

# Safety Data Sheet

Material Name: GARNET

SDS ID: 00233184

## \*\*\* Section 1 - PRODUCT AND COMPANY IDENTIFICATION \*\*\*

**Material Name: GARNET**

### Manufacturer Information

CMC Cometals  
CONTACT:  
2050 Center Avenue, Suite 250  
Ft. Lee, NJ 07024  
Mfg Contact: CMC Cometals

EMERGENCY

### Synonyms

HTSUS # 2513.20.90.00

## \*\*\* Section 2 - HAZARDS IDENTIFICATION \*\*\*

### EMERGENCY OVERVIEW

**Physical Form:** solid

**Health Hazards:** respiratory tract irritation, skin irritation, eye irritation, cancer

### POTENTIAL HEALTH EFFECTS

#### Inhalation

**Short Term:** irritation (possibly severe), changes in body temperature, metal fume fever, nausea, vomiting, diarrhea, chest pain, difficulty breathing, headache, lung damage

**Long Term:** cough, irritation (possibly severe), weight loss, chest pain, difficulty breathing, drowsiness, difficulty speaking, sleep disturbances, mood swings, tremors, muscle cramps, loss of coordination, bluish skin color, lung damage, cancer

#### Skin

**Short Term:** irritation (possibly severe), itching

**Long Term:** irritation (possibly severe), skin disorders

#### Eye

**Short Term:** irritation (possibly severe)

**Long Term:** irritation (possibly severe), eye damage

#### Ingestion

**Short Term:** irritation (possibly severe), nausea, vomiting, digestive disorders, diarrhea, stomach pain, chest and stomach pain, headache, drowsiness, dizziness, loss of coordination, blood disorders, liver damage, convulsions, coma

**Long Term:** irritation (possibly severe), digestive disorders, stomach pain, chest pain, blood disorders, kidney damage, liver damage, convulsions, coma

## \*\*\* Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS \*\*\*

CAS	Component	Percent	Symbol(s)	Risk Phrase(s)
7631-86-9	SILICON DIOXIDE 231-545-4	35 - 45	---	---
1345-25-1	IRON(II) OXIDE 215-721-8	25 - 37	---	---
1309-37-1	FERRIC OXIDE RED 215-168-2	25 - 37	---	---

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1344-28-1	ALUMINUM OXIDE (FIBROUS FORMS) 215-691-6	18 - 22	---	---
1305-78-8	CALCIUM OXIDE 215-138-9	2.2 - 3.9	C	R:34
11129-60-5	MANGANESE OXIDE 234-378-5	0.2 - 2	---	---
1309-48-4	MAGNESIUM OXIDE 215-171-9	0.2 - 1.4	---	---

## Component Related Regulatory Information

This product may be regulated, have exposure limits or other information identified as the following: Iron oxides, Aluminium compounds, Aluminum insoluble compounds, Aluminium oxides, Aluminum Oxide (135152-65-7), Manganese compounds, inorganic, Manganese compounds, n.o.s., Manganese oxides, magnesium inorganic compounds.

### \*\*\* Section 4 - FIRST AID MEASURES \*\*\*

#### Inhalation

If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. Get immediate medical attention.

#### Skin

Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.

#### Eyes

Flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.

#### Ingestion

If a large amount is swallowed, get medical attention.

### \*\*\* Section 5 - FIRE FIGHTING MEASURES \*\*\*

See Section 9 for Flammability Properties

**NFPA Ratings: Health: 2 Fire: 0 Reactivity: 0**

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

#### Flammable Properties

Negligible fire hazard.

#### Extinguishing Media

Use extinguishing agents appropriate for surrounding fire.

#### Fire Fighting Measures

Move container from fire area if it can be done without risk. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas.

### \*\*\* Section 6 - ACCIDENTAL RELEASE MEASURES \*\*\*

#### Water Release

Subject to California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65). Keep out of water supplies and sewers.

#### Occupational spill/release

Collect spilled material in appropriate container for disposal.

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## \*\*\* Section 7 - HANDLING AND STORAGE \*\*\*

### Handling Procedures

Use methods to minimize dust.

### Storage Procedures

Store and handle in accordance with all current regulations and standards. See original container for storage recommendations. Keep separated from incompatible substances.

