

## GUIDELINES FOR THE SAFETY DATA SHEET TEMPLATE FOR PORTLAND CEMENT CLINKER

15 December 2014

### Introduction

In December 2008, a comprehensive new system for the classification, labelling and packaging of hazardous substances and mixtures entered into force in the EU (CLP Regulation). This new system has also induced changes in the Safety Data Sheets for hazardous substances and mixtures.

This document contains guidelines and a new template for the SDS of Portland cement clinker. It was drafted by CEMBUREAU H&S experts from national associations, companies and outside experts covering the following fields of expertise: toxicology, eco-toxicology, medicine, process technical knowledge, quality assurance, law, and industrial hygiene. Some experts followed specific training in developing SDS. As such, this group fulfils the definition of “competent person” as given in the ECHA guidance on the SDS.

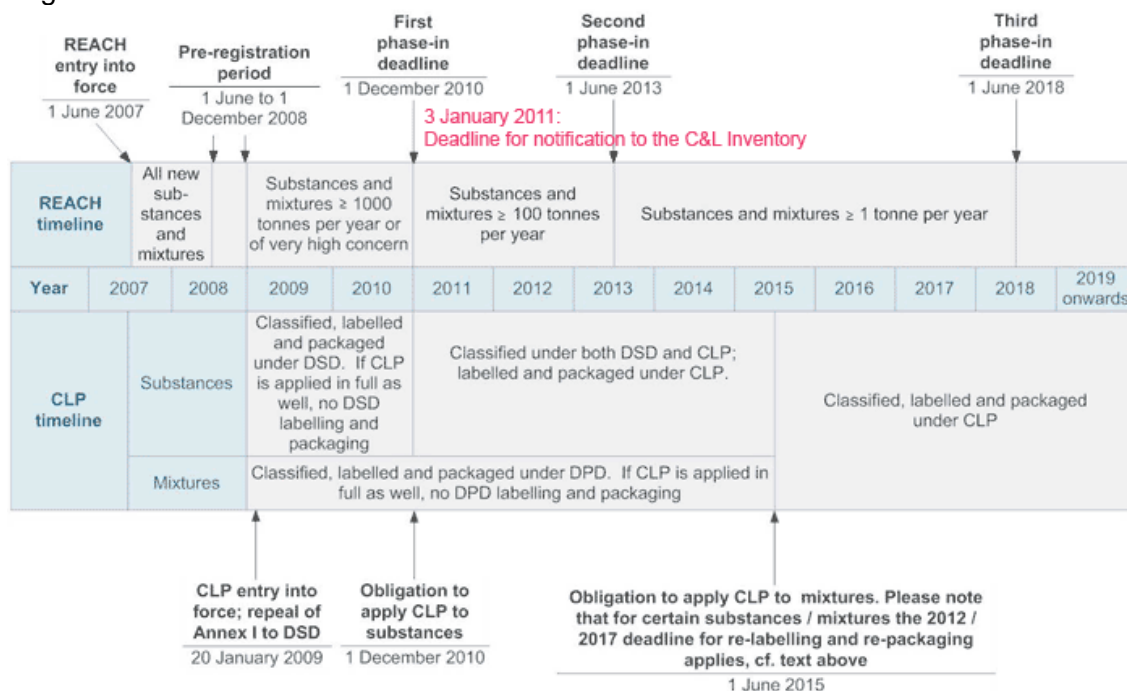
The first part of this document contains explanations for some of the specific sections of the template for the SDS. The template itself is the second part of this document.

Substances must be labelled and packaged according to the CLP ([Regulation \(EC\) No 1272/2008](#)).

Until 31 May 2015, substances must be classified under both the old system of the Dangerous substances Directive ([Council Directive 67/548/EEC](#)) and the CLP Regulation

More information about the CLP Regulation can be found from ECHA’s website: [http://echa.europa.eu/clp\\_en.asp](http://echa.europa.eu/clp_en.asp).

The graph below gives an overview of the timelines for the application of the CLP Regulation:



Together with the new system for classification and labelling, a new SDS format was introduced by the legislator. It is given in the amended [Annex II of REACH \(Commission Regulation \(EU\) 453/2010\)](#).

