SECTION 1 : IDENTIFICATION OF THE MIXTURE AND OF THE COMPANY

1.1 Product identifier

This safety data sheet is valid for the following cement types :

Ground Granulated Blast furnace Slag (GGBFS) according to the standard EN 15167-1

1.2. Relevant identified uses of the substance or mixture and uses advised against

GGBFS are used in industrial installations to manufacture/formulate hydraulic binders for building and construction work, such as ready-mixed concrete, mortars, renders, grouts, plasters as well as precast concrete.

GGBFS containing mixtures (hydraulic binders) are used industrially, by professionals as well as by consumers in building and construction work, indoor and outdoor.

The identified uses of GGBFS containing mixtures cover the dry products and the products in a wet suspension (paste).

See section 16.2 for more information regarding use descriptors and categories.

Any uses not mentioned above, are advised against.

1.3. Details of the supplier of the Safety Data Sheet

Company name : Eqiom A CRH Company

Full address : Colisée Gardens
10, avenue de l'Arche. ZAC DANTON
F - 92400 COURBEVOIE

Telephone : +33 1 41 06 11 00

E-mail address of person responsible for the SDS : reach @eqiom.com

1.4. Emergency telephone number

European emergency telephone number: 112

France: The emergency telephone number is the number of ORFILA (INRS): + 33 (0)1 45 42 59 59.
By dialling this number the coordinates of all the all "centres antipoisons" (poison centers) in France can be obtained. These centers offer free medical assistance (except call fees), Available : 24/24 hours and 7 days a week.

SECTION 2 : HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

2.1.1 According to Regulation (EC) No 1272/2008 (CLP)

GGBFS doesn't meet the classification criteria of Regulation (EC) No 1272/2008 (CLP) or its amendments.

2.2. Label elements

2.2.1. According to Regulation (EC) No 1272/2008 (CLP)

Hazard pictograms : None

Signal word : None

Hazard statements : None

Precautionary statements : None

Supplemental information

Dust of Ground Granulated Blast Furnace Slag can act as an irritant and cause mechanical irritation to the eyes and respiration system.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.2. Mixtures

Substances presenting a health or environmental hazard : see next table

Substance	**Concentration range**	**Registration number**	**EINECS**	**CAS**	**Classification Regulation n° 1272/2008**
	(% w/w)				**Hazard classs, category** ***Hazard statement***
GGBFS	100%	01-211948745625	266-002-0	65996-69-2	Not classified

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures

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 GGBFS, remove and rinse abundantly with soap and water.
For wet GGBFS, wash skin with plenty of soap and water.
Remove contaminated clothing, footwear, watches, etc. and clean thoroughly before re-using them. Seek medical treatment in all cases of irritation.

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.
When contacting a physician, take this SDS with you

4.2. Main symptoms and effects – Acute and Delayed

.

Eyes: Contact with ground slag (dry or wet) can cause serious and potentially irreversible eye damage.
Skin: Ground slag can have an irritating effect on damp skin (due to perspiration or ambient humidity) after prolonged contact, or may cause allergic reactions (eczema-like dermatitis) after repeated exposure.
Prolonged skin contact with wet ground slag or wet concrete can cause severe burns, as these may occur without the person feeling any pain (for example, by kneeling in wet concrete, even through trousers).
For more details, see Reference (1).
Inhalation: Repeated inhalation of ground slag dust over a long period increases the risk of developing lung diseases.
Environment: Under normal conditions of use, ground slag is 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

SECTION 5: FIRE-FIGHTING MEASURES

5.1. Extinguishing media

GGBFS itself is not flammable. Coordinate fire-fighting measures with surrounding

5.2. Special hazards arising from the substance or mixture

GGBFS are non-combustible and non-explosive and will not facilitate or sustain the combustion of other materials.

5.1. Advice for fire-fighters

Wear appropriate protective equipment and self-contained breathing apparatus (SCBA) if there is a risk of inhaling dust or combustion products.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

Avoid dust dispersion

6.2. Environmental precautions

Do not wash GGBFS down sewage and drainage systems or into bodies of water (e.g. streams).