## \*\*\* Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION \*\*\*

### Component Exposure Limits

#### SILICON DIOXIDE (7631-86-9)

NIOSH: 6 mg/m3 TWA  
3000 mg/m3 IDLH

OSHA (US): 20 mppcf TWA; ((80))/(% SiO<sub>2</sub>) mg/m3 TWA)

#### FERRIC OXIDE RED (1309-37-1)

ACGIH: 5 mg/m3 TWA (respirable fraction)  
NIOSH: 5 mg/m3 TWA (as Fe, dust and fume)  
2500 mg/m3 IDLH (as Fe, dust and fume)

OSHA (US): 10 mg/m3 TWA (fume)

Mexico: 5 mg/m3 TWA  
10 mg/m3 STEL (as Fe)

#### ALUMINUM OXIDE (FIBROUS FORMS) (1344-28-1)

ACGIH: 1 mg/m3 TWA (respirable fraction)

OSHA (US): 15 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable fraction)

Mexico: 10 mg/m3 TWA

#### CALCIUM OXIDE (1305-78-8)

ACGIH: 2 mg/m3 TWA

NIOSH: 2 mg/m3 TWA  
25 mg/m3 IDLH

OSHA (US): 5 mg/m3 TWA

Mexico: 2 mg/m3 TWA

#### MANGANESE OXIDE (11129-60-5)

ACGIH: 0.2 mg/m3 TWA (as Mn)

NIOSH: 1 mg/m3 TWA (as Mn)  
3 mg/m3 STEL (as Mn)  
500 mg/m3 IDLH (as Mn)

OSHA (US): 5 mg/m3 Ceiling (as Mn)

Mexico: 0.2 mg/m3 TWA (as Mn)

#### MAGNESIUM OXIDE (1309-48-4)

ACGIH: 10 mg/m3 TWA (inhalable fraction)

NIOSH: 750 mg/m3 IDLH (fume)

OSHA (US): 15 mg/m3 TWA (fume, total particulate)

Mexico: 10 mg/m3 TWA (as Mg, fume)

### Ventilation

Provide local exhaust ventilation system. Ensure compliance with applicable exposure limits.

### PERSONAL PROTECTIVE EQUIPMENT

#### Eyes/Face

Wear splash resistant safety goggles with a faceshield. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

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## Protective Clothing

Wear appropriate chemical resistant clothing.

## Glove Recommendations

Wear appropriate chemical resistant gloves.

## Respiratory Protection

Under conditions of frequent use or heavy exposure, respiratory protection may be needed.

Respiratory protection is ranked in order from minimum to maximum.

Consider warning properties before use.

Any particulate respirator equipped with an N95, R95, or P95 filter (including N95, R95, and P95 filtering facepieces) except quarter-mask respirators. The following filters may also be used: N99, R99, P99, N100, R100 or P100.

Any air-purifying full-facepiece respirator equipped with an N95, R95, or P95 filter. The following filters may also be used: N99, R99, P99, N100, R100 or P100.

Any powered, air-purifying respirator with a high-efficiency particulate filter.

Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter.

Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode.

### For Unknown Concentrations or Immediately Dangerous to Life or Health -

Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.

Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.

## \*\*\* Section 9 - PHYSICAL AND CHEMICAL PROPERTIES \*\*\*

<b>Physical State:</b>	Solid	<b>Appearance:</b>	Not available
<b>Physical Form:</b>	solid	<b>Odor:</b>	Not Available
<b>Odor Threshold:</b>	Not available	<b>Melting Point:</b>	1315 °C
<b>Boiling Point:</b>	Not applicable	<b>Vapor Pressure:</b>	Not applicable
<b>Vapor Density (air = 1):</b>	Not applicable	<b>Density:</b>	Not available
<b>Specific Gravity (water = 1):</b>	3.9 - 4.1	<b>Water Solubility:</b>	Not available
<b>Coeff. Water/Oil Dist:</b>	Not available		

## \*\*\* Section 10 - STABILITY AND REACTIVITY \*\*\*

### Chemical Stability

Stable at normal temperatures and pressure.

### Conditions to Avoid

None reported.

### Materials to Avoid

acids, oxidizing materials, vinyl acetate, aluminum, aluminum alloys, peroxides, magnesium, ethylene oxide, halocarbons, alkalis, fluorine, sulfur

CALCIUM OXIDE:

ACIDS: May cause exothermic reaction.

BORIC ACID + CALCIUM CHLORIDE (FUSED): May cause incandescent reaction.

BROMINE PENTAFLUORIDE: May cause violent reaction, ignition often occurring.

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CHLORINE TRIFLUORIDE: May cause violent reaction, ignition often occurring.

ETHANOL: May cause possible ignition and explosion if exposed to moisture or heat.

FLUORINE: May cause incandescent exothermic reaction.

HYDROGEN FLUORIDE: May cause violent, incandescent reaction.

INTERHALOGEN COMPOUNDS: Ignition.

ORGANIC MATERIALS: Fire and explosion hazard.

PHOSPHORUS PENTOXIDE: May cause violent reaction if warmed or moistened.

MANGANESE OXIDE:

HYDROGEN PEROXIDE: Very reactive.

FLUORINE: Reacts violently.

CALCIUM CHLORINE DIOXIDE: Reacts violently.

IRON(II) OXIDE:

HYDROGEN PEROXIDE: Incandesces.

NITRIC ACID: Incandesces with powdered oxide.

SULFUR DIOXIDE: Incandesces when heated.

SILICON DIOXIDE:

CHLORINE TRIFLUORIDE: Fire hazard.

