



Safety Data Sheet for Cement

According to Regulation (EC) REACH) Number 1907/2006 as amended by EC Regulation number 453/2010

According to "Guidelines for the safety data sheet template for common cements" dated March 31st, 2011, approved by the Board of CEMBUREAU on April 6th, 2011.

Product: Portland Cement

Sectorial version: 2.0

Edition: July 1st, 2013 Substitutes all previous editions.

Date of printing: July 1st, 2013

1. Identification of the substance or mixture and of the company undertaking

1.1. Product identifier

Portland Cement, Portland cement with fly ash, Portland cement with ground limestone, Portland cement with blast furnace slag, Portland Pozzolan cement and composite cement.

Substance	EINECS	CAS	Effects
Portland clinker cement	266-043-4*	65997-15-1	Serious eye damage, skin sensitization and STOT (single exposition)

* The name of the substance is Portland cement, designed as a chemical products, but the clinker is described as Portland cement clinker.

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

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

Common cements and cement containing mixtures (hydraulic binders) are used industrially, by professionals as well as by consumers in building and construction work, indoor and outdoor. The identified uses of cements and cement containing mixtures cover the dry products and the products in a wet suspension (paste).

Category of Process (PROC)	Identified Uses- Use Description	Manufacture/ /Formulation of	Professional/ /Industrial use of
		Building and construction materials	
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 preparations and articles	X	X
7	Industrial spraying		X
8 ^a	Transfer of substance or preparation from/to vessels/large container at non-dedicated facilities		X
8 ^b	Transfer of substance or preparation from/to vessels/large containers at dedicated facilities	X	X
9	Transfer of substance or preparation into small containers	X	X
10	Roller application or brushing		X
11	Non-industrial spraying		X
13	Treatment of articles by dipping and pouring		X
14	Production of preparations or articles by tableting, compression extrusion, pelletisation	X	X
19	Hand-mixing with intimate contact and only PPE available		X
22	Potentially closed processing operations with minerals/metals at elevated temperature industrial setting		X
26	Handling of solid inorganic substances at ambient temperature	X	X

1.3. Details of the supplier of the safety data sheet

Company name: CEMENTOS LEMONA, S. A.

Location of the Plant: Lemona

Full address: Arraibi, 40. 48330 Lemona (Vizcaya)

Telephone number: 94 487 22 55

E-mail address of the person responsible for the SDS: lemona@lemona.com**1.4. Emergency telephone number**

Call the medical emergency telephone number of your location or the universal emergency telephone number 112 and tell the operator the details of this data sheet.

2. Hazards identification

2.1. Classification of the substance or mixture

2.1.1. According to Regulation (EC) Number 1272/2008

Hazard class	Hazard category	Classification procedure
Skin irritation	2	On the basis of test data
Serious eye damage/eye irritation	1	On the basis of test data
Skin sensitisation	1	On the basis of literature survey
Specific target organ toxicity single exposure respiratory tract irritation (single exposition)	3	On the basis of literature survey

Hazard statements

H318: Causes serious eye damage

H315: Causes skin irritation

H317: May cause an allergic skin reaction

H335: May cause respiratory irritation

2.1.2. According to Directive 1999/45/EC

Xi (Irritant)

R36/37/38: Irritating to respiratory system and skin

R 43: May cause sensitization by skin contact

Cement dust may cause irritation of the respiratory system.

When cement reacts with water, for instance when making concrete or mortar, or when the cement becomes damp, a strong alkaline solution is produced. Due to the high alkalinity, wet cement may provoke skin and eye irritation.

It may also cause an allergic reaction in some individuals due to the soluble Cr (VI) content.

Cement is either naturally low in soluble chromium VI or reducing agents have been added to control the levels of sensitising soluble chromium (VI) to below 2 mg/kg (0,0002%) of the total dry weight of the cement ready for use according to legislation specified under Section 15.

