



**MATERIAL SAFETY DATA SHEET**

**GARNET CONCENTRATE**

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**1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION**

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**Product Identification**

Product Names: Garnet Concentrate

Other Names: Garnet Sand, Garnet Abrasive, Almandine Garnet

Chemical Formula:  $\text{Fe}_3\text{Al}_2(\text{SiO}_4)_3$

**Company Identification**

Company: Mineral Sand Resources (Pty) Ltd

Address: Farm Geelwal Karoo  
Koekenaap, Western Cape  
South Africa

Telephone Number: (+27)87 150 4010

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**2. COMPOSITION/INFORMATION ON INGREDIENTS**

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<b>Ingredients (typical)</b>	<b>Weight %</b>
Garnet	70-75%
Ilmenite	13-18%
Rutile	0.34%
Zircon (14940-68-2)	1.72%
Leucoxene	0.19%
Others	3.24 %

## Typical Analysis – Chemical

<b>Chemical Name</b>	<b>CAS number</b>	<b>Proportion</b>
Al <sub>2</sub> O <sub>3</sub>	1344-28-1	15-20%
FeO	1345-25-1	28.24%
Fe <sub>2</sub> O <sub>3</sub>	1309-37-1	20-25%
SiO <sub>2</sub>	14808-60-7	33-36%
TiO <sub>2</sub>	13463-67-7	5-15%
CaO	1305-78-8	2 - 5%
MgO	1309-48-4	5 - 10%
Cr <sub>2</sub> O <sub>3</sub>	1333-82-0	<1%
ZrO <sub>2</sub>	1314-23-4	0-3%
P <sub>2</sub> O <sub>5</sub>	1314-56-3	< 1%
Th	7440-29-1	72.96 mg/kg

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**3. HAZARDS IDENTIFICATION**

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Not classified as hazardous according to US Agency for Toxic Substances and Disease Registry and the American Conference of Governmental Industrial Hygienists.

**Potential Health Effects***Acute*

- Swallowed. Non-toxic. There are no known hazards resulting from accidental ingestion of Garnet Sand as may occur during normal handling. Swallowing a large amount may result in irritation to the digestive system due to abrasiveness.
- Eye. The Garnet grains and dust can be moderately irritating due to abrasiveness.
- Skin. Low hazard.
- Inhaled. The normal grain size of the product precludes it from being an inhalation hazard, however handling can cause grains to fracture so producing dust. This is normally regarded as general nuisance dust, but can be irritating if inhaled at high concentration. May cause symptoms such as coughing or sneezing.



*Chronic*

**Silica.** Crystalline silica is a known cause of lung fibrosis (silicosis). It has also has been classified as a human carcinogen. (International Agency for Research on Cancer). Garnet Sand contains a small amount of free quartz, (up to 0.5 %) and precautions should be taken to avoid inhaling the dust.

**Radiation.** In common with many minerals, Garnet sand contains very low levels of naturally occurring radioactive elements of the uranium and thorium series. The main radiological hazard from the product is internal exposure from small amounts of alpha particles given off by inhaled dust. Low level gamma radiation from bulk or bagged stockpiles of Garnet sand may present a lesser, external hazard. MSR Garnet sand is exempt from NRC regulations for source material per 10 CFR 40, since it falls under the definition of unprocessed material containing less than 0.05 % uranium and thorium.

*Carcinogenic Information*

The following components are listed by the IARC, NTP, OSHA and ACGIH as carcinogens. A “P” indicates a proposed carcinogen.

Material:	IARC	NTP	OSHA	ACGIH
Quartz	x	x	-	-

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**4. FIRST AID MEASURES**

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**Swallowed** First aid is unlikely to be required, but if necessary wash mouth out with water ensuring the mouthwash is not swallowed. Seek medical attention as a precaution if discomfort occurs.

**Eye** Hold eyelid open and flush with plenty of clean water. Continue for at least 15 minutes or until grit is removed. Seek medical attention if soreness or irritation persists.