FLUORINE: Fire hazard.

HYDROCHLORIC ACID + WATER: Explosion hazard with gel form.

HYDROFLUORIC ACID: Dissolves, releasing silicon tetrafluoride.

HYDROGEN FLUORIDE: Incompatible.

HYDROGENATED VEGETABLE OILS: Incompatible.

MAGNESIUM (POWDERED): Explosion hazard on heating in the presence of moisture.

MANGANESE TRIFLUORIDE: May react violently on heating, releasing silicon tetrafluoride.

OXIDIZERS (STRONG): Fire and explosion hazard.

OXYGEN DIFLUORIDE: Explosion hazard under certain conditions and in the presence of moisture.

OZONE: Potential explosion hazard at low temperatures if organic material is present.

PHOSPHORIC ACID (CONCENTRATED): Attacks on heating.

SODIUM (BURNING): Reacts with finely divided silica.

VINYL ACETATE (VAPOR): May react vigorously with gel form.

XENON HEXAFLUORIDE: May react explosively by forming xenon trioxide.

FERRIC OXIDE RED:

ALUMINUM: Intense, exothermic reaction on ignition; may explode in the presence of water.

ALUMINUM-MAGNESIUM ALLOY (MOLTEN) + WATER: Violent reaction.

ALUMINUM-MAGNESIUM-ZINC ALLOY: May produce sparks on impact.

CALCIUM ACETYLIDE: Burns violently when ignited.

CALCIUM HYPOCHLORITE: May explode.

CARBON MONOXIDE: Possible explosion.

CESIUM ACETYLIDE (CESIUM CARBIDE): Incandescent on warming.

ETHYLENE OXIDE: Violently polymerizes, liberating heat.

GUANIDINIUM PERCHLORATE: Reduces the thermal stability of the salt.

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HYDRAZINE: Incompatible.  
HYDROGEN PEROXIDE: Decomposes.  
MAGNESIUM: Violent reaction.  
PERFORMIC ACID: Incompatible.  
RUBIDIUM ACETYLIDE: Reacts exothermically.  
ALUMINUM OXIDE (FIBROUS FORMS):  
CHLORINATED RUBBER (HOT): Incompatible.  
CHLORINE TRIFLUORIDE: Violent reaction and possible ignition.  
ETHYLENE OXIDE: May initiate explosive polymerization.  
HALOCARBONS: Exothermic reaction above 200 C.  
HALOCARBONS + METALS: Exothermic reaction at ambient temperatures.  
OXYGEN DIFLUORIDE: Exothermic reaction.  
SODIUM NITRATE: May form explosive mixture.  
VINYL ACETATE: Possible vigorous reaction.  
MAGNESIUM OXIDE:  
ACIDS (STRONG): Violent reaction.  
ALKALIS (STRONG): May attack.  
ALUMINUM POWDER: May ignite or explode when heated.  
BROMINE PENTAFLUORIDE: Violent reaction.  
CHLORINE TRIFLUORIDE: May ignite.  
INTERHALOGENS: Incompatible.  
MAGNESIUM POWDER: May ignite or explode when heated.  
PHOSPHORUS PENTACHLORIDE: Incandesces brilliantly on heating.  
SULFUR (SUBLIMED): May ignite or explode when heated.

## Decomposition Products

miscellaneous decomposition products

## Possibility of Hazardous Reactions

Will not polymerize.

## \* \* \* Section 11 - TOXICOLOGICAL INFORMATION \* \* \*

### Component Analysis - LD50/LC50

The components of this material have been reviewed in various sources and the following selected endpoints are published:

**SILICON DIOXIDE (7631-86-9)**

Oral LD50 Rat: >5000 mg/kg; Inhalation LC50 Rat: >2.2 mg/L/1H; Dermal LD50 Rabbit: >2000 mg/kg

**FERRIC OXIDE RED (1309-37-1)**

Oral LD50 Rat: >10000 mg/kg

**ALUMINUM OXIDE (FIBROUS FORMS) (1344-28-1)**

Oral LD50 Rat: >5000 mg/kg

**CALCIUM OXIDE (1305-78-8)**

Oral LD50 Rat: 500 mg/kg

### RTECS Acute Toxicity (selected)

The components of this material have been reviewed and RTECS publishes no data as of the date on this document.

