

# SAFETY DATA SHEET

Date of Issuance: January 15, 2018

Revision 5



## SECTION I - IDENTIFICATION OF MATERIAL AND SUPPLIER

Product Name : **GMA Zircon Concentrate**

Synonyms : GMA Zircon/Rutile Concentrate, Zircon Concentrate, Zircon-Rutile sand

Recommended Use : Raw material for steelmaking refractories, glassmaking refractories, traditional ceramics, zirconia manufacture, zirconium manufacture, glass additive and foundry uses.

Supplier : GMA Garnet (USA) Corp

Address : 1800 Hughes Landing, STE 350 Woodlands Texas 77380 – Corporate  
25 Middle Drive, Fairless Hills, Pennsylvania, 19030 – Production Plant

Telephone : +1 (832) 243 9300

Email : greg.hildebrand@gmagarnet.com

Emergency Telephone : +1(832) 243-9300; +1 (208) 761-5121;  
Numbers 24 hours: (208) 761-5121

## SECTION 2 - HAZARDS IDENTIFICATION

**United States (U.S.)**

**According to OSHA 29 CFR 1910.1200 HCS**

**Classification of the substance or mixture:**

**OSHA HCS 2012** Carcinogenicity 1A -H350

**Label elements:**

**OSHA HCS 2012**

# SAFETY DATA SHEET

Date of Issuance: January 15, 2018

Revision 5



## Danger



### Hazard statements:

Prolonged inhalation exposure may cause cancer. - H350

### Precautionary Statements:

#### Prevention

Obtain special instructions before use - P201.  
Do not handle until all safety precautions have been read and understood. - P202.

#### Response

If exposed or concerned: Get medical advice/attention. - P308+P313.

#### Disposal

Store locked up. - P405.  
Dispose of content and/or container in accordance with local, regional, national, and/or International regulations - P501.

## OTHER HAZARDS

#### OSHA HCS 2012

Under United States Regulations (29 CFR 1910.1200 - Hazard Communication Standard), this product is considered hazardous.

#### CLP

According to Regulation (EC) No. 1272/2008 (CLP) this material is not considered hazardous.

#### DSD/DPD

According to European Directive 1999/45/EC this material is not considered dangerous.

If the crystalline silica (fine fraction) content in mixtures and substances is below 0.1 %, no classification is required.

# SAFETY DATA SHEET

Date of Issuance: January 15, 2018

Revision 5



## SECTION 3 - COMPOSITION / INFORMATION ON INGREDIENTS

This material is a natural mixture of zircon and almandine garnet and other trace minerals.

Chemical Name	Common Name	CAS Number	Proportion (weight %)
$X_3Y_2(SiO_4)_3$	Garnet *	1302-62-1	13.2 %
$TiO_2$	Anatase	13463-67-7	Less than 1 %
$XY(Si, Al_2)_6$	Pyroxene Group **	12174-37-7	34.7
$SiO_2$	Quartz (Crystalline Silica)	14808-60-7	34.7 %
$ZrSiO_4$	Zircon	14940-68-2	13.8 %
$TiO_2$	Rutile	1317-80-2	3.1%

\* Garnet group, where X=Ca, Fe<sup>2+</sup>, Mg, Mn<sup>2+</sup>; Y=Al, Cr<sup>3+</sup>, Fe<sup>3+</sup>, Mn<sup>3+</sup>, Si, Ti, V<sup>3+</sup>, Zr; Si is partly replaced by Al, Fe<sup>3+</sup>

\* Predominantly almandine Garnet along with minor amounts of Grossular Garnet and Spessartine Garnet

\*\* X = Ca, Fe<sup>2+</sup>, Li, Mg, Mn<sup>2+</sup>, Na, Zn; Y = Al, Cr<sup>3+</sup>, Fe<sup>2+</sup>, Fe<sup>3+</sup>, Mg, Mn<sup>2+</sup>, Sc, Ti, V<sup>3+</sup>

## SECTION 4 - FIRST AID MEASURES

Description of first aid measures:

- Ingestion : May cause abdominal discomfort due to abrasiveness; get medical attention if symptoms develop.
- Eye contact : In case of eye contact, immediately flush eyes with running water with plenty of clean water for at least 20. If eye irritation persists; seek medical advice/attention.

# SAFETY DATA SHEET

Date of Issuance: January 15, 2018

Revision 5



Skin contact : There are no known health effects from skin contact that may occur during normal handling. Contact with material under pressure will damage skin by abrasion. Clean and dress any open wound and seek medical advice/attention.

