



Cement Safety Data Sheet

20201118. In accordance with REACH Regulation (EC) no. 1907/2006 and its subsequent amendments.

In accordance with "Guidelines for the safety data sheet template for common cements" of 2020 by CEMBUREAU.

Product: Portland Cement

Version: 2.9

Version: 15.10.2024 Replaces all previous versions

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

1.1. Identification of the product

UFI: 5S10-Y05U-900A-XNYN: Cement Formula standard-1 CEM I 52,5 R

UFI: E920-00A7-4009-XQGG: Cement Formula standard-7 CEM II/A-L 42,5 R

UFI: E920-00A7-4009-XQGG: Cement Formula standard-7 CEM II/B-L 32,5 R

UFI: 5S10-Y05U-900A-XNYN: Cement Formula standard-1 CEM I 52,5 N-SR 5

UFI: 9030-10UD-K008-7F5K: Cement Formula standard-15 CEM IV/B (V) 32,5 N-SR

UFI: 9030-10UD-K008-7F5K: Cement Formula standard-15 CEM IV/A (V) 42,5 N-SR

1.2. Identified relevant uses of the substance or of the mix and uses advised against

Cements are used in industrial facilities for manufacturing/formulating hydraulic binders for construction and engineering work, such as ready-to-use concrete, mortars, plaster, grout, pastes, as well as precast concrete items.

Cements and mixtures that contain it (hydraulic binders) are used on an industrial scale, by professionals as well as by consumers in works and construction, both indoors and outdoors.

The uses identified for cements and mixtures containing it cover the products in dry form and in wet form (pastes). For more information about usage categories and descriptors, please see section 16.2.

Any usage not mentioned in the paragraph above is not recommended.

1.3. **Data of the supplier of the safety data sheet**

Name of the company: CEMENTOS LEMONA, S. A.

Factory of: Lemona

Address: Arraibi, 40. 48330 Lemona (Vizcaya)

Telephone no.: 94 487 22 55

Email address for the person responsible for the safety data sheet: lemona@lemona.com

1.4. **Emergency telephone number**

Emergency telephone number: +34 91 5620420 Toxicological information service of the national institute for information on toxicology and forensic sciences

Hours of operation: Twenty-four hours every day

Type of information that can be provided: Notify them of the information on this sheet

The service is available in the following languages: Spanish.

2. **Hazard identification**

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

2.1.1. According to Regulation (EC) No. 1272/2008 (CLP) the mixture is classified as:

Hazard class	Hazard category	Hazard indications
Skin irritation	2	H315: Causes skin irritation
Serious eye damage/ Eye irritation	1	H318: Causes serious eye damage
Specific Target Organ Systemic Toxicity (single exposure)	3	H335: May cause respiratory irritation

2.2. **Elements of the label**

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

Hazard pictograms



Warning word

Hazard

Hazard indications

H318 Causes serious eye damage

H315 Causes skin irritation

H335 May cause respiratory irritation

Precautionary tips

P102	Keep out of reach of children
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 centre or a doctor.
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/spray. IF INHALATION: remove person to fresh air and keep comfortable for breathing. Call a poison centre or doctor if you feel unwell.
P501	Dispose of the contents/container to the appropriate waste collection point in accordance with current waste legislation.

Additional Information

Contact with wet cement, concrete or fresh mortar on skin can cause irritation, dermatitis or burns.

It may cause damage to items made of aluminium or other non-precious metals.

The cement contains, when necessary, chromium reducer (VI), which determines a content of chromium (VI) soluble in water less than 0.0002 %, verified according to standard UNE-EN 196-10 to guarantee compliance with Ministerial Order PRE/1954/2004 and Regulation (EC) No. 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), and their subsequent amendments, with regards to its annex XVII.

Its declared period of effectiveness is:

- Sacks: Two months from the date shown on the packaging (storage conditions: sacks sealed in a cool place, off the ground and away from draughts of air).
- Bulk: One month from the date on the delivery note. In any case, it is limited to the first handling of the cement by the user (the cement shall be stored in a closed silo).

2.3. Other hazards

The cement does not meet the criteria for being classified as PBT or vPvB, in accordance with Annex XIII of the REACH (Regulation (EC) No. 1907/2006).

