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GUIDELINES FOR THE SAFETY DATA SHEET FOR PORTLAND CEMENT CLINKER

1. Safety Data Sheets under REACH	The REACH regulation (Regulation EC n° 1907/2006) considers the safety data sheet (SDS) as the key element in the hazard and risk management communication from chemical substance suppliers and formulators to downstream users (DU): from manufacturers to their professional customers. When a substance or preparation meets the criteria for classification as dangerous in accordance with Directives 67/548/EEC or 1999/45/EC*, ***the person responsible for placing that substance or preparation on the market, whether the manufacturer, importer, downstream user (DU) or distributor, shall supply the recipient, who is a downstream user or distributor of the substance or preparation, with a SDS***. Unless requested by the DU or distributor, a SDS will ***not have to be supplied for substances or preparations sold to the general public if sufficient information*** is provided to enable users to take the necessary measures with regard to the protection of the environment and human health. * To be updated once the GHS Regulation enters into force	The SDS shall be supplied in the official languages of the Member States in which the substance or preparation is placed on the market (unless the Member State provides otherwise). The SDS shall be supplied on paper or electronically at the latest at the time of first delivery of a substance. Suppliers shall update it without delay as soon as new information, which may affect the risk management measures, or new information on hazards becomes available. The same applies if an authorisation is granted or refused or a restriction has been imposed. The new dated version of the information identified as “Revision: (date)” shall be provided free of charge to all former recipients who have been supplied with the substance in the preceding 12 months (Article 31 REACH Regulation). Workers or their representatives shall be granted access by their employers to the SDS of the substances or preparations they use or might be exposed to in the course of their work.
2. Scope of SDS - Record keeping – Chemical Safety Report (CSR)	• The SDS is meant for professional users and should provide them with useful health and safety (H&S) information. • However, a SDS may be used as a basis for internal H&S protocols for the clinker production plant work force. Provided that the required personal protection equipment is correctly used in the production plant, then the health impacts for workers are considered as adequately controlled by what is explained in this SDS. • The SDS has to be kept on file for 10 years after the last manufacture, import, supply or use of the substance/preparation (Article 36 REACH) (including information used for its compilation).	

3. Labelling

- In addition to the SDS, information will be supplied by labelling the product containers under Dir. 67/548/EEC.Bulk deliveries of clinker also fall under these requirements.
- In addition, Member States may prescribe appropriate labelling in the case of small containers or containers that are otherwise unsuitable for labelling (Article 25 (2) (a) of 67/548)
- Portland cement clinker does not require to be labelled under the rules for the transport of dangerous goods.

4. Impacts of Globally Harmonised System for Classification and Labelling (GHS)

- In the explanatory memorandum to the proposal for a regulation on GHS, the European Commission states that: "The Safety Data Sheet Directive ensures that suppliers of substances and preparations provide information about the hazards of their chemicals and guidance on safe use to professional customers. These provisions have been taken up in REACH" (COM(2007) 355 final of 26 June 2007, p.3).
- According to the proposal for the GHS, the new classification and labelling system under GHS and the current system would coexist for a transitional period.
- Until 1 December 2010, substances shall be classified, labelled and packaged in accordance with Directive 67/548/EEC (DSD) and until 1 June 2015, mixtures shall be classified, labelled and packaged in accordance with Directive 1999/45/EC (DPD).

Producers may choose to classify and label according to the GHS prior to those dates. If they do so, the labelling requirements of the DSD and DPD do not apply. The use of GHS before 1 December 2010 (substances) and 1 June 2015 (mixtures) is not mandatory.
Between 1 December 2010 and 1 June 2015, substances shall be classified in accordance with both the DSD and the GHS. They shall be labelled and packaged in accordance with GHS.
After respectively 1 December 2010 (substances) and 1 June 2015 (mixtures), only the GHS shall apply.

- Changes to the SDS will be necessary once GHS is implemented in the EU, to adapt it to the modified classification and labelling under the GHS.
  Also, some classifications may change under GHS.