The ECHA guidance document on the compilation of SDS can be found below:



ECHA Guidance SDS\_en Feb 2014.pdf

CEMBUREAU also prepared the attached document with the labelling elements which under the CLP Regulation should be used on the bags of Portland cement clinker. The labelling elements follow from the unique classification of Portland cement clinker and of Common cements which was adopted by the CEMBUREAU Board.

The document also gives an overview of the arguments on which the classification is based and of the voluntary labelling elements which the European cement industry agreed to use for Portland cement clinker.



T20676 C&L clinker -  
cement - CLP update

## Explanations for some of the sections of the template SDS

The text between square brackets and in italic blue [*text*], contains instructions for the parts which need to be adapted by the manufacturer/importer.

### 2.1. Classification of the substance or mixture

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

CEMBUREAU recommends giving the full hazard and precautionary statements in this section, instead of referring to the full statements in section 16.

#### 2.1.2 According to Council Directive 67/548/EEC

This section must be included only until 31 May 2015. As of 1 June 2015, only the classification according to Regulation (EC) No 1272/2008 shall be given.

### 2.2. Label elements

#### According to Regulation (EC) No 1272/2008

The label elements given in this section must be consistent with the label affixed to the product.

To be adapted by the manufacturer/importer: The following statements have to be added for Portland cement clinker sold to the general public:

P102 Keep out of reach of children

P501 Dispose of contents/container to ... in accordance with local/regional/national/international regulation (to be specified).

This sentence needs to be completed by manufacturer/importer with the requirements in accordance with local/regional/national/ international regulation, eg, through the national implementation of Directive 2004/12/EC on packaging and packaging waste, amending Directive 94/62/EC or other measures.

To be completed by the manufacturer/importer: Nominal quantity of the substance in the packages made available to the general public, unless this quantity is specified elsewhere on the package.

### 3.1. Substances

Depending on the composition of the specific Portland cement clinker for which the SDS is made, manufacturers can add the following constituents in the table given in section 3.1, if these constituents are present in the clinker.

The value in the column “Typical concentration” is the value used in the notification of the classification and labelling of Portland cement clinker to the ECHA inventory, but can be adapted to the value which applies to the specific clinker.

In general, for UVCB substances, all the known constituents, present in more than 10% w/w, need to be given. In addition, all constituents relevant for the classification should be identified irrespective of their concentration. Unknown constituents should be identified as far as possible by a generic description (see [Guidance on Substance Identity](#)).

IUPAC name	EC number	CAS number	Mol. Formula	Typical conc. (%w/w)	Conc. Range (%w/w)
Magnesium oxide	215-171-9	1309-48-4	MgO	0.5	0 - 5
Potassium sulfate	231-915-5	7778-80-5	K <sub>2</sub> SO <sub>4</sub>	0.5	0 - 3
Calcium carbonate (calcite)	207-439-9	471-31-1	CaCO <sub>3</sub>	< 0.5	0 – 20
Calcium carbonate silicate (Spurrite)	na	11140-12-8	Ca <sub>5</sub> (SiO <sub>4</sub> ) <sub>2</sub> (CO <sub>3</sub> )	< 0.5	0 – 20
Calcium aluminate fluoride	na	12305-57-6	(CaO) <sub>11</sub> .(Al <sub>2</sub> O <sub>3</sub> ) <sub>7</sub> .CaF <sub>2</sub>	< 0.5	0 – 20

## 8.1. Control parameters

This section should list, where available, the national limit values (occupational or biological limit values or other), including the legal base for each of them, currently applicable in the MS where the SDS is provided. When listing occupational exposure limit values, the chemical identity as specified in Section 3 shall be used. If no limit values are available for Portland cement clinker, then the values for general dust or for cement can be given.

Some examples of control parameters are given below.

