



Material Safety Data Sheet (MSDS)

Material: Ground Granulated Blast Furnace Slag (GGBFS) & Granulated Blast Furnace Slag (GBFS)

Section I - Identification

Supplier: Name: National Cement Factory Address: Post Box No.106077 ICAD-I, Musaffah, Abudhabi, U.A.E Telephone: 00971 2 55 00 933; Fax : 00971 2 55 009 44	
Product Codes: Ground Granulated blast-furnace slag. (This MSDS Covers Ground and Un-ground Granulated Blast furnace Slag.	Formula: This product consists of a glassy granular material formed when molten blast-furnace slag is rapidly chilled, as by immersion in Water. It may then be finely pulverized.
Chemical Family: Amorphous silica; Fused mineral composite	Chemical Name and Synonyms Ground Granulated blast-furnace slag (GGBFS), ProCem™, Slag, Granulated Blast-furnace Slag (GBFS).

Section II – Components

Ingredient/component	CAS No.	Concentration percent (%) wt.
Granulated Blast Furnace Slag	65996-69-2	> 98%
Crystalline Silica (Quartz)	14808-60-7	< 1%

Trace constituents: GGBFS or granulated blast-furnace slag is a co-product of the steel industry produced by adding a limestone flux to the ore to remove non-ferrous contaminants.

As such, it may contain small quantities of hazardous heavy metals, including trace amounts of chromium, usually in solution in the glass. Although this material is not listed as a carcinogen, it does contain slight quantities of titanium in complexes, as well as, crystalline silica. Crystalline silica has been classified by IARC and NTP as a known human carcinogen. Hexavalent chromium is listed by IARC, EPA, NTP and OSHA as a known human carcinogen inhalation. When finely ground, it is referred to as ground granulated blast-furnace slag (GGBFS).

Section III – Hazardous Identification

Component	CAS No.	OSHA PEL (8-hour TWA)	ACGIH TLV-TWA (2002)
Ground Granulated blast furnace slag	65996-69-2	15 mg/m ³ (total dust); 5mg/m ³ (respirable dust)	see Nuisance Dust TLV10 mg/m ³ (total dust); 3mg/m ³ (respirable dust)
Amorphous silica	7631-86-9	(80 mg/m ³) /(percent silica)	10 mg/m ³
Crystalline Silica (Quartz) *	14808-60-7	10 mg/m ³ (respirable dust) /(percent silica + 2) 30 mg/m ³ (total dust) /(percent silica + 2)	0.10 mg/m ³ (respirable quartz)

***NIOSH REL (8-hour TWA) = 0.05 mg/m³ (respirable quartz)**

Emergency Overview

GGBFS is a light gray, tan, or white powder that poses little immediate hazard. GGBFS is sand-sized granules. A single short term Exposure to these materials is not likely to cause serious harm. However, exposure to these wet materials can cause serious, potentially irreversible tissue (skin or eye) destruction in the form of chemical (caustic) burns. The same type of tissue destruction can occur if wet or moist areas of the body are exposed for sufficient duration to these materials by chemical (caustic) burns or an allergic reaction.

Potential Health Effects

Relevant Routes of Exposure: Eye contact, skin contact, inhalation, and ingestion.

- *Effects resulting from eye contact: Exposure to airborne dust may cause immediate or delayed irritation or inflammation .Eye contact with larger amounts of dry powder or splashes of these wet materials may cause effects ranging from moderate eye irritation to chemical burns and blindness. Such exposures require immediate first aid (See section IV.) and medical attention to prevent significant damage to the eye.*
 - *Effects resulting from skin contact: Discomfort or pain cannot be relied upon to alert a person to a hazardous skin exposure. Consequently, the only effective means of avoiding skin injury or illness involves minimizing skin contact, particularly contact with wet GGBFS or GGBFS. Exposed persons may not feel discomfort until hours after the exposure has ended and significant injury has occurred. Exposure to dry GGBFS or GGBFS may cause drying of the skin with consequent mild irritation or more significant effects attributable to aggravation of other conditions. Dry GGBFS or GGBFS contacting wet skin or exposure to moist or wet GGBFS or GGBFS 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.*
- Some individuals may exhibit an allergic response (e.g., allergic contact dermatitis) upon exposure to GGBFS or GGBFS, possibly due to trace amounts of chromium. The response may appear in a variety of forms ranging from a mild rash to severe skin ulcers. Persons already sensitized may react to the first contact with the product. Other persons may experience this effect after years of contact with GGBFS or GGBFS products.*
- *Effects resulting from inhalation: GGBFS or GGBFS contains small amounts of free crystalline silica. Prolonged exposure to respirable free crystalline silica can aggravate other lung conditions and cause silicosis, a disabling and potentially fatal lung disease and/or other diseases. Risk of injury or disease depends on duration and degree of exposure. (Also see “Carcinogenic potential” below.)Exposure to GGBFS or GGBFS may cause irritation to the moist mucous membranes of the nose, throat, and upper respiratory system. It may also leave unpleasant deposits in the nose.*
 - *Effects resulting from ingestion: Although small quantities of dust are not known to be harmful, ill effects are possible if larger quantities are consumed. GGBFS or GGBFS should not be eaten.*

