



P.O. Box 191, U.S. Route 1 • Thomaston, Maine 04861 • 207-594-5555

SAFETY DATA SHEET

SECTION 1: IDENTIFICATION

Product Identifier:	Dragon Slag
Other means of identification:	Ground Granulated Blast Furnace Slag (GGBFS), Slag, Grade 80, 100 or 120 Slag, Slag Cement
Recommended use and restrictions on use:	Slag is used in the production of quality-improved slag cement. For restrictions, see Section 10 for incompatibility information
Manufacturer or distributor name, address, phone number:	Dragon Products Company US Route 1 P.O. Box 191 Thomaston, Maine 04861 207-594-5555
Emergency phone number:	207-593-0120

SECTION 2: HAZARD IDENTIFICATION

Classification:	Carcinogenicity ¹ Skin Corrosion ^{1A to 1C} Ingestion ⁴
Signal Word:	DANGER
Hazard Statement:	May cause Cancer. May cause severe skin burns and eye damage. Harmful if swallowed.
Symbol(s):	
Precautionary Statement(s):	
Prevention	Use proper engineering controls, work practices and personal protective equipment to prevent exposure to product. Wash hands thoroughly after handling. Avoid breathing dust.
Response	If swallowed seek medical attention. If in eyes, rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. If eye irritation persists, seek medical attention. If inhaled, remove person to fresh air. If skin irritation occurs remove

	contained clothing. Rinse skin with water.
Storage	Store in sealed containers in a dry area away from the weather and flood danger.
Disposal	Dispose of contents according to local, state and federal regulation.

SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

Components	CAS No.	% by Weight
Amorphous Silica	7631-86-9	30 - 50
Complexed silicates and fused mineral oxides, including: Ca ₂ FeO ₅ , Ca ₃ Mg(SiO ₄) ₂ , and Ca ₂ Al ₂ SiO ₇	Mixture	0 - 40
Calcium Oxide	1305-78-8	0 - 5
Crystalline Silica - Quartz	14808-60-7	0 - 15
Iron Compounds	Various	0 - 10
Magnesium Compounds	Various	0 - 20
Titanium Compounds	Various	0 - 5
Manganese Compounds	Various	0 - 2
Sulfur	7704-34-9	0 - 2

SECTION 4: FIRST AID MEASURES

Eyes:	Immediately flush eye(s) with plenty of clean water for at least 15 minutes while holding the eyelid(s) open. Occasionally lift the eyelid(s) to ensure thorough rinsing. Beyond flushing, do not attempt to remove material from the eye(s). Get immediate medical attention.
Skin:	Wash affected areas thoroughly with mild soap and fresh water. Remove and wash contaminated clothing and shoes. Contact a physician if irritation persists or later develops. Burns should be treated as caustic burns.
Inhalation:	If inhaled remove to fresh air. Dust in throat and nasal passages should clear spontaneously. Contact a physician if irritation persists or if breathing is difficult.
Ingestion:	If person is conscious, do not induce vomiting. Give large quantity of water and get immediate medical attention. Never attempt to make an unconscious person drink.
Additional Medical Information:	Calcium oxide particles readily adhere to the conjunctiva and may form clumps of moist compound which can be difficult to remove by usual irrigation. These clumps tend to lodge deep in inferior and superior cul-de-sacs and act as reservoirs of calcium hydroxide

	over long periods of time. Rapid irrigation is recommended; however, debridement and use of a complexing agent (such as disodium EDTA) may also be necessary. Not all individuals with silicosis will exhibit symptoms of the disease. However, silicosis is progressive, and symptoms can appear at any time, even years after exposures have ceased. Persons with silicosis have an increased risk of pulmonary tuberculosis infection.
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SECTION 5: FIRE-FIGHTING MEASURES

