

SECTION 1 - IDENTIFICATION

COMPANY ADDRESS:

The Virtual Foundry, Inc
211 S Water St
Stoughton, WI 53589
USA

PRODUCT NAME: **Sapphire 3D Steel Blend**

PRODUCT USE: Sintering Refractory Ballast

SECTION 2 - HAZARDS IDENTIFICATION SUMMARY

(As defined by OSHA Hazard Communication Standard, 29 CFR 1910.1200)

Emergency Overview: Dust irritating to eyes and respiratory tract.

PHYSICAL HAZARDS:

Eye: Mechanical eye irritant. May cause tearing and redness.

Skin: Mechanical skin irritant. Prolonged contact may cause skin abrasion, redness, itching.

Sensitization: No data available.

Ingestion: May cause nausea and vomiting. No long-term health effects are anticipated.

Inhalation: Dust may be slightly irritating to the respiratory tract. May cause coughing or shortness of breath.

Target Organs: Eyes, skin, respiratory system.

Acute Effects of Exposure: Exposure may include persistent cough, shortness of breath.

Chronic Effects of Exposure: Harmful if swallowed. May cause cancer.

Signs & Symptoms of Exposure: Coughing, shortness of breath.

HMIS

| | |
|---------------------|---|
| HEALTH | 1 |
| FLAMMABILITY | 0 |
| PHYSICAL HAZARD | 0 |
| Personal Protection | E |



Precautionary Statements - Prevention:

Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product

Precautionary Statements - Response:

IF exposed or concerned: Get medical advice/attention
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell Rinse mouth

Precautionary Statements - Storage:

Store locked up

Precautionary Statements - Disposal:

Dispose of contents/container to an approved waste disposal plant

SECTION 3 - COMPOSITION, INFORMATION OF INGREDIENTS

| Chemical Name | CAS No. | %by Weight |
|--------------------|------------|-------------|
| Aluminum Oxide | 1344-28-1 | 69.0 – 75.0 |
| Graphite | 7782-42-5 | 15.0 - 25.0 |
| Titanium Dioxide | 13463-67-7 | 0.7 – 3.0 |
| Crystalline Silica | 14808-60-7 | 0.2 - 1.3 |
| Silicon Dioxide | 7631-86-9 | 0.1 – 1.3 |
| Iron Oxide | 1309-37-1 | 0.1 – 1.2 |

*The exact percentage (concentration) of composition has been withheld as a trade secret.

SECTION 4 - FIRST AID MEASURES

IF SWALLOWED: Ingestion is an unlikely route of exposure. Leave decision to induce vomiting to qualified medical personnel, since particles may be aspirated into the lungs. Seek immediate medical attention.

IF ON SKIN OR CLOTHING: Wash the affected area with soap and water. If signs/symptoms persist, seek medical attention.

IF IN EYES: Flush eyes with large amounts of water. If signs/symptoms persist, seek medical attention.

IF INHALED: Remove person to fresh air. If signs/symptoms develop, seek medical attention.

MAIN SYMPTOMS: Redness, coughing and/or wheezing.

NOTE TO PHYSICIAN: Treat symptomatically.

SECTION 5 - FIRE FIGHTING MEASURES**FLAMMABILITY**

AUTOIGNITION TEMPERATURE: N/A

SUITABLE EXTINGUISHING MEDIA: Extinguisher suitable for ordinary combustible materials. Class A extinguishing agents.

UNSUITABLE EXTINGUISHING MEDIA: CAUTION: Use of water spray when fighting fire may be inefficient.

SPECIFIC HAZARDS ARISING FROM THE CHEMICAL: N/A

HAZARDOUS COMBUSTION PRODUCTS: N/A

EXPLOSION DATA

SENSITIVITY TO MECHANICAL IMPACT: Not sensitive.

SENSITIVITY TO STATIC DISCHARGE: No information available.

FIRE FIGHTING INSTRUCTIONS AND FIRE FIGHTING EQUIPMENT: In fire conditions, fire-fighters should wear appropriate respiratory protection and full protective gear.