5. Content of the guidelines for a harmonised SDS for Portland cement clinker

- These guidelines are based on the contents of the SDS as required by REACH (Annex II Guide to the Compilation of Safety Data Sheets) and sub-report from the RIP 3.2-1A Technical Guidance Document "Safety Data Sheet Requirements under REACH" from 27 July 2005.
- The guidelines are intended to assist towards a more harmonised SDS for Portland cement clinker in all CEMBUREAU Member countries. However, the responsibility for the accuracy of the individual SDS remains with the individual Portland cement clinker manufacturer.

6. Comments to some points in the template

Date of SDS
Give either the date the SDS was issued, or give the date it was revised.

1.3 Company identification
Give the full address and telephone number of the person responsible for placing the substance or preparation on the market within the Community. Give the e-mail address of the competent person responsible for the SDS.
If this person is not located in the MS where the substance or preparation is placed on the market, give the full address and telephone number of the person responsible in the MS, if possible.

1.4 Emergency telephone
Emergency telephone number of company and/or relevant official advisory body (e.g. body responsible for receiving health and safety information referred to in Art 17 of 1999/45/EC).
It is not mandatory to have the emergency telephone number available outside office hours, but if not, this should be specified.

2.1 Hazard characterisation
Depending on the evaluation by the Portland cement clinker manufacturer of the risk of ocular lesions, he may decide not to use R41 but use R36 instead.

8.2 Exposure controls

8.2.1 Occupational exposure controls
Respiratory protection
To be adapted to national standard by the manufacturer if applicable.

15.1 Classification and labelling of Portland cement clinker according to 67/548/EEC
Depending on the evaluation by the clinker manufacturer of the risk of ocular lesions, he may decide not to use R41 but use R36 instead.

15.3 National legislation/requirements
List any legislation/requirements in force in the MS where the Portland cement clinker is marketed.

16 Other information
For a revised SDS, indicate clearly the information that has been deleted, added or revised (unless this has been indicated elsewhere).
If applicable, it can be added under this point that in some cases, clinker can be supplied at high temperatures (100-200°C) during loading on a lorry.

7. Template for the SDS for Portland cement clinker

Template Safety Data Sheet for Portland cement clinker	
Date issued	DD/MM/YYYY

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

1.1 Identification of the substance/preparation
Portland cement clinker

1.2 Use of the substance/preparation
Portland cement clinker is exclusively used for cement production in industrial installations.

1.3 Company identification

To be completed by the manufacturer

Company name:
Address:
Telephone number:
E-mail of person responsible for SDS:

1.4 Emergency telephone

To be completed by the manufacturer

Emergency telephone number:
Available outside office hours?
□ **Y** □ **N**

2. HAZARD IDENTIFICATION

When Portland cement clinker accidentally comes into contact with water or when clinker or clinker dust becomes damp, a strong alkaline solution is produced.

2.1 Hazard characterisation
Xi Irritant
R37/38 Irritating to respiratory system and skin
R41 Risk of serious damage to eyes
R43 May cause sensitisation by skin contact

2.2 Primary route(s) of entry
***Inhalation*:** Yes
***Skin - eyes*:** Yes
***Ingestion*:** No, except in accidental cases

2.3 Human health
***Inhalation*:** Frequent inhalation of large quantities of Portland cement clinker dust over a long period of time increases the risk of developing lung diseases.

Eyes: Eye contact with Portland cement clinker dust (dry or wet) may cause serious and potentially irreversible injuries.

Skin: Portland cement clinker may have an irritating effect on moist skin (due to transpiration or humidity) or may cause contact dermatitis after prolonged contact.
Contact between clinker dust and moist skin may cause irritation, dermatitis or burns.

For more details see Reference (1).

2.4 Environment
Under normal use, the product is not expected to be hazardous to the environment.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Chemical composition
Portland cement clinker is a multiconstituent substance consisting of 4 clinker phases (calcium-silicates ($3CaO.SiO_2$ and $2CaO.SiO_2$), calcium-aluminate ($3CaO.Al_2O_3$) and calcium-aluminate-ferrite ($4CaO.Al_2O_3.Fe_2O_3$) usually together with some unreacted CaO (free lime). It is made by mineralogical transformation of a precisely specified mixture of raw materials containing CaO, SiO_2, Al_2O_3, Fe_2O_3 and small quantities of other elements.

4. FIRST AID MEASURES

When contacting a physician, take this SDS with you.