2.2. Label elements

2.2.1. According to Regulation (EC) Number 1999/45/CE



Xi Irritant

R36/37/38: Irritating to respiratory system and skin

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 label

Supplemental information

The cement contains, when required, reducing agents for chromium (VI), which determines a content of soluble chromium (VI) below 0,0002%, verified according to Normative UNE EN 196-10:2008 to guarantee the legislation specified in European Directive 2003/53/EC, transcribed to OM PRE/1954/2004, which reads: "Skin contact with wet cement, fresh concrete or mortar may cause irritation, dermatitis or burns."

2.3. Other hazards

Cement does not meet the criteria for PBT or vPvB in accordance with Annex XIII of REACH (Regulation (EC) Number 1907/2006).

3. Composition/Information on components

3.1. Mixtures

Cement consists of clinker, gypsum and mass additives in different proportions according to the type of cement, according to the chart below. Chart for Normative UNE-EN 197-1:2011/UNE 80303-1-2:2011/UNE 80305:2012/UNE 80307:2001/ UNE-EN 14.216:2005/UNE-EN 413-1:2005.

Type	Substance	Name	Composition (proportion in mass)							Minor Components	
			Main components								
			Clinker	Blast furnace slag	Silica fume	Natural Pozzolan	Silica fly ash	Limestone			
K	S	D	P	V	L	LL					
CEM I	Portland cement	CEM I	95 - 100	-	-	-	-	-	-	0 - 5	
CEM II	Portland cement	CEM II/A-S	80 - 94	6 - 20	-	-	-	-	-	0 - 5	
	blast furnace slag	CEM II/B-S	65 - 79	21 - 35	-	-	-	-	-	0 - 5	
	Portland cement with silica fume	CEM II/A-D	90 - 94	-	6 - 10	-	-	-	-	0 - 5	
	Portland cement with Pozzolan	CEM II/A-P	80 - 94	-	-	6 - 20	-	-	-	0 - 5	
		CEM II/B-P	65 - 79	-	-	21 - 35	-	-	-	0 - 5	
	Portland cement with fly ash	CEM II/A-V	80 - 94	-	-	-	6 - 20	-	-	0 - 5	
		CEM II/B-V	65 - 79	-	-	-	21 - 35	-	-	0 - 5	
	Portland cement with ground limestone		CEM II/A-L	80 - 94	-	-	-	-	6 - 20	-	0 - 5
			CEM II/B-L	65 - 79	-	-	-	-	21 - 35	-	0 - 5
			CEM II/A-LL	80 - 94	-	-	-	-	-	6 - 20	0 - 5
		CEM II/B-LL	65 - 79	-	-	-	-	-	21 - 35	0 - 5	
Composite Portland cement	CEM II/A-M	80 - 94	←-----6 - 20-----→							0 - 5	
	CEM II/B-M	65 - 79	←-----21 - 35-----→							0 - 5	
CEM III	Portland cement with blast furnace slag	CEM III/A	35 - 64	36 - 65	-	-	-	-	-	0 - 5	
		CEM III/B	20 - 34	66 - 80	-	-	-	-	-	0 - 5	
		CEM III/C	5 - 19	81 - 95	-	-	-	-	-	0 - 5	
CEM IV	Pozzolan cement	CEM IV/A	65 - 89	-	←-----11 - 35-----→			-	-	0 - 5	
		CEM IV/B	45 - 64	-	←-----36 - 55-----→			-	-	0 - 5	
CEM V	Composite cement	CEM V/A	40 - 64	18 - 30	-	←-----18 - 30-----→		-	-	0 - 5	
		CEM V/B	20 - 38	31 - 50	-	←-----18 - 30-----→		-	-	0 - 5	

The additives can be: fly ash (No. C.A.S. 68131-74-8), limestone, slag (No. C.A.S. 65996-69-2), pozzolan or silica fume. Also it contains calcium sulfate, mainly as gypsum (No. C.A.S. 10101-41-4) or anhydrite (No. C.A.S. 7778-18-9).

It could also contain ferrous sulfate (No C.A.S 7720-78-7 (anhydrous) and/or stannous sulfate (No. C.A.S 7488-55-3).