Name – limit value	Limit value type	Value (as 8 h TWA)	Unit	Legal reference
<b>France</b>				
General dust	OELV total inhalable dust*	10	mg/m <sup>3</sup>	Article R.4222-10 of Occupational Code
General dust	OELV alveolar fraction*	5	mg/m <sup>3</sup>	Article R.4222-10 of Occupational Code
<b>Germany</b>				
General dust	OELV total inhalable dust	10	mg/m <sup>3</sup>	Working place limit values
General dust	OELV alveolar dust	1.25	mg/m <sup>3</sup>	Working place limit values
<b>Portugal</b>				
Cement dust	VLE-MP total inhalable dust	10	mg/m <sup>3</sup>	
Cement dust	VLE-MP alveolar dust	3	mg/m <sup>3</sup>	

\* Dust reputedly without any specific effects

Note: Alveolar= respirable

## 8.2. Exposure controls

### 8.2.2 Individual protection measures such as personal protection equipment

#### **Skin protection**

If required, the following information can be given in this paragraph:

Examinations have shown that nitrile soaked cotton gloves (layer thickness ca. 0.15 mm) with CE marking, internally lined with cotton, offer over a period of 480 min sufficient protection. Change wet gloves. Ready hold gloves for change.

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

To be completed by the manufacturer/importer: any relevant national measures applicable to Portland cement clinker: eg for Germany, content from TRGS, GefStoffV.

**Safety Data Sheet** according to Regulation (EC) No 1907/2006 (REACH) as amended by Reg 453/2010  
**[Template SDS Portland cement clinker]**

Product: *[Trade name]*

*[Revised] Version 2.0 / EN of [date]*

Replaces all previous versions

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## **SECTION 1: Identification of the substance/mixture and of the company/undertaking**

### **1.1 Product identifier**

Portland cement clinker\*  
EINECS: 266-043-4\*  
CAS: 65997-15-1

\*Entry is referred to as Cement, portland, chemicals but actually describes Portland cement clinker  
Reference number C&L notification: 02-2119682167-31-0000

*[Own company identifiers for substance may be added such as names by which substance is commonly known, numbers, company product codes, other unique identifiers]  
[The identifier shall be the same as used on the label, if applicable]*

Cement clinker is exempt from registration (Art 2.7 (b) and Annex V.10 of REACH), hence no registration number is given.

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

Portland cement clinker is used for the production of Common cements or other hydraulic binders in industrial installations.

Cement and hydraulic binders are used in the production of building materials and in construction by professional users or consumers.

### **1.3. Details of the supplier of the safety data sheet**

*[To be completed by the manufacturer/importer]*

*[If the supplier is not located in the MS where the clinker is placed on the market and he has nominated a responsible person for that MS, the full address and telephone number of that responsible person shall be given]*

*[If an Only Representative has been nominated, details of non-community manufacturer may also be provided]*

Company name:

Full address:

Telephone number:

E-mail address of competent person responsible for the SDS:

*[It is recommended to use a generic email address that can be checked by different persons. There is no requirement to mention the name of a physical person in the SDS and this person does not need to be located within the territory of the EU or the EEA]*

National contact:

*[Optional, if applicable]*

### **1.4. Emergency telephone number**

*[From official advisory body if it exists, eg according to Art. 45 of CLP or from company, to be completed by manufacturer/importer]*

Emergency telephone number:

Hours of operation: *[To be completed if applicable]*

Information provided will be limited to: *[To be completed if applicable]*

Service is provided in the following language:

*[It is recommended to have an emergency telephone number available 24h/7 days]*

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## **SECTION 2: Hazards identification**

### **2.1. Classification of the substance or mixture**

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

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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
Specific target organ toxicity single exposure respiratory tract irritation	3	H335: May cause respiratory irritation

**2.1.2 According to Council Directive 67/548/EEC**

[To be included until 31 May 2015]

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. Label elements**

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

**Hazard pictograms**



**Signal word**

Danger

**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

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.

If sold to the general public, these 2 statements have to be added:

P102 Keep out of reach of children

P501 Dispose of contents/container to ...

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### 2.3. Other hazards

Portland cement clinker does not meet the criteria for PBT or vPvB in accordance with Annex XIII of REACH (Regulation (EC) No 1907/2006).

Portland cement clinker dust may cause an allergic reaction in some individuals due to the water soluble Cr(VI) content.

