 mg/m³ 8 hour(s). Form: Respirable fraction; see</p> <p>US specific: OSHA PEL Z3 (United States, 2/2016). TWA: 250 mppcf / (%SiO₂+5) 8 hours. Form: Respirable TWA: 10 mg/m³ / (%SiO₂+2) 8 hours. Form: Respirable TWA: 30 mg/m³ / (%SiO₂+2) 8 hours. Form: Total Dust</p> <p>NIOSH REL (United States, 10/2013). TWA: 0.05 mg/m³ 10 hours. Form: Respirable dust</p> <p>Other countries' specific OELS:</p>

Recommended monitoring procedures: This product contains ingredients with exposure limits, and therefore personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to monitoring standards, such as the following: European Standard EN 689 (Workplace atmospheres - Guidance for the assessment of exposure by inhalation to chemical agents for comparison with limit values and measurement strategy) European Standard EN 14042 (Workplace atmospheres - Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents) European Standard EN 482 (Workplace atmospheres - General requirements for the performance of procedures for the measurement of chemical agents)

Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

US Specific: OSHA Occupational Exposure to Respirable Crystalline Silica Updated Rule 29 CFR Parts 1910, 1915, and 1926

DNEL: not available

PNEC: not available

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8.2 Exposure controls:

8.2.1 Appropriate engineering controls:

To avoid inhalation of dust, use in a well-ventilated area. Where a dust inhalation risk exists, local exhaust ventilation (LEV) is recommended. Maintain dust levels below the recommended exposure standard.

8.2.2 Individual protection measures, such as personal protective equipment

8.2.2.1 In dusty conditions, personal protective equipment (PPE) shall be worn: overall, safety glasses, gloves and well-fitting mask

8.2.2.2. Eye / face protection:
wear safety glasses in normal conditions.
wear dust-proof goggles in dusty conditions.

Hand protection: wear industrial grade gloves

Other skin protection: wear disposable coveralls where heavy contamination is likely.

8.2.2.3 Respiratory protection: where an inhalation risk exists, wear a Class P1 (Particulate) respirator.

8.2.2.4 Thermal Hazards: no thermal hazard exists

8.2.3 Environmental exposure controls:

Encourage the re-use of uncontaminated product. Use LEV to prevent/reduce air emissions. Emissions trapped from LEV should be re-used where possible. Liquid waste can be treated at on-site or off-site waste water treatment plants. Solid waste that cannot be re-used should be disposed of according to the local laws and regulations. Avoid creating dust and prevent wind dispersal.

9. PHYSICAL AND CHEMICAL PROPERTIES:

9.1 Information on basic physical and chemical properties	
a) Appearance	Off-white to brown granular solid
b) Odour	Odourless
c) Odour threshold	Not applicable
d) pH	Not applicable
e) Melting point/freezing point	2250°C
f) Initial boiling point and boiling range	Not applicable
g) Flash point	Not applicable
h) Evaporation rate	Not applicable
i) Flammability (solid, gas);	Not applicable
j) Upper/lower flammability or explosive limits	Not applicable
k) Vapour pressure;	Not applicable
l) Vapour density	Not applicable

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m) Relative density	1.7-3 g/cm ³
n) Solubility(ies);	Not applicable
o) Partition coefficient: n-octanol/water;	Not applicable
p) Auto-ignition temperature	Not applicable
q) Decomposition temperature;	Not applicable
r) Viscosity	Not applicable
s) Explosive properties	Not applicable
t) Oxidising properties	Not applicable

9.2 Other information: no applicable information

10. STABILITY AND REACTIVITY:

- 10.1 Reactivity:** no specific test data related to reactivity available for this product or its ingredients.
Very fine particles may ignite in the presence of air/oxygen
- 10.2 Chemical stability:** the product is stable
- 10.3 Possibility of hazardous reactions:** under normal conditions of storage and use, hazardous reactions will not occur
- 10.4 Conditions to avoid:** no specific conditions to avoid
- 10.5 Incompatible materials:** none known
- 10.6 Hazardous decomposition products:** under normal conditions of storage and use, hazardous decomposition products will not occur

11. TOXICOLOGICAL INFORMATION:

11.1 Information on toxicological effects

- a) acute toxicity:** No concerns from absorption, metabolism, distribution and excretion.
An inert substance with extremely low toxicity to humans and animals
- b) skin corrosion/irritation:** non-irritating to the skin
- c) serious eye damage/irritation:** non-irritating to the eyes
- d) respiratory or skin sensitisation:** non-sensitizer to the respiratory system or skin
- e) germ cell mutagenicity:** not mutagenic (Ames test)
- f) carcinogenicity:** data not available
- g) reproductive toxicity:** data not available
- h) STOT-single exposure:** data not available
- i) STOT-repeated exposure:** data not available
- j) aspiration hazard:** not applicable

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Information on likely routes of exposure:

Likely of exposure anticipated: dermal, inhalation, oral

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

Eye contact:	No specific data.
Inhalation:	No specific data.
Skin contact:	No specific data.
Ingestion:	No specific data.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Short-term exposure

Potential immediate effects:	not available
Potential delayed effects:	not available

Long-term exposure

Potential immediate effects:	not available
Potential delayed effects:	not available

Potential chronic health effects: not available

Conclusion/Summary: prolonged and/or massive exposure to respirable crystalline silica-containing dust may cause silicosis, a nodular pulmonary fibrosis caused by deposition in the lungs of fine respirable particles of crystalline silica.

