



SAFETY DATA SHEET (SDS)

This SDS is issued according to Regulation for Safety Data Sheets of Danger Substances and Mixtures (National OJ 13.12.2014 - 29204).

Product : Ground Granulated Blast Furnace Slag

Date of Preparation : 16.04.2018

Form No : GBF 2018 -110

Revision Date/Number : -

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product Identifier

Ground Granulated Blast Furnace Slag

1.2 Relevant Identified Uses of the Substance/Mixture and Uses Advised Against

It is obtained by grinding the blast furnace slag, a by-product of the iron and steel industry. It shows binding properties by very fine grinding. The chemical is resistant to external influences and it is used for project need very high chemical resistance, sulfate resistance, chlorine resistance and very low hydration heat, shrinkage, impermeability.

Company Details

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1.3 Emergency Telephone Number

114 - UZEM "Ministry of Health - National Poison Centre"

2. HAZARDS IDENTIFICATION

2.1 Classification of the Substance/Mixture

According to CLP,

Hazard Class	Hazard Category	Hazard Statements
Skin irritation	2	H315: Causes skin irritation
Serious eye damage/eye irritation	1	H318: Causes serious eye damage
Skin sensitisation	1B	H317: May cause an allergic skin reaction

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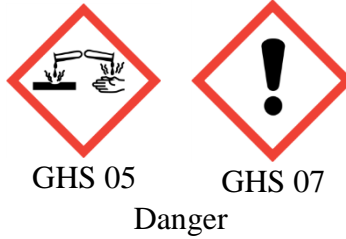
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Hazard Class	Hazard Category	Hazard Statements
Specific target organ toxicity single exposure respiratory tract irritation	3	H335: May cause respiratory irritation

2.2 Label Elements

Hazard Pictograms



Hazard Statements

- H318 Causes serious eye damage
H315 Causes skin irritation
H317 May cause an allergic skin reaction
H335 May cause respiratory irritation

Precautionary Statements

P280	Wear protective gloves/protective clothing/eye protection/face protection
P264	Wash hands thoroughly after handling
P272	Contaminated work clothing should not be allowed out of the workplace.
P305 P351 P338 P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/physician
P302 P352 P333 P313	IF ON SKIN: Wash with plenty of soap and water. If skin irritation or rash occurs: Get medical advice/attention
P261 P304 P340 P312	Avoid breathing dust/fume/gas/mist/vapours/spray. IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.
P102	Keep out of reach of children
P501	Dispose of contents/container in accordance with SDS.

2.3 Other Hazards



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Ground Granulated Blast Furnace Slag does not meet the criteria for PBT or vPvB in accordance with Annex XIII of REACH (Regulation (EC) No 1907/2006).

Ground Granulated Blast Furnace dust may cause an allergic reaction in some individuals due to the water soluble Cr(VI) content.

Wet Ground Granulated Blast Furnace Slag or contact with skin can cause irritation.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Mixtures

Material Name	CAS No	EC No	Concentration by mass (%)	Classification Acc. CLP
Blast Furnace Slag	65996-69-2	266-002-0	100	This substance is not classified as dangerous
CONTENT				
Calcium Oxide (CaO)	1305-78-8	215-138-9	30-50	H315: Causes skin irritation H318: Causes serious eye damage H335: May cause respiratory irritation H317: May cause an allergic skin reaction
Magnesium Oxide (MgO)	1309-48-4	215-171-9	1 - 10	Not classified as dangerous
Quartz (SiO ₂)	14808-60-7	238-878-4	< 1,0	H335: May cause respiratory irritation

4. FIRST AID MEASURES

4.1 Description of first aid measures

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No personal protective equipment is needed for first aid responders. First aid workers should avoid contact with wet ground granulated blast furnace slag containing mixtures.



Following contact with eyes

Do not rub eyes in order to avoid possible cornea damage as a result of mechanical stress. Remove contact lenses if any. Incline head to injured eye, open the eyelid(s) widely and flush eye(s) immediately by thoroughly rinsing with plenty of clean water for at least 20 minutes to remove all particles. Avoid flushing particles into uninjured eye. If possible, use isotonic water (0.9% NaCl). Contact a specialist of occupational medicine or an eye specialist.