ADDITIONAL INFORMATION: N/A

PERSONAL PROTECTIVE EQUIPMENT: N/A

SECTION 6 - ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS: Avoid creating dust. Avoid contact with skin and eyes. Use with adequate ventilation.

ENVIRONMENTAL PRECAUTIONS: Ensure material is properly disposed of.

METHODS FOR CLEANING UP: Collect spilled material mechanically and place in a suitable, compatible, properly labeled container. Avoid creating any dust. Ensure adequate ventilation and dispose of material in accordance with all applicable local, state and federal laws.

SECTION 7 - HANDLING AND STORAGE

HANDLING: Avoid contact with skin and eyes. Wash hands before eating. Prevent the formation of dust.
Handle with adequate ventilation.

STORAGE: Normal Storage: Store in the original container in a cool, dry, well ventilated area. Keep containers tightly sealed.

SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION

EXPOSURE LIMITS

| Chemical Name | CAS No. | %by Weight | ACGIH TLV (Mg/M ³) | OSHA PEL (Mg/M ³) |
|---------------|---------|------------|-----------------------------------|----------------------------------|
|---------------|---------|------------|-----------------------------------|----------------------------------|

| | | | | |
|--------------------|------------|-------------|---------------|-----------------------------|
| Aluminum Oxide | 1344-28-1 | 69.0 – 75.0 | | |
| Graphite | 7782-42-5 | 15.0 - 25.0 | 2.0 (Resp.) | 15.0 (Total) 5.0 (Resp.) |
| Titanium Dioxide | 13463-67-7 | 0.7 – 3.0 | | |
| Crystalline Silica | 14808-60-7 | 0.2 - 1.3 | 0.025 (Resp.) | 0.1 (Resp.) |
| Silicon Dioxide | 7631-86-9 | 0.1 – 1.3 | | |
| Iron Oxide | 1309-37-1 | 0.1 – 1.2 | | |

TLV: Threshold Limit Value over 8 hours of work.

PEL: Permissible Exposure Limit

ADDITIONAL PROTECTION:

ENGINEERING CONTROLS

Engineering Measures:

Showers and Eyewash stations. Provide sufficient mechanical ventilation to reduce airborne concentrations and minimize exposure. Maintain employee exposure below applicable permissible exposure limits.

EXPOSURE MONITORING

Exposure Limits: See table above.

Hygiene Measures: Do not inhale dust/smoke/mist. Avoid contact with skin and eyes. Wash hands before eating.

PERSONAL PROTECTIVE EQUIPMENT

Eye protection: Avoid eye contact. To minimize the risk of injury to eyes, always wear appropriate protective safety glasses or chemical safety goggles.

Skin protection: Avoid skin contact with molten polymer. Wear appropriate protective clothing to minimize risk of injury to the skin from contact with dust or physical abrasion. Long sleeved/impervious clothing if contact is probable and skin is sensitive. Protect contact with skin when processing; while material is hot, wear insulated safety gloves; wash hands after handling. Coveralls should be made from fire resistive materials which tend to not accumulate static charges. They should be designed in such a way as to avoid accumulation of dust in cuffs, pockets, etc.

Respiratory protection: Avoid breathing dust. Assess exposure concentrations of all materials involved in the workplace. If concentrations exceed the exposure limits listed in Section 2, Exposure Guidelines, or irritation or other symptoms are experienced, follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard 149 approved respirator.

Hand protection: While material is hot, wear insulated safety gloves; wash hands after handling.