6.3. Methods and material for containment and cleaning up

Collect the spillage in a dry state if possible.

Dry GGBFS
Use cleanup methods such as vacuum clean-up or vacuum extraction (Industrial portable units, equipped with high efficiency air filters [EPA and HEPA filters, EN 1822-1] or equivalent technique) which do not cause airborne dispersion. Never use compressed air.

Alternatively, wipe-up the dust by mopping, wet brushing or by using water sprays or hoses (fine mist to avoid that the dust becomes airborne) and remove slurry.
If not possible, remove by slurrying with water (see wet GGBFS).

When wet cleaning or vacuum cleaning is not possible and only dry cleaning with brushes can be done, ensure that the workers wear the appropriate personal protective equipment and prevent dust from spreading.

Avoid inhalation of GGBFS and contact with skin. Place spilled materials into a container. Solidify before disposal as described under Section 13.

Wet GGBFS
Clean up wet GGBFS and place in a container. Allow material to dry and solidify before disposal as described under Section 13.

6.4. Reference to other sections

See sections 8 and 13 for more details.

SECTION 7: HANDLING AND STORAGE

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

7.1. Precautions for safe handling

The so-called “Good practice guides” which contain advice on safe handling practices can be found from: http://www.nepsi.eu/agreement-good-practice-guide/good-practice-guide.aspx. These good practices have been adopted under the Social Dialogue "Agreement on Workers' Health Protection through the Good Handling and Use of Crystalline Silica and Products Containing it” by Employee and Employer European sectoral associations, among which CEMBUREAU (European Cement Association).

7.1.1 Protective measures

Follow the recommendations as given under Section 8. To clean up dry GGBFS, 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.

Measure 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 GGBFS 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 GGBFS without taking the proper security measures. GGBFS can build-up or adhere to the walls of a confined space. The GGBFS can release, collapse or fall unexpectedly.

Packed products should be stored in unopened bags clear of the ground in cool, dry conditions and protected from excessive draught in order to avoid degradation of quality.
Bags should be stacked in a stable manner.
Do not use aluminium containers for the storage or transport of wet GGBFS containing mixtures due to incompatibility of the materials.

7.3. Specific end use(s)

No additional information for the specific end uses (see section 1.2).

7.4. Soluble Hexavalent Chromium Controm Cr(VI)

Ground slags have a soluble hexavalent chromium content below the regulatory limit of 0.0002% of the total dry weight of the ground slag, in accordance with EN 196-10.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

France

Limit value	Exposure route	Exposure frequency	Legal Reference
General dust (reputed without any specific effects) Total inhalable dust : OELV 10 mg/m³ General dust (reputed without any specific effects) Alveolar fraction: OELV : 5 mg/m³	Inhalation	Working place limite value (mean value over one shift)	Article R.4222-10 of the Occupational Code
Chrome soluble (VI) : 2 ppm	Skin	Short period (intense) Prolonged period (repeated)	Regulation EC 1907/2006

8.2. Exposure controls

For each individual PROC, users can choose from either option A) or B) in the table below, according to what is best suited to their specific situation. If one option is chosen, then the same option has to be chosen in the table from section “8.2.2 Individual protection measures such as personal protection equipment” - Specification of respiratory protective equipment. Only combinations between A) – A) and B) – B) are possible.

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.

