



**Material Safety Data Sheet**  
**For**  
**Ground Granulated Blast Furnace Slag**  
**DURA SLAG™**

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**Section I – Identity**

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**Material Name:** Ground Granulated Blast Furnace Slag (GGBS/GGBFS, or Slag Powder)  
**Trade Name:** DURA SLAG™  
**Description:** A ground powder made with an appropriate mill from a glassy granular material formed when molten iron blast furnace slag is rapidly chilled as by immersion in water.  
**CAS Reg. No.:** N/A (Mixture)  
**Revision Date:** November 2011  
**Contact Phone No.:** (913) 451-8900  
**Manufacturer:** Ash Grove Cement Company  
11011 Cody  
Overland Park, KS 66210

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**Section II – Ingredients Identity**

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<b>Ingredient:</b>	Iron Blast-Furnace Slag	
<u>Components</u>	<u>CAS Number</u>	<u>Percentage (Approx.)</u>
Calcium oxide (CaO)	1305-78-8	30-50
Silicon dioxide (amorphous) (SiO <sub>2</sub> )	7631-86-9	30-40
Magnesium oxide (MgO)	1309-48-4	2-14
Alumina (Al <sub>2</sub> O <sub>3</sub> )	1344-28-1	7-18
Iron oxide (Fe <sub>2</sub> O <sub>3</sub> )	1309-37-1	0.1-1.8
Manganese oxide (MnO)	7439-96-5	0-1.0
Sulfur (S)	7704-34-9	0-2.0
Gypsum	13397-24-5	0-5

Slag is a nonmetallic byproduct of the production from the production of iron. Trace amounts of chemicals may be detected during chemical analysis. For example, slag may contain trace amounts of titanium oxide, chromium compounds, sulfur compounds, and other trace compounds.

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**Section III – Physical Data of Material**

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**Boiling Point:** N/A  
**Specific Gravity (H<sub>2</sub>O=1):** 2.80-2.95  
**Vapor Pressure (mm Hg):** N/A  
**Melting Point:** N/A  
**Vapor Density (AIR-1):** N/A



<b>Evaporation Rate:</b>	N/A
<b>Solubility in Water:</b>	0.1-0.5%
<b>Appearance &amp; Odor:</b>	Beige to white powder with traces of sulfur odor

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#### Section IV – Fire and Explosion Hazard of Material

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<b>Flash Point:</b>	N/A.
<b>Extinguishing Media:</b>	Use media suitable for surrounding fire.
<b>Special Fire Fighting Procedures:</b>	None.
<b>Unusual Fire &amp; Explosion Hazards:</b>	None Reported.
<b>Flammable Limits:</b>	N/A.
<b>Lower Explosive Limit:</b>	N/A.
<b>Upper Explosive Limits:</b>	N/A.

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#### Section V – Reactivity Data

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<b>Stability:</b>	Stable. Keep dry until use. Slag may react with water resulting in slight release of heat, depending on the amount of calcium oxide present. Avoid contact with incompatible materials.
<b>Conditions to Avoid (Stability):</b>	Avoid moisture. Keep dry until used.
<b>Incompatibility:</b>	Slag is incompatible with acids, ammonium salts, and aluminum metal. Slag dissolves in hydrofluoric acid, producing corrosive silicon tetrafluoride gas. Slag reacts with water to form silicates and calcium hydroxide. Silicates react with powerful oxidizers such as fluorine, boron trifluoride, chlorine trifluoride, manganese trifluoride, and oxygen difluoride.
<b>Hazardous Decomposition/Byproducts:</b>	Hydrogen sulfide may be released from moist or wet slag when heated. Respirable dust particles may be generated when the product is handled.
<b>Hazardous Polymerization:</b>	Will not occur. No conditions to avoid.

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#### Section VI - Health Hazard Data

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##### **SECTION VI: HEALTH HAZARD DATA AND FIRST AID**

##### **EXPOSURE LIMITS:**

Unless specified otherwise, limits are expressed as a time-weighted average (TWA) concentration for an 8-hour work shift of a 40-hour workweek.

##### **Abbreviations:**

**ACGIH TLV:** Threshold limit value of the American Conference of Governmental Industrial Hygienists (ACGIH). The Federal Mine Safety and Health Administration (MSHA) has adopted the TLVs established by ACGIH, as set forth in the 1973 edition of "TLVs Threshold Limit Values for Chemical Substances in Workroom Air Adopted by ACGIH for 1973".



**IARC:** International Agency for Research on Cancer

**m.p.p.c.f.:** Millions of particles per cubic foot of air, based on impinger samples counted by lightfield techniques; this is an antiquated form of measurement and is seldom used.

**mg/m<sup>3</sup>:** Milligrams of substance per cubic meter of air.

**NIOSH REL:** Recommended exposure limit of the National Institute for Occupational Safety and Health (NIOSH), expressed as a TWA concentration for up to a 10-hour workday during a 40- hour workweek.