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## SECTION 3: Composition/information on ingredients

### 3.1. Substances

Portland cement clinker is a UVCB substance (Substances of Unknown or Variable composition, Complex reaction products or Biological materials) consisting of 4 main clinker phases, namely tri- and dicalcium-silicates ( $3\text{CaO}\cdot\text{SiO}_2$  and  $2\text{CaO}\cdot\text{SiO}_2$ ), tricalcium-aluminate ( $3\text{CaO}\cdot\text{Al}_2\text{O}_3$ ) and tetracalcium-aluminoferrite ( $4\text{CaO}\cdot\text{Al}_2\text{O}_3\cdot\text{Fe}_2\text{O}_3$ ), usually together with some unreacted CaO (free lime). It is made by mineralogical transformation of a precisely specified mixture of raw materials based on oxides of calcium, silicon, aluminium and iron and small quantities of other elements.

<b>Composition information – main constituents</b>					
IUPAC name	EC number	CAS number	Mol. Formula	Typical conc. (%w/w)	Conc. Range (%w/w)
Tricalcium silicate	235-336-9	12168-85-3	$3\text{CaO}\cdot\text{SiO}_2$	63	0 – 85
Dicalcium silicate	233-107-8	10034-77-2	$2\text{CaO}\cdot\text{SiO}_2$	15	0 - 85
Tetracalcium aluminoferrite	235-094-4	12068-35-8	$4\text{CaO}\cdot\text{Al}_2\text{O}_3\cdot\text{Fe}_2\text{O}_3$	10	0 – 30
Tricalcium aluminate	234-932-6	12042-78-3	$3\text{CaO}\cdot\text{Al}_2\text{O}_3$	10	0 – 20
Calcium oxide (free lime)	215-138-9	1305-78-8	CaO	1	0 - 10

### 3.2. Mixtures

[Can be empty, or filled with a sentence such as "Not Applicable as the product is a substance, not a mixture"]

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## SECTION 4: First aid measures

### 4.1. Description of first aid measures

#### **General notes**

No personal protective equipment is needed for first aid responders. First aid workers should avoid contact with wet Portland cement clinker or wet Portland cement clinker containing mixtures.

#### **Following contact with eyes**

Do not rub eyes in order to avoid possible corneal damage by mechanical stress.  
Remove contact lenses if any. Incline head to injured eye, open the eyelids 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 Portland cement clinker, remove and rinse abundantly with water.  
For wet/damp Portland cement clinker, wash skin with plenty of water.  
Remove contaminated clothing, footwear, watches, etc. and clean thoroughly before re-using them.  
Seek medical treatment in all cases of irritation or burns.



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**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.

**4.2. Most important symptoms and effects, both acute and delayed**

**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 sweat or humidity) after prolonged contact or may cause contact dermatitis after repeated contact.

Prolonged contact between clinker dust and moist skin may cause irritation, dermatitis or burns.

*For more details see Reference (1).*

**Inhalation:** Repeated inhalation of Portland cement clinker dust over a long period of time increases the risk of developing lung diseases.

**Environment:** Under normal use, Portland cement clinker 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.

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**SECTION 5: Fire-fighting measures**

**5.1. Extinguishing media**

Portland cement clinker is not flammable.

**5.2. Special hazards arising from the substance or mixture**

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

**5.3. Advice for fire-fighters**

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

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**SECTION 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 Portland cement clinker down sewage and drainage systems or into bodies of water (e.g. streams).



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### **6.3. Methods and material for containment and cleaning up**

Collect spilled material and use it.

#### ***Dry Portland cement clinker***

Use dry cleanup methods such as vacuum clean-up or vacuum extraction (Industrial portable units equipped with high efficiency air filters (EPA and HEPA filters, EN 1822-1:2009 or equivalent technique) which do not cause airborne dispersion. Never use compressed air.

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 in a container for future use.

### **6.4. Reference to other sections**

See sections 8 and 13 for more details.

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## **SECTION 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 Portland cement clinker, 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.

For more information, refer to the practice guidelines 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. These safe handling practices It can be found via the following link: <http://www.nepsi.eu/agreement-good-practice-guide/good-practice-guide.aspx>.

#### ***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**

Portland cement clinker should be stored under waterproof, dry (i.e. with 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 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 Portland cement clinker without taking the proper safety measures.

Do not use aluminium containers for the storage or transport of wet cement containing mixtures due to incompatibility of the materials.