3.1.1. Components that are hazardous for the health of the environment

Substance	Percentage of concentration (p/p in cement)	Number of registration	EINECS	CAS	Classification 67/548/EEC		Regulation of Classification 1272/2008	
					Symbol [C&L]	R	Type of hazard, category	Degree of hazardness
Clinker of Portland Cement	5 – 100%	Not applicable	266-043-4	65997-15-1	Xi	R37	STOT SE, Irritating to respiratory system	H335: may irritate respiratory system
						R38	Irritating to skin (category 2)	H315: produces skin irritation
						R41	Serious damage to eyes / Eye irritation (category 1)	H318: produces serious eye irritation
						R43	Sensitisation of skin (category 1)	H317: may produce an allergic skin reaction

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 cement or wet cement containing preparations.

Following contact with eyes

Do not rub eyes in order to avoid possible cornea damage as a result of mechanical stress. Remove contact lenses if any. Incline head to injured eye, open the eyelid(s) widely and flush eye(s) immediately by thoroughly rinsing with plenty of clean water for at least 20 minutes to remove all particles. Avoid flushing particles into injured eye. If possible, use isotonic water (0,9% NaCl). Contact a specialist of occupational medicine or an eye specialist.

Following skin contact

For dry cement, remove and rinse abundantly with water.

For wet cement, wash skin with plenty of water.

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

Seek medical treatment in all cases of irritation or burns.

Following inhalation

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

Following ingestion

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

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

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

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

Prolonged skin contact with wet cement or wet concrete may cause irritation and contact sensitization.

For more details see Reference (1).

Inhalation: Repeated inhalation of dust of common cements over a long period of time increases the risk of developing lung diseases.

Environment: Under normal use, common cement is not hazardous to the environment.

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

When contacting a physician, take this Safety Data Sheet with you.

5. Fire-fighting measures

5.1. Extinguishing media

Common cements are not flammable.

5.2. Special hazards arising from the substance or mixture

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

5.3. Advice for fire-fighters

Cement poses no fire-related hazards. No need for special protective equipment for fire fighters.

6. Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

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

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 level.

6.2. Environmental precautions

Do not wash cement down sewage and drainage systems or into bodies of water (for example, streams).

6.3. Methods and material for containment and cleaning up

Collect the spillage in a dry state if possible.

Dry cement:

Use clean-up methods such as vacuum clean-up or vacuum extraction (industrial portable units, equipped with high efficiency air filters (EPA and HEPA, UNE-EN 1822-1:2010) or equivalent technique). Never use compressed air.

Alternatively, wipe-up the dust mopping, wet brushing or by using water sprays or hoses (fine mist to avoid that the dust becomes airborne) and remove slurry.

If not possible, remove by slurring with water (see wet cement).

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

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

Wet cement:

Clean up wet cement and place in an appropriate container. Allow material to dry and solidify before disposal as described under Section 13.

6.4. Reference to other sections

See sections 8 and 13 for more details.

7. Handling and storage

7.1. Precautions for safe handling

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

7.1.1. Protective measures

Follow the recommendations as given under Section 8.

To clean up dry cement, see Subsection 6.3.

Measures to prevent fire:

Not applicable.

Measures to prevent aerosol and dust generation:

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

Measures to protect the environment:

No particular measures.

7.1.2. Information on general occupational hygiene

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

In dusty environment wear dust mask and protective goggles.

Use protective gloves to avoid skin contact.

7.2. Conditions for safe storage, including any incompatibilities

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

Engulfment danger: Cement can build-up or adhere to the walls of a confined space. The cement 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 cement without taking the proper security measures.

Packed products should be stored in unopened bags clear of the ground in cool, dry conditions and protected from excessive draught in order to avoid degradation of quality.

Bags should be stacked in a stable manner.

Do not use aluminum containers due to incompatibility of the materials.

7.3. Specific end use(s)

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

7.4. Control of soluble Cr (VI)

For cements treated with a Cr (VI) reducing agent according to the regulations given in Section 15, the effectiveness of the reducing agent diminishes with time. Therefore, cement bags and/or delivery documents will contain information on the packaging date, the storage conditions and the storage period appropriate to maintaining the activity of the reducing agent and to keeping the content of soluble chromium VI below 0,0002% of the total dry weight of the cement ready for use, according to UNE EN 196-10. They will also indicate the appropriate storage conditions for maintaining the effectiveness of the reducing agent.