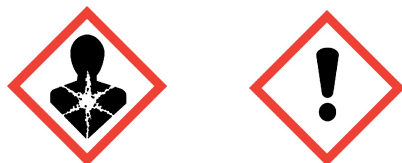
• **Carcinogenic potential:** NTP, OSHA, or IARC has not listed GGBFS or GGBFS as a carcinogen. It may, however, contain trace amounts of substances listed as carcinogens by these organizations. Crystalline silica, which is present in GGBFS or GGBFS in small amounts, has been listed by IARC and NTP as a known human carcinogen (Group I) through inhalation. Hexavalent chromium is listed by IARC, EPA, NTP and OSHA as Group I known carcinogen by inhalation.

• **Medical conditions which may be aggravated by inhalation or dermal exposure:**

Pre-existing upper respiratory and lung diseases

Unusual (hyper) sensitivity to Hexavalent chromium (chromium+6) salts.

• **Pictograms**



Section IV – First Aid

Eyes: Immediately flush eyes thoroughly with water. Continue flushing eye for at least 15 minutes, including under lids, to remove all particles. Call physician immediately.

Skin: Wash skin with cool water and pH-neutral soap or a mild detergent. Seek medical treatment for abrasions.

Inhalation of Airborne Dust: Remove to fresh air. Seek medical help if coughing or other symptoms do not subside. (Inhalation of gross amounts of GGBFS or Slag requires immediate medical attention.)

Ingestion: Do not induce vomiting. If conscious, have the victim drink plenty of water and call a physician immediately.

Section V – Fire & Explosion Data

Flash point: *None*

Lower Explosive Limit: *None*

Extinguishing media: *Not Combustible*

Hazardous combustion products: *None*

Auto ignition temperature: *Not Combustible*

Upper Explosive Limit: *None*

Unusual fire & explosion hazards *None*

Special firefighting procedures: *None.* (Although GGBFS poses no fire-related hazards, a self-contained breathing apparatus is recommended to limit exposure to combustion products when fighting any fire.)

Section VI – Accidental Release Measure

Collect dry material using a scoop. Avoid actions that cause dust to become airborne. Avoid inhalation of dust and contact with skin. Wear appropriate personal protective equipment as described in Section VIII.

Scrape up wet material and place in an appropriate container. Allow the material to “dry” before disposal. Do not attempt to wash GGBFS or Slag down drains.

Dispose of waste material according to local, state, and federal regulations.

Section VII – Handling & Storage

Keep GGBFS or GGBFS dry until used. Normal temperatures and pressures do not affect the material. Promptly remove dusty clothing or clothing that is wet with GGBFS or GGBFS fluids, and launder before reuse. Wash thoroughly after exposure to dust, wet GGBFS or GGBFS mixtures or fluids.

Section VIII – Exposure Control /Personal Protection

Skin Protection: Wear impervious gloves, shoes and protective clothing to prevent skin contact.

Respiratory protection: Avoid actions that cause dust to become airborne. Use local or general ventilation to control exposures below applicable exposure limits. Under ordinary circumstances, no respiratory protection should be required. Use NIOSH or MSHA approved respirators in poorly ventilated areas, if an applicable exposure limit is exceeded, or when dust causes discomfort or irritation.

Ventilation: Use local exhaust or general dilution ventilation to control exposure within applicable limits.

Eye Protection: In conditions where user may be exposed to excessive concentrations of GGBFS or Slag dust, safety glasses with side shields or goggles should be worn.



Section IX– Physical & Chemical Properties

Appearance: *GGBFS is Gray, tan, or white powder,
GBFS is sand-like in appearance*

Physical state: *Solid (powder)*

Solubility in water: *Slightly (0.1 to 1.0%)*

Vapor Pressure: *Not applicable*

Boiling point: *Not applicable (i.e., > 1000 °C)*

Specific gravity (H₂O = 1.0): *2.90*

Odor: *No distinct odor*

pH (in water): *10.5 to 12.7*

Evaporation Rate: *Not applicable*

Vapor density: *Not applicable*

Melting point: *1300 to 1350 °C*

Section X– Stability & Reactivity

Stability: *Stable.*

Incompatibility: *Wet GGBFS & Slag is alkaline. As such it is incompatible with
Acids, ammonium salts, and aluminum metal.*

Conditions to avoid: *Unintentional contact with water.*

Hazardous decomposition: *Will not spontaneously occur. Adding water produces (caustic)
Calcium hydroxide as a result of hydration.*

Hazardous polymerization: *Will not occur.*

Section XI– Toxicological Information

Acute toxicity: Based on available data, the classification criteria are not met.