Hygiene measures: Provide regular cleaning of equipment, work area and clothing. Handle in accordance with good industrial hygiene and safety practices. Do not eat, drink or smoke when using this product. Wash hands before breaks and immediately after handling the product. Avoid contact with eyes. Do not breathe dust. Use personal protective equipment as required.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

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|--|---|
| Physical State: | Solid |
| Appearance: | Powder |
| Color: | Blackish |
| Odor: | None |
| Odor Threshold: | No information available. |
| Melting/Freezing Point: | No information available. |
| Boiling Point: | No information available. |
| Flash Point: | No information available. |
| Evaporation Rate: | No information available. |
| Flammability: | No information available. |
| Flammability Limits: | No information available. |
| Vapor Pressure: | Not applicable |
| Vapor Density: | Not applicable |
| Specific gravity: | No information available. |
| Relative Density: | No information available. |
| Water Solubility: | Negligible (<0.1%), Insoluble in cold and hot water |
| Percent Volatile (v/v): | 0% |
| Chemical Stability: | No information available. |
| Conditions to avoid: | No information available. |
| Solubility in other solvents: | Insoluble |
| Partition Coefficient: | No information available. |
| Auto-Ignition Temperature: | No information available. |
| Hazardous Decomposition Products: | No information available. |

| | |
|--|---------------------------|
| Possibility of Hazardous Reactions: | No information available. |
| Hazardous Polymerization: | No information available. |
| Decomposition Temperature: | No information available. |
| Viscosity: | No information available. |
| Explosive Properties: | No information available. |
| Oxidizing Properties: | No information available. |

SECTION 10 - STABILITY AND REACTIVITY

INCOMPATIBILITY:

CHEMICAL STABILITY: Stable under recommended storage conditions.

HAZARDOUS POLYMERIZATION: Will not undergo hazardous polymerization.

CONDITIONS & MATERIALS TO AVOID:

HAZARDOUS DECOMPOSITION PRODUCTS: Burning produces noxious and toxic fumes, Carbon monoxide (CO), Carbon Dioxide (CO₂). Exothermic reaction with water, acids, alkalis, to generate hydrogen and heat.

SECTION 11 - TOXICOLOGICAL INFORMATION

Principal routes of exposure: Skin contact.

PRODUCT INFORMATION:

Acute toxicity: None established.

Chronic toxicity: None established.

Specific effects: None established.

Long term toxicity: None established.

Mutagenic effects: None established.

Reproductive toxicity: None established.

Carcinogenic effects: None established.

Target organ effects: Eyes, Respiratory system.

Ingestion: May cause gastrointestinal discomfort if consumed in large amounts. Not an expected route of exposure.

Inhalation: Inhalation of dust in high concentration may cause irritation of the respiratory system.

Eye Contact: Dust contact with the eyes can lead to mechanical irritation.

Symptoms related to the physical, chemical, and toxicological characteristics: Redness. Coughing and/or wheezing.

Delayed and immediate effects and also chronic effects from short and long term exposure:

Irritation: Product dust may be irritating to eyes, skin, and respiratory system.

| Chemical Name | Oral LD50 | Dermal LD50 | Inhalation LC50 |
|----------------------------------|---------------------|-------------|-----------------|
| Crystalline Silica 14808-60-7 | = 500 mg/kg (Rat) | | |

INFORMATION ON TOXICOLOGICAL EFFECTS

Symptoms: No information available

DELAYED AND IMMEDIATE EFFECTS AS WELL AS CHRONIC EFFECTS FROM SHORT AND LONG-TERM EXPOSURE

Sensitization: No information available

Germ cell mutagenicity: No information available

Carcinogenicity: No information available

| Chemical Name | ACGIH | IARC | NTP | OSHA |
|----------------------------------|-------|---------|-------|------|
| Crystalline Silica 14808-60-7 | A2 | Group 1 | Known | X |

ACGIH (American Conference of Governmental Industrial Hygienists)

A2 - Suspected Human Carcinogen

IARC (International Agency for Research on Cancer)

Group 1 - Carcinogenic to Humans

NTP (National Toxicology Program)

Known - Known Carcinogen

OSHA (Occupational Safety and Health Administration of the US Department of Labor)

X - Present

Reproductive toxicity: No information available

STOT - single exposure: No information available

STOT - repeated exposure: No information available

Target Organ Effects: Central Vascular System (CVS), Eyes, lungs, Respiratory system

Aspiration hazard: No information available.

SECTION 12 - ECOLOGICAL INFORMATION

Ecotoxicity: 100% of the mixture consists of component(s) of unknown hazards to the aquatic

environment

Persistence and degradability: Not readily biodegradable.