4.1 After significant accidental inhalation
Move 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 subside.

4.2 After contact with eyes
Do not rub eye as additional corneal damage is possible by mechanical stress.
Remove any contact lenses and open the eyelids widely to flush eye(s) immediately by thoroughly rinsing with plenty of clean water for at least 45 minutes to remove all particles. If possible, use isotonic water (0,9% NaCl).
Contact a specialist of occupational medicine or an eye specialist.

4.3 After skin contact

For dry Portland cement clinker, remove and rinse abundantly with water.
For wet/damp Portland cement clinker, wash skin 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.

4.4 After significant accidental ingestion

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

5. FIRE-FIGHTING MEASURES

5.1 Flashpoint and method

Portland cement clinker is non-combustible and non-explosive and will not facilitate nor support combustion of other materials.

5.2 Extinguishing media

All types of extinguishing media are suitable.

5.3 Fire fighting equipment

Portland cement clinker poses no fire-related hazards. No need for specialist protective equipment for fire fighters.

5.4 Combustion products

None.

5.5 Flammable limits: Lower explosion limit LEL – Upper explosion limit UEL

Not applicable.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal protective measures

Wear protective equipment as described under Heading 8 and follow the advice for safe handling and use given under Heading 7.
Emergency procedures are not required.

6.2 Environment protection measures

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

6.3 Methods for cleaning up

Collect spilled material and use it.
Use dry cleanup methods that do not cause airborne dispersion.
Ensure that the workers wear appropriate personal protective equipment and prevent dust from spreading.
Avoid inhalation of Portland cement clinker dust and contact with skin. Place spilled material into a container and use it.

7. HANDLING AND STORAGE

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

7.1 Handling

Follow the recommendations as given under Heading 8.

Avoid dust development.
To clean up dry Portland cement clinker. See heading 6.3.

7.2 Storage

Portland cement clinker should be stored under waterproof, dry (internal condensation minimised) conditions, clean and protected from contamination.
Engulfment hazard: Portland cement clinker can build-up or adhere to the walls of a confined space. The clinker can release, collapse or fall unexpectedly. To prevent burial 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 Portland cement clinker without taking the proper security measures.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Exposure limit values

To be completed by the manufacturer in line with national provisions in place

8.2 Exposure controls

8.2.1 Occupational exposure controls

General: Do not eat, drink or smoke when working with Portland cement clinker to avoid clinker dust contact with skin or mouth.

Immediately after working with Portland cement clinker, workers should wash or shower or use skin moisturisers.
Remove contaminated clothing, footwear, watches, etc. and clean thoroughly before re-using them.

Respiratory protection: When a person is exposed to dust above exposure limits, use appropriate respiratory protection. It should be adapted to the dust level and conform to the relevant EN standard.

To be adapted by the manufacturer in accordance with national standards if applicable

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

Skin protection: Use impervious, abrasion and alkali resistant gloves (made of low soluble Cr (VI) containing material), internally lined with cotton, boots, closed long-sleeved protective clothing and additionally skin care products (including barrier creams) to protect the skin from prolonged contact with Portland cement clinker. Particular care should be taken to ensure that Portland cement clinker does not enter the boots.

8.2.2 Environmental exposure controls
According to available technology. See heading 2.4.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 General information
Portland cement clinker is a grey or white, odourless, granular inorganic material.

9.2 Physical data
Solubility in water: not relevant
Density: 2.75-3.20 g/cm³
Apparent density (ES): 0.9-1.8 g/cm³
pH (T = 20°C in water): 11-13.5
Boiling/melting point: > 1 250 °C
Flash point, flammability, oxidising properties, explosive properties, partition coefficient n-octanol/water, vapour pressure, vapour density, evaporation rate, viscosity: not relevant

10. STABILITY AND REACTIVITY

10.1 Stability
Portland cement clinker is stable as long as it is stored properly (see Heading 7).
When mixed with water, Portland cement clinker will harden into a stable mass that is not reactive to normal environments.

10.2 Conditions to avoid
Humidity during storage may cause lump formation and loss of product quality.

10.3 Materials to avoid
Not applicable

10.4 Hazardous decomposition products
Portland cement clinker will not decompose into other hazardous by-products and does not polymerise.