Suitable (and unsuitable) extinguishing media:	The presence of this material in a fire does not hinder the use of any standard extinguishing medium. Use extinguishing medium for surrounding fire.
Specific Hazards:	<i>Flash Point (Method Used):</i> Not applicable <i>Flammable Limits:</i> LEL and UEL - Not applicable <i>Autoignition Temperature:</i> Not applicable Hydrogen sulfide gas could accumulate if heated moist slag is enclosed without adequate ventilation. Hydrogen sulfide is an extremely flammable gas and can explode if an ignition source is provided. A self-contained breathing apparatus approved by NIOSH/MSHA is recommended.
Special protective equipment and precautions:	Use proper personal protective equipment (PPE) appropriate to manage the fire.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment, and emergency procedures:	Persons involved in cleanup processes should first observe precautions (as appropriate) identified in Section 8 of this SDS. Spilled material, where dust is generated, may overexpose cleanup personnel to cement dust and respirable crystalline silica-containing dust. Do not dry sweep. Wetting of spilled material and/or use of respiratory protective equipment may be necessary. Prevent spilled materials from entering streams, drains, or sewers. Allow to dry or solidify before disposal.
Methods and materials for containment and clean up:	Dispose of waste materials in accordance with applicable federal, state and local laws and regulations.

SECTION 7: HANDLING AND STORAGE

Precautions for safe handling:	Mixture is caustic when wet. Respirable crystalline silica-containing dust may be generated during processing, handling, and storage. Use personal protection and controls identified in Section 8 of this SDS as appropriate.
Conditions for safe storage,	Store in sealed containers in a dry area away from the

including any incompatibilities:	weather and flood danger. Cement will swell and generate heat when moistened, and may burst containers. Do not store near food, beverages or smoking materials.
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SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

<i>Legend:</i> NE = Not Established; PEL = Permissible Exposure Limit; TLV = Threshold Limit Value; REL = Recommended Exposure Limit; OSHA = Occupational Safety and Health Administration; MSHA = Mine Safety and Health Administration; NIOSH = National Institute for Occupational Safety and Health; ACGIH = American Conference of Governmental Industrial Hygienists			
Component	OSHA/MSHA PEL	ACGIH TLV	NIOSH REL
Amorphous Silica	20 mppcf (80mg/m ³ /percentsilica)	NE	6 mg/m ³
Particulates not otherwise classified – nuisance dust	15 mg/m ³ (total dust) 5 mg/m ³ (respirable fraction)	10 mg/m ³ (inhalable fraction) 3 mg/m ³ (respirable fraction)	NE
Respirable dust containing silica	10 mg/m ³ ÷ (% silica + 2)	Use Respirable Silica TLV	Use Respirable Silica TLV
Total dust containing silica	OSHA: 30 mg/m ³ ÷ (% silica + 2) MSHA: 30 mg/m ³ ÷ (% silica + 3)	NE	NE
Respirable dust containing silica	NE -Use respirable dust PEL	0.025 mg/m ³	0.05 mg/m ³
Respirable Crystalline Silica (quartz)	1/2 of OSHA and MSHA respirable dust PEL	0.025 mg/m ³	0.05 mg/m ³
Respirable Tridymite and Cristobalite (other forms of crystalline silica)	5 mg/m ³	2 mg/m ³	2 mg/m ³
Calcium Oxide	15 mg/m ³ (total dust)	10 mg/m ³ (inhalable fraction)	2 mg/m ³
Magnesium Oxide	15 mg/m ³ (total dust) 5 mg/m ³ (Respirable)	10 mg/m ³ (total dust)	NE
Aluminum Oxide	10 mg/m ³	5 mg/m ³ (respirable fraction)	15 mg/m ³ (total dust) 5 mg/m ³ (Respirable)
Iron Oxide	15 mg/m ³ (total dust)	10 mg/m ³ (total dust) 3 mg/m ³ (respirable fraction)	5 mg/m ³ (respirable fraction)
Titanium Oxide	5 mg/m ³ (respirable fraction)	0.2 mg/m ³ (as Mn)	NE
Manganese Oxide	5 mg/m ³ (as Mn)	14 mg/m ³ 21 mg/m ³ (STEL)	1 mg/m ³