8. Exposure controls/personal protection**8.1. Control parameters**

Name-limit value	Type of limit value	Value (at 8h TWA)	Units	Legal references
Dust (insoluble or little soluble)	VLA-ED Inhalible fraction	10	mg/m ³	"Lista de Exposición Profesional para agentes químicos de España" del INSHT.
Dust (insoluble or little soluble)	VLA-ED Respirable fraction	3	mg/m ³	ORDEN itc/2585/2007 "Lista de Exposición Profesional para agentes químicos de España" del INSHT.
Portland cement	VLA-ED Inhalible fraction	10	mg/m ³	"Lista de Exposición Profesional para agentes químicos de España" del INSHT.

Other control parameters

DNEL inhalation (8h): 3 mg/m³

DNEL dermal: not applicable

DNEL oral: not relevant

The DNEL refers to respirable dust. In contrast, the tool used for the risk assessment (MEASE) works with the inhalable fraction. Therefore, an additional safety margin is inherently included in the outcome of the assessment and the derived risk management measures.

For workers, no DNEL for dermal exposure are available, neither from human hazard studies nor from human experience.

PNEC water: not applicable

PNEC sediment: not applicable

PNEC soil: not applicable

The risk assessment of the environmental compartments is based on the resulting pH impact on water. Possible pH changes in surface water, ground water and STP effluent should not increase the value 9.

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.

Exposure Scenario	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%
Industrial uses of dry hydraulic building and construction materials (indoor, outdoor)	2		not required	-
	14,22,26		A) not required or B) generic local exhaust ventilation	- 78%
	5,8b,9		A) general ventilation or B) generic local exhaust ventilation	17% 78%
Industrial uses of wet suspension of hydraulic building and construction materials	7		A) not required or B) generic local exhaust ventilation	- 78%
	2,5,8b,9,10,13,14		not required	-
Professional use of dry hydraulic building and construction material (indoor, outdoor)	2		not required	-
	9,26		A) not required or B) generic local exhaust ventilation	- 78%
	5,8a,8b,14		A) not required or B) generic local exhaust ventilation	- 87%
	19		localised controls are not applicable, process only in good ventilated rooms or outdoor	50%
Professional uses of wet suspensions of hydraulic building and construction materials	11	A) not required or B) generic local exhaust ventilation	- 78%	
	2,5,8a,8b,9,10,13,14,19	not required	-	

* PROC's are identified uses and defined in section 1.2.

8.2.2. Individual protection measures such as personal protection equipment

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

Do not eat, drink or smoke when working with cement to avoid contact with skin or mouth. Immediately after working with cement or cement-containing materials, workers should wash or shower or use skin moisturizers.

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

Eye/face protection:



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

Skin protection:



Use impervious, abrasion and alkali resistant gloves (made of low soluble Cr (VI) containing material), boots, closed long sleeved protective clothing as well as skin care products (including barrier creams) to protect the skin from prolonged contact with wet cement. Particular case should be taken to ensure that wet cement does not enter the boots.



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

Respiratory protection:



When a person is potentially exposed to dust levels above exposure limits, use appropriate respiratory protection. The type of respiratory protection should be adapted to the dust level and conform to the relevant EN standard, (for example UNE EN 149, UNE EN 140, UNE EN 14387, UNE EN 1827 or national standard).

Thermal hazards:

Not applicable.