Following skin contact

For dry or wet ground granulated blast furnace slags, remove and rinse abundantly with water. Remove contaminated clothing, footwear, watches, etc. and clean thoroughly before re-using them. Seek medical treatment in all cases of irritation or burns.



Following inhalation

Move the person to fresh air. Dust in throat and nasal passages should clear spontaneously. Contact a physician if irritation persists or later develops or if discomfort, coughing or other symptoms persist.



Following ingestion

Do not induce vomiting. If the person is conscious, wash out mouth with water and give plenty of water to drink. Get immediate medical attention or contact the anti poison centre.

Avoid inhalation of cement and contact with skin. Wear appropriate protective equipment as described in Section 8.

4.2. Most Important Symptoms and Effects, Both Acute and Delayed

Eyes: Ground granulated blast furnace slags (dry or wet) may cause serious and potentially irreversible injuries.

Skin: Ground granulated blast furnace slags may have an irritating effect on moist skin (due to sweat or humidity) after prolonged contact or may cause contact dermatitis after repeated contact.

Prolonged skin contact with wet Ground granulated blast furnace slags or wet concrete may cause serious burns because they develop without pain being felt (for example when kneeling in wet concrete even when wearing trousers).



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Inhalation: Repeated inhalation of dust of ground granulated blast furnace slags over a long period of time increases the risk of developing lung diseases.

Environment: Under normal use ground granulated blast furnace slags are not hazardous to the environment.

4.3. Indication of any immediate medical attention and special treatment needed

When contacting a physician, take this SDS with you.

5. FIRE-FIGHTING MEASURES

5.1. Extinguishing media

Ground granulated blast furnace slags do not include organics, they are not flammable.

5.2. Special hazards arising from the substance or mixture

Ground granulated blast furnace slags are non-combustible and non-explosive and will not facilitate or sustain the combustion of other materials.

5.3. Advice for fire-fighters

No need for special protective equipment for fire-fighters.

6. ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

Wear protective equipment as described under Section 8 and follow the advice for safe handling and use given under Section 7

6.1.2. For emergency responders

Emergency procedures are not required. However, respiratory protection is needed in situations with high dust levels.

6.2. Environmental precautions

Do not wash ground granulated blast furnace slags down sewage and drainage systems or into bodies of water (e.g. streams).

Prevent entry to water resources and soil.

6.3. Methods and material for containment and cleaning up

Ground granulated blast furnace slag;

Absorb spilled cement/binding agent and reuse, if possible. Use cleanup methods such as vacuum clean-up or vacuum extraction (industrial portable units, equipped with high



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efficiency air filters (EPA and HEPA filters, EN 1822-1:2009) or equivalent technique) which do not cause airborne dispersion. Never use compressed air.

Ensure that the workers wear the appropriate personal protective equipment and prevent dust from spreading.

Avoid inhalation of cement and contact with skin. Place spilled materials into a container.

Wet blast furnace or sulphate resisting blast furnace cements;

Clean up wet cement and place in a container. Allow material to dry and solidify before disposal.

6.4. Reference to other sections

See sections 8 and 13 for more details.

7. HANDLING AND STORAGE

7.1. Precautions for safe handling

7.1.1. Protective measures

Follow the recommendations as given under Section 8.

To clean up dry ground granulated blast furnace slag see Subsection 6.3.

Measures to prevent fire

Not applicable.

Measures to prevent aerosol and dust generation

Do not sweep. Use dry cleanup methods such as vacuum clean-up or vacuum extraction, which do not cause airborne dispersion.

Measures to protect the environment

No particular measures.

7.1.2. Information on general occupational hygiene

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

In dusty environment, wear dust mask and protective goggles.

Use protective gloves to avoid skin contact.

7.2. Conditions for safe storage, including any incompatibilities

Bulk ground granulated blast furnace slag should be stored in silos that are waterproof, dry (i.e. with internal condensation minimised), clean and protected from contamination.

Engulfment hazard: To prevent engulfment or suffocation, do not enter a confined space, such as a silo, bin, bulk truck, or other storage container or vessel that stores or contains ground granulated blast furnace slag without taking the proper security measures. Ground granulated



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blast furnace slag can build up or adhere to the walls of a confined space. The slag can release, collapse or fall unexpectedly.

Do not use aluminium containers for the storage or transport of wet ground granulated blast furnace slag containing mixtures due to incompatibility of the materials.