11. TOXICOLOGICAL INFORMATION

11.1 Acute effects
Eye contact: Direct contact with Portland cement clinker may cause corneal damage by mechanical stress, immediate or delayed irritation or inflammation. Direct contact with larger amounts of dry Portland cement clinker dust or splashes of wet clinker may cause effects ranging from moderate eye irritation (e.g. conjunctivitis or blepharitis) to chemical burns and blindness.

Skin contact: Portland cement clinker in contact with wet skin may cause thickening, cracking or fissuring of the skin. Prolonged contact in combination with abrasion can cause severe burns.

Acute dermal toxicity: Limit test, rabbit, 24 hours contact, 2 000 mg/kg body weight – no lethality [Reference (2)].

***Ingestion*:** Swallowing large quantities may cause irritation to the gastrointestinal tract.

***Inhalation*:** Portland Cement clinker dust may irritate the throat and respiratory tract. Coughing, sneezing, and shortness of breath may occur following exposures in excess of occupational exposure limits.

11.2 Chronic effects
***Inhalation*:** Chronic exposure to respirable dust in excess of occupational exposure limits may cause coughing, shortness of breath and may cause chronic obstructive lung disease (COPD).

***Carcinogenicity*:** no causal association has been established [Reference (1)].

***Contact dermatitis/Sensitising effects*:** Some individuals may exhibit eczema upon exposure to wet clinker 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 [Reference (3)].

11.3 Medical conditions aggravated by exposure
Portland cement clinker 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.

12. ECOLOGICAL INFORMATION

12.1 Ecotoxicity

The product is not expected to be hazardous to the environment. Ecotoxicological tests with Portland cement on Daphnia magna [Reference (4)] and Selenastrum coli [Reference (5)] have shown little toxicological impact. Therefore LC50 and EC50 values could not be determined [Reference (6)]. There is no indication of sediment phase toxicity [Reference (7)]. The addition of large amounts of Portland cement clinker to water may, however, cause a rise in pH and may therefore be toxic to aquatic life under certain circumstances.

12.2 Mobility

Portland cement clinker is not volatile but might become airborne during handling operations.

12.3 Persistence and degradability/Bio accumulative potential/Results of PBT assessment/Other adverse effects

not relevant as Portland cement clinker is an inorganic material. After hydration, Portland cement clinker lumps present no toxicity risks.

13. DISPOSAL CONSIDERATIONS

Cement clinker may always be reused. Disposal considerations do not apply.

14. TRANSPORT INFORMATION

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

15. REGULATORY INFORMATION

15.1 Classification and labelling of Portland cement clinker according to 67/548/EEC

Xi Irritant

R37/38 Irritating to respiratory system and skin
R41 Risk of serious damage to eyes
R43 May cause sensitisation by skin contact
S2 Keep out of reach of children
S22 Do not breathe dust
S24/25 Avoid contact with skin and eyes
S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice
S36/37/39 Wear suitable protective clothing, gloves and eye/face protection
S46 If swallowed, seek medical advice immediately and show this container or label

15.2 National legislation/requirements

To be completed by the manufacturer

16. OTHER INFORMATION

Abbreviations

- IMDG: International Maritime Dangerous Goods
- IATA: International Air Transport Association
- ADR/RID: Agreement on the transport of dangerous goods by road/Regulations on the international transport of dangerous goods by rail
- EC50 median effective concentration: Statistically derived concentration which is expected to cause a defined non-lethal effect in 50% of the given population of organisms under defined conditions

References

(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) *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).

(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).

(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.

To be completed by the manufacturer: information about revision of SDS

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 own activities.

8. Disclaimer	These guidelines for SDS and the SDS template have been assembled by CEMBUREAU on the basis of information and documentation supplied by CEMBUREAU Members. CEMBUREAU Members may wish to use the guidelines and the template as a guidance and basis for the creation of SDS for their products. CEMBUREAU cannot represent, warrant or guarantee the accuracy, reliability or completeness of these documents to either CEMBUREAU Members or third parties. It is the user's responsibility to satisfy itself as to the suitability, correctness and completeness of such information for its purpose, and it is the manufacturer's, importer's and distributor's responsibility to provide accurate SDS for the clinker and clinker products they market.

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