Exposure Scenario	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	La duración no está limitada (hasta 480 min/turno; 5 turnos/semana)	Not required	-
	14,26		A) P1 mask (FF, FM) or B) Not required	FPA = 4 -
	5,8b,9		A) P2 mask (FF, FM) or B) P1 mask (FF, FM)	FPA = 10 FPA = 4
Industrial uses of dry hydraulic building and construction materials (indoor, outdoor)	2		Not required	-
	14,22,26		A) P1 mask (FF, FM) or B) not required	FPA = 4 -
	5,8b,9		A) P2 mask (FF, FM) or B) P1 mask (FF, FM)	FPA = 10 FPA = 4
Industrial uses of wet suspension of hydraulic building and construction materials	7	A) P1 mask (FF, FM) or B) not required	FPA = 4 -	

Exposure Scenario	PROC*	Exposure	Specification of respiratory protective equipment (RPE)	RPE Efficiency assigned protection factor (APF)
	2,5,8b,9,10,13,14		Not required	-
Professional use of dry hydraulic building and construction material (indoor, outdoor)	2		P1 mask (FF, FM)	FPA = 4
	9,26		A) P2 mask (FF, FM) or B) Protección respiratoria P1	FPA = 10 FPA = 4
	5,8a,8b,14		A) P3 mask (FF, FM) or B) P1 mask (FF, FM)	FPA = 20 FPA = 4
	19		P2 mask (FF, FM)	FPA = 10
Professional uses of wet suspensions of hydraulic building and construction materials	11		A) P2 mask (FF, FM) or B) P1 mask (FF, FM)	FPA = 10 FPA = 4
	2,5,8a,8b,9,10,13,14,19		Not required	-

* PROC's are identified uses and defined in section 1.2.

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

8.2.3. Environmental exposure controls

Environmental exposure control for the emission of cement particles into air has to be in accordance with the available technology and regulations for the emission of general dust particles.

Environmental exposure control is relevant for the aquatic environment as emissions of cements in the different life-cycle stages (production and use) mainly apply to ground and waste water. The aquatic effect and risk assessment cover the effect on organisms/ecosystems due to possible pH changes related to hydroxide discharges. The toxicity of other dissolved inorganic ions is expected to be negligible compared to the potential pH effect.

Any effects that might occur during production and use would be expected to take place on a local scale. The pH of effluent and surface water should not exceed 9. Otherwise it could have an impact on municipal sewage treatment plants (STPs) and industrial waste water treatment plants (WWTPs). For that assessment of the exposure, a stepwise approach is recommended:

Tier 1: Retrieve information on effluent pH and the contribution of the cement on the resulting pH. Should the pH be above 9 and be predominantly attributable to cement, then further actions are required to demonstrate safe use.

Tier 2: Retrieve information on receiving water pH after the discharge point. The pH of the receiving water shall not exceed the value of 9.

Tier 3: Measure the pH in the receiving water after the discharge point. If pH is below 9, safe use is reasonably remonstrated. If pH is found to be above 9, risk management measures

have to be implemented: the effluent has to undergo neutralization, thus ensuring safe use of cement during production or use phase.

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

9. Physical and chemical properties

9.1. Information on basic physical and chemical properties

This information applies to the whole mixture.

- a) **Appearance:** Dry cement is a finely ground solid inorganic material (grey or white powder).
- b) **Granulometry:** 5-30 μm
- c) **Odour:** odourless
- d) **Odour threshold:** no odour threshold, odourless.
- e) **pH:** ($T^a = 20\text{ }^\circ\text{C}$; in water, wáter-solid ratio 1:2): basic in between 11 y 13,5
- f) **Melting point:** $> 1250\text{ }^\circ\text{C}$
- g) **Initial boiling point and boiling range:** not applicable as under normal atmospheric conditions, melting point $>1250\text{ }^\circ\text{C}$.
- h) **Flash point:** not applicable as is not a liquid.
- i) **Evaporation rate:** not applicable as is not a liquid.
- j) **Flammability (solid, gas):** not applicable as is a solid which is non combustible and does not cause or contribute to fire through friction.
- k) **Upper/lower flammability or explosive limits:** not applicable as is not a flammable gas.
- l) **Vapour pressure:** not applicable as melting point $>1250\text{ }^\circ\text{C}$.
- m) **Vapour density:** not applicable as melting point $>1250\text{ }^\circ\text{C}$.
- n) **Relative density:** 2,75 - 3,20 g/cm^3 a $20\text{ }^\circ\text{C}$; apparent density 0,9-1,5 g/cm^3 a $20\text{ }^\circ\text{C}$
- o) **Solubility(ies) in water:** ($T\ 20\text{ }^\circ\text{C}$): slight (0.1-1.5 g/l)
- p) **Partition coefficient: n-octanol/water:** not applicable as is inorganic mixture
- q) **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).
- r) **Decomposition temperature:** not applicable as no organic peroxide present
- s) **Viscosity:** not applicable as not a liquid
- t) **Explosive properties:** Not applicable. Not explosive or pyrotechnic. Not in itself capable by chemical reaction of producing gas at such temperature and pressure and at such a speed as to cause damage to the surroundings. Not capable of a self-sustaining exothermic chemical reaction.
- u) **Oxidising properties:** Not applicable as does not cause or contribute to the combustion of other materials.

