Safety Data Sheet

Material Name: Monolith Refractory **SDS ID: 00234142**

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

Material Name: Monolith Refractory

Manufacturer Information

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

Synonyms

Product Use

alloy

* * * Section 2 - HAZARDS IDENTIFICATION * * *

EMERGENCY OVERVIEW

Physical Form: powder crystals

Health Hazards: cancer

Physical Hazards: Negligible fire and explosion hazard in bulk form. Dust/air mixtures may ignite or explode.

POTENTIAL HEALTH EFFECTS

Inhalation

Short Term: irritation, cough, metal fume fever, chest pain, difficulty breathing

Long Term: irritation, cough, metal fume fever, weight loss, chest pain, difficulty breathing, bluish skin color, lung damage, cancer

Skin

Short Term: irritation

Long Term: irritation

Eye

Short Term: irritation

Long Term: irritation, eye damage

Ingestion

Short Term: irritation

Long Term: no information on significant adverse effects

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

CAS	Component	Percent	Symbol(s)	Risk Phrase(s)
1344-28-1	ALUMINUM OXIDE 215-691-6	70-75	---	---
7631-86-9	Silica, amorphous 231-545-4	5-15	---	---
7440-44-0	CARBON 231-153-3	1-5	F	R:11
13463-67-7	Titanium dioxide 236-675-5	1-3	---	---
1309-37-1	FERRIC OXIDE RED 215-168-2	0-1	---	---

Component Related Regulatory Information

This product may be regulated, have exposure limits or other information identified as the following: Graphite, synthetic, Titanium dioxide (1309-63-3), Titanium dioxide (1344-29-2).

* * * 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: 1 **Fire:** 0 **Reactivity:** 0

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

Flammable Properties

Negligible fire hazard. Dust/air mixtures may ignite or explode.

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.

Thermal Decomposition Products

Combustion: oxides of carbon, oxides of silicon

* * * 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

Large spills: Collect spilled material in appropriate container for disposal. Avoid generating dust. Clean up residue with a high-efficiency particulate filter vacuum.

* * * 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

ALUMINUM OXIDE (1344-28-1)
OSHA (US): 15 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable fraction)
Mexico: 10 mg/m3 TWA

Silica, amorphous (7631-86-9)
NIOSH: 6 mg/m3 TWA
3000 mg/m3 IDLH
OSHA (US): 20 mppcf TWA; ((80)/(% SiO2) mg/m3 TWA)

CARBON (7440-44-0)
OSHA (US): 15 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable fraction)
Mexico: 2 mg/m3 TWA (dust)

Titanium dioxide (13463-67-7)
ACGIH: 10 mg/m3 TWA
NIOSH: 5000 mg/m3 IDLH
OSHA (US): 15 mg/m3 TWA (total dust)
Mexico: 10 mg/m3 TWA (as Ti)
20 mg/m3 STEL (as Ti)

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)

Ventilation

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

PERSONAL PROTECTIVE EQUIPMENT

Eyes/Face

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

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 * * *

Physical State:	Solid	**Appearance:**	Not available
Physical Form:	powder crystals	**Odor:**	Not Available
Odor Threshold:	Not available	**Melting Point:**	Not available
Boiling Point:	Not applicable	**Vapor Pressure:**	Not applicable
Vapor Density (air = 1):	Not applicable	**Density:**	Not available
Specific Gravity (water = 1):	Not available	**Water Solubility:**	Not available
Coeff. Water/Oil Dist:	Not available		

* * * Section 10 - STABILITY AND REACTIVITY * * *

Chemical Stability

Stable at normal temperatures and pressure.

Conditions to Avoid

Avoid generating dust.

Materials to Avoid

halo carbons, halogens, combustible materials, oxidizing materials

ALUMINUM OXIDE (ALUMINA):

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.

CARBON:

ALKALI METALS: Contact may result in an exothermic reaction with ignition or an explosion.

AMMONIUM NITRATE: Possible explosion when heated.

AMMONIUM PERCHLORATE: Possible explosion on heating.

BROMATES: Contact is likely to result in ignition or an explosion.

