MATERIAL SAFETY DATA SHEET

ZIRCON FLOUR

1. IDENTIFICATION OF MATERIAL AND SUPPLIER

Product Identification

Product Name	Zircon Flour
Other Names	-
Recommended Uses	Opacifier in ceramic products, such as tiles and sanitary ware. Constituent of high temperature refractory products, for steel and glass manufacture.

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
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2. HAZARD IDENTIFICATION

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

Risk Phases (R-Phrases)	None
Safety Phrases (S-Phrases)	None
UN Number	None Allocated
Class and Subsidiary Risk	None Allocated
Hazchem Code	None Allocated
Poisons Schedule Number	None Allocated

Potential Health Effects

Acute

Swallowed:	Non-toxic, although ingestion of large quantities may cause irritation of the gastrointestinal system as a result of abrasive action.
Eye:	Sand is an irritant, due to abrasive action.
Skin:	Not absorbed through skin. May cause abrasions.
Inhaled:	Irritating if inhaled in high concentrations, causing coughing, shortness of breath and/or sneezing.

Chronic

Zircon contains naturally occurring radioactive elements of the uranium and thorium series and free silica. 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.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Ingredients (typical)	***CAS Number***	***Proportion %***
Zircon	14940-68-2	99
Rutile	1317-80-2	< 1
Ilmenite	103170-28-1	< 0.1
Quartz	14808-60-7	< 1
U (Uranium)	7440-61-1	150-280ppm
Th (Thorium)	7440-29-1	100-210ppm

4. FIRST AID MEASURES

Swallowed	Wash mouth out with water ensuring the mouthwash is not swallowed. Seek medical attention as a precaution.
Eyes	Hold eyelids open and wash continuously with water for 15 minutes. Do not rub eyes. Seek medical attention if soreness or irritation persists.
Skin	No irritation is likely to develop following contact with skin. Gently remove clothing and wash off with soap and water. Contact a doctor if an irritation persists.
Inhaled	Remove from exposure to fresh air. Blow nose to remove particulates from nasal passages. If breathing is laboured or stopped, give artificial respiration. If any adverse reaction develops, seek medical attention.
First Aid Facilities	Eye wash facilities.
Advise to Physician	Treat symptomatically.

5. FIRE FIGHTING MEASURES

Flashpoint	None
Flammability Limits	Non-combustible
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, dry and dust generation minimised when handling.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Standards:

Chemical Name	*CAS Number*	*Proportion (wt %)*	*ASCC TWA*
Zirconium Dioxide (Zirconia)	1314-23-4	≥ 95.0	5 mg/m^3 as Zr
Silicon Dioxide	60676-86-0	< 3.5	2 mg/m^3
Quartz	14808-60-7	< 1.0	0.2 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: Ventilation requirements will depend on handling methods and the amount in use, but should be sufficient to maintain dust levels below exposure limits. Indoor points of dust generation such as conveyor and hopper discharges should be equipped with an effective extraction system.

Personal Protection: Safety glasses with side shields or goggles. If risk of inhaling dust is present wear, at minimum, a P1 personal respirator (disposable or cartridge type). The use of protective clothing is recommended to reduce unnecessary contact with skin.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance (form): Off white to brownish free running sand, odourless and tasteless

Chemical Formula	$ZrSiO_4$
Boiling Point	Not Applicable
Melting Point	2200ºC
Vapour Pressure	Not Applicable
Evaporation Rate	Not Applicable

Specific Gravity (H_2O = 1)	4.6
Solubility in Water	Insoluble
pH	Neutral
Bulk Density:	2.7 Kg/Lt

Additional Information

Radioactivity: Zircon contains low levels of U and Th (U + Th ~ 550 ppm, ~4Bq/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 if handled, used and disposed of in the approved manner. 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

EINECS No. Zircon 239-019-6

16. OTHER INFORMATION

Labelling	Labelling not required according to EC-Dir. 67/548, as amended.
Other Information	This MSDS has been prepared by Doral Fused Materials, Safety Health and Environment Department.
Date of Issue	16/01/2014
Replaces	14/07/2009

This MSDS 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 MSDS