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## 7.3. Specific end use(s)

Clinker is used for the production of common cements or other hydraulic binders. In general such final products have to be low in water soluble Cr(VI). Typically, the final products contain a chromate reducing agent.

## SECTION 8: Exposure controls/personal protection

### 8.1. Control parameters

[To be completed by the manufacturer/importer in line with national provisions in place in the country where the clinker is placed on the market: national control parameters such as occupational or biological limit values; or other and monitoring procedures with references to a specific standard if applicable]

### 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.

Use	PROC*	Exposure	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 %

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

[For each individual PROC, users can choose from either option A) or B) in the table above, 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.]

#### 8.2.2 Individual protection measures such as personal protection equipment

##### General

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

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

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

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

[Add reference to EN standards or other standards where relevant]

##### Eye /face protection



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

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**Skin protection**



Use watertight, wear- and alkali-resistant protective gloves (eg nitrile soaked cotton gloves with CE mark) internally lined with cotton; boots; closed long-sleeved protective clothing as well as skin care products (eg including barrier creams) to protect the skin from prolonged contact with wet Portland cement clinker. For the gloves, respect the maximum wearing time to avoid skin problems.

**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) 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) FFP1 or B) not required	APF = 4  -
	5, 8b, 9		A) FFP2 or B) FFP1	APF = 10  APF = 4

\* 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.]

[To be adapted by the manufacturer/importer in accordance with national standards if applicable]

**8.2.3 Environmental exposure controls**

**Air:** Environmental exposure control for the emission of clinker 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 clinker 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.

[Information required by the employer to fulfil his commitments under Community environmental legislation is to be provided]

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## SECTION 9: Physical and chemical properties

### 9.1. Information on basic physical and chemical properties

- (a) Appearance: Portland cement clinker is a grey or white, granular inorganic solid material
- (b) Odour: Odourless
- (c) Odour threshold: no odour threshold, odourless
- (d) pH: (T = 20°C in water, water-solid ratio 1:2): 11-13.5
- (e) Melting point: > 1 250 °C
- (f) Initial boiling point and boiling range: Not applicable as under normal atmospheric conditions, melting point >1 250°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) Relative density: 2.75-3.20; Apparent density -: 0.9-1.5 g/cm<sup>3</sup>
- (n) Solubility(ies) in water (T = 20 °C): slight (0.1-1.5 g/l)
- (o) Partition coefficient: n-octanol/water: Not applicable as is inorganic substance
- (p) 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)
- (q) Decomposition temperature: Not applicable as no organic peroxide present
- (r) Viscosity: Not applicable as not a liquid
- (s) Explosive properties: Not applicable. Not explosive or pyrotechnic. Not in itself capable of producing gas by chemical reaction at temperature and pressure and at a speed as to cause damage to the surroundings. Not capable of a self-sustaining exothermic chemical reaction.
- (t) Oxidising properties: Not applicable as does not cause or contribute to the combustion of other materials.

### 9.2. Other information

Not applicable.

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## SECTION 10: Stability and reactivity

### 10.1. Reactivity

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

### 10.2. Chemical stability

Portland cement clinker is stable as long as it is properly stored (see Section 7). It should be kept dry.

Contact with incompatible materials should be avoided.

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

### 10.3. Possibility of hazardous reactions

Portland cement clinkers do not cause hazardous reactions.

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**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**

Portland cement clinker 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. Cement used in the study is Portland cement with over 90% of Portland cement clinker. 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	(8)
Acute toxicity - oral	-	No indication of oral toxicity from studies with cement kiln dust. Cement kiln dust contains Portland cement clinker in varying amounts. Based on available data, the classification criteria are not met	Literature survey
Skin corrosion/ irritation	2	Portland cement clinker in contact with wet skin may cause thickening, cracking or fissuring of the skin. Prolonged contact in combination with abrasion may cause severe burns. Cement used in the study is Portland cement with over 90% Portland cement clinker.	(2) Human experience
Serious eye damage/irritation	1	Portland cement clinker caused a mixed picture of corneal effects and the calculated irritation index was 128. 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.	(9), (10)
Skin sensitisation	1B	Some individuals may develop 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.	(3), (11), (16)
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)
Carcinogenicity	-	No causal association has been established between Portland cement exposure and cancer. The epidemiological literature does not support the designation of Portland cement as a suspected human carcinogen Portland cement 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.). Portland cement contains over 90% Portland cement clinker 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

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Hazard class	Cat	Effect	Reference
STOT single exposure	3	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. 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 Portland cement clinker is not used as an aerosol.	