CALCIUM HYPOCHLORITE: Possible explosion on heating.

CHLORATES: Contact is likely to result in ignition or an explosion.

CHLORINE MONOXIDE: Explodes.

CHROMATES: Incompatible.

DICHLORINE OXIDE: Explosion reaction.

HALOGENS: Contact of carbon with any halogen is liable to result in ignition or an explosion.
INTERHALOGENS: Contact of carbon with any interhalogen is liable to result in ignition or an explosion.
IODATES: Contact is likely to result in ignition or an explosion.
IODINE PENTOXIDE: Explodes when warmed.
METAL NITRATES: Contact is likely to result in ignition or an explosion.
NITRIC ACID: Violent reaction.
NITROGEN OXIDE: Ignition with incandescence.
NITROGEN TRIFLUORIDE: Explosion at reduced temperatures.
OILS (UNSATURATED): Fire and explosion hazard.
OXIDES: Contact with many oxides is likely to result in ignition or an explosion.
OXIDIZERS (STRONG): Fire and explosion hazard.
OXOSALTS: Contact is likely to result in ignition or an explosion.
OXYGEN: May result in ignition or an explosion.
OXYGEN DIFLUORIDE: Possible explosion.
OZONE: Fire hazard.
PEROXIDES: Contact is likely to result in ignition or an explosion.
PEROXYFORMIC ACID: Violent oxidation.
PEROXYFUROIC ACID: Explosive decomposition.
POTASSIUM PERMANGANATE: Ignition on heating.
SODIUM SULFIDE: May undergo spontaneous heating.
TRIOXYGEN DIFLUORIDE: Ignition with possible explosion.
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.
HYDRAZINE: Incompatible.
HYDROGEN PEROXIDE: Decomposes.
MAGNESIUM: Violent reaction.
PERFORMIC ACID: Incompatible.
RUBIDIUM ACETYLIDE: Reacts exothermically.
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.
TITANIUM DIOXIDE:
ALUMINUM: Reaction is accompanied by incandescence.
CALCIUM: Reaction is accompanied by incandescence.
LITHIUM: Reaction occurs around 200 C, with incandescence.
MAGNESIUM: Reaction is accompanied by incandescence.
POTASSIUM: Reaction is accompanied by incandescence.
SODIUM: Reaction is accompanied by incandescence.
ZINC: Reaction is accompanied by incandescence.

Thermal Decomposition Products

Combustion: oxides of carbon, oxides of silicon

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:

ALUMINUM OXIDE (1344-28-1)
Oral LD50 Rat: >5000 mg/kg
Silica, amorphous (7631-86-9)
Oral LD50 Rat: >5000 mg/kg; Inhalation LC50 Rat: >2.2 mg/L/1H; Dermal LD50 Rabbit: >2000 mg/kg
CARBON (7440-44-0)
Oral LD50 Rat: >10000 mg/kg
Titanium dioxide (13463-67-7)
Oral LD50 Rat: >10000 mg/kg
FERRIC OXIDE RED (1309-37-1)
Oral LD50 Rat: >10000 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.

Acute Toxicity Level

Titanium dioxide (13463-67-7)

Moderately Toxic: inhalation.

Slightly Toxic: ingestion.

Component Carcinogenicity

ALUMINUM OXIDE (1344-28-1)

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

Silica, amorphous (7631-86-9)

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

Titanium dioxide (13463-67-7)

ACGIH: A4 - Not Classifiable as a Human Carcinogen

IARC: Monograph 93 [in preparation]; Monograph 47 [1989] (Group 2B (possibly carcinogenic to humans))

DFG: Category 3A (could be carcinogenic for man, inhalable fraction with the exception of ultra small particles)

OSHA: Present

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))

RTECS Irritation

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

Silica, amorphous (7631-86-9)

25 mg/24 hour(s) eyes rabbit mild

Titanium dioxide (13463-67-7)

300 ug/3 day(s) intermittent skin human mild

Experimental studies showed an increased incidence of benign and malignant lung tumors in rats after inhalation of ceramic fibers. Intrapleural implantation of several kinds of ceramic fibers in rats produced variable incidences of pleural mesotheliomas or sarcomas. Mesotheliomas of the abdominal cavity were found after intraperitoneal injection of ceramic fibers in rats and hamsters. Tumor incidence was related to fiber length and dose in the intraperitoneal studies.

