Portland Cement clinker, chemicals

Safety Data Sheet

according to the REACH Regulation (EC) 1907/2006 amended by Regulation (EU) 2020/878
Revision date: 21/12/2023 Supersedes version of: 30/12/2015 Version: 3.0

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

1.1. Product identifier

Product form	:	Substance
Name	:	Portland Cement clinker, chemicals
EC-No.	:	266-043-4
CAS-No.	:	65997-15-1
Synonyms	:	Portland cement clinker

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

Relevant identified uses

Use of the substance/mixture	:	Substance used for building products formulation

1.3. Details of the supplier of the safety data sheet

S.A. VICAT
Direction Commerciale Ciments et Liants Hydrauliques -
4 Rue Aristide Bergès
FR 38080 L'Isle d'Abeau
France
T +33 4 74 27 59 00 , F +33 4 74 18 41 15
fds.ciment@vicat.fr

1.4. Emergency telephone number

Country/Area	Organisation/Company	Address	Emergency number	Comment
Ireland	National Poisons Information Centre Beaumont Hospital	PO Box 1297 Beaumont Road 9 Dublin	+353 1 809 2566 (Healthcare professionals-24/7) +353 1 809 2166 (public, 8am - 10pm, 7/7)	
Malta	Medicines & Poisons Info Office	Mater Dei Hospital Msida MSD 2090 Msida	112 +356 2545 6508	

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Skin Irrit. 2	H315
Eye Dam. 1	H318
Skin Sens. 1	H317
STOT SE 3	H335

Full text of hazard classes, H- and EUH-statements: see section 16

Adverse physicochemical, human health and environmental effects

When clinker comes into contact with the skin, when mixing concrete or mortar for example, or when clinker is wet, a strongly alkaline solution is produced.
Inhalation :
Frequent inhalation of large quantities of clinker dust over a long period increases the risk of the onset of respiratory disease.
Eyes :
Contact of clinker (dry or wet) with the eyes may lead to serious eye injuries which are potentially irreversible.
Skin :
Clinker may have an irritating effect on damp skin (by transpiration or ambient humidity) after prolonged contact. Prolonged contact of the skin with wet clinker may lead to severe burning because these burns occur without pain. Repeated contact between the skin and wet clinker may also lead to contact dermatitis.

2.2. Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP) :

GHS05 GHS07

Signal word (CLP) : Danger

Hazard statements (CLP) : H315 - Causes skin irritation.
H317 - May cause an allergic skin reaction.
H318 - Causes serious eye damage.
H335 - May cause respiratory irritation.

Precautionary statements (CLP) : P102 - Keep out of reach of children.
P261 - Avoid breathing dust.
P280 - Wear eye protection, face protection, protective gloves, protective clothing.
P302+P352 - IF ON SKIN: Wash with plenty of soap and water.
P333+P313 - If skin irritation or rash occurs: Get medical advice/attention.
P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing.
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.
P312 - Call a POISON CENTRE or doctor if you feel unwell.
P501 - Dispose of contents and container to an authorised waste collection point.

2.3. Other hazards

PBT : Not applicable (inorganic substance)
vPvB : Not applicable (inorganic substance)

The substance is not included in the list established in accordance with Article 59(1) of REACH for having endocrine disrupting properties, or is not identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605

SECTION 3: Composition/information on ingredients

3.1. Substances

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Portland Cement clinker, chemicals	CAS-No.: 65997-15-1 EC-No.: 266-043-4	100	Skin Irrit. 2, H315 Eye Dam. 1, H318 Skin Sens. 1, H317 STOT SE 3, H335

Full text of H- and EUH-statements: see section 16

Comments : Specific concentration limits LCS: not concerned
Multiplication factor M: not concerned
Acute toxicity estimate (ATE): not relevant
Nanoparticle material: no data available

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures general : No personal protective equipment is necessary for first responders. First aiders must avoid contact with moistened clinker or mixtures containing moistened clinker.

First-aid measures after inhalation : In case of massive inhalation : Move the affected person to the fresh air. The throat and nostrils should clear themselves. Consult a doctor if irritation occurs, or if latter discomfort, coughing or any other symptoms appear.

First-aid measures after skin contact : If the clinker is dry: Wipe off as much as possible. Rinse with plenty of water. If the clinker is mixed: Remove clothing, shoes, watches and other objects that have become contaminated and clean thoroughly before reuse. In case of irritation, redness or burns, consult a doctor.