Hydrogen Sulfide	20 ppm (Ceiling)	1.4 mg/m ³ 7.0 mg/m ³ (STEL)	10 ppm (Ceiling)
Sulfur Dioxide	13 mg/m ³	5 mg/m ³ 13 mg/m ³ (STEL)	5 mg/m ³ 13 mg/m ³ (STEL)
Appropriate Engineering Controls/Personal Protective Equipment			
Eye Protection		Skin Protection (Protective Gloves/Clothing)	
Safety glasses with side shields should be worn as minimum protection. Goggles or face shield should be worn where splashing is possible. Dust goggles should be worn when excessively (visible) dusty conditions are present or are anticipated due to working with hardened product. Do not wear contact lenses when working under dusty conditions.		Waterproof gloves, rubber boots, and clothing sufficient to protect the skin from contact with wet product should be worn. Clothing saturated from contact with wet product should be removed promptly to prevent continued contact with skin. As a precaution, wash hands thoroughly before eating, smoking, and using toilet facilities. After working with product, workers should clean their skin/shower with soap and water. Clean clothing should be worn after showering.	
Respiratory Protection			
All respirators must be NIOSH-approved for the exposure levels present. (See NIOSH Respirator Selection Guide). The need for respiratory protection should be evaluated by a qualified safety and health professional. Activities that generate dust require the use of an appropriate dust respirator where dust levels exceed or are likely to exceed allowable exposure limits. For respirable silica levels that exceed or are likely to exceed an 8hr Time Weighted Average (TWA) of 0.5 mg/m ³ , a high efficiency particulate filter respirator must be worn at a minimum; however, if respirable silica levels exceed or are likely to exceed an 8 hr TWA of 5.0 mg/m ³ a positive pressure, full face respirator or equivalent is required. Respirator use must comply with applicable MSHA(42 CFR 84) or OSHA (29 CFR 1910.134) standards, which include provisions for a user training program, respirator inspection, repair and cleaning, respirator fit testing, medical surveillance and other requirements.			
Ventilation		Other	
Activities that generate dust require the use of local exhaust or general ventilation adequate to maintain exposures below appropriate exposure limits.		A clean water supply for emergency first aid and washing facilities should be readily available. Clothing should be washed between uses. Dust and other components should be monitored regularly to determine worker exposure levels. Exposure levels in excess of appropriate exposure limits should be reduced by all feasible engineering controls, including (but not limited to) wet suppression, ventilation, process enclosure, and enclosed employee workstations.	

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point: Not Applicable	pH: 8 -11 in water	Specific Gravity (H ₂ O = 1): 2-3
Evaporation Rate (Butyl Acetate = 1): Not applicable	Melting Point: Not Applicable	Vapor Pressure (mm Hg): Not Applicable
Solubility in Water: 0.1 - 1%	Vapor Density (Air = 1): Not applicable	% Volatile: None
Appearance and odor: Gray to white, solid (powder); no odor		

SECTION 10: STABILITY AND REACTIVITY

Chemical Stability:	<i>Stability</i> - Stable under normal temperatures and pressures. Reacts with water resulting in a slight release of heat, depending on the amount of calcium oxide present.
Possibility of Hazardous Reactions:	<p><i>Conditions to Avoid</i> - Avoid heating moist or wet slag because toxic hydrogen sulfide gas may be produced. Contact with incompatible materials should be avoided (see below). See Sections 5 and 7 for additional information.</p> <p><i>Incompatibility (Materials to Avoid)</i> - Trace amounts of calcium oxide in slag may react with water to form caustic calcium hydroxide. Calcium oxide reacts violently with phosphoric anhydride halogenated compounds including boron trifluoride, chlorine trifluoride, hydrogen fluoride, and fluorine. Contact with hydrochloric acid may produce toxic chlorine gas. Silica reacts violently with powerful oxidizing agents such as fluorine, boron trifluoride, chlorine trifluoride, manganese trifluoride, and oxygen difluoride yielding possible fire and/or explosions. Silica dissolves readily in hydrofluoric acid producing a corrosive gas -silicon tetrafluoride.</p> <p><i>Hazardous Decomposition or Byproducts</i> - Hydrogen sulfide gas may be released from slag when it is heated or dried. Toxic chloride and fluoride fumes may be released during thermal decomposition. When heated, quartz is slowly transformed into tridymite (above 860°C/1580°F) and cristobalite (above 1470°C/2678°F). Both tridymite and cristobalite are considered more fibrogenic to the lungs than quartz.</p> <p><i>Hazardous Polymerization</i> - Not known to occur.</p>