The cement either is naturally low in soluble chromium (VI) or reducing agents are added to it to control the levels of soluble chromium (VI) below 2 mg/kg in accordance with the specific legislation in section 15. If the storage conditions are not adequate or if the period of effectiveness stated in the supplementary information in section 2.2 is exceeded, the effectiveness of the reducing agent may decrease and the cement may be sensitizing to the skin (H317).

3. Composition / Information on components

3.1. Substances

Not applicable because the product is a mixture, not a substance.

3.2. Mixtures

Cements are composed by clinker, gypsum and additions in different proportions in mass depending on the type of cement, according to the following table. Table of UNE-EN 197-1:2011/UNE 80303-1:2017/UNE 80303-2:2017//UNE 80305:2012/UNE 80307:2001/UNE-EN 14.216:2015/UNE-EN 413-1:2011 Standards.

Main types	Names of the 27 products (common types of cement)		Composition (proportion in mass ^a)											Constit. Minorit.
			Main components											
			Clinker	Blast furnace slag	Silica fume	Natural		Fly ash		Burnt shale	Limestone			
						Natural	Natural burnt	Siliceous	Calcite		L	LL		
K	S	D ^b	P	Q	V	W	T	L	LL					
CEM I	Portland Cement	CEM I	95-100	-	-	-	-	-	-	-	-	-	-	0-5
CEM II	Portland cement with slag	CEM II/A-S	80-94	6-20	-	-	-	-	-	-	-	-	-	0-5
		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 Pozzolana	CEM II/A-P	80-94	-	-	6-20	-	-	-	-	-	-	-	0-5
		CEM II/B-P	65-79	-	-	21-35	-	-	-	-	-	-	-	0-5
		CEM II/A-Q	80-94	-	-	-	6-20	-	-	-	-	-	-	0-5
		CEM II/B-Q	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
		CEM II/A-W	80-94	-	-	-	-	-	6-20	-	-	-	-	0-5
		CEM II/B-W	65-79	-	-	-	-	-	21-35	-	-	-	-	0-5
	Portland Cement with burnt shale	CEM II/A-T	80-94	-	-	-	-	-	-	6-20	-	-	-	0-5
		CEM II/B-T	65-79	-	-	-	-	-	-	21-35	-	-	-	0-5
	Portland cement with 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 ^c	CEM II/A-M	80-88	<----- 12-20 ----->										0-5	
	CEM II/B-M	65-79	<----- 21-35 ----->										0-5	
CEM III	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	Pozzolana cement ^c	CEM IV/A	65-89	-	<----- 11-35 ----->						-	-	-	0-5
		CEM IV/B	45-64	-	<----- 36-35 ----->						-	-	-	0-5
CEM V	Composite cement ^c	CEMV/A	40-64	18-30	-	<----- 18-30 ----->			-	-	-	-	0-5	
		CEMV/B	20-38	31-49	-	<----- 31-49 ----->			-	-	-	-	0-5	
	a.	The values in the table refer to the sum of the main components and additional minority components, not including gypsum (which is usually around 3-6% of the total weight of the product).												
	b.	The proportion of silica fume is limited to 10%.												
	c.	In composite Portland cements CEM II/A-M and CEM II/B-M, in Pozzolana cements CEM IV/A and CEM IV/B, and in composite cements CEM V/A and CEM V/B, the main components other than clinker must be declared in the cement name.												

Main types	Names of products		Composition (proportion in mass ^a)							Constit. Minorit.
			Main components							
			Clinker	Blast furnace slag	Silica fume	Natural		Fly ash		
						Natural	Natural burnt	Siliceous	Calcite	
K	S	D ^b	P	Q	V	W				
ESP VI-1	Cement for special use	ESP VI-1	25-55	(Only S, P, V may be used) 45-75 P ≤ 40%					0-5	
VLH	Cement with a very low hydration heat	VLH III/B	20-34	66-80	-	-	-	-	0-5	
		VLH III/C	5-19	81-95	-	-	-	-	0-5	
		VLH IV/A	65-89	-	<----- 11-35 ----->				0-5	
		VLH IV/B	45-64	-	<----- 36-55 ----->				0-5	
		VLH V/A	40-64	18-30	-	<----- 18-30 ----->			0-5	
		VLH V/B	20-38	31-49	-	<----- 31-49 ----->			0-5	
MC	Masonry cement (2)	MC	≥25 (MCS) / ≥40	< 75 (including L, LL, other mineral components) < 60 ("						