Apart from skin sensitisation, Portland cement clinker and Common cements have the same toxicological and eco-toxicological properties.

**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.

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**SECTION 12: Ecological information**

**12.1. Toxicity**

The product is not hazardous to the environment. Ecotoxicological tests with Portland cement - whose composition is very closely related to that of clinker - 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. Persistence and degradability**

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

**12.3. Bioaccumulative potential**

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

**12.4. Mobility in soil**

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

**12.5. Results of PBT and vPvB assessment**

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

**12.6. Other adverse effects**

Not relevant.

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## **SECTION 13: Disposal considerations**

### **13.1. Waste treatment methods**

Cement clinker may always be reused. Waste treatment methods do not apply.  
Do not dispose of into sewage systems or surface waters.

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## **SECTION 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 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.

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## **SECTION 15: Regulatory information**

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

Cement clinker is exempt from registration (Art 2.7 (b) and Annex V.10 of REACH).

#### **National regulatory information**

*[To be completed by the manufacturer/importer: any relevant national measures applicable to Portland cement clinker].*

### **15.2. Chemical Safety Assessment**

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

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## **SECTION 16: Other information**

### **16.1 Indication of changes**

*[Version history and main changes to SDS to be completed by the manufacturer/importer]*



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**16.2 Identified uses and use descriptors and categories**

PROC	Identified Uses - Use Description	Manufacture/ Formulation of building and construction materials	Professional/ Industrial use of
2	Use in closed, continuous process with occasional controlled exposure	X	X
3	Use in closed batch process	X	X
5	Mixing or blending in batch process for formulation of mixtures and articles	X	X
8b	Transfer of substance or mixture from/to vessels/large containers a dedicated facilities	X	X
9	Transfer of substance or mixture into small containers	X	X
14	Production of mixtures or articles by tableting, compression extrusion, pelletisation	X	X
26	Handling of solid inorganic substances at ambient temperature	X	X

**16.3 Abbreviations and acronyms**

ADR/RID	European Agreements on the transport of Dangerous goods by Road/Railway
APF	Assigned protection factor
CAS	Chemical Abstracts Service
CLP	Classification, labelling and packaging (Regulation (EC) No 1272/2008)
COPD	Chronic Obstructive Pulmonary Disease
DNEL	Derived no-effect level
EC50	Half maximal effective concentration
ECHA	European Chemicals Agency
EINECS	European INventory of Existing Commercial chemical Substances
EPA	Type of high efficiency air filter
FF P	Filtering facepiece against particles (disposable)
FM P	Filtering mask against particles with filter cartridge
GefStoffV	Gefahrstoffverordnung
HEPA	Type of high efficiency air filter
H&S	Health and Safety
IATA	International Air Transport Association
IMDG	International agreement on the Maritime transport of Dangerous Goods
LC50	Median lethal dose
MS	Member State
OEL	Occupational exposure limit
OELV	Occupational exposure limit value
PBT	Persistent, bio-accumulative and toxic
PNEC	Predicted no-effect concentration
PROC	Process category
REACH	Registration, Evaluation and Authorisation of Chemicals
SCOEL	Scientific Committee on Occupational Exposure Limit Values
SDS	Safety Data Sheet
STOT	Specific target organ toxicity
TLV-TWA	Threshold Limit Value-Time-Weighted Average
TRGS	Technische Regeln für Gefahrstoffe
UVCB	Substances of Unknown or Variable composition, Complex reaction products or Biological materials
VLE-MP	Exposure limit value-weighted average in mg by cubic meter of air
vPvB	Very persistent, very bio-accumulative

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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) *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 5<sup>th</sup> 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](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 Skogstad and Karl-Christian Nordby, National Institute of Occupational Health, Oslo, Norway, March 2010.

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

### 16.5 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.

### 16.6 Classification and procedure used to derive the classification for substances 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 sens. 1B, H317	Human experience
STOT SE. 3, H335	Human experience

### 16.7 Disclaimer

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