Medical Conditions Aggravated by Exposure

respiratory disorders

RTECS Tumorigenic

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

ALUMINUM OXIDE (1344-28-1)

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

Titanium dioxide (13463-67-7)

10 mg/m3 inhalation rat TC (18 hour(s)); 250 mg/m3 inhalation rat TCLo (6 hour(s)); 260 mg/kg intramuscular rat TD (84 week(s)); 360 mg/kg intramuscular rat TDLo (2 year(s))

FERRIC OXIDE RED (1309-37-1)

135 mg/kg subcutaneous rat TDLo

RTECS Mutagenic

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

Titanium dioxide (13463-67-7)

sister chromatid exchange hamster ovary 1 umol/L; DNA inhibition hamster lung 500 mg/L; micronucleus test hamster ovary 5 umol/L; micronucleus test mouse intraperitoneal 3 gm/kg/3 day(s) continuous

RTECS Reproductive Effects

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

CARBON (7440-44-0)

167 mg/kg subcutaneous rat TDLo (pregnant female 8 day(s), continuous)

HEALTH EFFECTS

Inhalation - Acute Exposure

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.

CARBON: Inhalation of dust may cause slight mucous membrane irritation.

QUARTZ: Exposure to high concentrations may cause physical discomfort of the upper respiratory tract.

SILICON DIOXIDE: Dusts may cause irritation of the respiratory tract and coughing.

TITANIUM DIOXIDE: Inhalation may cause irritation with cough and sneezing. Nuisance dusts may cause unpleasant deposits in the nasal passages.

Inhalation - Chronic Exposure

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.

CARBON: Repeated or prolonged exposure may cause irritation and pulmonary disorders. Lung damage may result if sufficient exposure occurs.

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 characterised 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.

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.

TITANIUM DIOXIDE: Long-term exposure may cause pulmonary irritation with cough, difficulty breathing, a decline in pulmonary function, and x-ray evidence of mild fibrosis. A few cases of slight fibrosis without disabling injury have been reported from occupational exposure. Rats repeatedly exposed to concentrations of 10-328 million particles/ft3 for as long as 13 months showed small focal areas of emphysema which were attributed to large deposits of dust. Rats exposed to concentrations of 10, 50, and 250 mg/m3 for 6 hours/day, 5 days/week, for 2 years, showed no abnormal clinical signs, body weight changes, or excess mortality in any exposed group. There were, however, dose-dependent increases in the incidence of pneumonia, tracheitis, and rhinitis, with squamous metaplasia in the anterior nasal cavity. At 10 mg/m3, the pulmonary response satisfied the criteria for a nuisance dust. Bronchioalveolar adenomas and non-neoplastic pulmonary keratinizing cysts occurred only at the 250 mg/m3 level, twenty-five times the threshold limit value. These lung tumors were different from common human lung cancers in terms of tumor type, location, and tumorigenesis, and were devoid of tumor metastasis.

Inhalation - Other Toxicity Information

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.

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.

Skin Contact - Acute Exposure

ALUMINUM OXIDE (ALUMINA): Contact may cause an irritant dermatitis accompanied by pruritis.

CARBON: Contact may cause irritation.
TITANIUM DIOXIDE: Topically, it is reported to be devoid of toxicity and chemically non-irritating. However, titanium dioxide may occasionally be so occlusive that it produces miliaria.
SILICON DIOXIDE: Prolonged skin contact with dry particulate may cause drying of the skin.
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.

Skin Contact - Chronic Exposure

ALUMINUM OXIDE (ALUMINA): No data available.
CARBON: Repeated or prolonged contact may cause mechanical irritation.
SILICON DIOXIDE: No data available.
QUARTZ: No data available.
TITANIUM DIOXIDE: Application of 300 ug for 3 days intermittently to human skin produced mild irritation.

