SAFETY DATA SHEET

FUSED ZIRCONIA

1. IDENTIFICATION OF MATERIAL AND SUPPLIER

Product Identification

Product Name	Fused Zirconia
Other Names	Zirconia, Zirconium Dioxide, Beneficiated Zirconia, Zirconium Concentrated Ore
Recommended Uses	Production of Refractories, Abrasives,Ceramics and Friction.

Supplier Identification

Company	Doral Fused Materials Pty. Ltd. A.B.N. 62 009 415 025
Address	Lot 6 Alumina Road, East Rockingham Western Australia 6168 PO Box 84, Rockingham Western Australia 6968
Telephone Number	Within Australia (08) 9439 2236 International +61 8 9439 2236
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2. HAZARD IDENTIFICATION

Fused Zirconia is not classified as hazardous according to criteria of Worksafe Australia.

GHS Pictograms:

Signal Word:	WARNING.
GHS Class:	Eye Irritation. Category 2.
Hazard Statements:	**H319** - Causes serious eye irritation
Precautionary Statements:	**P264 -** Wash hands thoroughly after handling **P280 -** Wear protective glove s/protective clothing/eye protection/face protection **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.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Ingredients (typical)	***CAS Number***	***Proportion %***
Zirconium Dioxide (Zirconia)	1314-23-4	≥ 95.0 (wt.%)
Silicon Dioxide	60676-86-0	< 3.5 (wt.%)
U (Uranium)	7440-61-1	380ppm
Th (Thorium)	7440-29-1	220ppm

Fused Zirconia contains naturally occurring radioactive elements of the uranium and thorium series. The feedstock contains low concentrations of these impurities, with typical specific activities of 0.6 to 0.9 Bq/gm (thorium-232) and 1.5 to 3.4 Bq/gm (uranium-238). Daughter products are present typically at equilibrium concentrations. The main radiological hazard is internal exposure to alpha particles from inhaled dust. Suitable dust control measures shall be employed to ensure occupational exposure to generated dust and alpha particles are kept as low as reasonably achievable. As a guide, continuous worker exposure to respirable dust levels above 1.5 mg/m^3 could give rise to annual internal exposures above 1 mSv. External exposure is from gamma radiation. Continuous exposure (2000 hours per year) within 2 metres of bulk zircon could give rise to an annual external dose above 1 mSv. Radiation exposure from stored product presents a considerably lower hazard.

4. FIRST AID MEASURES

Swallowed	Drink large amounts of water. Do **not** induce vomiting. Consult a doctor immediately.
Eyes	Hold eyelids open and wash continuously with water for 15 minutes. Do not rub eyes. Seek medical attention.
Skin	No irritation is likely to develop following contact with skin. Remove clothing and wash off with soap and water. Contact a doctor if an irritation persists.
Inhaled	Remove from exposure to fresh air. If breathing is laboured or stopped, give artificial respiration. Get immediate medical attention.
First Aid Facilities	No special requirements.
Advise to Physician	Treat symptomatically.

5. FIRE FIGHTING MEASURES

Flashpoint	None
Flammability Limits	Non-flammable
General Hazard	This product is not flammable and does not support combustion.
Extinguishing Media	Use media suitable for the material that is burning.

6. ACCIDENTAL RELEASE MEASURES

Spills and disposal	Wear safety equipment as for normal handling. Avoid generating dust. Vacuum up if possible, otherwise sweep up and re-cycle. If the spilled product is not suitable for re-use, damp down, collect and where possible return to manufacturer for reprocessing. Any disposal to an approved landfill site and cover with clean fill shall be conducted in accordance with State/Local Council regulations.

7. HANDLING AND STORAGE

Handling	Avoid breathing dust. Suitable dust controls should be utilised when handling bulk materials. Wash thoroughly after handling. If handling respirable flour it is advisable to also use gloves and wash hands before eating, drinking or smoking to minimise inhalation or ingestion from hands.
Storage	Storage areas should be well ventilated and dust generation minimised when handling.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Standards:

Chemical Name	*CAS Number*	*Proportion (wt %)*	*NOHSC TWA*	*ACGIH TLV*
Zirconium Dioxide (Zirconia)	1314-23-4	≥ 95.0	5 mg/m^3 as Zr	5 mg/m^3 as Zr
Silicon Dioxide	60676-86-0	< 3.5	2 mg/m^3	2 mg/m^3

Radiation Exposure[1]

Occupational exposure should be as low as reasonably achievable, (ALARA principle), but should not exceed a total of 100 milli-seiverts over five consecutive years. (ICRP)

[1] Denotes recommendation of the International Commission on Radiological Protection, ICRP Publication 60, Annals of the ICRP Vol 21, No 1 – 3 1991

Engineering Controls: Use with adequate ventilation to meet exposure limit listed above.

Personal Protection: Use protective glasses and an approved P1 mask/dust respirator if over-exposure potential exists. The use of protective clothing is recommended to reduce unnecessary contact with skin.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance (form)	Cream-white powder, or granules, odourless and tasteless.
Chemical Formula	
Boiling Point	Not Applicable
Melting Point	2700ºC
Vapour Pressure	Not Applicable
Evaporation Rate	Not Applicable
Specific Gravity (H_2O = 1)	5.7
Solubility in Water	Insoluble
pH	5 – 7.5
Bulk Density:	1.4 - 3.1 g/cm^3

Additional Information

Radioactivity:	Zirconia contains low levels of U and Th (U + Th ~ 600 ppm, ~5.7Bq/g). When following recommended safe handling practices radiation exposure is unlikely to exceed 0.5 mSv/year (whole body average).

10. STABILITY AND REACTIVITY

Reactivity	Inert
Chemical Stability	Stable
Incompatibilities	None in normal or expected use
Decomposition	Decomposition will not occur

11. TOXICOLOGICAL INFORMATION

This product is non-toxic. Refer to section 2 - Hazards Identification.

12. ECOLOGICAL INFORMATION

This material is unlikely to cause any environmental damage. It is insoluble in water and is unlikely to contaminate waterways or food chains.

13. DISPOSAL CONSIDERATION

Disposal must be in accordance with Federal, State and Local Council regulations. If approved, may be transferred to an approved landfill site.

Note: Many states are developing new regulations for the disposal of waste containing Naturally Occurring Radioactive Materials (NORM) or Technologically Enhanced Naturally Occurring Radioactive Materials (TENORM) above background levels. Consult and comply with current regulations.

14. TRANSPORT INFORMATION

Transport may be regulated in some countries, although the product is not generally regarded as a transport hazard. Not classified as radioactive pursuant to paragraph 107 of IAEA TS-R-1 regulations. Trucks however should be covered when transporting dry bulk product to prevent dust generation.

15. REGULARTORY INFORMATION

None stated.

16. OTHER INFORMATION

Labelling	Labelling not required according to EC-Dir. 67/548, as amended.
Other Information	This SDS has been prepared by Doral Fused Materials, Safety Health and Environment Department.
Date of Issue	10/03/2023
Replaces	11/08/2021

This SDS is valid for five (5) years from the date of issue but readers should refer to Doral's website (www.doral.com.au) to ensure that this is the latest issue. As per the Worksafe Guidance Note NOHSC 3017, each user should review the information in the specific context of the intended application.

Abbreviations

Bq/gm	Becquerel per gram
IAEA	International Atomic Energy Agency
IRAC	International Agency for Research on Cancer
ICRP	International Commission on Radiation Protection
mg/m^3	Milligram per cubic metre
ASCC	Australian Safety and Compensation Commission
TLV	Threshold Limit Value
TWA	Time Weighted Average

End of SDS