7.3. Specific end use(s)

Ground granulated blast furnace slag is used as a binder in concrete and mortars that are widely used in construction. Soluble Cr(VI) in the cement should be less.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control Parameters

No exposure and biological limit is defined according to safety, health and welfare at work (chemical agents) regulations and Directive 2004/37/EC - carcinogens or mutagens at work. However, according to Occupational Safety and Health Administration (OSHA), National Institute for Occupational Safety and Health (NIOSH) and American conference of governmental industrial hygienist (ACGIH), occupational exposure limits are listed as follows:

Substance name	EINECs No	CAS No	Boundary Value Type (Country)	Occupational Exposure				Specific Description	Source
				Long term TWA ⁽⁴⁾ (8 hours)		Short Term STEL ⁽⁵⁾ (15 min)			
				mg/m ³ ⁽⁶⁾	ppm ⁽⁷⁾	mg/m ³	ppm		
Ground Granulated Blast Furnace Slag	266-002-0	65996-69-2	TLV (ABD) PEL	10	-	15 (Total) 5 (Respirable)	-	ACGIH OSHA	

8.2. Exposure controls

8.2.1. Appropriate engineering controls

Measures to reduce generation of dust and to avoid dust propagating in the environment such as dedusting, exhaust ventilation and dry clean-up methods which do not cause airborne dispersion.

8.2.2. Individual protection measures such as personal protection equipment

General

Do not eat, drink or smoke when working with cement to avoid contact with skin or mouth. Before starting to work with cement, apply a barrier creme and reapply it at regular intervals. Immediately after working with cement or cement-containing materials, workers should wash or shower or use skin moisturisers.

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Remove contaminated clothing, footwear, watches, etc. and clean thoroughly before re-using them.



Eye/face protection

Wear approved glasses or safety goggles according to EN 166 when handling dry or wet cement to prevent contact with eyes.



Skin protection

Use watertight, wear- and alkali-resistant protective gloves (e.g. nitrile soaked cotton gloves with CE marking) internally lined with cotton; boots; closed long-sleeved protective clothing as well as skin care products (e.g. barrier creams) to protect the skin from prolonged contact with wet cement. Particular care should be taken to ensure that wet cement does not enter the boots. For the gloves, respect the maximum wearing time to avoid skin problems.

In some circumstances, such as when laying concrete or screed, waterproof trousers or kneepads are necessary.



Respiratory protection

When a person is potentially exposed to dust levels above exposure limits, use appropriate respiratory protection. The type of respiratory protection should be adapted to the dust level and conform to the relevant EN standard (EN 149) or national standard.

Thermal hazards

Thermal hazards.

8.2.3. Environmental exposure controls

Air: Environmental exposure control for the emission of ground granulated blast furnace slag particles into air has to be in accordance with the available technology and regulations for the emission of general dust particles.

Water: Do not wash ground granulated blast furnace slag into sewage systems or into bodies of water, to avoid high pH. Above pH 9 negative ecotoxicological impacts are possible.

Soil and terrestrial environment: No special emission control measures are necessary for the exposure to the terrestrial environment.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties



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Properties	Information
Appearance	Grey in colour, finely ground solid, inorganic material
Odour	Odourless
Odour threshold	No odour threshold, odourless
pH: (T = 20°C in water, water-solid ratio 1:2)	11-13.5
Melting point	> 1250 °C
Initial boiling point and boiling range	Not applicable as under normal atmospheric conditions, melting point >1250°C
Flash point	Not applicable as is not a liquid.
Evaporation rate	Not applicable as is not a liquid.
Flammability (solid, gas)	Not applicable as is a solid which is non combustible and does not cause or contribute to fire through friction.
Upper/lower flammability or explosive limits:	Not applicable as is not a flammable gas
Vapour pressure	Not applicable as melting point > 1250 °C
Vapour density	Not applicable as melting point > 1250 °C
Relative density	2.00-3.00 g/cm ³
Solubility(ies) in water (T = 20 °C)	Slight (0.1-1.5 g/l)
Partition coefficient: n-octanol/water	Not applicable as is inorganic mixture.
Auto-ignition temperature	Not applicable (no pyrophoricity – no organo-metallic, organo-metalloid or organo-phosphine bindings or of their derivatives, and no other pyrophoric constituent in the composition)
Decomposition temperature	Not applicable, as no organic peroxide present.
Viscosity	Not applicable, as not a liquid.
Explosive properties	Not applicable.
Oxidising properties	Not applicable as does not cause or contribute to the combustion of other materials

9.2. Other information



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Not applicable.