Skin: Irritating to the skin. Contact with powder or wetted form may result in irritation, rash and dermatitis.

Eye: Causes serious eye damage. Contact with moisture in the eyes may result in irritation, lacrimation, pain, redness, conjunctivitis, and possible alkaline burns aided by mechanical irritation and abrasion.

Sensitization: Not classified as causing skin or respiratory sensitization

Mutagenicity: Insufficient data available to classify as a mutagen.

Carcinogenicity: Crystalline silica is classified as carcinogenic to humans (IARC Group 1). However, there is a body of evidence supporting the fact that increased cancer risk would be limited to people already suffering from silicosis.

Reproductive: Insufficient data available to classify as a reproductive toxin.

STOT-single exposure: Irritating to the respiratory system. Over exposure may result in irritation of the nose and throat, with coughing. High level exposure may result in breathing difficulties.

STOT-repeated exposure: Not classified as causing organ damage from repeated exposure. Repeated exposure to crystalline silica may cause lung fibrosis (silicosis), however due to the low levels of respirable crystalline silica in this product, adverse health effects are not anticipated with normal use.

Aspiration: This product is a solid and aspiration hazards are not expected to occur.

Section XII– Ecological Information

Ecotoxicity: No recognized unusual toxicity to plants or animals

Relevant physical and chemical properties: See Sections IX & X

Section XIII– Disposal

Dispose of waste material according to local, state, and federal regulations. (Since GGBFS or GGBFS is stable, uncontaminated material may be saved for future use.) Dispose of bags in an approved landfill or incinerator.

Section XIV– Transportation Data

Ground Granulated Blast Furnace Slag (GGBFS) or Granulated Blast Furnace Slag (GBFS) are not considered hazardous according to the International regulation for transportation of hazardous freights, therefore it shall not be subject to the respective modal (Page 9 of 10) regulations: IMDG (by sea), ADR (by land), RID (by railway), ICAO/IATA (by air). Also, not hazardous under U.S. and UAE Department of Transportation (DOT) regulations

No other safety measures are needed besides those mentioned under item VII.

Section XV– Other Regulatory Information

- **Status under USDOL-OSHA Hazard Communication Rule, 29 CFR 1910.1200:** GGBFS or Slag is considered a "hazardous chemical". Under this regulation, and should be part of any hazard communication program.
- **Status under CERCLA/Superfund, 40 CFR 117 and 302:** Not listed.

- **Hazard Category under SARA (Title III), Sections 311 & 312:** GGBFS or Slag *qualifies as a “hazardous substance” with delayed Health effects.*
- **Status under SARA (Title III) Section 313:** *Not subject to reporting requirements under section 313.*
- **Status under TSCA (as of May 1997):** *Some trace substances, which may be present in GGBFS or Slag, are on the TSCA inventory list.*
- **Status under the Federal Hazardous Substances Act:** *GGBFS or Slag is a “hazardous substance” subject to statutes Promulgated under the subject act.*
- **Status under California Proposition 65: WARNING:** *This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. California law requires the manufacturer to give the above warning in the absence of definitive testing to prove that the defined risks do not exist.*
- **Status under Canadian Environmental Protection Act:** *Not listed.*
- **Workplace Hazardous Material Information System (Canada):** *GGBFS or Slag is a hazardous material under the Hazardous Product Act as defined by the Controlled Products Regulations and is therefore subject to the labeling and MSDS requirements of the Workplace Hazardous Materials Information System (WHMIS).*

Section XVI– Other Information

Approved by: Abdullah Al Khateeb
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Other important information:

GGBFS should only be used by knowledgeable persons. While the information provided in the material safety data sheet is believed to provide a useful summary of the hazards of GGBFS as it is commonly used, the sheet cannot anticipate and provide all the information that might be needed in every situation. Inexperienced product users should obtain proper training before using this product.

A key to using the product safely requires the user to recognize that GGBFS chemically reacts with water, and that some of the intermediate products of this reaction (that is, those present while a GGBFS product is “setting”) pose a more severe hazard than does GGBFS itself. These hazards include potential injuries to eyes and skin.

The data furnished in this sheet do not address hazards that may be posed by other materials mixed with GGBFS OR GGBFS to produce GGBFS products. Users should review other relevant material safety data sheets before working with these GGBFS OR GGBFS products, including, for example, concrete containing GGBFS.

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