Bioaccumulation: Not expected to bioconcentrate or bioaccumulate.

Mobility: Is not likely mobile in the environment.

Other adverse effects: This substance is not considered to be persistent, bioaccumulating nor toxic (PBT).

Ozone: Not applicable.

SECTION 13 - DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHODS: Solid or chemical waste generators must determine whether a discarded waste is classified as a hazardous waste. U.S. EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local waste regulations to ensure complete and accurate classification.

CONTAMINATED PACKAGING: No information available.

SECTION 14 - TRANSPORT INFORMATION

DOT: Not regulated.

MEX: Not regulated.

ICAO: Not regulated.

IATA: Not regulated.

IMDG: Not regulated.

UN NUMBER: N/A.

SECTION 15 - REGULATORY INFORMATION

DSL/NDL - Canadian Domestic Substances List/Non-Domestic Substances List.

EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances.

ENCS - Japan Existing and New Chemical Substances.

IECSC - China Inventory of Existing Chemical Substances.

KECL - Korean Existing and Evaluated Chemical Substances.

PICCS - Philippines Inventory of Chemicals and Chemical Substances.

AICS - Australian Inventory of Chemical Substances.

DOT: This product is not regulated by USDOT as a Hazardous Material (49 CFR 172.101). No UN code assigned. No placard required for transportation.

SARA (TITLE III): Under applicable definitions, this material may meet the criteria for a delayed (chronic) health hazard.

SARA (SECTION 313): Aluminum Oxide is not an extremely hazardous substance in Section 302 and is not a toxic chemical subject to the requirements of 313.

CALIFORNIA PROP. 65: Not Listed

TSCA: Aluminum Oxide is listed on the TSCA inventory under CAS# 1344-28-1. United States Toxic Substances Control Act Section 8(b) Inventory.

CERCLA: Aluminum Oxide is not classified as a hazardous substance under CERCLA regulations, 40 CFR 302.

RCRA HAZARDOUS WASTE NUMBER: Aluminum Oxide is not classified as a hazardous material under RCRA or its regulations, 40 CFR 261.

Electrical equipment must be suitable for use in hazardous atmospheres involving Group E combustible dusts in accordance with 29CFR1910.307. Refer to the National Electrical Code (NFPA 70) for guidance in determining the type and design of equipment and installation which meets this requirement.

CLEAN AIR ACT, TITLE VI (1990): This product does not contain, nor was it manufactured using ozone depleting chemicals.

California Proposition 65: This product contains the following Proposition 65 chemicals

| Chemical Name | California Proposition 65 |
|---------------------------------|---------------------------|
| Crystalline Silica - 14808-60-7 | Carcinogen |

US RIGHT TO KNOW REGULATIONS

| Chemical Name | New Jersey | Massachusetts | Pennsylvania |
|----------------------------------|------------|---------------|--------------|
| Graphite 7782-42-5 | X | X | X |
| Crystalline Silica 14808-60-7 | X | X | X |

US EPA LABEL INFORMATION

EPA Pesticide Registration Number: Not applicable

SECTION 16 - OTHER INFORMATION, INCLUDING THE DATE OF PREPARATION OF THE LAST REVISION

LABEL REQUIREMENTS: Not expected to produce significant adverse health effects when the recommended instructions for use are followed.

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|---------------------------|-----------------|---|
| NFPA HAZARD RATINGS | HEALTH | 0 |
| | FLAMMABILITY | 1 |
| | PHYSICAL HAZARD | 0 |
| | INSTABILITY | - |

| | | | | | |
|---------------------------|--|---|--|--|--|
| | 4=Severe 3=Serious 2=Moderate 1=Slight 0=Minimal | | | | |
| HMIS HAZARD RATINGS | HEALTH | 1 | | | |
| | FLAMMABILITY | 1 | | | |
| | PHYSICAL HAZARD | 0 | | | |
| | PERSONAL PROTECTION | X | | | |
| | 4=Severe 3=Serious 2=Moderate 1=Slight 0=Minimal | | | | |

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REVISED DATE: December 2020