9.2. Other information

Not applicable.

10. Stability and reactivity

10.1. Reactivity

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

10.2. Chemical stability

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

Contact with incompatible materials should be avoided.

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

10.3. Possibility of hazardous reactions

Cements do not cause hazardous reactions.

10.4. Conditions to avoid

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

10.5. Incompatible materials

Acids, ammonium salts, aluminum or other non-noble metals. Uncontrolled use of aluminum powder in wet cement should be avoided as hydrogen is produced.

10.6. Hazardous decomposition products

Cement will not decompose into any hazardous products.

11. Toxicological information**11.1. Information on toxicological effects**

Hazard class	Cat	Effect	Reference
Acute toxicity – dermal	-	Limit test, rabbit, 24 hours contact, 2.000 mg/kg body weight – no lethality. Based on available data, the classification criteria are not met.	(2)
Acute toxicity – inhalation	-	No acute toxicity by inhalation observed. Based on available data, the classification criteria are not met.	(9)
Acute toxicity – oral	-	No indication of oral toxicity from studies with cement kiln dust. Based on available data, the classification criteria are not met.	Literature survey
Skin corrosion/irritation	2	Cement in contact with wet skin may cause thickening, cracking or fissuring of the skin. Prolonged contact in combination with abrasion may cause severe burns.	(2) Human experience
Serious eye damage/irritation	1	Portland cement clinker caused a mixed picture of corneal effects and the calculated irritation index was 128. Common cements contain varying quantities of Portland cement clinker, fly ash, blast furnace slag, gypsum, natural pozzolans, burnt shale, silica fume and limestone. Direct contact with cement may cause corneal damage by mechanical stress, immediate or delayed irritation or inflammation. Direct contact by larger amounts of dry cement or splashes of wet cement may cause effects ranging from moderate eye irritation (for example conjunctivitis or blepharitis) to chemical burns and blindness.	(10), (11)
Skin sensitisation	1	Some individuals develop eczema upon exposure to wet cement dust, caused either by the high pH which induces	(3), (4)

Hazard class	Cat	Effect	Reference
		irritant contact dermatitis after prolonged contact, or by an immunological reaction to soluble Cr (VI) which elicits allergic contact dermatitis. The response may appear in a variety of forms ranging from a mild rash to severe dermatitis and is a combination of the two above mentioned mechanisms. If the cement contains a soluble Cr (VI) reducing agent and as long as the mentioned period of effectiveness of the chromate reduction is not exceeded, a sensitising effect is not expected (Reference 3).	
Respiratory sensitisation	-	There is no indication of sensitization 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 casual 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). Based on available data, the classification criteria are not met.	(1), (14)
Reproductive toxicity	-	Based on available data, the classification criteria are not met.	No evidence from human experience
STOT – single exposure	3	Cement 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 cements are not used as an aerosol.	-

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

11.2. Medical conditions aggravated by exposure

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

12. Ecological information**12.1. Toxicity**

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

12.2. Persistence and degradability

Not relevant as cement is an inorganic material. After hardening, cement presents no toxicity risks.

12.3. Bioaccumulative potential

Not relevant as cement is an inorganic material. After hardening, cement presents no toxicity risks.

12.4. Mobility in soil

Not relevant as cement is an inorganic material. After hardening, cement presents no toxicity risks.

12.5. Results of PBT and vPvB assessment

Not relevant as cement is an inorganic material. After hardening, cement presents no toxicity risks.

12.6. Other adverse effects

Not relevant.