10. STABILITY AND REACTIVITY

10.1 Reactivity

Product is stable. Keep dry until use.

When mixed with water, ground granulated blast furnace slag will harden into a stable mass that is not reactive in normal environments.

10.2 Chemical stability

Dry ground granulated blast furnace slag is stable as long as it is properly stored (see Section 7) and compatible with most other building materials. They should be kept dry.

Wet ground granulated blast furnace slag is alkaline and incompatible with acids, with ammonium salts, with aluminium or other non-noble metals.

Contact with incompatible materials should be avoided.

Ground granulated blast furnace slag dissolves in hydrofluoric acid to produce corrosive silicon tetrafluoride gas. Ground granulated blast furnace slag reacts with water to form silicates and calcium hydroxide. Silicates in ground granulated blast furnace slag; react with powerful oxidizers such as fluorine, boron trifluoride, chlorine trifluoride, manganese trifluoride, and oxygen difluoride. Please follow measures given in Section 7.

10.3 Possibility of hazardous reactions

Hydrogen sulfide gas may be released from moist or wet slag when it is heated.

10.4 Conditions to avoid

Humid conditions during storage may cause lump formation and loss of product quality.

10.5 Incompatible materials

Acids, ammonium salts, aluminium or other non-noble metals.

10.6 Hazardous decomposition products

Ground granulated blast furnace slag will not decompose into any hazardous products.

11. TOXICOLOGICAL INFORMATION

Lime, calcium silicates and alkalis in the ground blast furnace slag have partial solubility. When mixed with water, alkaline solutions bring potential hazards. The chromium (VI) salts in the water are soluble in water and when mixed with water, they bring to the water a solution of potential hazards.

When a blasted blast furnace slag is mixed with water or wetted in concrete or mortar construction, a strong basic solution is formed. If this material comes into contact with



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eyes or skin, it may cause serious irritation. Especially the eyes are more vulnerable and the damage will increase with the contact time. Strong basic solubilizers destroy nerve endings before they damage the skin. Chemical burns can develop without pain. The effects on health depend on the duration and level of exposure. Inhalation may lead to lung diseases according to severity of exposure. Exposure to airborne grinded blast furnace slag dust can cause irritation in the nose, coughing with mucous and upper respiratory tract irritation and breathing difficulty. Exposure to pulverized blast furnace slag dust can lead to chronic bronchitis and lung diseases. It does not contain any odor. Direct contact with wet milled blast furnace slag can result in skin burns involving dermal necrosis. No obvious pain may develop during exposure. Swallowing of dry milled blast furnace slag or uncured wet milled blast furnace slag can cause burns of stomach or esophagus (food borne). No toxicity to water has been determined. However, the addition of milled blast furnace slag to the water will increase the pH value and, in some cases, damage the aquatic life cycle.

11.1 Acute Toxicity:

Ground granulated blast furnace slag (CAS# 65996-69-2)
- LD50.....: No information
- IDLHs⁽⁸⁾.....: 5000 mg/m³

11.2 Skin Corrosion

Ground granulated blast furnace slag (CAS# 65996-69-2)
- Irritant on skin and mucous membrane.
- Serious eye irritant.

11.3 Chronic Toxicity (Carcinogenic, Mutagenic and Toxic Effects on the Urea):

- The risk of cancer depends on the duration and degree of exposure. According to the results of the International Agency for Research on Cancer (IARC), blasted blast furnace slag has not been listed on the list of carcinogenic products.
- In case of contact with the eyes or skin, the ground granulated blast furnace slag will become highly caustic, causing eye and deep burns.
- Dry or wet ground granulated blast furnace slag may result in burns or corneal damage in contact with the eye. In large quantities, wet or dry ground granulated blast furnace slag may be affected by exposure to chemical burns from medium to moderate exposure to the eye.
- Grinded blast furnace slag contains no carcinogens, as listed in NTP (9), IARC (10) or OSHA (11), as stated in 29 CFR 1910.1200 (Risk Statement). However, in its content, trace amounts may contain substances classified as carcinogenic.
- Gypsum is tumogenic: Carcinogenic according to RTECS criteria.
Tumorigenic: Tumor formation (Ref: ZHPMAT⁽¹²⁾)
Exposure/Organism : intraperitoneal
Dose: lowest published toxic dose: 450 mg/kg/3 weekly
Even if the product contains active substance at higher concentrations;



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- No evidence of mutagenic effect.
- No signs of nausea toxic effect.