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.

Other information:

Prolonged and/or massive exposure to respirable crystalline silica-containing dust may cause silicosis, a nodular pulmonary fibrosis caused by deposition in the lungs of fine respirable particles of crystalline silica.

In 1997, IARC (the International Agency for Research on Cancer) concluded that crystalline silica inhaled from occupational sources can cause lung cancer in humans. However, it pointed out that not all industrial circumstances, nor all crystalline silica types, were to be incriminated. (IARC Monographs on the evaluation of the carcinogenic risks of chemicals to humans, Silica, silicates dust and organic fibres, 1997, Vol. 68, IARC, Lyon, France.)

In June 2003, EU SCOEL (the EU Scientific Committee on Occupational Exposure Limits) concluded that the main effect in humans of the inhalation of respirable crystalline silica dust

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is silicosis. "There is sufficient information to conclude that the relative risk of lung cancer is increased in persons with silicosis (and, apparently, not in employees without silicosis exposed to silica dust in quarries and in the ceramic industry). Therefore, preventing the onset of silicosis will also reduce the cancer risk... "(SCOEL SUM Doc 94-final, June 2003). So, there is a body of evidence supporting the fact that increased cancer risk would be limited to people already suffering from silicosis. Worker protection against silicosis should be assured by respecting the existing regulatory occupational exposure limits and implementing additional risk management measures where required (see section 16 below).

12. ECOLOGICAL INFORMATION:

- 12.1 Toxicity:** no known significant effects or critical hazards
- 12.2 Persistence and degradability:** inorganic; not readily biodegradable
- 12.3 Bioaccumulation potential:** not applicable
- 12.4 Mobility in soil:** not available
- 12.5 Results on PBT and vPvB assessment:**
PBT: not available
vPvB: not available
- 12.6 Other adverse effects:** no known significant effects or critical hazards.

13. DISPOSAL CONSIDERATIONS:

- 13.1 Waste treatment methods**

Product

Method(s) of disposal: the generation of waste should be avoided or minimised wherever possible. Significant quantities of waste product residues shall be processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product 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.

Hazardous waste: within the present knowledge of the supplier, this product is not regarded as hazardous waste, as defined by EU Directive 2008/98/EC. Local definitions of hazardous waste should be consulted in other jurisdictions.

Special precautions: the product and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Avoid dispersal of spilt material and runoff to soil, waterways, drains and sewers.

14. TRANSPORT INFORMATION:

- 14.1 UN Number:** not regulated as a dangerous good for transport
- 14.2 UN proper shipping name:** not applicable

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- 14.3 Transport hazard class(es): none applicable
- 14.4 Packing group: not applicable
- 14.5 Environmental hazards: none applicable. Not a marine pollutant.
- 14.6 Special precautions for user: see Sections 6.1 and 7.1
- 14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code: Referenced as Zircon Sand. No other applicable information

15. REGULATORY INFORMATION:

- 15.1 **Safety, health and environmental regulations/legislation specific for the substance or mixture:**
not applicable as the substance is not classified according to GHS
- 15.2 **Chemical safety assessment: This is EU specific and not needed elsewhere**
substance is not classified therefore no Chemical Safety Assessment has been carried out for this product by the supplier

16. OTHER INFORMATION:

- a) Date of previous issue: *[in the case of a revised safety data sheet, a clear indication of where changes have been made to the previous version, unless such indication is given elsewhere in the safety data sheet, with an explanation of the changes, if appropriate. Note: supplier shall provide an explanation of the changes upon request]*
- b) List of acronyms:
- ATE = Acute Toxicity Estimate
 - CLP = Classification, Labelling and Packaging Regulation
 - DMEL = Derived Minimal Effect Level
 - DNEL = Derived No Effect Level
 - EUH statement = CLP-specific Hazard statement
 - IMSBC = International Maritime Solid Bulk Cargoes Code
 - PBT = Persistent, Bioaccumulative and Toxic
 - PNEC = Predicted No Effect Concentration
 - RRN = REACH Registration Number
 - vPvB = Very Persistent and Very Bioaccumulative

Disclaimer:

To the best of the supplier's knowledge, the information contained herein is accurate. However, the supplier assumes no 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, the supplier cannot guarantee that these are the only hazards that exist.