13. Disposal considerations**13.1. Waste treatment methods**

Do not dispose of into sewage systems or surface waters.

Product – cement with a chrome reducer that has exceed its efficiency period (and when demonstrated that it contains more than 0,0002% soluble Cr(VI)):

Shall not be used/sold other than for use in controlled closed and totally automated processes or should be recycled or disposed of according to local legislation or treated again with a reducing agent.

Product – unused residue or dry spillage

Pick up dry unused residue or dry spillage as is. Mark the containers. Possibly reuse depending upon shelf life considerations and the requirement to avoid dust exposure. In case of disposal, harden with water and dispose according to "Product – after addition of water, hardened".

Product – slurries

Allow to harden, avoid entry in sewage and drainage systems or into bodies of water (for example streams) and dispose of as explained below under "Product – after addition of water, hardened".

Product – after addition of water, hardened

Dispose of according to the local legislation. Avoid entry into the sewage water system. Dispose of the hardened product as concrete waste. Due to the inertisation, concrete waste is not a dangerous waste.

EWC entries: 10 13 14 (waste from manufacturing of cement – waste concrete or concrete sludge) or 17 01 01 (construction and demolition wastes – concrete).

Packaging

Completely empty the packaging and process it according to local legislation.

EWC entry: 15 01 01 or 15 01 05 (waste paper and cardboard packaging).

14. Transport information

Cement is not covered by the international regulation on the transport of dangerous goods (IMDG, IATA, ADR/RID). Not dangerous goods according to transport regulation.

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.

15. Regulatory information

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

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

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

1. "Cement and cement containing mixtures shall not be placed on the market, or used, if they contain, when hydrated, more than 2 mg/kg (0,0002%) soluble chromium VI of the total dry weight of the cement."
2. "If reducing agents are used, then without prejudice to the application of other Community provisions on the classification, packaging and labeling of substances and mixtures, suppliers shall ensure before the placing on the market that the packaging of cement or cement-containing mixtures is visibly, legibly and indelibly marked with information on the packing date, as well as on the storage conditions and the storage period appropriate to maintaining the activity of the reducing agent and to keeping the content of soluble chromium VI below the limit indicated in paragraph 1."
3. "By way of derogation, paragraphs 1 and 2 shall not apply to the placing on the market for, and use in, controlled closed and totally automated processes in which cement and cement-containing mixtures are handled solely by machines and in which there is no possibility of contact with the skin."

Social Dialogue Agreement on Crystalline Silica

The so-called « Good practice guides» with contain advice on safe handling practices can be found from [http:// www.nepsi.eu/good-practice-guide.aspx](http://www.nepsi.eu/good-practice-guide.aspx). These good practices have been adopted under the Social Dialogue "Agreement on Workers' Health Protection through the Good Handling and Use of Crystalline Silica and Products Containing it by Employee and Employer European sectoral associations, among which is CEMBUREAU. The Spanish cement industry voluntarily adopted the terms of the Agreement and has elaborated a protocol of application of this specific document to the Spanish cement industry http://www.oficemen.com/reportajePag.asp?id_rep=139.

15.2. Chemical Safety Assessment

No chemical safety assessment has been carried out.

16. Other information

16.1. Indication of changes

To this edition has been incorporated the classification and labeling of cement according to CLP Regulation and updates the Safety Data Sheet to new Annex II of REACH "Requirements for the elaboration of the safety data sheets" that has been modified by EU Regulation Number 453/2010 dated May 20th 2010.