First-aid measures after eye contact : Do not rub in order to avoid further damage to the cornea. If need be, remove contact lenses, then rinse immediately with copious amounts of clean water for at least 20 minutes, keeping the eyelids wide apart in order to eliminate any residue. If possible, use isotonic water (0.9% NaCL). Consult an occupational doctor or ophthalmologist.

First-aid measures after ingestion : On ingestion in large quantities: Do not induce vomiting. Rinse mouth out with water (only if the person is conscious). Immediately call a POISON CENTER/doctor.

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

Symptoms/effects after inhalation : Clinker may irritate the throat and respiratory tract. Coughs, sneezing and respiratory discomfort may appear in circumstances where the limit value of occupational exposure is exceeded. Repeated inhalation of clinker dust over a long period increases the risk of developing lung disease.

Symptoms/effects after skin contact : Clinker may have an irritating effect on damp skin (due to sweat or humidity) after prolonged contact or may cause contact dermatitis after repeated contact. Prolonged contact between clinker dust and damp skin can cause serious burns.

Symptoms/effects after eye contact : Direct contact with clinker dust may damage the cornea due to rubbing, may cause immediate or subsequent irritation or inflammation. Splashes of mixed product may lead to consequences ranging from moderate irritation (conjunctivitis or blepharitis) to chemical burns and blindness.

Symptoms/effects after ingestion : Severe irritation or burns to the mouth, throat, oesophagus, and stomach. Nausea. Vomiting.

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

Treat symptomatically. If possible show this sheet, if not available show packaging or label.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : All extinguishing agents can be used.

5.2. Special hazards arising from the substance or mixture

Fire hazard : Clinker is neither combustible, nor explosive and will not aid or feed the combustion of other materials.

5.3. Advice for firefighters

Precautionary measures fire : Clinker poses no fire-related hazards. No need for special protective equipment for fire-fighters.

Firefighting instructions : Prevent fire fighting water from entering the environment.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

For non-emergency personnel

Protective equipment : Concerning personal protective equipment to use, see section 8. See Section 7 for information on safe handling.

Emergency procedures : Avoid contact with skin, eyes and clothing. Avoid breathing dust.

For emergency responders

Protective equipment : Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection".

6.2. Environmental precautions

Do not allow product to spread into the environment. Do not discharge into drains or rivers.

6.3. Methods and material for containment and cleaning up

For containment : If possible, collect the spilled material in a dry state.
Dry clinker:
Use cleaning methods that do not cause airborne dispersion of the product, such as suction or vacuum extraction (portable industrial systems equipped with high efficiency air filters - EPA and HEPA - of standard EN 1822-1 - or equivalent technique). Never use compressed air.
It is also possible to clean the dust in a damp state using damp mops or push brooms, sprinklers or garden hoses (jet in "fine rain" to avoid projecting the dust in the air) and recover the sludge formed.
When wet cleaning or vacuuming the product cannot be applied and only dry brushing is possible, ensure that workers wear the appropriate personal protective equipment and avoid spreading dust.
Avoid inhalation of clinker dust and contact with skin. Collect the spilled product in a container. Solidify it before disposing of it as described in Section 13.
Wet clinker:
Collect the wet product and place it in a container. Allow material to dry and harden before disposing of as described in Section 13.

Methods for cleaning up : Wash contaminated area with large amounts of water.

Other information : Dispose of at a licensed waste collection centre. After humidification, the product can be disposed of as ordinary building waste.

6.4. Reference to other sections

For personal protective equipment, see section 8. For disposal of solid materials or residues refer to section 13 : "Disposal considerations".

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Avoid creating or spreading dust. Avoid contact with skin, eyes and clothing. Do not sweep. Use dry cleaning methods such as vacuuming or extraction, which do not cause airborne dispersion. Do not breathe dust. In case of insufficient ventilation, wear suitable respiratory equipment.

Hygiene measures : Do not eat, drink or smoke while handling clinker in order to avoid all contact with the skin or mouth. Wash your hands immediately after handling cement or products containing clinker. Remove clothing, shoes, watches and other contaminated objects and wash them separately and thoroughly before reuse. Immediately after handling the clinker, wash and possibly take a shower.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Bulk clinker must be stored in silos or containers that are airtight, dry (with reduced internal condensation), clean and protected from any contamination. Endangerment: To avoid any risk of choking or suffocation, do not enter an enclosed space such as a silo, hopper, bulk truck or any other container for storing or transporting the product without take appropriate security measures. In a confined space, the clinker can accumulate on the walls or adhere to them then disperse, collapse or fall suddenly.