Use	PROC*	Expo-sure	Localised controls	Efficiency
Industrial manufacture/formulation of hydraulic building and construction materials	2, 3	Duration is not restricted (up to 480 minutes per shift, 5 shifts a week)	not required	-
	14, 26		A) not required or B) generic local exhaust ventilation	- 78 %
	5, 8b, 9		A) general ventilation or B) generic local exhaust ventilation	17 % 78 %
Industrial uses of dry hydraulic building and construction materials (indoor, outdoor)	2		not required	-
	14, 22, 26		A) not required or B) generic local exhaust ventilation	- 78 %
	5, 8b, 9		A) general ventilation or B) generic local exhaust ventilation	17 % 78 %
Industrial uses of wet suspension of hydraulic building and construction materials	7		A) not required or B) generic local exhaust ventilation	- 78 %
	2, 5, 8b, 9, 10, 13, 14		not required	-
Professional use of dry hydraulic building and construction material (indoor, outdoor)	2		not required	-
	9, 26		A) not required or B) generic local exhaust ventilation	- 72 %
	5, 8a, 8b, 14		A) not required or B) integrated local exhaust ventilation	- 87 %
	19		localised controls are not applicable, process only in good ventilated rooms or outdoor	-
Professional uses of wet suspensions of hydraulic building and construction Materials	11		A) not required or B) generic local exhaust ventilation	- 72 %
	2, 5, 8a, 8b, 9, 10, 13, 14, 19		not required	-

* PROC's are identified uses and defined in section 16.2.

8.2.2 Individual protection measures such as personal protection equipment

General

During work avoid kneeling in fresh mortar or concrete wherever possible. If kneeling is absolutely necessary then appropriate waterproof personal protective equipment must be worn.

Do not eat, drink or smoke when working with GGBFS to avoid contact with skin or mouth.

Before starting to work with GGBFS, apply a barrier creme and reapply it at regular intervals.

Immediately after working with GGBFS or GGBFS-containing materials, workers should wash or shower or use skin moisturisers.

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 GGBFS 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 GGBFS. Particular care should be taken to ensure that dry or 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, (e.g. EN 149, EN 140, EN 14387, EN 1827) or national standard.

Thermal hazards

Not applicable.

Use	PROC*	Exposure	Specification of respiratory protective equipment (RPE)	RPE efficiency - Assigned protection factor (APF)
Industrial manufacture/formulation of hydraulic building and construction materials	2, 3	Duration is not restricted (up to 480 minutes per shift, 5 shifts a week)	not required	-
	14, 26		A) P1 mask (FF, FM) or B) not required	APF = 4 -
	5, 8b, 9		A) P2 mask (FF, FM) or B) P1 mask (FF, FM)	APF = 10 APF = 4
Industrial uses of dry hydraulic building and construction materials (indoor, outdoor)	2		not required	-
	14, 22, 26		A) P1 mask (FF, FM) or B) not required	APF = 4 -
	5, 8b, 9		A) P2 mask (FF, FM) or B) P1 mask (FF, FM)	APF = 10 APF = 4
Industrial uses of wet suspension of hydraulic building and construction materials	7		A) P1 mask (FF, FM) or B) not required	APF = 4 -
	2, 5, 8b, 9, 10, 13, 14		not required	-
Professional use of dry hydraulic building and construction material (indoor, outdoor)	2		P1 mask (FF, FM)	APF = 4
	9, 26		A) P2 mask (FF, FM) or B) P1 mask (FF, FM)	APF = 10 APF = 4
	5, 8a, 8b, 14		A) P3 mask (FF, FM) or B) P1 mask (FF, FM)	APF = 20 APF = 4
	19		P2 mask (FF, FM)	APF = 10
Professional uses of wet suspensions of hydraulic building and construction materials	11		A) P2 mask (FF, FM) or B) P1 mask (FF, FM)	APF = 10 APF = 4
	2, 5, 8a, 8b, 9, 10, 13, 14, 19		not required	-

*

PROC's are identified uses and defined in section 16.2.

For each individual PROC, users must choose option A) or B) in the table above, according to what was chosen in section "8.2.1 Appropriate engineering controls" – localised controls. An overview of the APFs of different RPE (according to EN 529) can be found in the glossary of MEASE (16).

Any RPE as defined above shall only be worn if the following principles are implemented in parallel: The duration of work (compare with "duration of exposure" above) should reflect the additional physiological stress for the worker due to the breathing resistance and mass of the RPE itself, due to the increased thermal stress by enclosing the head. In addition, it shall be considered that the worker's capability of using tools and of communicating are reduced during the wearing of RPE.