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## Component Carcinogenicity

### SILICON DIOXIDE (7631-86-9)

IARC: Monograph 68 [1997]; Supplement 7 [1987] (Group 3 (not classifiable))

### FERRIC OXIDE RED (1309-37-1)

ACGIH: A4 - Not Classifiable as a Human Carcinogen

IARC: Supplement 7 [1987]; Monograph 1 [1972] (Group 3 (not classifiable))

### ALUMINUM OXIDE (FIBROUS FORMS) (1344-28-1)

ACGIH: A4 - Not Classifiable as a Human Carcinogen

DFG: Category 2 (considered to be carcinogenic for man, fibre dust)

### MAGNESIUM OXIDE (1309-48-4)

ACGIH: A4 - Not Classifiable as a Human Carcinogen

## RTECS Irritation

The components of this material have been reviewed, and RTECS publishes the following endpoints:

### SILICON DIOXIDE (7631-86-9)

25 mg/24 hour(s) eyes rabbit mild

## Local Effects

### CALCIUM OXIDE (1305-78-8)

**Corrosive:** inhalation, skin, eye, ingestion.

Adenocarcinomas and squamous-cell carcinomas of the lung in rats were produced after inhalation or repeated intratracheal instillation of various forms of crystalline silica. Malignant lymphomas developed in rats after intrapleural and intraperitoneal injections of quartz suspensions and intrapleural injection of cristobalite and tridymite. Epidemiologic studies indicate lung cancer occurs more frequently among silicotics than in the general population. A statistically significant increase in the incidence of benign and malignant tumors of the lung were observed in rats exposed by inhalation. Mesotheliomas were found in the abdomen after intraperitoneal injection in rats and hamsters.

## Medical Conditions Aggravated by Exposure

respiratory disorders, respiratory disorders, respiratory disorders, respiratory disorders, respiratory disorders, skin disorders and allergies, skin disorders, eye disorders

## RTECS Tumorigenic

The components of this material have been reviewed, and RTECS publishes the following endpoints:

### FERRIC OXIDE RED (1309-37-1)

135 mg/kg subcutaneous rat TDLo

### ALUMINUM OXIDE (FIBROUS FORMS) (1344-28-1)

200 mg/kg implant rat TD; 200 mg/kg implant rat TDLo; 90 mg/kg intrapleural rat TDLo

### MAGNESIUM OXIDE (1309-48-4)

480 mg/kg intratracheal hamster TDLo (30 week(s))

## Additional Data

Interactions with drugs may occur. Smoking may enhance the toxic effects.

## HEALTH EFFECTS

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## Inhalation - Acute Exposure

SILICON DIOXIDE: Dusts may cause irritation of the respiratory tract and coughing. MANGANESE OXIDE: Slight irritation of the respiratory system may occur. Freshly formed fumes may produce metal fume fever. Inhalation of the dust may lead to a form of lobar pneumonia, which is unresponsive to antibiotics. It has not yet been possible to prove that a definite pneumonitis results in humans from exposure to many dusts or fumes under industrial conditions. However, experiments with mice have produced a striking lung pathology which varied in intensity with the length of exposure to the dust. CALCIUM OXIDE: May cause severe irritation of the mucous membranes with sore throat, coughing, and dyspnea. Bronchitis and pneumonitis have also been reported. Delayed pulmonary edema may occur in severe cases. MAGNESIUM OXIDE: The dust may cause respiratory tract irritation. Metal fume fever, an influenza-like illness, may occur if freshly formed magnesium oxide fumes composed of particles sized between 0.02-0.05 microns are inhaled in sufficient amounts. Symptoms may be delayed 4-12 hours and begin with a sudden onset of thirst, and a sweet, metallic or foul taste in the mouth. Other symptoms may include upper respiratory tract irritation accompanied by coughing and a dryness of the mucous membranes, lassitude and a generalized feeling of malaise. Fever, chills, muscular pain, mild to severe headache, nausea, occasional vomiting, exaggerated mental activity, profuse sweating, excessive urination, diarrhea, prostration and leukocytosis may also occur. Tolerance to fumes develops rapidly, but is quickly lost. All symptoms usually subside within 24-36 hours. QUARTZ: Exposure to high concentrations may cause physical discomfort of the upper respiratory tract. METAL FUME FEVER: Metal fume fever, an influenza-like illness, may occur due to the inhalation of freshly formed metal oxide particles sized below 1.5 microns and usually between 0.02-0.05 microns. Symptoms may be delayed 4-12 hours and begin with a sudden onset of thirst, and a sweet, metallic or foul taste in the mouth. Other symptoms may include upper respiratory tract irritation accompanied by coughing and a dryness of the mucous membranes, lassitude and a generalized feeling of malaise. Fever, chills, muscular pain, mild to severe headache, nausea, occasional vomiting, exaggerated mental activity, profuse sweating, excessive urination, diarrhea and prostration may also occur. Tolerance to fumes develops rapidly, but is quickly lost. All symptoms usually subside within 24-36 hours.

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## Inhalation - Chronic Exposure

**SILICON DIOXIDE:** Exposure to dusts of crystalline or amorphous silica for 6 months to 30 years may result in silicosis with symptoms of cough, chest pain, dyspnea, tachypnea, marked weakness and weight loss. This pulmonary insufficiency may be characterized by diffuse nodular fibrosis, distortion of bronchi, diminished chest expansion, decreased vital capacity and compensatory and bullous emphysema. Although pulmonary fibrosis has been reported from workers exposed to amorphous silica, the crystalline form is the established cause of fibrotic response in the lung. However, the amorphous form has been reported fibrogenic to a lesser extent. As the disease progresses, cor pulmonale, cardiorespiratory failure, and death may occur. Various forms and preparations of crystalline silica produced adenocarcinomas and squamous cell carcinomas of the lungs in rats.