Eye Contact - Acute Exposure

ALUMINUM OXIDE (ALUMINA): Dust may cause mechanical irritation with redness and possibly swelling of the conjunctiva.
CARBON: Contact with dust may cause mechanical irritation. May also cause conjunctivitis.
TITANIUM DIOXIDE: Introduction by tatooing into the cornea of rabbit eyes and patients with corneal scars resulted in permanent white coloration, but no irritation.
SILICON DIOXIDE: Dusts may cause irritation with redness and pain.
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.
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

ALUMINUM OXIDE (ALUMINA): No data available.
CARBON: Repeated or prolonged exposure may cause mechanical irritation.
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.
FERRIC OXIDE RED: No data available.
SILICON DIOXIDE: No data available.
TITANIUM DIOXIDE: No data available.

Ingestion - Acute Exposure

ALUMINUM OXIDE (ALUMINA): No data available.
CARBON: Extremely large doses may produce gastrointestinal disturbances.
TITANIUM DIOXIDE: Titanium dioxide has been reported to be physiologically inert. Ingestion of large quantities may cause intestinal obstruction. However, a pound has been ingested without apparent harm or distress.
SILICON DIOXIDE: The effects of ingestion are purely mechanical as the substance is inert chemically and biologically.
QUARTZ: Effects of ingestion are due to mechanical action as crystalline silicas are biologically inert.

Ingestion - Chronic Exposure

ALUMINUM OXIDE (ALUMINA): Some aluminum compounds cause constipation.

CARBON: No data available.
TITANIUM DIOXIDE: Mice and rats fed 50,000 and 25,000 ppm for 103 weeks showed no evidence of toxicity and no increased incidence of tumors.
SILICON DIOXIDE: No data available.
QUARTZ: No data available.

* * * Section 12 - ECOLOGICAL INFORMATION * * *

Ecotoxicity

No data available.

Component Analysis - Aquatic Toxicity

Silica, amorphous (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

* * * 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.

ADR Tunnel Code Restrictions

This list contains tunnel restriction codes for those substances and/or chemically related entries which are found in chapter 3.2 of the ADR regulations.

CARBON (7440-44-0)

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 (1344-28-1)

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

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

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

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
ALUMINUM OXIDE	1344-28-1	Yes	Yes	Yes	Yes	Yes	Yes
Silica, amorphous	7631-86-9	Yes	Yes	Yes	No	Yes	No
CARBON ([1]related to: Graphite, synthetic)	7440-44-0	No	Yes[1]	No	No	Yes[1]	Yes
Titanium dioxide	13463-67-7	No	Yes	Yes	Yes	Yes	Yes
FERRIC OXIDE RED	1309-37-1	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:

ALUMINUM OXIDE (1344-28-1)

1 %

Silica, amorphous (7631-86-9)

1 %

FERRIC OXIDE RED (1309-37-1)

1 %

European

Not determined

Germany Water Classification

ALUMINUM OXIDE (1344-28-1)

Number 1346, not considered hazardous to water

Silica, amorphous (7631-86-9)

Number 849, not considered hazardous to water

Silica, amorphous (7631-86-9)

Number 849, not considered hazardous to water

CARBON (7440-44-0)

Number 801, not considered hazardous to water

Titanium dioxide (13463-67-7)

Number 1345, not considered hazardous to water

FERRIC OXIDE RED (1309-37-1)

Number 800, not considered hazardous to water

EU Marking and Labelling

This material is not classified

Component Analysis - Inventory

Component	CAS	US	CA	EU	AU	PH	JP	KR	CN	NZ
ALUMINUM OXIDE	1344-28-1	Yes	DSL	EIN	Yes	Yes	Yes	Yes	Yes	Yes
Silica, amorphous	7631-86-9	Yes	DSL	EIN	Yes	Yes	Yes	Yes	Yes	Yes
CARBON	7440-44-0	Yes	DSL	EIN	Yes	Yes	No	Yes	Yes	Yes
Titanium dioxide	13463-67-7	Yes	DSL	EIN	Yes	Yes	Yes	Yes	Yes	Yes
FERRIC OXIDE RED	1309-37-1	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

R11 Highly flammable.

Other Information

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End of Sheet 00234142