For reasons as given above, the worker should therefore be (i) healthy (especially in view of medical problems that may affect the use of RPE), (ii) have suitable facial characteristics reducing leakages between face and mask (in view of scars and facial hair). The recommended devices above which rely on a tight face seal will not provide the required protection unless they fit the contours of the face properly and securely.

The employer and self-employed persons have legal responsibilities for the maintenance and issue of respiratory protective devices and the management of their correct use in the workplace. Therefore, they should define and document a suitable policy for a respiratory protective device programme including training of the workers.

8.2.3 Environmental exposure controls

Air: Environmental exposure control for the emission of GGBFS 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 GGBFS 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.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

This information applies to the whole mixture.

(a) Appearance: Dry GGBFS is a finely ground solid inorganic material (grey or white powder). Main particle size: 5-30 µm
(b) Odour: may have a midly sulphurous odour
(c) Odour threshold: No odour threshold, odourless
(d) pH: (T = 20°C in water, water-solid ratio 1:2): 10-12
(e) Melting point: > 1 000 °C
(f) Initial boiling point and boiling range: Not applicable as under normal atmospheric conditions, melting point >1 000°C
(g) Flash point: Not applicable as is not a liquid
(h) Evaporation rate: Not applicable as is not a liquid
(i) Flammability (solid, gas): Not applicable as is a solid which is non combustible and does not cause or contribute to fire through friction
(j) Upper/lower flammability or explosive limits: Not applicable as is not a flammable gas

(k) Vapour pressure: Not applicable as melting point > 1250 °C
(l) Vapour density: Not applicable as melting point > 1250 °C
(m) Flammability (solid, gas): Not applicable as is a solid which is non combustible and does not cause or contribute to fire through friction
(n) Upper/lower flammability or explosive limits: Not applicable as is not a flammable gas
(o) Vapour pressure: Not applicable as melting point > 1250 °C
(p) Vapour density: Not applicable as melting point > 1250 °C
(q) Relative density: 2,75-3,20; Apparent density: 0,9-1,5 g/cm³
(r) Solubility(ies) in water (T = 20 °C): slight < 100 mg/l)
(s) Partition coefficient: n-octanol/water: Not applicable as is inorganic mixture
(t) 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)
(u) Decomposition temperature: Not applicable as no organic peroxide present
(v) Viscosity: Not applicable as not a liquid
(w) Explosive properties: Not applicable. Not explosive or pyrotechnic. Not in itself capable by chemical reaction of producing gas at such temperature and pressure and at such a speed as to cause damage to the surroundings. Not capable of a self-sustaining exothermic chemical reaction.
(x) Oxidising properties: Not applicable as does not cause or contribute to the combustion of other materials

9.2. Other information

Not applicable.

SECTION 10: STABILITY AND REACTIVITY

10.1. Reactivity

When mixed with water, GGBFS will harden into a stable mass that is not reactive in normal environments.

10.2. Chemical stability

Dry GGBFS are stable as long as they are properly stored (see Section 7) and compatible with most other building materials. They should be kept dry.

Contact with incompatible materials should be avoided.
Wet GGBFS is alkaline and incompatible with acids, with ammonium salts, with aluminium or other non-noble metals. GGBFS dissolves in hydrofluoric acid to produce corrosive silicon tetrafluoride gas. GGBFS reacts with water to form silicates and calcium hydroxide. Silicates in GGBFS react with powerful oxidizers such as fluorine, boron trifluoride, chlorine trifluoride, managanese trifluoride, and oxygen difluoride.

10.3. Possibility of hazardous reactions

GGBFS do not cause hazardous reactions.

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. Uncontrolled use of aluminium powder in wet GGBFS should be avoided as hydrogen is produced.