16.2. Abbreviations and acronyms

ACGIH	American Conference of Industrial Hygienists
ADR/RID	European Agreements on the transport of Dangerous goods by Road/Railway
APF	Assigned Protection Factor
CAS	Chemical Abstracts Service
CLP	Classification, labelling and packaging (Regulation (EC), number 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
ES	Exposure scenario
EWC	European Waste Catalogue
FF P	Filtering facepiece against particles (disposable)

FM P	Filtering mask against particles with filter cartridge
HEPA	Type of high efficiency air filter
H&S	Health and Safety
IATA	International Air Transport Association
IMDG	International agreement on the Maritime transport of Dangerous Goods LC50 Median lethal dose
MEASE	Metals estimation and assessment of substance exposure, EBRC Consulting GmbH for Eurometaux, http://www.ebrc.de/ebrc/ebrc-mease.php
MS	Member State
OELV	Occupational exposure limit value
PBT	Persistent, bio-accumulative and toxic
PNEC	Predicted no-effect concentration
PROC	Process category
RE	Repeated exposure
REACH	Registration, Evaluation and Authorization of Chemicals
RPE	Respiratory protective equipment
R20	Hazardous for inhalation
R37/38	Irritating to respiratory system and skin
R41	Risk of serious damage to eyes
R43	May cause sensitisation by skin contact
R48	Risk of serious health problems in case of long exposure
SCOEL	Scientific Committee on Occupational Exposure Limit Values
SDS	Safety Data Sheet
SE	Single exposure
STP	Sewage treatment plant
STOT	Specific Target Organ Toxicity
TLV-TWA	Threshold Limit Value-Time-Weighted Average
VLE-MP	Exposure limit value-weighted average in mg by cubic meter of air
vPvB	Very persistent, very bio-accumulative
w/w	Weight by weight
WWTP	Waste water treatment plant

16.3. Key literature references and sources of data

- 1) Portland Cement Dust - Hazard assessment document EH75/7, UK Health and Safety Executive, 2006. Available from: <http://www.hse.gov.uk/pubns/web/portlandcement.pdf>
- 2) Observations on the effects of skin irritation caused by cement, Kietzman et al, *Dermatosen*, 47, 5, 184-189 (1999).
- 3) European Commission's Scientific Committee on Toxicology, Ecotoxicology and the Environment (SCTEE) opinion of the risks to health from Cr (VI) in cement (European Commission, 2002).
http://ec.europa.eu/health/archive/ph_risk/committees/sct/documents/out158_en.pdf
- 4) Epidemiological assessment of the occurrence of allergic dermatitis in workers in the construction industry related to the content of Cr (VI) in cement, NIOH, Page 11, 2003.
- 5) U.S. EPA, Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, 3rd ed. EPA/600/7-91/002, Environmental Monitoring and Support Laboratory, U.S. EPA, Cincinnati, OH (1994a) and 4th ed. EPA-821-R-02-013, US EPA, office of water, Washington D.C. (2002).
- 6) U.S. EPA, Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, 4th ed. EPA/600/4-90/027F, Environmental Monitoring and 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, July 2010 – unaudited draft approved
- 10) TNO report V8815/09, Evaluation of eye irritation potential of cement clinker G in vitro using the isolated chicken eye test, April 2010
- 11) TNO report V8815/10, Evaluation of eye irritation potential of cement clinker W in vitro using the isolated chicken eye test, April 2010
- 12) Investigation of the cytotoxic and proinflammatory effects of cement dusts in rat alveolar macrophages, Van Berlo et al, Chem. Res. Toxicol., 2009 Sept; 22(9): 1548-58
- 13) Cytotoxicity and genotoxicity of cement dusts in A549 human epithelial lung cells in vitro; Gminski et al, Abstract DGPT conference Mainz, 2008
- 14) Comments on a recommendation from the American Conference of governmental industrial Hygienists to change the threshold limit value for Portland cement, Patrick A. Hessel and John F. Gamble, EpiLung Consulting, June 2008
- 15) Prospective monitoring of exposure and lung function among cement workers, Interim report of the study after the data collection of Phase I-II 2006-2010, Hilde Notø, Helge Kjuus, Marit Skogstad and Karl-Christian Nordby, National Institute of Occupational Health, Oslo, Norway, March 2010,
- 16) MEASE, Metals estimation and assessment of substance exposure, EBRC Consulting GmbH for Eurometaux, <http://www.ebrc.de/ebrc/ebrc-mease.php>.

16.4. 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.

16.5. Further information

Not applicable.

16.6. Disclaimer

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

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

This safety data sheet about cement cancels and replaces version 1.0 of November 2009 and the safety data sheet of cement of Cementos Lemona dated March 2012.