SECTION 11: TOXICOLOGICAL INFORMATION

Health effects:	<i>Acute</i> - When slag containing moisture is heated, it can release small quantities of hydrogen sulfide (H ₂ S)
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gas which can be extremely hazardous, particularly in confined spaces. Do not depend upon the sense of smell for warning of overexposure, since H₂S causes rapid olfactory fatigue which deadens the sense of smell at levels as low as 50 ppm. Exposure to H₂S concentrations above the permissible exposure limit causes irritation of the mucous membranes, headache, dizziness, vomiting, coughing, nasal discharge and pulmonary edema. At levels between 500 and 700 ppm, respiratory paralysis, loss of consciousness, and possibly death can occur within 30 to 60 minutes. Exposure to higher concentrations of H₂S can result in immediate death. Repeated exposure to low levels may also cause eye effects including conjunctivitis and corneal injury. There is no evidence that H₂S will accumulate in the body tissue after repeated overexposure. Calcium oxide (lime) severely irritates the tissues contacted primarily because of its alkalinity.

Chronic - Slag cement may contain trace amounts of hexavalent chromium. Hexavalent chromium has been associated in some individuals with causing allergic skin reactions which may be manifested as contact dermatitis and skin ulcerations. Individuals who develop allergies to skin sensitizers such as hexavalent chromium, may experience a reaction upon repeated contact with those compounds. Irritated or broken skin is more likely to develop further complications such as ulcers and infection. Repeated or prolonged exposure of the skin and eyes to sulfur containing dust may cause dermatitis and/or conjunctivitis (inflammation of the eye). Chronic overexposure to iron oxide dust has resulted in a benign pneumoconiosis called Siderosis. The condition has not been found to cause fibrosis or decreased pulmonary function, and has not been associated with illness nor decreased life expectancy. Prolonged overexposure to respirable dusts in excess of appropriate exposure limits can cause inflammation of the lung leading to possible fibrotic changes, a medical condition known as pneumoconiosis. Prolonged and repeated inhalation of respirable crystalline silica-containing dust in excess of allowable exposure limits may cause a chronic form of silicosis, an incurable lung disease that may result in permanent lung damage or death. Chronic silicosis generally occurs after 10 years or more of overexposure; a more accelerated type of silicosis may occur between 5 and 10 years of higher levels of exposure. In early stages of silicosis, not all individuals will exhibit symptoms

(signs) of the disease. However, silicosis can be progressive, and symptoms can appear at any time, even years after exposure has ceased. Symptoms of silicosis may include, but are not limited to, the following: shortness of breath; difficulty breathing with or without exertion; coughing; diminished work capacity; diminished chest expansion; reduction of lung volume; right heart enlargement and/or failure. Persons with silicosis have an increased risk of pulmonary tuberculosis infection. Repeated overexposures to very high levels of respirable crystalline silica (quartz, cristobalite, tridymite) for periods as short as six months may cause acute silicosis. Acute silicosis is a rapidly progressive, incurable lung disease that is typically fatal. Symptoms include (but are not limited to): shortness of breath, cough, fever, weight loss, and chest pain. Respirable dust containing newly broken silica particles has been shown to be more hazardous to animals in laboratory tests than respirable dust containing older silica particles of similar size. Respirable silica particles which had aged for sixty days or more showed less lung injury in animals than equal exposures of respirable dust containing newly broken particles of silica. There are reports in the literature suggesting that excessive crystalline silica exposure may be associated with autoimmune disorders and other adverse health effects involving the kidney. In particular, the incidence of scleroderma (thickening of the skin caused by swelling and thickening of fibrous tissue) appears to be higher in silicotic individuals. To date, the evidence does not conclusively demonstrate a causal relationship between silica exposure and these adverse health effects.