10.6. Hazardous decomposition products

GGBFS will not decompose into any hazardous products.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects

Hazard class	Cat	Effect	Reference
Acute toxicity - dermal	-	Limit test, rabbit, 24 hours contact, 2.000 mg/kg body weight – no lethality. Based on available data, the classification criteria are not met.	(2)
Acute toxicity- inhalation	-	No acute toxicity by inhalation observed. Based on available data, the classification criteria are not met.	(9)
Acute toxicity - oral	-	No indication of oral toxicity from studies with GGBFS. Based on available data, the classification criteria are not met.	Literature survey
Skin corrosion/ irritation	2	GGBFS in contact with wet skin may cause thickening, cracking or fissuring of the skin. Prolonged contact in combination with abrasion may cause severe burns.	(2) Human experience
Serious eye damage/irritation	1	Direct contact with GGBFS may cause corneal damage by mechanical stress, immediate or delayed irritation or inflammation. Direct contact by larger amounts of dry cement or splashes of wet cement may cause effects ranging from moderate eye irritation (e.g. conjunctivitis or blepharitis) to chemical burns and blindness.	(10), (11)
Skin sensitisation	1B	Some individuals may develop eczema upon exposure to wet GGBFS dust, caused either by the high pH which induces irritant contact dermatitis after prolonged contact, or by an immunological reaction to soluble Cr (VI) which elicits allergic contact dermatitis. The response may appear in a variety of forms ranging from a mild rash to severe dermatitis and is a combination of the two above mentioned mechanisms. If the cement contains a soluble Cr (VI) reducing agent and as long as the mentioned period of effectiveness of the chromate reduction is not exceeded, a sensitising effect is not expected [Reference (3)].	(3), (4), (17)
Respiratory - sensitisation		There is no indication of sensitisation of the respiratory system. Based on available data, the classification criteria are not met.	(1)
Germ cell mutagenicity	-	No indication. Based on available data, the classification criteria are not met.	(12), (13)

Hazard class	Cat	Effect	Reference
Carcinogenicity	-	No causal association has been established between GGBFS exposure and cancer. The epidemiological literature does not support the designation of GGBFS as a suspected human carcinogen. GGBFS is not classifiable as a human carcinogen (According to ACGIH A4: Agents that cause concern that they could be carcinogenic for humans but which cannot be assessed conclusively because of a lack of data. In vitro or animal studies do not provide indications of carcinogenicity that are sufficient to classify the agent with one of the other notations.). Based on available data, the classification criteria are not met.	(1) (14)
Reproductive toxicity	-	Based on available data, the classification criteria are not met.	No evidence from human experience
STOT-single exposure	3	GGBFS dust may irritate the throat and respiratory tract. Coughing, sneezing, and shortness of breath may occur following exposures in excess of occupational exposure limits. Overall, the pattern of evidence clearly indicates that occupational exposure to cement dust has produced deficits in respiratory function. However, evidence available at the present time is insufficient to establish with any confidence the dose-response relationship for these effects.	(1)
STOT-repeated exposure	-	There is an indication of COPD. The effects are acute and due to high exposures. No chronic effects or effects at low concentration have been observed. Based on available data, the classification criteria are not met.	(15)
Aspiration hazard	-	Not applicable as GGBFS are not used as an aerosol.	

Medical conditions aggravated by exposure

Inhaling cement dust may aggravate existing respiratory system disease(s) and/or medical conditions such as emphysema or asthma and/or existing skin and/or eye conditions.

SECTION 12: ECOLOGICAL INFORMATION

12.1. Toxicity

The product is not hazardous to the environment. Ecotoxicological tests with Portland cement on Daphnia magna [Reference (5)] and Selenastrum coli [Reference (6)] have shown little toxicological impact. Therefore LC50 and EC50 values could not be determined [Reference (7)]. There is no indication of sediment phase toxicity [Reference (8)]. The addition of large amounts of cement to water may, however, cause a rise in pH and may, therefore, be toxic to aquatic life under certain circumstances.

12.2. Persistence and degradability

Not relevant. After hardening, cement presents no toxicity risks.

12.3. Bioaccumulative potential

Not relevant. After hardening, cement presents no toxicity risks.

12.4. Mobility in soil

Not relevant. After hardening, cement presents no toxicity risks.

12.5. Results of PBT and vPvB assessment

Not relevant. After hardening, cement presents no toxicity risks.

12.6. Other adverse effects

Not relevant.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Do not dispose of into sewage systems or surface waters.