Inhalation : IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing. Administer oxygen if breathing is difficult.  
If breathing difficulties persist, seek medical attention immediately.

Most important symptoms and effects, both acute and delayed:  
Refer to Section 11 - Toxicological Information.

Indication of immediate medical attention and special treatment needed, if necessary:

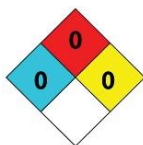
All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.

## SECTION 5 - FIRE FIGHTING

This product is non-flammable and does not support combustion.

- a) Extinguishing media : Non-flammable. Use media suitable for the surrounding materials.
- b) Specific hazards arising from the chemical : None known.
- c) Special protective equipment and precautions : No specific procedures given. Use protective equipment and precautions suitable for surrounding fire.

### NFPA



# SAFETY DATA SHEET

Date of Issuance: January 15, 2018

Revision 5



## SECTION 6 - ACCIDENTAL RELEASE MEASURES

a) **Personal precautions, protective equipment and emergency procedures:**

Do not walk through spilled material. Wear appropriate Personal Protective Equipment (PPE).

b) **Environmental Precautions:**

This material should not be dumped in nature but collected and disposed of in accordance with local, state or federal guidelines. Avoid run off to waterways and sewers.

c) **Methods and materials for containment and cleaning up:**

Avoid generating unnecessary dust. Sweep or vacuum up material for disposal or recovery.

## SECTION 7 - HANDLING AND STORAGE

a) **Precautions for safe handling:**

No special precautions necessary for normal handling of the material. Use only with adequate ventilation. Wear appropriate personal protective equipment.

b) **Conditions of safe storage, including any incompatibilities:**

No special precautions necessary for normal storage of the material. Keep container/package tightly closed and in a well-ventilated place. Practice good housekeeping practices to keep nuisance dust to a minimum.

## SECTION 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

(a) **Control Parameters/Exposure Standards:**

OELs (respirable fraction) in air for dust containing crystalline silica (quartz).

# SAFETY DATA SHEET

Date of Issuance: January 15, 2018

Revision 5



Standard	Exposure Limits
ACGIH TLV** (8-Hour Time-Weighted Average)	0.025 mg/m <sup>3</sup>
NIOSH REL** (10-Hour Time-Weighted Average, 40-hour work week)	0.05 mg/m <sup>3</sup>
MSHA/OSHA PEL* (8-Hour Time-Weighted Average)	10 mg/m <sup>3</sup> / % SiO <sub>2</sub> +2)
AIOH	0.1 mg/m <sup>3</sup>
OHS	0.025 mg/m <sup>3</sup>

\* Crystalline silica is normally measured as respirable dust. The OSHA/MSHA standard also presents a formula for calculation of the PEL based on total dust: 30 mg/m<sup>3</sup>/(% SiO<sub>2</sub> +2). The OSHA/MSHA PEL for dust containing crystalline silica (quartz) is based on the silica content of the respirable dust sample. The OSHA/MSHA PEL for crystalline silica as tridymite and cristobalite is one-half the PEL for crystalline silica (quartz).

\*\* The ACGIH and NIOSH limits are for crystalline silica (quartz), independent of the dust concentration. The ACGIH TLV for crystalline silica as cristobalite is equal to the TLV for crystalline silica as quartz. In 2005, ACGIH withdrew the TLV for crystalline silica as tridymite.

OELs in air for inert/nuisance dust

Standard	Respirable Dust	Total Dust
MSHA/OSHA PEL (as Inert or Nuisance Dust)	5 mg/m <sup>3</sup>	15 mg/m <sup>3</sup>
ACGIH TLV (as Particles Not Otherwise Specified)	3 mg/m <sup>3</sup>	*10 mg/m <sup>3</sup>

Note: The limits for Inert Dust are provided as guidelines. Nuisance dust is limited to particulates not known to cause systemic injury or illness. \* The TLV provided is for inhalable particles not otherwise specified.

# SAFETY DATA SHEET

Date of Issuance: January 15, 2018

Revision 5



California/OSHA's Permissible Exposure Levels over an 8-hour average basis.

Respirable crystalline silica (quartz, fused, tripoli), 0.1 mg/m<sup>3</sup> - 0.1 milligrams of Silica in 1 cubic meter of air. Total crystalline silica (quartz), 0.3 mg/m<sup>3</sup>, Respirable cristobalite and tridymite, 0.05 mg/m<sup>3</sup>.