**MANGANESE OXIDE:** Repeated exposure to manganese dust or fume for at least 3 months may cause manganism. Symptoms may include apathy, anorexia, and somnolence, sometimes preceded by a transitory phase of psychomotor excitement, stolid, masklike face, low monotonous voice with economical speech, muscular twitching, varying from a fine tremor of the hands to gross rhythmical movements of the arms, legs, trunk and head, stiffness of the leg muscles and cramps in the calves that usually come on at night and are worse after a day of exertion, retropulsion and propulsion in walking, with a peculiar slappy gait, uncontrollable laughter, less frequently crying, speech difficulties, impaired ability to arise and to maintain postural stability, diminished libido, difficulty with fine movements, memory loss, dysphagia and urinary bladder disturbances. Some neurological signs stabilize, and speech difficulties and tremor may subside after exposure ceases but gait disturbances may persist. One study indicates that exposure of maternal mice induces postnatal development and behavior irregularities of pups.

**CALCIUM OXIDE:** Depending on the concentration and duration of exposure, repeated or prolonged exposure may cause inflammation and ulceration of the nasal and buccal mucosa, perforation of the nasal septum, and possibly bronchial and gastrointestinal disturbances.

**MAGNESIUM OXIDE:** May cause respiratory tract irritation, nasal catarrh, and coughing up of discolored sputum. Dusts may cause chronic bronchitis, emphysema, and bronchial asthma.

**QUARTZ:** Inhalation of very high concentrations of finely divided crystalline silica dust, exposure ranging from a few weeks to 4-5 years, may cause a rapidly developing silicosis, characterized by pulmonary insufficiency with severe dyspnea, violent coughing, tachypnea, weight loss, and cyanosis leading to the development of cor pulmonale and death within a relatively short period of time. A slowly developing silicosis may result from exposure for 6 months-30 years to relatively low levels of the dust. The first symptom is usually a slowly increasing, non-disabling, exertional dyspnea due to pulmonary fibrosis and the emphysema associated with it. Continued exposure may increase the rate of progression of the disease. Also, the fibrogenic action may continue when exposure ceases. As the fibrosis advances, other symptoms may include shortness of breath, productive cough, wheezing, chest tightness or pain, marked weakness, decreased capacity for work, and repeated non-specific chest illnesses. Cyanosis, clubbing of digits, orthopnea, or serious weight loss are not usually evident until the disease is advanced. Pulmonary infections, which may be indicated by hemoptysis, and cardiac decompensation may exacerbate the symptoms. Three major complications, which are the most frequent causes of death, are pulmonary tuberculosis, respiratory insufficiency which is due to the massive emphysematous and fibrotic changes and is sometimes accompanied by chronic cor pulmonale, and acute bronchopulmonary infection. A number of studies have shown that persons diagnosed as having silicosis have an increased risk for dying from lung cancer. This increase has been seen among miners, quarry workers, foundry workers, ceramic workers, granite workers, and stone cutters. In some of these studies, the risk of lung cancer increased with the duration of employment. Various forms and preparations of crystalline silica produced adenocarcinomas and squamous cell carcinomas of the lungs in rats.

**METAL FUME FEVER:** There is no form of chronic metal fume fever, however, repeated bouts with symptoms as described above are quite common. Resistance to the condition develops after a few days of exposure, but is quickly lost in 1 or 2 days.

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## Inhalation - Other Toxicity Information

IRON(II) OXIDE: See information on metal fume fever. May cause pulmonary fibrosis if dust particles are inhaled. FERRIC OXIDE RED: Chronic exposure may cause dyspnea and chronic bronchitis. Repeated exposure, usually from 6-10 years, to iron oxide dust or fume may cause a benign pneumoconiosis (siderosis) which may cause X-ray shadows that can be indistinguishable from fibrotic pneumoconiosis. See information on metal fume fever. ALUMINUM OXIDE (FIBROUS FORMS): A statistically significant increase in the incidence of benign and malignant tumors of the lung were observed in rats exposed by inhalation. Inhalation of high concentrations may cause coughing, shortness of breath, respiratory tract irritation due to mechanical action, unpleasant deposits in the nasal passages, and exacerbation of symptoms in persons with impaired pulmonary function. Humans exposed chronically to aluminum oxide, particle size approximately 1.2 microns, did not experience either systemic or respiratory adverse effects. Hydrated aluminum oxide, injected intratracheally, produced dense and numerous nodules of advanced fibrosis in rats, a reticulin network with occasional collagen fibers in mice and guinea pigs, and only a slight reticulin network in rabbits. A production process in which aluminum oxide (bauxite), iron, coke, and silica are fused at 2000 C poses a threat of Shaver's disease, a rapidly progressive and often fatal interstitial fibrosis of the lungs. See information on metal fume fever.