EWC entry: 10 13 99 (wastes not otherwise specified)

Product - unused residue or dry spillage
Pick up dry unused residue or dry spillage as is. Mark the containers. Possibly reuse depending upon shelf life considerations and the requirement to avoid dust exposure. In case of disposal, harden with water and dispose according to “Product – after addition of water, hardened”
EWC entry: 10 13 06 (Other particulates and dust)

Product – slurries
Allow to harden, avoid entry in sewage and drainage systems or into bodies of water (e.g. streams) and dispose of as explained below under “Product - after addition of water, hardened”.

Product - after addition of water, hardened
Dispose of according to the local legislation. Avoid entry into the sewage water system. Dispose of the hardened product as concrete waste. Due to the inertisation, concrete waste is not a dangerous waste. *EWC entries*: 10 13 14 (waste from manufacturing of cement – waste concrete or concrete sludge) or 17 01 01 (construction and demolition wastes - concrete).

Packaging
Completely empty the packaging and process it according to local legislation. *EWC entry:*
15 01 01 (waste paper and cardboard packaging).

SECTION 14: TRANSPORT INFORMATION

GGBFS is not covered by the international regulation on the transport of dangerous goods (IMDG, IATA, ADR/RID), therefore no classification is required.
No special precautions are needed apart from those mentioned under Section 8.

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

SECTION 15: REGULATORY INFORMATION

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

EU regulatory information:
GGBFS is a substance according to REACH (EC 1907/2006) and it is subject to registration. Its REACH registration number is 01-2119487456-25.

15.2. Chemical Safety Assessment

No chemical safety assessment has been carried out for this mixture by the supplier.

SECTION 16: OTHER INFORMATION

16.1 Indication of changes

This version, completely revised according to Regulation (EC) No. 453/2010, is based on the work of the CEMBUREAU's Health & Safety Experts Group.

16.2 Identified uses and use descriptors and categories

The table below gives an overview of all relevant identified uses of GGBFS or concrete containing GGBFS. All the uses have been grouped in these identified uses because of the specific conditions of exposure for human health and environment. For each specific use, a set of risk management measures or localised controls has been derived (see section 8) which need to be put in place by the user of GGBFS or concrete containing GGBFS to bring the exposure to an acceptable level.

PROC	Identified Uses - Use Description	Manufacture/ Formulation of building and construction materials	Professional/ Industrial use of building and construction materials
2	Use in closed, continuous process with occasional controlled exposure, e.g. industrial or professional manufacture of hydraulic binders	X	X
3	Use in closed batch process, e.g. industrial or professional manufacture of ready-mix concrete	X	X
5	Mixing or blending in batch process for formulation of mixtures and articles, e.g. industrial or professional manufacture of pre-cast concrete	X	X
7	Industrial spraying, e.g. industrial use of wet suspensions of hydraulic binders by spraying		X
8a	Transfer of substance or mixture from/to vessels/large containers at non-dedicated facilities, e.g. use of cement in bags to prepare mortar		X
8b	Transfer of substance or mixture from/to vessels/large containers a dedicated facilities, e.g. filling of silos, trucks or barges at cement plants	X	X
9	Transfer of substance or mixture into small containers, e.g. filling of cement bags in cement plants	X	X

PROC	Identified Uses - Use Description	Manufacture/ Formulation of building and construction materials	Professional/ Industrial use of building and construction materials
10	Roller application or brushing, e.g. products to improve adherence between building surfaces and finishing Products		X
11	Non-Industrial spraying, e.g. professional use of wet suspensions of hydraulic binders by spraying		X
13	Treatment of articles by dipping and pouring, e.g. covering of construction products with a layer to improve the performance of the product		X
14	Production of mixtures or articles by tabletting, compression extrusion, pelletisation, e.g. production of floor tiling	X	X
19	Hand-mixing with intimate contact and only PPE available, e.g. mixture of wet hydraulic binder on a construction site		X
22	Potentially closed processing operations with minerals/metals at elevated temperature in industrial setting, e.g. production of bricks		X
26	Handling of solid inorganic substances at ambient temperature, e.g. mixture of wet hydraulic binders	X	X