11.4 Other Toxicological Effects:

Allergy Effect:

Contains chromium (VI). Causes allergic reactions.

Impact on Repeated Dose:

Repeated or prolonged contact may cause dermatitis, dryness, cracks and irritation.

Repeated exposures to high levels of finely dispersed powders in the work environment may cause a phenomenon known as pneumoconiosis, Pneumoconiosis is the accumulation of all kinds of respiratory dust in the lung regardless of its effect. This is particularly the case when a significant amount of particles is smaller than 0.5 microns (1 / 50,000 inches). In the X-ray film, stains appear in the lung. Symptoms of pneumoconiosis can be progressive dry cough, shortness of breath when exerted, increased chest expansion, weakness and weight loss. As the disease progresses, the cough leads to a thread-like mucosa, the capacity of life gradually decreases and the breathlessness becomes more serious. Pneumoconiosis is the accumulation of dust in the lungs and the tissue reaction that occurs in their presence. It is also classified as collagenous and non-collagenous types. Non-collagenous pneumoconiosis with benign features is defined as the minimal stromal reaction, mainly involving the reticulo fibers and intact alveolar structure, and may be reversed as the case may be. Asthma-like symptoms can persist for months or even years after the end of exposure to the substance. For this reason, irritation is a nonallergic condition known as reactive airway difunction syndrome (RADS) which can occur after exposure to high doses of a high substance. The most important criteria for RADS diagnosis are the absence of a respiratory tract disease and the onset of sudden asthmatic symptoms within minutes and hours after exposure to an irritant substance in a non-atopic individual. In the methacholine challenge test, spirometride with a moderate to high level of bronchial hyperreactivity and a lack of minimal lymphatic inflammation without eosinophilia are among the criteria for RADS diagnosis. RADS (or asthma) following an irritant substance inhalation is a rare disorder that occurs due to the duration of exposure to the irritant and the weight of the concentrate. On the other hand, industrial bronchitis occurs as a result of exposure to high concentrations of irritant material and is completely cut off when the exposure is over. The disorder is characterized by shortness of breath, cough and mucus production.

Harmful: danger of serious damage to health by prolonged exposure through inhalation.

Respiratory sensitization may result in allergic / asthmatic reactions; These are reactions ranging from coughing and small respiratory difficulties to difficulty with bronchial coagulation with solum.



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Sensitization may give violent reactions to exposure to very low levels, eg hypersensitivity. Sensitized persons should not be allowed to work in situations where they may be exposed.

Stunning Impact:

There is no known effect.

Sensitization (Sensitization):

No information

Developmental Toxicological Effects (Teratogenic effect):

There is no known effect

Fertility:

There is no known effect.

11.5 Effects on Health:

Eye Contact:

This material causes severe eye damage in the case of visual contact. Chemical burns can occur after direct contact of the material with the eye. May be extremely irritating to vapors or fumes. Dust can cause eye irritation and corrosive eye inflammation.

Skin Contact:

Causes skin irritation. Exposure to skin and deeply dry granulated blast furnace slag leads to permanent skin irritation with permanent moderate irritation. Chemical burns may occur after material contact with the skin. Entry into the bloodstream by means of cuts, abrasions or lesions; May cause systemic damage with harmful effects. Before using the material, examine the skin and make sure that any external injuries are adequately protected. Prolonged or repeated exposure to the material may cause severe skin irritation; In case of contact, redness, swelling, vesicle formation, exfoliating and thickening of the skin may occur. Repeated exposures may lead to severe ulcer formation.

Inhalation:

Inhalation of dust that occurs during normal use of the material may damage the health of the person. The material may cause respiratory irritation in some people. The reaction of the body to such an irritation can lead to more lung damage. In the presence of respirable particles, the effects on the lungs increase significantly. Acute silicosis occurs especially when dust particles are too small to be exposed to high levels of silica dust when they are small. The disease progresses rapidly, diffuses widely into the lungs within a few months after the first exposure and causes death within 1-2 years..