Canadian OEL:

Canada Labor Code (Canadian Centre Occupational Health & Safety [OHS]): 0.025 mg/m<sup>3</sup> (respirable)

Alberta, British Columbia: 0.025 mg/m<sup>3</sup> (respirable quartz and cristobalite)

Saskatchewan: 0.05 mg/m<sup>3</sup> (respirable, cristobalite); 0.05 mg/m<sup>3</sup> (respirable, quartz); 0.1 mg/m<sup>3</sup> (respirable, Tripoli, as quartz) Manitoba, Newfoundland, Prince Edward Island: 0.025 mg/m<sup>3</sup> (respirable, crystalline silica)

Ontario: 0.05 mg/m<sup>3</sup> (respirable cristobalite); 0.1 mg/m<sup>3</sup> (quartz, tripoli)

Quebec: 0.05 mg/m<sup>3</sup> (respirable, cristobalite, tridymite); 0.1 mg/m<sup>3</sup> (quartz, tripoli) New Brunswick: 0.1 mg/m<sup>3</sup> (quartz); 0.05 mg/m<sup>3</sup> (cristobalite)

Nova Scotia: 0.025 mg/m<sup>3</sup> (quartz, cristobalite)

Yukon: 300 particles/ml measured with a konimeter (quartz, and tripoli); 150 particles/ML measured with a konimeter (cristobalite and tridymite)

Northwest Territories, Nunavut: 0.05 mg/m<sup>3</sup> (respirable, cristobalite, tridymite); 0.1 mg/m<sup>3</sup> (respirable) Austria

OEL: - Maximum allowable concentration 0.15 mg/m<sup>3</sup>

Australia: (AIOH) (OEL) – 0.1 mg/m<sup>3</sup>

Mexico: 0.1 mg/m<sup>3</sup> (quartz, tripoli containing respirable quartz powder, inhalable), 0.05 mg/m<sup>3</sup> (cristobalite, tridymite inhalable) (Also refer to ACGIH)

Argentina: 0.05 mg/m<sup>3</sup> (quartz, cristobalite, tridymite respirable) 0.1 mg/m<sup>3</sup> (tripoli, respirable) United Kingdom OEL: 0.1 mg/m<sup>3</sup> (quartz, cristobalite, tridymite)

Japan OEL: Japan Society of Occupational Health Respirable crystalline silica 0.03 mg/m<sup>3</sup> Poland OEL TWA: 2 mg/m<sup>3</sup> (total inhalable dust, containing >50% free crystalline silica);

0.3 mg/m<sup>3</sup> (respirable dust, containing >50% free crystalline silica);

4.0 mg/m<sup>3</sup> (total inhalable dust, containing 2% to 50% free crystalline silica);

1.0 mg/m<sup>3</sup> (respirable dust, containing 2% to 50% free crystalline silica); and

10.0 mg/m<sup>3</sup> (total inhalable dust, containing < 2% free crystalline silica)

# SAFETY DATA SHEET

Date of Issuance: January 15, 2018  
Revision 5



If your Country or Territory is not listed, stricter regulations (ACGIH) apply where the materials are being used.

## Key to abbreviations

PEL = Permissible Exposure Level determined by the Occupational Safety and Health Administration (OSHA)

ACGIH = American Conference of Governmental Industrial Hygiene

AIOH = Australian Institute of Occupational Hygienists OSHA = Occupational Safety and Health Administration

NIOSH = National Institute of Occupational Safety and Health

TLV = Threshold Limit Value determined by the American Conference of Governmental Industrial Hygienists (ACGIH)

TWA = Time-Weighted Averages are based on 8h/day, 40h/week exposures

## b) Engineering Measures and Controls:

Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable use process enclosures, exhaust ventilation or dust collectors to maintain airborne levels below recommended exposure limits. Operate and maintain dust collectors per manufacture recommendations.

## c) Personal Protective Equipment:

For limited exposure use an N95 dust mask or equivalent. For prolonged exposure follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149.

Wear safety glasses.

Wear protective clothing and gloves.

Follow local, state or federal guidelines for the use of personal protection equipment.

Blast cleaning operations should use an air fed abrasive blast hood conforming to relevant standards such as Australian Standards 1715,1716 and European Standard EN14594:2005 such as a Nova 2000, as well as leather (or equivalent) gloves and apron when in use. Hearing protection should also be worn when blast cleaning.