**NIOSH STEL:** NIOSH Short Term Exposure Limit. This is a 15-minute TWA exposure that should not be exceeded at any time during a workday.

**NTP:** National Toxicology Program

**OSHA ACC:** Acceptable Ceiling Concentration set by the federal Occupational Safety and Health Administration (OSHA). Under OSHA regulations, an employee's exposure to an acceptable ceiling concentration shall not exceed at any time during an 8-hour shift the acceptable ceiling concentration limit given for the substance, except for a time period, and up to a concentration not exceeding the maximum duration and concentration allowed as specified under the subheading "acceptable maximum peak above ACC for an 8-hour shift". If no such subheading appears, then employee exposure shall never exceed the acceptable ceiling concentration limit.

**OSHA PEL:** Permissible exposure limit of OSHA.

<b>Calcium Oxide (CaO)</b>	<b>OSHA PEL:</b> 5 mg/m <sup>3</sup>	<b>ACGIH TLV:</b> 5 mg/m <sup>3</sup>	<b>NIOSH REL:</b> 2 mg/m <sup>3</sup>
<b>Amorphous Silicon Dioxide (SiO<sub>2</sub>)</b>	<b>OSHA PEL:</b> 80 mg/m <sup>3</sup> ÷ % SiO <sub>2</sub>	<b>ACGIH 1973 TLV:</b> 20 m.p.p.c.f.; 2005 ACGIH TLV: withdrawn due to insufficient data	<b>NIOSH REL:</b> 6 mg/m <sup>3</sup>
<b>Magnesium Oxide (MgO)</b>	<b>OSHA PEL:</b> (total particulate) 15 mg/m <sup>3</sup>	<b>ACGIH TLV:</b> 10 mg/m <sup>3</sup>	<b>NIOSH REL:</b> Not listed
<b>Alumina (Al<sub>2</sub>O<sub>3</sub>)</b>	<b>OSHA PEL:</b> (respirable) 5 mg/m <sup>3</sup> , (total dust) 15 mg/m <sup>3</sup>	<b>ACGIH TLV:</b> 10 mg/m <sup>3</sup>	<b>NIOSH REL:</b> Not listed
<b>Iron Oxide (Fe<sub>2</sub>O<sub>3</sub>)</b>	<b>OSHA PEL:</b> 10 mg/m <sup>3</sup>	<b>ACGIH TLV:</b> 10 mg/m <sup>3</sup>	<b>NIOSH REL:</b> 5 mg/m <sup>3</sup>
<b>Manganese Oxide (MnO)</b>	<b>OSHA ACC:</b> 5 mg/m <sup>3</sup>	<b>ACGIH TLV:</b> 5 mg/m <sup>3</sup>	<b>NIOSH STEL:</b> 3 mg/m <sup>3</sup> ; <b>NIOSH REL:</b> 1 mg/m <sup>3</sup>
<b>Sulfur (S)</b>	<b>OSHA PEL:</b> Not listed	<b>ACGIH TLV:</b> Not listed	<b>NIOSH STEL:</b> Not listed
<b>Other Particulates</b>	<b>OSHA PEL:</b> total particulate, not otherwise regulated) 15 mg/m <sup>3</sup> ; (respirable particulate, not otherwise regulated) 5 mg/m <sup>3</sup>	<b>ACGIH TLV</b> (nuisance particulates) 10 mg/m <sup>3</sup> .	



**HEALTH HAZARDS:**

**Primary Route(s) of Entry:**

**Inhalation:** Yes      **Skin:** Yes      **Ingestion:** No or unlikely.

**Acute:**

**Eye Contact:** May cause immediate or delayed irritation to the eyes. Direct contact by larger amounts of material or splashes of wet material may cause effects ranging from moderate eye irritation to chemical burns and blindness. Eye exposures require immediate first aid to prevent significant damage to the eye.

**Inhalation:** Dusts may irritate the nose, throat, and respiratory tract. Coughing, sneezing, and shortness of breath may occur following exposures in excess of appropriate exposure limits.

**Skin Contact:** Exposure to dry material may cause drying of the skin with consequent mild irritation. Dry material contacting wet skin or exposure to moist or wet material may cause more severe skin effects including thickening, cracking or fissuring of the skin. Prolonged exposure can cause severe skin damage in the form of (caustic) chemical burns.

**Ingestion:** Ingestion of large amounts may cause gastrointestinal irritation and blockage.

**Chronic:**

**Inhalation:** Inhalation of slag dust can cause inflammation of the lining of the nose.

**Carcinogenicity:** Slag is not listed as a carcinogen by IARC or NTP. However, slag may contain trace amounts of substances (such as hexavalent chromium) that are classified by IARC and NTP as carcinogens.