Main types	Names of the seven products (common types of sulphur-resistant cement) ^b		Composition (proportion in mass)				Additional minority components
			Main components				
			Clinker	Blast furnace slag	Natural Pozzolana	Siliceous fly ash	
			K	S	P	V	
CEM I	Portland cement resistant to sulphates	CEM I-SR 0	95 - 100	-	-	-	0 - 5
		CEM I-SR 3					
		CEM I-SR 5					
CEM III	Blast furnace cement resistant to sulphates	CEM III/B-SR	20 - 34	66 - 80	-	-	0 - 5
		CEM III/C-SR	5 - 19	81 - 95	-	-	0 - 5
CEM IV	Pozzolana cement resistant to sulphates	CEM IV/A-SR	65 - 79	-	<-----21 - 35----->		0 - 5
		CEM IV/B-SR	45 - 64	-	<-----36 - 55----->		0 - 5
a.	The values in the table refer to the sum of the main components and additional minority components.						
b.	In sulphate-resistant Pozzolana cements CEM IV/A –SR and CEM IV/B-SR, the main components other than clinker must be declared in the cement name.						

3.2.1. Components that pose a hazard for health or the environment

Substance	Concentration range (p/p in cement)	Registration No.	EINECS	CAS	Classification Regulation 1272/2008	
					Hazard class, category	Hazard indication
Portland cement clinker	5 – 100%	Exempt from registration	266-043-4	65997-15-1	STOT SE, Tract irritation Irritation cat 3	H335: may cause respiratory irritation
					Skin irritation. cat 2	H315: causes skin irritation
					Serious eye Damage / Eye irritation cat 1	H318: causes serious eye damage
					Skin sensitizer cat 1B	H317: May cause an allergic skin reaction

4. First aid

4.1. First aid description

General indications

The use of personal protective equipment by the people providing first aid is not necessary. Workers who provide first aid must avoid coming into contact with wet cement or wet mixtures containing it.

After contact with the eyes

Do not rub the eyes to prevent damage to the cornea by mechanical stress. Remove contact lenses, if present. Tilt your head on the side of the affected eye, open your eyelid fully and rinse immediately with plenty of water (if possible use saline solution 0.9% NaCl), for at least 20 minutes to remove all particles. Prevent the particles dragged by the liquid falling into the other eye. Call an eye doctor or a specialist in occupational medicine.

After contact with skin

If the cement dust is dry remove as much as possible and then wash thoroughly with water. If the cement dust is wet, wash thoroughly with water. Remove and thoroughly clean garments, footwear, watches, etc. stained before using them again. Seek medical assistance whenever there is irritation or chemical burns.

After inhalation

Remove person to a place where he/she can breathe fresh air. The dust in the throat and in the nostrils should be dispelled spontaneously. Seek medical assistance if irritation persists or appears later or if the discomfort, cough or other symptoms persist.

After accidental ingestion

Do not induce vomiting. If the person is conscious rinse his/her mouth to remove the material or dust. Give him/her plenty of water to drink and immediately call a doctor or a Poison Centre.

4.2. Main acute and delayed symptoms and effects

Contact with eyes: direct contact with cement dust (wet or dry) can cause serious injury, potentially irreversible.

Contact with skin: cement can have an irritant effect on the wet skin (due to sweat or moisture) after a prolonged contact or can cause contact dermatitis after repeated contact without adequate protection.

Prolonged contact, without adequate protection, with wet cement or concrete can cause serious burns because as they occur feeling no pain (for example kneeling on fresh concrete, even wearing trousers).

For more information, see Reference [1].

Inhalation: repeated inhalation of cement dust over a long period of time increases the risk of developing lung diseases.

Environment: making a normal usage, cement does not have any particular risk for the environment.

4.3. Indication of all medical attention and special treatments that must be given immediately

When you contact a doctor take this safety sheet with you.

5. Firefighting methods

5.1. Extinguishing media

The cements are not flammable.