Controls should be engineered to prevent release to the environment, including procedures to prevent spills, atmospheric release and release to waterways. Follow best practice for site management and disposal of waste.



# SAFETY DATA SHEET

Date of Issuance: January 15, 2018

Revision 5



## SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

(a)	Appearance	: Black to brown colored free flowing sand
(b)	Odor	: Odorless
(c)	Odor threshold	: Not applicable
(d)	pH	: 7.0 – 8.0 (Neutral)
(e)	Melting point	: 2,100 to 2,300 (°C)
(f)	Flash point	: Non-combustible
(g)	Evaporation rate	: Not applicable
(h)	Flammability (solid, gas)	: Non-flammable
(i)	Upper/lower flammability or explosive limits	: Non-combustible
(j)	Vapor pressure	: Not applicable
(k)	Vapor density	: Not applicable
(l)	Specific gravity	: 3.7 to 4.0
(m)	Solubility	: Insoluble
(n)	Hardness	: Not applicable
(o)	Particle size	: Not-applicable
(p)	Particle shape	: Sub-angular to Angular
(q)	Bulk density	: Approximately 2.3 t/m <sup>3</sup> (145 lbs/ft <sup>3</sup> )
(r)	Volatile organic compounds content	: Below detectable limits
(s)	Partition coefficient: n-octanol/water	: Not applicable
(t)	Auto-ignition temperature	: Not applicable
(u)	Decomposition temperature	: Not applicable
(v)	Viscosity	: Not applicable

## SECTION 10 - STABILITY REACTIVITY

(a)	Reactivity	: Inert solid, no dangerous reaction known under conditions of normal use.
(b)	Chemical stability	: Stable
(c)	Possibility of hazardous reactions	: None known
(d)	Conditions to avoid	: None known
(e)	Incompatible materials	: None known
(f)	Hazardous decomposition products	: None known

# SAFETY DATA SHEET

Date of Issuance: January 15, 2018

Revision 5



## SECTION 11 - TOXICOLOGICAL INFORMATION

### Information on toxicological effects

Crystalline Silica (SiO <sub>2</sub> )	14808-60-7	<b>Acute Toxicity:</b> Inhalation-Human TCLo • 16 mppcf 8 Hour(s) 17.9 Year(s)- Intermittent; <i>Lungs, Thorax, or Respiration:</i> <b>Fibrosis, focal (pneumoconiosis);</b> <i>Lungs, Thorax, or Respiration:</i> <b>Cough;</b> <i>Lungs, Thorax, or Respiration:</i> <b>Dyspnea;</b> Inhalation-Rat TCLo • 200 mg/kg; <i>Lungs, Thorax, or Respiration:</i> <b>Fibrosis, focal (pneumoconiosis);</b> <i>Lungs, Thorax, or Respiration.</i>
---	------------	---

GHS Properties	Classification
Acute Toxicity	EU/CLP• Data lacking OSHA HCS 2012•Data lacking
Aspiration Hazard	EU/CLP•Data lacking OSHA HCS 2012•Data lacking
Carcinogenicity	EU/CLP•Data lacking OSHA HCS 2012•Carcinogenicity 1A
Germ Cell Mutagenicity	EU/CLP•Data lacking OSHA HCS 2012•Data lacking
Skin Corrosion /Irritation	EU/CLP•Data lacking OSHA HCS 2012•Data lacking
Skin Sensitization	EU/CLP•Data lacking OSHA HCS 2012•Data lacking
STOT-RE	EU/CLP•Data lacking OSHA HCS 2012•Data lacking
STOT-SE	EU/CLP•Data lacking OSHA HCS 2012•Data lacking
Toxicity for Reproduction	EU/CLP•Data lacking OSHA HCS 2012•Data lacking
Respiratory Sensitization	EU/CLP•Data lacking OSHA HCS 2012•Data lacking
Serious Eye Damage/Irritation	EU/CLP•Data lacking OSHA HCS 2012•Data lacking

# SAFETY DATA SHEET

Date of Issuance: January 15, 2018

Revision 5



## Potential Health Effects Inhalation

**Acute  
(Immediate)**

Exposure to dust may cause irritation.

**Chronic  
(Delayed)**

Inhalation of respirable dusts containing crystalline silica may cause lung injury or disease silicosis and/or cancer.

**Skin Acute  
(Immediate)**

May cause abrasions.

**Chronic  
(Delayed)**

No data available.