Incompatible materials : Aluminium.

Special rules on packaging : Do not use aluminium containers for the storage or transport of wet clinker containing mixtures due to incompatibility of the materials.

7.3. Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

National occupational exposure and biological limit values

Portland Cement clinker, chemicals (65997-15-1)	
Ireland - Occupational Exposure Limits	
Local name	Portland Cement [Cement (Portland)]
OEL TWA	1 mg/m³ R (Respirable Fraction)
Remark	Advisory OELV (Advisory Occupational Exposure Limit Values)
Regulatory reference	Chemical Agents Code of Practice 2024

8.2. Exposure controls

Appropriate engineering controls

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.

Personal protection equipment

Eye and face protection

Eye protection:
Handling dry or humidified clinker: Approved goggles or watertight goggles complying with ISO 16321-1

Skin protection

Skin and body protection:
Protective clothing (closed sleeves and collar) including waterproof pants. Boots. Take particular care that moistened clinker does not penetrate the boots.

Hand protection:
Protective gloves made from waterproof nitrile rubber or neoprene, using material containing little soluble Cr (VI), with a cotton lining. These gloves must be waterproof and resistant to wear and alkalis. The gloves are efficient only if the particles of klinker do not penetrate between gloves and skin. The protective gloves to be used must comply with the specifications of the regulation 2016/425 and the resultant standard ISO 374-1. Breakthrough time (min) : 480. Always change damaged or soaked gloves immediately. Always have spare gloves in ready supply.

Respiratory protection

Respiratory protection:
When a person is potentially exposed to dust levels above exposure limits, use appropriate respiratory protection. The type of respiratory protection should be adapted to the dust level and conform to the relevant EN standard (EN 149) or national standard (dust mask FFP2).

Thermal hazards

Thermal hazard protection:
Not applicable.

Environmental exposure controls

Environmental exposure controls:
Air: Environmental exposure control relating to the emission of clinker particles into the air must comply with available technologies and applicable regulations on dust emissions without specific effects.
Water: Do not wash clinker into sewers or waterways to avoid high pH. Above a pH of 9, negative eco-toxicological effects are possible.
Soil and Terrestrial Environment: No specific control measures are required for terrestrial exposure.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	:	Solid
Colour	:	Grey.
Appearance	:	Granular inorganic solid material.
Odour	:	odourless.

Odour threshold	:	Not available
Melting point	:	> 1250 °C
Freezing point	:	Not applicable
Boiling point	:	Not applicable
Flammability	:	The product is not flammable
Lower explosion limit	:	Not applicable
Upper explosion limit	:	Not applicable
Flash point	:	Not applicable (non-flammable solid)
Auto-ignition temperature	:	Not applicable
Decomposition temperature	:	Not applicable
pH	:	11 – 13.5 (water/powder aqueous solution 1:2 at 20°C)
pH solution	:	Not available
Viscosity, kinematic	:	Not applicable
Viscosity, dynamic	:	Not applicable
Solubility	:	Water: 0.1 – 1.5 g/l Slightly soluble (20°C)
Partition coefficient n-octanol/water (Log Kow)	:	Not applicable
Partition coefficient n-octanol/water (Log Pow)	:	Not applicable
Vapour pressure	:	Not applicable
Vapour pressure at 50°C	:	Not available
Density	:	0.9 – 1.5 g/cm³ (Apparent specific gravity) - 2.8-3.20 g/cm³ (Absolute specific gravity)
Relative density	:	Not available
Relative vapour density at 20°C	:	Not applicable
Particle size	:	None available.

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

The clinker, once moistened, hardens into a stable mass that does not react in a normal environment.

10.2. Chemical stability

Dry clinker remains stable as long as it is stored correctly (see section 7) and compatible with most other building materials. When moistened, the clinker hardens into a stable mass that does not react in ordinary environments. Humidified clinker is alkaline and incompatible with acids, ammonium salts, aluminum or other non-noble metals. The clinker dissolves in hydrofluoric acid producing corrosive silicon tetrafluoride gas. The clinker reacts with water to form silicates and calcium hydroxide. Silicates in clinker react with strong oxidants such as fluorine, boron trifluoride, chlorine trifluoride, manganese trifluoride, and oxygen difluoride.

10.3. Possibility of hazardous reactions

No dangerous reactions known under normal conditions of use.

10.4. Conditions to avoid

Humidity can cause clinker to set (formation of lumps) and a loss of product quality.