16.3 Abbreviations and acronyms

ACGIH American Conference of Industrial Hygienists
ADR/RID European Agreements on the transport of Dangerous goods by Road/Railway
APF Assigned protection factor
C&L Classification and Labelling
CAS Chemical Abstracts Service
CLP Classification, labelling and packaging (Regulation (EC) No 1272/2008)
COPD Chronic Obstructive Pulmonary Disease
EC50 Half maximal effective concentration
EINECS European INventory of Existing Commercial chemical Substances
EPA Type of high efficiency air filter
EWC European Waste Catalogue
FF P Filtering facepiece against particles (disposable)
FM P Filtering mask against particles with filter cartridge
HEPA Type of high efficiency air filter
IATA International Air Transport Association

IBC	International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk (International Bulk Chemical code)
IMDG	International agreement on the Maritime transport of Dangerous Goods
LC50	Median lethal dose
MARPOL	International Convention for the Prevention of Pollution from Ships
MEASE	Metals estimation and assessment of substance exposure, EBRC Consulting GmbH for Eurometaux, http://www.ebrc.de/ebrc/ebrc-mease.php
OELV	Occupational exposure limit value
PBT	Persistent, bio-accumulative and toxic
PPE	Personal protective equipment
PROC	Process category
RE	Repeated exposure
REACH	Registration, Evaluation and Authorisation of Chemicals
RPE	Respiratory protective equipment
SDS	Safety Data Sheet
SE	Single exposure
STOT	Specific Target Organ Toxicity
vPvB	Very persistent, very bio-accumulative
w/w	Weight by weight

16.4 Key literature references and sources of data

(1) *Portland Cement Dust - Hazard assessment document EH75/7*, UK Health and Safety Executive, 2006. Available from: http://www.hse.gov.uk/pubns/web/portlandcement.pdf.

(2) *Observations on the effects of skin irritation caused by cement*, Kietzman et al, Dermatosen, 47, 5, 184-189 (1999).

(3) *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.

(4) *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.

(5) *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).

(6) *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 th

Support Laboratory, U.S. EPA, Cincinnati, OH (1993) and 5 ed. EPA-821-R-02-012, US EPA, office of water, Washington D.C. (2002).

(7) *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.

(8) *Final report Sediment Phase Toxicity Test Results with Corophium volutator for Portland clinker* prepared for Norcem A.S. by AnalyCen Ecotox AS, 2007.

(9) TNO report V8801/02, *An acute (4-hour) inhalation toxicity study with Portland Cement Clinker CLP/GHS 03-2010-fine in rats*, August 2010.

(10) TNO report V8815/09, *Evaluation of eye irritation potential of cement clinker G in vitro using the isolated chicken eye test*, April 2010.

(11) TNO report V8815/10, *Evaluation of eye irritation potential of cement clinker W in vitro using the isolated chicken eye test*, April 2010.

(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 Skogstad and KarlChristian Nordby, National Institute of Occupational Health, Oslo, Norway, March 2010.

(16) *MEASE, Metals estimation and assessment of substance exposure,* EBRC Consulting GmbH for Eurometaux, http://www.ebrc.de/ebrc/ebrc-mease.php.

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

16.5 Relevant R-phrases and/or H-Statements

See subsection 2.2.
R48/20 Harmful: danger of serious damage to health by prolonged exposure through inhalation

16.6 Training advice

In addition to health, safety and environmental training programs for their workers, companies must ensure that workers read, understand and apply the requirements of this SDS.

16.7 Further information

The data and test methods used for the purpose of classification of GGBFS, are given or referred to in subsection 11.1.

16.8 Disclaimer

The information on this data sheet reflects the currently available knowledge and is reliable provided that the product is used under the prescribed conditions and in accordance with the application specified on the packaging and/or in the technical guidance literature. Any other use of the product, including the use of the product in combination with any other product or any other process, is the responsibility of the user.

It is implicit that the user is responsible for determining appropriate safety measures and for applying the legislation covering his/her own activities.