**Eye Acute  
(Immediate)**

Exposure to dust may cause irritation.

**Chronic  
(Delayed)**

No data available.

**Ingestion Acute  
(Immediate)**

No known effects, however ingestion not recommended.

**Chronic  
(Delayed)**

No data available.

**Carcinogenic  
Effects**

This product contains crystalline silica and/or quartz. IARC Monographs on Evaluation of Carcinogenic Risk of Chemicals to Humans (Monograph 68, 1997) concludes that there is sufficient evidence for the carcinogenicity of crystalline silica to humans (IARC Group I). Crystalline Silica is classified as a Known Carcinogen according to NTP.

# SAFETY DATA SHEET

Date of Issuance: January 15, 2018

Revision 5



Carcinogenic Effects			
	CAS	IARC	NTP
Crystalline Silica (SiO <sub>2</sub> )	14808-60-7	Group 1-Carcinogenic	Known Human Carcinogen

## SECTION 12 - ECOLOGICAL INFORMATION

This material is a naturally occurring mineral with no known Eco-Toxicity. It is insoluble in water and unlikely to contaminate waterways or food chains. GMA garnet does not contain rubber or plastic materials.

Independent laboratory Toxicity Characteristic Leaching Procedure (TCLP) testing for leachates has shown that this material is not a hazardous or toxic substance.

- |                                   |                 |
|-----------------------------------|-----------------|
| (a) Persistence and degradability | : Data lacking. |
| (b) Bioaccumulative potential     | : Data lacking. |
| (c) Mobility in soil              | : Data lacking. |
| (d) Other adverse effects         | : None known.   |

## SECTION 13 - DISPOSAL CONSIDERATIONS

- (a) Disposal methods: Dispose of content and packaging waste in accordance with local, state, or federal guidelines for disposal of inert solid waste, e.g. landfill disposal.

MATERIAL CONTAMINATED OR REDUCED TO DUST IN USE MAY NEED SPECIAL HANDLING AND DISPOSAL. IT IS THE RESPONSIBILITY OF THE USER TO UNDERTAKE ANY EVALUATION, CLASSIFICATION AND DISPOSAL OF MATERIAL AFTER USE.

# SAFETY DATA SHEET

Date of Issuance: January 15, 2018

Revision 5



## SECTION 14 - TRANSPORT INFORMATION

No special precautions necessary. It is recommended to keep bags closed and dry bulk loads covered to prevent dust generation and moisture incursion.

- |     |                              |   |
|-----|------------------------------|---|
| (a) | UN number                    | : None allocated.   |
| (b) | UN proper shipping name      | : Not classified for transportation.  |
| (c) | Transport hazard class(es)   | : Not classed as Dangerous under theADG Code.   |
| (d) | Packing group                | : Not classified for transportation.  |
| (e) | Environmental hazards        | : Not classified as a marine pollutant. Does not meet the criteria of 2.9.3.3.1 "environmentally hazardous substances (aquatic environment)". |
| (f) | Special precautions for user | : None necessary. It is recommended to keep bags closed and dry bulk loads covered to prevent dust generation and moisture incursion.         |
| (g) | Hazchem code                 | : None allocated.   |
| (h) | Harmonized System code       | : 251320  |

## SECTION 15 - REGULATORY INFORMATION

- (a) Safety, health and environmental regulations/ legislation specific for the substance mixture:

GMA Garnet™ is exempt from the obligation to register under REACH legislation (EC 1907/2006) Annex V 7.

This product is an inorganic substance and does not meet the criteria for PBT or vPvB in accordance with Annex XIII of REACH.

No known additional regulations for this product.

# SAFETY DATA SHEET

Date of Issuance: January 15, 2018

Revision 5



## SECTION 16 - OTHER INFORMATION

This SDS has been prepared by GMA Garnet USA Corporation and complies with the Practice on the *Preparation of Safety Data Sheets for Hazardous Chemicals December 2011* and follows the Globally Harmonized System of Classification and Labeling of Chemicals (the GHS).

As per Worksafe Guidance Note NOHSC 3017, each user should review the information in the specific context of the intended application.

**Disclaimer:** The information in this SDS was obtained from sources that are believed to be reliable; however, the information is provided without any representation or warranty, express or implied, regarding its accuracy or correctness. The conditions or methods of handling, storage, use, and disposal of this product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage, or expense arising out of, or in any way connected with, the handling, storage, use or disposal of this product.

Date of Issuance: September 2017

Revision 4

End of SDS.