10.5. Incompatible materials

Acids. Ammonium salts. Aluminium and other non-noble metals. The uncontrolled use of aluminum powder in humidified clinker releases hydrogen and should therefore be avoided.

10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced. The clinker does not break down into hazardous by-products and does not undergo polymerization.

SECTION 11: Toxicological information

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

Acute toxicity (oral)	:	Not classified (Based on available data, the classification criteria are not met)

Acute toxicity (dermal)	:	Not classified (Based on available data, the classification criteria are not met)
Acute toxicity (inhalation)	:	Not classified (Based on available data, the classification criteria are not met)
Skin corrosion/irritation	:	Causes skin irritation. pH: 11 – 13.5 (water/powder aqueous solution 1:2 at 20°C)
Additional information	:	Product in contact with wet skin may cause thickening of the skin and the appearance of cracks or cracks. Prolonged contact coupled with mechanical friction can cause severe burns. Some people may develop eczema from exposure to wet product dust caused by the high pH which induces irritant contact dermatitis after prolonged contact.
Serious eye damage/irritation	:	Causes serious eye damage. pH: 11 – 13.5 (water/powder aqueous solution 1:2 at 20°C)
Additional information	:	Direct contact with the product may cause damage to the cornea by mechanical friction, and immediate or delayed irritation or inflammation. Direct contact with large quantities of dry product or splashes of wet product can produce various effects ranging from moderate eye irritation (conjunctivitis or blepharitis for example) to chemical burns or blindness.
Respiratory or skin sensitisation	:	May cause an allergic skin reaction.
Germ cell mutagenicity	:	Not classified (Based on available data, the classification criteria are not met)
Carcinogenicity	:	Not classified (Based on available data, the classification criteria are not met)
Reproductive toxicity	:	Not classified (Based on available data, the classification criteria are not met)
STOT-single exposure	:	May cause respiratory irritation.
Additional information	:	Product dust may irritate throat and respiratory tract. Exposure above the exposure limit values can cause coughing, sneezing and difficulty breathing. There is a body of evidence showing that occupational exposure to clinker dust has led to respiratory function deficits in the past. However, the indices currently available are insufficient to reliably establish a dose-response relationship for these effects.
STOT-repeated exposure	:	Not classified (Based on available data, the classification criteria are not met)
Additional information	:	Medical conditions aggravated by exposure: Repeated exposure to inhalable dust above the average occupational exposure value can cause coughing, sneezing and difficulty breathing and the onset of chronic obstructive pulmonary disease (COPD). Inhalation of product dust may aggravate pre-existing respiratory tract disease and/or conditions such as emphysema or asthma and/or other pre-existing eye or skin conditions. No chronic effects were observed at low concentrations.
Aspiration hazard	:	Not classified (Technical impossibility to obtain the data)

Portland Cement clinker, chemicals (65997-15-1)	
Viscosity, kinematic	Not applicable

11.2. Information on other hazards

Endocrine disrupting properties

Adverse health effects caused by endocrine disrupting properties	:	The substance is not included in the list established in accordance with Article 59(1) of REACH for having endocrine disrupting properties, or is not identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general	:	A priori the product does not present any hazard for the environment (LC50 aquatic toxicity is not yet determined). However, the addition of large amount of klinker in water may cause an increase in pH and therefore be toxic to aquatic organisms in certain circumstances. After hardening, the product presents no risk of toxicity.
Hazardous to the aquatic environment, short–term (acute)	:	Not classified (Based on available data, the classification criteria are not met)
Hazardous to the aquatic environment, long–term (chronic)	:	Not classified (Based on available data, the classification criteria are not met)

12.2. Persistence and degradability

Portland Cement clinker, chemicals (65997-15-1)	
Persistence and degradability	Not biodegradable.

12.3. Bioaccumulative potential

Portland Cement clinker, chemicals (65997-15-1)	
Partition coefficient n-octanol/water (Log Pow)	Not applicable
Partition coefficient n-octanol/water (Log Kow)	Not applicable
Bioaccumulative potential	Not applicable (inorganic substance).

12.4. Mobility in soil

Portland Cement clinker, chemicals (65997-15-1)	
Ecology - soil	Not applicable.

12.5. Results of PBT and vPvB assessment

Portland Cement clinker, chemicals (65997-15-1)
PBT : Not applicable (inorganic substance)
vPvB : Not applicable (inorganic substance)

12.6. Endocrine disrupting properties

Adverse effects on the environment caused by endocrine disrupting properties : None known.