**Skin** Gently remove contaminated clothing to avoid generating dust. Wash material from the skin. If repeated contact results in skin irritation, seek medical advice. Launder clothing before re-use.

**Inhaled** Move to fresh air. Blow nose to remove particulates from nasal passages. If any adverse reaction develops, seek medical attention.

**First Aid**

Facilities. Eye wash facilities.

Advice to Physician. Treat symptomatically.



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**5. FIRE FIGHTING MEASURES**

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**Flashpoint:** Not applicable

**Flammability Limits:** Not applicable

**General Hazard:** This product is not flammable and does not support combustion.

**Extinguishing Media:** Use media suitable for the material that is burning.

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**6. ACCIDENTAL RELEASE MEASURES**

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**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. Otherwise dispose of to an approved landfill site and cover with clean fill in accordance with local regulations.

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**7. STORAGE AND HANDLING**

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**Handling (Personnel)**

Avoid breathing dust. Wash thoroughly after handling.

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**8. EXPOSURE CONTROLS/PERSONAL PROTECTION**

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**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.

If using MSR Garnet sand as an abrasive blast agent in confined areas, airborne dust should be controlled by a physical enclosure in accordance with 29 CFR 1910.94 Ventilation (a) Abrasive Blasting.

**Personal** Protection Safety glasses with side shields or goggles. If risk of inhaling dust is present wear, at minimum, a dust mask (disposable or cartridge type).

OSHA (29 CFR 1910.94) requires a continuous flow air-line supplied respirator with hood for protection in abrasive blasting operations.

Exposure Standards Inhalable general nuisance dust:

(<sup>1</sup> TLV, Occupational) TWA – 10mg/m<sup>3</sup> (ACGIH)

Respirable quartz dust:

TWA – 0.1mg/m<sup>3</sup> (ACGIH)

<sup>1</sup>TLV (Threshold Limit Value) is the exposure standard term used by American Conference of Governmental Industrial Hygienists (ACGIH)



**Radiation**

Exposure <sup>2</sup> 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).

<sup>2</sup> Recommendation of the International Commission on Radiological Protection, ICRP Publication 60, Annals of the ICRP Vol 21, No 1 – 3 1991

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**9. PHYSICAL AND CHEMICAL PROPERTIES**

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Appearance (Form):	Light pink free running sand, odourless and tasteless
Melting Point:	1315 °C (approximately)
Vapour Pressure:	Not volatile
Evaporation Rate:	Not volatile
Specific Gravity:	4.25
Solubility in Water:	Insoluble
pH:	6 – 7.5
Bulk Density:	2200 - 2300 kg/m <sup>3</sup>
Grain size:	75 to 1000 micron

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**10. STABILITY AND REACTIVITY**

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

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**11. TOXICOLOGICAL INFORMATION**

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Non toxic

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**12. ECOLOGICAL INFORMATION**

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

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**13. DISPOSAL CONSIDERATIONS**

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Disposal must be in accordance with local regulations. If approved, may be transferred to an approved landfill site.



## MINERAL SANDS RESOURCES (PTY) LTD

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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.

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### 14. TRANSPORT INFORMATION

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Transport is not regulated and may be transported as a non-hazardous material. Trucks transporting bulk material must be covered to prevent dust generation.

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### 15. REGULATORY INFORMATION

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#### U.S. Federal Regulations

TSCA Inventory Status: Reported/Included

TITLE III HAZARD CLASSIFICATIONS SECTIONS 311, 312

Acute:	No
Chronic:	Yes
Fire:	No
Reactivity:	No
Pressure:	No

#### *Lists*

SARA Extremely Hazardous Substance: No

CERCLA Hazardous Material: No

SARA Toxic Chemical: No

#### Radiological protection

The regulation pertaining to radiological protection vary from country to country. It is the responsibility of the buyer to ensure that those are met in accordance with its country law.

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### 16. OTHER INFORMATION

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Note: This product contains small quantities of quartz and radionuclides, both known to cause cancer.

#### Preparation Information

This MSDS has been prepared by Mineral Sands Resources (Pty) Ltd, Safety Health and Environment Department.