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Ingestion:

The ingestion of the material may lead to chemical burns in the oral cavity and gastrointestinal tract following ingestion.

It is considered that the entry route to commercial / industrial areas is unlikely.

Ingestion may result in nausea, abdominal irritation, pain and vomiting.

Target Organs:

Eye, Skin Respiratory system.

Medical Alerts:

Asthma-like symptoms can persist for months or even years after the end of exposure to the substance. For this reason, irritation is a nonallergic condition known as reactive airway dysfunction syndrome (RADS) which can occur after exposure to high doses of a high substance. The most important criteria for RADS diagnosis are the absence of a respiratory tract disease and the onset of sudden asthmatic symptoms within minutes and hours after exposure to an irritant in the non-atopic individual. In the methacholine challenge test, spirometry with a moderate to high level of bronchial hyperreactivity and a lack of minimal lymphatic inflammation without eosinophilia are among the criteria for RADS diagnosis. RADS (or asthma) following an irritant substance inhalation is a rare disorder that occurs due to the duration of exposure to the irritant and the weight of the concentrate. On the other hand, industrial bronchitis occurs as a result of exposure to high concentrations of irritant material and is completely cut off when the exposure is over. The disorder is characterized by shortness of breath, cough and mucus production.

11.6 Additional toxicological warnings:

The toxicological classification was made based on the content information and available information.

Hazard classification for health according to EC and local regulations: Xi-Irritant

Hazard class	Cat	Effect	Reference
Acute toxicity - dermal	-	Boundary test, Rabbit, 24 hour contact, 2,000 mg / kg body weight - not lethal. Portland cement containing over 90% clinker was used in the study. There is no classification criterion according to the current knowledge.	(2)
Acute toxicity- inhalation	-	Inhalation, no pest. There is no categorization criterion according to current knowledge	(8)
Acute toxicity - oral	-	There is no data in the work done with cement kiln dust. There is no classification criterion according to the current knowledge.	Literature review
Skin corrosion/ irritation	2	Slag can cause thickening and cracking when wet and dry. Prolonged contact with abrasion can cause serious burns. Over 90% of Portland cement clinker cement was used in the study	(2), Human experience
Serious eye	1	Slag may cause corneal damage and irritation	(9), (10)



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Hazard class	Cat	Effect	Reference
damage/irritation			
Skin sensitisation	1B	Wet slag can lead to the exhaust of the shade. In case of long-term contact, high pH and water-soluble Cr (VI) may cause skin inflammation.	(3), (11),(16)
Respiratory sensitisation	-	There is no evidence. There is no categorization criterion according to current knowledge	(1)
Germ cell mutagenicity	-	There is no evidence. There is no categorization criterion according to current knowledge	(12), (13)
Carcinogenicity	-	There is no up-to-date link between slag exposure and cancer. Epidemiological literature has not shown slag as the cause of cancer. Slag is not classified as carcinogenic. There was no evidence of carcinogenicity in animal studies. Slag contains over 90% clinker. There is no categorization criterion according to current knowledge	(1) (14)
Reproductive toxicity	-	There is no categorization criterion according to current knowledge.	Kanıt yoktur
BHOT – single exposure	3	Slag can irritate the respiratory system and throat. Exposure above the regional exposure limits may lead to coughing, sneezing and brief breathing. However, no relevant finding related to these effects was found	(1)
BHOT – repeated exposure	-	There are COPD findings. The effects are laced and highly exposed. Chronic effect or low concentration effect was not observed	(15)
Aspiration hazard	-	Not applicable as slag are not used as an aerosol.	

In addition to skin sensitivity, milled blast furnace slag and general cements have the same toxic and ecotoxic properties. Exacerbated medical conditions due to exposure Grinded blast furnace slag may trigger the formation of dust respiratory system diseases and / or emphysema, asthma or skin / eye disorders.

12. ECOLOGICAL INFORMATION

12.1 Ecotoxicity:

Dry milled blast furnace slag is not dangerous for the ecosystem.

The ecotoxicity data have not been specifically identified for the assessment of environmental damage to this product.