**Eye Contact:** Exposure to slag dust may cause inflammation of the cornea.

**Skin Contact:** Hypersensitive individuals may develop allergic dermatitis due to the potential presence of trace amounts of hexavalent chromium.

**Signs & Symptoms of Exposure:** Irritation of eyes, skin and/or respiratory system.

**Medical Conditions Generally Aggravated by Exposure:** Inhaling respirable dust may aggravate existing respiratory system disease(s) and/or dysfunctions such as emphysema or asthma. Exposure may aggravate existing skin and/or eye conditions.

**EMERGENCY & FIRST AID PROCEDURES:**

**Eyes:** Immediately flush eye(s) with plenty of clean water for at least 15 minutes, while holding the eyelid(s) open. Beyond flushing, do not attempt to remove material from the eye(s). Contact a physician if irritation persists or later develops.

**Inhalation:** Remove to fresh air. Dust in throat and nasal passages should clear spontaneously. Contact a physician if irritation persists or later develops.

**Skin:** Wash with cool water and a pH-neutral soap or mild detergent intended for use on skin. Seek medical treatment in all cases of prolonged direct exposure to wet product or prolonged wet skin exposure to dry product.

**Ingestion:** Do not induce vomiting. If person is conscious, give large quantity of water. Get immediate medical attention.



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## Section VII - Preventive Measures

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**Ventilation:** Local exhaust or general ventilation adequate to maintain exposures below appropriate exposure limits.

**Other:** Exposure levels should be monitored regularly. Exposure levels in excess of appropriate exposure limits should be reduced by all feasible engineering controls, including (but not limited to) ventilation, process enclosure, and enclosed employee workstations.

**Respiratory Protection:** When exposure levels exceed or are likely to exceed appropriate exposure limits, follow MSHA or OSHA regulations, as appropriate, for use of NIOSH-approved respiratory protection equipment.

**Skin Protection:** Protective gloves, shoes and protective clothing that are impervious to water should be worn to avoid contact with skin.

**Eye Protection:** Safety glasses with side shields should be worn as minimum protection. Dust goggles should be worn when excessive (visible) dust conditions are present or anticipated. Contact lenses should not be worn when working with this product.

**Hygiene:** Periodically wash exposed skin with a pH-neutral soap. Wash again before eating, drinking, smoking, and using toilet facilities. Wash work clothes after each use. If clothing becomes saturated with wet material, it should be removed and replaced with clean, dry clothing.

**Respirable dust** may be generated during processing, handling, and storage. The personal protection and controls identified in Section VII of the MSDS should be applied as appropriate.

**Keep** product dry until used.

**Do not** store or handle near food and beverages or smoking materials.

**The personal protection and controls** identified in Section VII of the MSDS should be applied as appropriate.

**Steps to be taken if material is released or spilled:** Use dry clean-up methods that do not disperse dust into the air. Avoid actions that cause dust to become airborne. Avoid inhalation of dust and contact with skin. Wear appropriate personal protective equipment. Scrape up wet material and place in an appropriate container. Allow the material to "dry" before disposal.

**Waste Disposal Method:** Do not attempt to wash material down drains. Dispose of waste materials only in accordance with applicable federal, state, and local laws and regulations.

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## Section VIII – Toxicological and Ecological Information

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For questions regarding toxicological or ecological information, see the contact information in Section I.



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### Section IX – Disposal Considerations

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Dispose of waste and containers in compliance with applicable federal, state, and local regulations

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### Section X – Transport Information

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This material is not classified as a Hazardous Material under U.S. DOT or Canadian TDG regulations.

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### Section XI – Regulatory Information

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**OSHA/MSHA Hazard  
Communication**

This material is considered to be a hazardous chemical by OSHA and MSHA and should be included in the employer's hazard communication program.

**CERCLA/Superfund  
EPCRA SARA Title III**

This product is not listed as a CERCLA hazardous substance. This product has been reviewed according to the EPA hazard categories promulgated under sections 311 and 312 under the Superfund Amendment and Reauthorization Act of 1986 and is considered a hazardous chemical and delayed health hazard.

**EPCRA SARA Section 313**

This product may contain substances subject to the reporting requirements of Section 313 of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR Part 372.

**RCRA**

If discarded in its purchased form this product would not be a hazardous waste either by listing or characteristic. However, under RCRA, it is the responsibility of the user to determine at the time of disposal whether a material containing the product or derived from the product should be listed as a hazardous waste.

**TSCA  
California Proposition 65**

Slag is exempt from reporting under the inventory update rule. Hexavalent chromium is known by the State of California to cause cancer.

**WHMIS/DSL**

Products containing calcium oxide are classified as D2A, E and are subject to WHMIS requirements.

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This product neither contains nor is directly manufactured with any controlled ozone depleting substances, Class I and II.