## Skin Contact - Acute Exposure

SILICON DIOXIDE: Prolonged skin contact with dry particulate may cause drying of the skin. MANGANESE OXIDE: Manganese dust and fumes are apparently completely innocuous to intact skin. IRON(II) OXIDE: May cause irritation. CALCIUM OXIDE: Contact, especially with moist skin, may cause severe irritation with pain, redness, burns, and ulceration. Burns severe enough to be fatal have resulted from massive exposure. MAGNESIUM OXIDE: Particulates may cause slight irritation. QUARTZ: May cause irritation of intact skin due to mechanical abrasion. If the skin is abraded, a heavy growth of scar tissue may be induced. ALUMINUM OXIDE (FIBROUS FORMS): Contact may cause an irritant dermatitis accompanied by pruritis. FERRIC OXIDE RED: No data available.

## Skin Contact - Chronic Exposure

SILICON DIOXIDE: No data available. MANGANESE OXIDE: No data available. IRON(II) OXIDE: Repeated or prolonged contact may cause irritation. CALCIUM OXIDE: Effects depend on the concentration and duration of exposure. Repeated or prolonged contact may cause dermatitis, with desquamation and vesicular rash, fissuring and brittleness of the nails, or effects similar to acute exposure. MAGNESIUM OXIDE: May cause eczema, edema, or hives. QUARTZ: No data available. ALUMINUM OXIDE (FIBROUS FORMS): No data available. FERRIC OXIDE RED: No data available.

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## Eye Contact - Acute Exposure

SILICON DIOXIDE: Dusts may cause irritation with redness and pain. MANGANESE OXIDE: May cause minor irritation. IRON(II) OXIDE: Particles of iron or iron compounds which become imbedded in the eye may cause siderosis with varied effects. Discoloring of the iris to yellowish green to brown is the earliest and most common sign of siderosis. May also cause conjunctivitis, choroiditis, or retinitis. CALCIUM OXIDE: Upon contact, dust may react with moisture and protein in the eye and form clumps of moist compound, which are often lodged deep in the conjunctiva. The degree of injury depends on the concentration and duration of contact. There may be severe irritation, edema, hyperemia, pain, lacrimation, blurred vision, spasmodic blinking, corneal opacities, ulceration and perforation, sometimes with loss of vision. MAGNESIUM OXIDE: May cause slight irritation, redness, and pain. Abrasive action of dust can damage eyes. QUARTZ: May cause irritation due to mechanical action. Particles of silica in the range of 2-3 micrometers introduced into the corneal stroma of rabbit eyes caused very little reaction. These same particles introduced into the anterior chamber resulted in an inflammatory reaction in 3-5 weeks with the formation of fibrotic nodules in the iridocorneal angle. Finely divided silica injected into the vitreous of rabbit eyes has caused necrosis of the retina and atrophy of the choroid. ALUMINUM OXIDE (FIBROUS FORMS): Dust may cause mechanical irritation with redness and possibly swelling of the conjunctiva. FERRIC OXIDE RED: Particles of iron or iron compounds which become imbedded in the eye may cause siderosis with varied effects. Discoloring of the iris to yellowish green or brown is the earliest and most common sign of siderosis.

## Eye Contact - Chronic Exposure

SILICON DIOXIDE: No data available. MANGANESE OXIDE: No data available. IRON(II) OXIDE: No data available. CALCIUM OXIDE: Effects depend on the concentration and duration of exposure. Repeated or prolonged contact may result in conjunctivitis or effects as in acute exposure. MAGNESIUM OXIDE: Repeated or prolonged exposure may cause conjunctivitis. QUARTZ: An abnormally high silicon content in the cornea, and a gradual decrease in visual acuity due to corneal opacities in the pupillary area, have been reported in a group of foundry workers. ALUMINUM OXIDE (FIBROUS FORMS): No data available. FERRIC OXIDE RED: No data available.

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## Ingestion - Acute Exposure