In large quantities Adding milled blast furnace slag to the water can increase the pH value and therefore water can be toxic to life.



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The information given in this section pertains to the information on the components and to the ecotoxicity of similar substances

12.1.1 Acute Toxicity:

- Acute Fish Toxicity (LC50 96 Hours): No information
- Acute Daphnia Toxicity (EC50 48 Hours): No information
- Acute Algae Toxicity (IC50 72 Hours): No information

12.1.2 Mobility:

Solid (Powder)

- Solubility in water: 0,1-1,0%
- When determining environmental mobility, do not take into account the chemical and physical properties of the product (see Chapter 9)
- Surface tension: No information

12.2 Persistence and Degradability

Since the milled blast furnace slag is inorganic, there is no relation. After hydration Grinded blast furnace slag can create toxic risks.

12.3 Potential for bioaccumulation

Since the milled blast furnace slag is inorganic, there is no relation. Grinded blast furnace slag after hydration can create toxic risks.

12.4 Mobility in Soil

Since the milled blast furnace slag is inorganic, there is no relation. After hydration Grinded blast furnace slag can create toxic risks.

12.5 Results of PBT and vPvB evaluation

Since the milled blast furnace slag is inorganic, there is no relation. After hydration Grinded blast furnace slag can create toxic risks.

12.6 Other adverse effects

There is no information.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Do not dispose of into sewage systems or surface waters.

14. TRANSPORT INFORMATION



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Ground granulated blast furnace slag is not covered by the international regulation on the transport of dangerous goods (IMDG, IATA, ADR/RID), therefore no classification is required.

14.1 UN number

Not relevant.

14.2 UN proper shipping name

Not relevant.

14.3 Transport hazard class(es)

Not relevant.

14.4 Packing group

Not relevant.

14.5 Environmental hazards

Not relevant.

14.6 Special precautions for user

Not relevant.

14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code

Not relevant.

15. REGULATORY INFORMATION

15.1 Safety, Health And Environmental Regulations/Legislation Specific For The Substance Or Mixture

EU Regulatory Information

Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC.

Cement is a mixture according to REACH and is not subject to registration. Cement clinker is exempt from registration (Art 2.7 (b) and Annex V.10 of REACH).



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The marketing and use of cement is subject to a restriction on the content of soluble Cr (VI) (REACH Annex XVII point 47 Chromium VI compounds).

National Regulatory Information

Regulation for Classification, Labelling and Packing of Materials and Mixtures (National OJ 11.12.2013 - 28848)

Regulation for Safety Data Sheets of Danger Substances and Mixtures (National OJ 13.12.2014 - 29204)

Ragulation for Transport of Hazardous Substances (National OJ 24.10.2013 - 28801)

Regulation for Substances Depleting Ozon Layer(National OJ 12.11.2008 – 27052) and Prevention and Preperadness of Major Industrial Accidents (National OJ 30.12.2013 – 28867) is not applicable to Portland Cement.

16. OTHER INFORMATION

16.1 Indication of changes

No change.

16.2 Abbreviations And Acronyms

CAS	Chemical Abstracts Service
CLP	Classification, labelling and packaging (Regulation (EC) No 1272/2008)
ADR/RID	European Agreements on the transport of Dangerous goods by Road/Railway
IATA	International Air Transport Association
IMDG	International agreement on the Maritime transport of Dangerous Goods LC50 Median lethal dose
PBT	Persistent, bio-accumulative and toxic
STOT	Specific Target Organ Toxicity
vPvB	Very persistent, very bio-accumulative
UZEM	Ulusal zehir danışma merkezi
APF	Assigned protection factor
SDS	Safety Data Sheet
REACH	Registration, Evaluation and Authorisation of Chemicals
EINECS	European INventory of Existing Commercial chemical Substances
ECHA	European Chemicals Agency
IDLH	Immediate impact on life and health