5.2. Specific hazards arising from the substance or mixture

Cements are non-flammable, non-explosive and or facilitate or feed the combustion of other material.

5.3. Recommendations for the firefighting staff

Cement does not pose any hazard related to fires. The firefighting staff does not have to use any special protective equipment.

6. Measures in the event of accidental spillages

6.1. Personal precautions, protection equipment and emergency procedures

6.1.1. For the staff who are not part of the emergency services

Wear the protective equipment described in section 8 and follow the tips for safe handling given in section 7.

6.1.2. For the emergency personnel

No emergency procedures are required.

However, in situations with high levels of concentration of dust breathing apparatus must be worn.

6.2. Environmental precautions

Do not pour cement either into sewage systems or into surface water (for example streams).

6.3. Material and methods of containment and of cleaning

Collect the poured material and reuse it.

Dry cement

Use dry cleaning methods that do not lift dust such as vacuum or extraction systems (hand-held industrial vacuum cleaners equipped with high efficiency particles - (EPA and HEPA filters, UNE-EN 1822-1) or equivalent technique). Never use pressurised air.

Other alternatives to clean the dust are: scrubbing, wet brushing or washing (gently to avoid lifting dust) and then picking up the mixture.

If this is not possible, clean mixing directly with water (see paragraph on wet cement). When wet or vacuum cleaning cannot be used and only removal with utensils is applicable, it must be

ensured that all workers wear the appropriate protective equipment and prevent the dispersion of dust by using appropriate utensils, avoiding sweeping with a brush. Avoid inhalation of cement and its contact with eyes and skin. Deposit the material collected in a container. Leave to harden before disposing of it as described in section 13.

Wet cement

Collect the wet cement and put it into a suitable container. Leave the material to dry and harden before its disposal as described in section 13.

6.4. Reference to other sections

For more information, see sections 8 and 13.

7. Handling and storage

7.1. Precautions for safe handling

7.1.1. Protective measures

Follow the recommendations given in section 8.

To clean dry cement, see section 6.3

Fire prevention measures

Not applicable.

Measures for preventing formation of suspended particulates and dust

Do not sweep. Use cleaning dry methods that do not lift dust such as vacuum or extraction systems.

For more information, consult the “Good practice guide” adopted by the European Social Dialogue Agreement, “Agreement on the protection of the health of workers for the proper handling and good use of crystalline silica and the products that contain it” by Trade Union Organisations and European trade associations, among which are Cembureau. These recommendations on safe handling can be found in <http://www.nepsi.eu/good-practice-guide.aspx>.

The Spanish cement industry voluntarily adopted the terms of the Agreement and has written a protocol for the application of this specific document of the Spanish cement sector. (http://www.oficemen.com/reportajePag.asp?id_rep=139).

Measures to protect the environment

No special measures are required.

7.1.2. General occupational hygiene measures

Do not handle or store near food, beverages or tobacco.

In dusty environments wear mask and goggles.

Use gloves to avoid contact with the skin.

7.2. Safe storage conditions, including possible incompatibilities

Bulk cement should be stored in a dry (minimising condensation), indoor, clean place safe from contamination.

Hazard of being buried: Cement may accumulate or adhere to the walls of confined spaces and may come loose, collapse or fall unexpectedly. To prevent the risk of burial or asphyxia do not enter confined spaces such as silos, containers, tanks or other containers that are used to store or contain cement without taking appropriate safety measures.

The packaged product must be stored in closed sacks, without touching the floor, in a cool and dry place, protected from excessive draughts of air that might affect the quality of the cement. The sacks must be stacked in a stable way.

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

7.3. Specific end uses

There are no additional recommendations for the uses identified in paragraph 1.2.

Control of the Cr(VI) soluble in water

In the cements treated with Cr (VI) reducing agent according to the standard given in section 15, the effectiveness of the reducing agent decreases with time. Therefore, the sacks and delivery notes should include information on the period of effectiveness (expiration date) that the manufacturer guarantees that the reducing agent will continue to maintain the level of Cr (VI) below the regulatory limit of 0.0002% of Cr (VI) soluble in water of the total dry weight of the cement, in accordance with Standard UNE-EN 196-10. In addition, the appropriate storage conditions to maintain the effectiveness of the reducing agent must be indicated. This information can be found in section 2.2 (Supplementary information), and 7.2.