SILICON DIOXIDE: The effects of ingestion are purely mechanical as the substance is inert chemically and biologically. MANGANESE OXIDE: No data available. IRON(II) OXIDE: Overdose of iron compounds may have a corrosive effect on the gastrointestinal mucosa and be followed by necrosis, perforation, and stricture formation. Several hours may elapse before symptoms, that can include epigastric pain, diarrhea, vomiting, nausea, hematemesis, prolonged clotting times, or elevation of plasma serotonin and histamine, occur. After apparent recovery a person may experience metabolic acidosis, convulsions, or coma, hours or days later. Further complications may develop, leading to acute liver necrosis that may result in death due to hepatic coma. ALKALINE CORROSIVES: May cause immediate pain, circumoral burns and corrosion of the mucous membranes which at first turn white and soapy and then become brown, edematous and ulcerated. There may be profuse salivation and difficulty or inability to swallow or speak. Even when there is no evidence of oral burns, the esophagus and stomach may be involved with burning pain, vomiting and diarrhea. The vomitus may be thick and slimy with mucous, and later contain blood and shreds of mucosa. Epiglottal edema may result in respiratory distress and possibly asphyxia. Shock with marked hypotension, weak and rapid pulse, shallow respiration, and clammy skin may occur. Circulatory collapse may ensue, and if uncorrected, lead to renal failure. In severe cases, esophageal or gastric perforation are possible and may be accompanied by mediastinitis, substernal pain, peritonitis, abdominal rigidity, and fever. Esophageal, and possibly gastric or pyloric stricture, may occur within a few weeks, but may be delayed for months or even years. Death may result within a short time from asphyxia, circulatory collapse, or aspiration of even minute amounts. If death is delayed it may be due to the complications of perforation, pneumonia, or the effects of stricture formation. MAGNESIUM OXIDE: Magnesium salts are generally so slowly absorbed that oral administration causes nothing more than purging. If evacuation fails, mucosal irritation and absorption may occur. If ingested in sufficient quantities, may cause gastrointestinal disturbances. Symptoms may include irritation, nausea, vomiting, abdominal pain, and diarrhea. Systemically, magnesium may produce central nervous system depression, abolition of reflexes, and death from respiratory paralysis. QUARTZ: Effects of ingestion are due to mechanical action as crystalline silicas are biologically inert. ALUMINUM OXIDE (FIBROUS FORMS): No data available. FERRIC OXIDE RED: No data available.

## Ingestion - Chronic Exposure

SILICON DIOXIDE: No data available. MANGANESE OXIDE: Manganous oxide is used as a nutrient and/or dietary supplement food additive as well as a trace mineral added to animal feed. No data is available on the effects from exposure to large amounts. IRON(II) OXIDE: Long term exposure to iron compounds may produce effects similar to those seen in acute exposure, with the addition of pink urine, black stool, and kidney damage. ALKALINE CORROSIVES: Depending on the concentration, repeated ingestion may result in inflammatory and ulcerative effects on the oral mucous membranes and other effects as with acute ingestion. MAGNESIUM OXIDE: No data available. QUARTZ: No data available. ALUMINUM OXIDE (FIBROUS FORMS): No specific data available. Some aluminum compounds cause constipation. FERRIC OXIDE RED: No data available.

## Ingestion - Other Toxicity Information

CALCIUM OXIDE: See information on alkaline corrosives.

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## \*\*\* Section 12 - ECOLOGICAL INFORMATION \*\*\*

### Component Analysis - Aquatic Toxicity

#### SILICON DIOXIDE (7631-86-9)

Fish: 96 Hr LC50 Brachydanio rerio: 5000 mg/L [static]

Algae: 72 Hr EC50 Pseudokirchneriella subcapitata: 440 mg/L

Invertebrate: 48 Hr EC50 Ceriodaphnia dubia: 7600 mg/L

#### CALCIUM OXIDE (1305-78-8)

Fish: 96 Hr LC50 Cyprinus carpio: 1070 mg/L [static]

## \*\*\* Section 13 - DISPOSAL CONSIDERATIONS \*\*\*

### Disposal Methods

Dispose in accordance with all applicable regulations.

### Component Waste Numbers

The U.S. EPA has not published waste numbers for this product's components.

## \*\*\* Section 14 - TRANSPORT INFORMATION \*\*\*

### US DOT Information

No Classification assigned.

### TDG Information

No Classification assigned.

### ADR Information

No Classification assigned.

### RID Information

No Classification assigned.

### IATA Information

No Classification assigned.

### ICAO Information

No Classification assigned.

### IMDG Information

No Classification assigned.

## \*\*\* Section 15 - REGULATORY INFORMATION \*\*\*

### U.S. Federal Regulations

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 311/312 (40 CFR 370.21), SARA Section 313 (40 CFR 372.65), CERCLA (40 CFR 302.4), TSCA 12(b), and/or require an OSHA process safety plan.