16.3 References

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- (2) *Observations on the effects of skin irritation caused by cement*, Kietzman et al, *Dermatosen*, 47, 5, 184-189 (1999).
- (3) *Epidemiological assessment of the occurrence of allergic dermatitis in workers in the construction industry related to the content of Cr (VI) in cement*, NIOH, Page 11, 2003.
- (4) U.S. EPA, *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*, 3rd ed. EPA/600/7-91/002, Environmental Monitoring and Support Laboratory, U.S. EPA, Cincinnati, OH (1994a) and 4th ed. EPA-821-R-02-013, US EPA, office of water, Washington D.C. (2002).
- (5) U.S. EPA, *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms*, 4th ed. EPA/600/4-90/027F, Environmental Monitoring and Support Laboratory, U.S. EPA, Cincinnati, OH (1993) and 5th ed. EPA-821-R-02-012, US EPA, office of water, Washington D.C. (2002).
- (6) *Environmental Impact of Construction and Repair Materials on Surface and Ground Waters. Summary of Methodology, Laboratory Results, and Model Development*. NCHRP report 448, National Academy Press, Washington, D.C., 2001.
- (7) *Final report Sediment Phase Toxicity Test Results with Corophium volutator for Portland clinker* prepared for Norcem A.S. by AnalyCen Ecotox AS, 2007.
- (8) TNO report V8801/02, *An acute (4-hour) inhalation toxicity study with Portland Cement Clinker CLP/GHS 03-2010-fine in rats*, August 2010.
- (9) TNO report V8815/09, *Evaluation of eye irritation potential of cement clinker G in vitro using the isolated chicken eye test*, April 2010.
- (10) TNO report V8815/10, *Evaluation of eye irritation potential of cement clinker W in vitro using the isolated chicken eye test*, April 2010.
- (11) *European Commission's Scientific Committee on Toxicology, Ecotoxicology and the Environment (SCTEE) opinion of the risks to health from Cr (VI) in cement* (European Commission, 2002).
http://ec.europa.eu/health/archive/ph_risk/committees/sct/documents/out158_en.pdf.
- (12) *Investigation of the cytotoxic and proinflammatory effects of cement dusts in rat alveolar macrophages*, Van Berlo et al, *Chem. Res. Toxicol.*, 2009 Sept; 22(9):1548-58
- (13) *Cytotoxicity and genotoxicity of cement dusts in A549 human epithelial lung cells in vitro*; Gminski et al, Abstract DGPT conference Mainz, 2008.
- (14) *Comments on a recommendation from the American Conference of governmental industrial Hygienists to change the threshold limit value for Portland cement*, Patrick A. Hessel and John F. Gamble, EpiLung Consulting, June 2008.
- (15) *Prospective monitoring of exposure and lung function among cement workers, Interim report of the study after the data collection of Phase I-II 2006-2010*, Hilde Notø, Helge Kjuus, Marit



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Skogstad and Karl-Christian Nordby, National Institute of Occupational Health, Oslo, Norway, March 2010.

(16) *Occurrence of allergic contact dermatitis caused by chromium in cement. A review of epidemiological investigations*, Kåre Lenvik, Helge Kjuus, NIOH, Oslo, December 2011.

16.4 Classification and procedure used to derive the classification for mixtures according to Regulation (EC) 1272/2008 [CLP]

Classification according to Regulation (EC) No. 1272/2008	Classification Procedure
Skin Irrit. 2, H315	On basis of test data.
Eye Dam. 1, H318	On basis of test data.
Skin Irrit., 1B, H317	Human experience.
STOT SE 3, H335	Human experience.

16.5 Hazard (H) and Precautionary (P) Statements

Hazard Statements

H318 Causes serious eye damage
H315 Causes skin irritation
H317 May cause an allergic skin reaction
H335 May cause respiratory irritation

Precautionary Statements

P280 Wear protective gloves/protective clothing/eye protection/face protection
P264 Wash hands thoroughly after handling
P272 Contaminated work clothing should not be allowed out of the workplace.
IF IN EYES: Rinse cautiously with water for several minutes.
P305+P351+P338+P310 Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/physician
IF ON SKIN: Wash with plenty of soap and water. If skin irritation or rash occurs: Get medical advice/attention
P302+P352+P333+P313



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Precautionary Statements

P261+P304+P340+P312 Avoid breathing dust/fume/gas/mist/vapours/spray. IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.

P102 Keep out of reach of children

P501 Dispose of contents/container in accordance with SDS.

16.6 Training advice

In addition to training programs for employees on the topics health, safety and the environment, companies must ensure that their employees are able to read and understand the safety data sheet, and to implement the requirements.

16.7 Prepared by

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