Carcinogenicity: Epidemiology studies on the association between crystalline silica exposure and lung cancer have had both positive and negative results. There is some speculation that the source and type of crystalline silica may play a role. Studies of persons with silicosis indicate an increased risk of developing lung cancer, a risk that increases with the level and duration of exposure. It is not clear whether or not lung cancer develops in nonsilicotic patients. Several studies of silicotics do not account for lung cancer confounders, especially smoking, which have been shown to increase the risk of developing lung disorders, including emphysema and lung cancer. In October 1996, an IARC Working Group designated respirable crystalline silica as carcinogenic (Group 1). The

	<p>NTP's Report on Carcinogens, 9th edition, lists respirable crystalline silica as a "known human carcinogen." In year 2000, the American Conference of Governmental Industrial Hygienists (ACGIH) listed respirable crystalline silica (quartz) as a suspected human carcinogen (A-2). These classifications are based on sufficient evidence of carcinogenicity in certain experimental animals and on selected epidemiological studies of workers exposed to crystalline silica. Slag Cement is not listed as a carcinogen by International Agency for Research on Cancer (IARC) or National Toxicological Program (NTP); However Slag Cement does contain trace amounts of Chromium VI (hexavalent) which is classified by IARC and NTP as a known human carcinogen.</p>
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SECTION 12: ECOLOGICAL INFORMATION (Non-mandatory)

Ecological:	Prevent spilled materials from entering streams, drains, or sewers. A large release of pH material may result in toxicity to aquatic organisms and systems. Other adverse effects: No specific data on this product.
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SECTION 13: DISPOSAL CONSIDERATIONS (Non-mandatory)

Safe handling and methods of disposal:	Place contaminated materials in appropriate containers and dispose of in a manner consistent with applicable federal, state, and local regulations. Do not dump on the ground unless allowed by local regulatory officials. Prevent from entering drainage, sewer systems, and unintended bodies of water. It is the responsibility of the user to determine, at the time of disposal, whether product meets criteria for hazardous waste. Product uses, transformations, mixture and processes, may render the resulting material hazardous.
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SECTION 14: TRANSPORT INFORMATION (Non-mandatory)

UN Number:	Not Applicable
UN Proper Shipping Name:	Not Regulated
Packing group, If applicable:	Not Applicable
Environmental hazards (e.g., Marine Pollutant):	Not Applicable
Other - Labeling Requirements:	Not applicable. Label as required by the OSHA Hazard Communication standard [29 CFR 1910.1200(f)], MSHA Hazard Communication standard [30 CFR Part 47] and applicable state and local regulations.

SECTION 15: REGULATORY INFORMATION (Non-mandatory)

<p>Specific safety, health and environmental regulations:</p>	<p><i>Toxic Substances Control Act (TSCA):</i> The components in this product are listed on the TSCA Inventory or are exempt.</p> <p><i>Comprehensive Environmental Response, Compensation and Liability Act (CERCLA):</i> Releases of this material to air, land, or water are not reportable to the National Response Center under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) or to state and local emergency planning committees under the Superfund Amendments and Reauthorization Act.</p> <p><i>Superfund Amendments and Reauthorization Act of 1986 (SARA), Title III: Section 302 extremely hazardous substances:</i> None</p> <p><i>Section 311/312 hazard categories: Acute Health, Delayed Health, Section 313 reportable ingredients at or above de minimus concentrations:</i> None</p> <p><i>California Proposition 65:</i> This product may contain chemicals (crystalline silica; trace hexavalent chromium; trace metals) known to the State of California to cause cancer.</p> <p><i>State Regulatory Lists:</i> Each state may promulgate standards more stringent than the federal government. This section cannot encompass an inclusive list or all state regulations. Therefore, the user should review the components listed in Section 2 and consult state or local authorities for specific regulations that apply.</p> <p><i>Canadian Workplace Hazardous Materials Information System (WHMIS):</i> This product contains crystalline silica and calcium oxide and is classified as D2A, E (Very toxic material causing other toxic effects; corrosive solid), subject to WHMIS requirements. Consult local authorities for acceptable exposure limits. WHMIS information 416-327-7066.</p>
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SECTION 16: OTHER INFORMATION (Non-mandatory)

<p>Date of Preparation:</p>	<p>March 17, 2015</p>
<p>Disclaimer of Liability:</p>	<p>Dragon Products Company LLC believes the information contained herein is accurate; however, Dragon Products Company LLC makes no guarantees with respect to such accuracy and assumes no liability in connection with the use of the information contained herein by any party. The provision of the information contained herein is not intended to be and should not be construed as legal advice</p>

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