12.7. Other adverse effects

No additional information available

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Product/Packaging disposal recommendations : Product - unused residue or dry spillage
EWC entry: 10 13 06 (Other particulates and dust)
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”

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).

Additional information : Empty packaging completely and process according to local by-laws. Entries in the European waste catalogue: 15 01 01 (paper waste and cardboard packaging). The user's attention is drawn to the possible existence of specific european, national or local regulations regarding disposal.

Ecological waste information : Do not allow to enter sewers, surface or groundwater.

SECTION 14: Transport information

In accordance with ADR / IMDG / IATA / ADN / RID

ADR	IMDG	IATA	ADN	RID
14.1. UN number or ID number				
Not regulated for transport				
14.2. UN proper shipping name				
Not regulated	Not regulated	Not regulated	Not regulated	Not regulated
14.3. Transport hazard class(es)				
Not regulated	Not regulated	Not regulated	Not regulated	Not regulated
14.4. Packing group				
Not regulated	Not regulated	Not regulated	Not regulated	Not regulated
14.5. Environmental hazards				
Not regulated	Not regulated	Not regulated	Not regulated	Not regulated

14.6. Special precautions for user

Overland transport

Not regulated

Transport by sea

Not regulated

Air transport

Not regulated

Inland waterway transport

Not regulated

Rail transport

Not regulated

14.7. Maritime transport in bulk according to IMO instruments

Not applicable

SECTION 15: Regulatory information

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

EU-Regulations

REACH Annex XVII (Restriction List)

Not listed on REACH Annex XVII

REACH Annex XIV (Authorisation List)

Not listed on REACH Annex XIV (Authorisation List)

REACH Candidate List (SVHC)

Not listed on the REACH Candidate List

PIC Regulation (Prior Informed Consent)

Not listed on the PIC list (Regulation EU 649/2012)

POP Regulation (Persistent Organic Pollutants)

Not listed on the POP list (Regulation EU 2019/1021)

Ozone Regulation (2024/590)

Not listed on the Ozone Depletion list (Regulation EU 2024/590)

Council Regulation (EC) for the control of dual-use items

Not listed on the COUNCIL REGULATION (EC) of dual-use items.

Explosives Precursors Regulation (2019/1148)

Contains no substance(s) listed on the Explosives Precursors list (Regulation EU 2019/1148 on the marketing and use of explosives precursors)

Drug Precursors Regulation (273/2004)

Contains no substance(s) listed on the Drug Precursors list (Regulation EC 273/2004 on the manufacture and the placing on market of certain substances used in the illicit manufacture of narcotic drugs and psychotropic substances)

15.2. Chemical safety assessment

No chemical safety assessment has been carried out

SECTION 16: Other information

Indication of changes:
This sheet has been revised completely (changes were not marked). SDS EU format according to COMMISSION REGULATION (EU) 2020/878.

Abbreviations and acronyms:	
ACGIH	American Conference of Governement Industrial Hygienists
ADN	European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road
CLP	Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008
DNEL	Derived-No Effect Level
IATA	International Air Transport Association
IMDG	International Maritime Dangerous Goods
Log Koc	adsorption coefficient
OEL TWA	Occupational exposure limits Time Weighted Average
Pow (log)	n-octanol/water partition coefficient
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006
RID	Regulations concerning the International Carriage of Dangerous Goods by Rail
PBT	Persistent Bioaccumulative Toxic
vPvB	Very Persistent and Very Bioaccumulative

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

(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) Exposure to Thoracic Aerosol in a Prospective Lung Function Study of Cement Production Workers; Noto, H, et al; Ann. Occup. Hyg, 2015, Vol. 59, No. 1, 4–24.

(16) MEASE, Metals estimation and assessment of substance exposure, EBRC Consulting GmbH for Eurometaux, http://www.ebrc.de/industrial-chemicals-reach/projects-and-references/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.

(18) ECHA Support Questions and answers agreed with National Helpdesks. ID1695

May 2020. https://echa.europa.eu/es/support/qas-support/qas-agreed-with-national-helpdesks.

Full text of H- and EUH-statements:	
Eye Dam. 1	Serious eye damage/eye irritation, Category 1
Skin Irrit. 2	Skin corrosion/irritation, Category 2
Skin Sens. 1	Skin sensitisation, Category 1
STOT SE 3	Specific target organ toxicity – Single exposure, Category 3, Respiratory tract irritation
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H318	Causes serious eye damage.
H335	May cause respiratory irritation.

Safety Data Sheet (SDS), EU

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.