#### ALUMINUM OXIDE (FIBROUS FORMS) (1344-28-1)

SARA 313: 1.0 % de minimis concentration (fibrous forms)

#### MANGANESE OXIDE (11129-60-5)

SARA 313: 1.0 % de minimis concentration (Chemical Category N450)

### SARA Section 311/312 (40 CFR 370 Subparts B and C)

Acute Health: Yes Chronic Health: Yes Fire: No Pressure: No Reactive: No

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## U.S. State Regulations

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA	RI
SILICON DIOXIDE	7631-86-9	Yes	Yes	Yes	No	Yes	No
FERRIC OXIDE RED	1309-37-1	Yes	Yes	Yes	Yes	Yes	Yes
ALUMINUM OXIDE (FIBROUS FORMS)	1344-28-1	Yes	Yes	Yes	Yes	Yes	Yes
CALCIUM OXIDE	1305-78-8	Yes	Yes	Yes	Yes	Yes	Yes
MANGANESE OXIDE (related to: Manganese compounds, n.o.s.)	11129-60-5	Yes <sup>1</sup>	No	Yes <sup>1</sup>	Yes <sup>1</sup>	Yes <sup>1</sup>	No
MAGNESIUM OXIDE	1309-48-4	Yes	Yes	Yes	Yes	Yes	Yes

Not regulated under California Proposition 65

## Canada

### Canada WHMIS

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List:

**SILICON DIOXIDE (7631-86-9)**

1 %

**FERRIC OXIDE RED (1309-37-1)**

1 %

**ALUMINUM OXIDE (FIBROUS FORMS) (1344-28-1)**

1 %

**CALCIUM OXIDE (1305-78-8)**

1 %

**MANGANESE OXIDE (11129-60-5)**

1 %

## Germany Water Classification

**SILICON DIOXIDE (7631-86-9)**

Number 849, not considered hazardous to water

**SILICON DIOXIDE (7631-86-9)**

Number 849, not considered hazardous to water

**IRON(II) OXIDE (1345-25-1)**

Number 750, not considered hazardous to water

**FERRIC OXIDE RED (1309-37-1)**

Number 800, not considered hazardous to water

**ALUMINUM OXIDE (FIBROUS FORMS) (1344-28-1)**

Number 1346, not considered hazardous to water

**CALCIUM OXIDE (1305-78-8)**

Number 322, hazard class 1 - low hazard to waters

**MAGNESIUM OXIDE (1309-48-4)**

Number 5208, hazard class 1 - low hazard to waters

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## EU Marking and Labelling

This material is not classified

## Component Analysis - Inventory

Component	CAS	US	CA	EU	AU	PH	JP	KR	CN	NZ
SILICON DIOXIDE	7631-86-9	Yes	DSL	EIN	Yes	Yes	Yes	Yes	Yes	Yes
IRON(II) OXIDE	1345-25-1	Yes	DSL	EIN	Yes	No	Yes	Yes	Yes	Yes
FERRIC OXIDE RED	1309-37-1	Yes	DSL	EIN	Yes	Yes	Yes	Yes	Yes	Yes
ALUMINUM OXIDE (FIBROUS FORMS)	1344-28-1	Yes	DSL	EIN	Yes	Yes	Yes	Yes	Yes	Yes
CALCIUM OXIDE	1305-78-8	Yes	DSL	EIN	Yes	Yes	Yes	Yes	Yes	Yes
MANGANESE OXIDE	11129-60-5	No	DSL	EIN	No	Yes	Yes	Yes	Yes	No
MAGNESIUM OXIDE	1309-48-4	Yes	DSL	EIN	Yes	Yes	Yes	Yes	Yes	Yes

## \* \* \* Section 16 - OTHER INFORMATION \* \* \*

### Key / Legend

ACGIH - American Conference of Governmental Industrial Hygienists; ADR - European Road Transport; AU - Australia; BOD - Biochemical Oxygen Demand; C - Celsius; CA - Canada; CAS - Chemical Abstracts Service; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CN - China; CPR - Controlled Products Regulations; DFG - Deutsche Forschungsgemeinschaft; DOT - Department of Transportation; DSL - Domestic Substances List; EEC - European Economic Community; EINECS - European Inventory of Existing Commercial Chemical Substances; EPA - Environmental Protection Agency; EU - European Union; F - Fahrenheit; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; ICAO - International Civil Aviation Organization; IDL - Ingredient Disclosure List; IDLH - Immediately Dangerous to Life and Health; IMDG - International Maritime Dangerous Goods; JP - Japan; Kow - Octanol/water partition coefficient; KR - Korea; LEL - Lower Explosive Limit; LOLI - List Of Lists™ - ChemADVISOR's Regulatory Database; MAK - Maximum Concentration Value in the Workplace; MEL - Maximum Exposure Limits; NFPA - National Fire Protection Agency; NIOSH - National Institute for Occupational Safety and Health; NJTSR - New Jersey Trade Secret Registry; NTP - National Toxicology Program; NZ - New Zealand; OSHA - Occupational Safety and Health Administration; PH - Philippines; RCRA - Resource Conservation and Recovery Act; RID - European Rail Transport; RTECS - Registry of Toxic Effects of Chemical Substances®; SARA - Superfund Amendments and Reauthorization Act; STEL - Short-term Exposure Limit; TDG - Transportation of Dangerous Goods; TSCA - Toxic Substances Control Act; TWA - Time Weighted Average; UEL - Upper Explosive Limit; US - United States

### Full text of R phrases in Section 3

**R34** Causes burns.

# Safety Data Sheet

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## Other Information

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