8. Exposure/personal protection controls

8.1. Control parameters

Limit name-value	Type of limit value	Value (at 8h TWA)	Units	Legal references
Particles (insoluble or not very soluble)	VLA-ED Inhalable fraction	10	mg/m ³	"Limits for Occupational Exposure to Chemical agents in Spain" by the INSHT.
Particles (insoluble or not very soluble)	VLA-ED Breathable fraction	3	mg/m ³	ORDER TED/723/2021 approving ITC 02.0.02 "Limits for Occupational Exposure to Chemical agents in Spain" by the INSHT.
Portland Cement	VLA-ED Breathable fraction	4	mg/m ³	"Limits for Occupational Exposure to Chemical agents in Spain" by the INSHT.
Crystalline silica	ELV-DE Respirable fraction	0.05	mg/m ³	Limit applicable in Spain according to Royal Decree 665/1997.

8.2. Controls of the exposure

8.2.1. Appropriate technical controls

Measures to reduce the formation of particles in suspension and the spreading of dust such as: dusting, vacuuming systems and methods of dry cleaning that do not raise dust.

Exposure scenarios	PROC*	Exposure	Localised controls	Efficiency
Industrial manufacturing/formulation of hydraulic binders and construction materials	2, 3	The duration is not limited (up to 480 min/shift; 5 shifts/week)	Not required	-
	14, 26		A) Not required or B) Localised vacuuming	- 78%
	5, 8b, 9		A) General ventilation or B) Localised vacuuming	17% 78%
Industrial uses of dry hydraulic binders and construction materials (interior, exterior)	2		Not required	-
	14, 22, 26		A) Not required or B) Localised vacuuming	- 78%
	5, 8b, 9		A) General ventilation or B) Localised vacuuming	17% 78%

Exposure scenarios	PROC*	Exposure	Localised controls	Efficiency
Industrial uses of wet suspensions of hydraulic binders and construction materials	7	The duration is not limited (up to 480 min/shift; 5 shifts/week)	A) Not required or B) Localised vacuuming	- 78%
	2, 5, 8b, 9, 10, 13, 14		Not required	-
Professional uses of dry hydraulic binders and construction materials (interior, exterior)	2		Not required	-
	9, 26		A) Not required or B) Localised vacuuming	- 72%
	5, 8a, 8b, 14		A) Not required or B) Localised vacuuming	- 87%
	19		Localised controls are not applicable, the process can only be carried out in well ventilated spaces or outdoors.	-
Professional uses of wet suspensions of hydraulic binders and construction materials	11	A) Not required or B) Localised vacuuming	- 72%	
	2, 5, 8a, 8b, 9, 10, 13, 14, 19	Not required	-	

* PROC are uses identified and defined in section 16.2.

8.2.2. Individual protective measures, such as personal protective equipment

General: During work, whenever possible, avoid kneeling on fresh concrete or mortar. If to do the job it is absolutely necessary to get on your knees, then using waterproof individual protection equipment is mandatory (waterproof kneepads).

Do not eat, drink or smoke when working with cement to prevent contact with the skin or mouth. Once the work with cement or materials that contain it have been finished, workers must wash or shower or apply moisturising creams immediately.

Remove any soiled garment (clothing, footwear, watches, etc.) and clean it before using it again.

Protection of the eyes or face:



When handling wet or dry cement, use approved glasses or certified protective goggles (e.g. UNE-EN 166).

Skin protection:



Wear waterproof gloves resistant to abrasion and alkalis (e.g. gloves with special outer nitrile coating and cotton lining), safety footwear, long-sleeved protective clothing as well as skincare products (including protective creams) to protect the skin from long periods of contact with wet cement. Special care must be taken to prevent wet cement entering safety footwear. With regards to gloves, respect the maximum time limit for usage to avoid skin problems. The available studies show that nitrile-impregnated cotton gloves (approximately 0.15 mm thick) provide sufficient protection for a period of 480 minutes under conditions of normal wear and tear (which may vary depending on the task). Keeping spare gloves available is recommended in case those in use are damaged.

In some circumstances, such as when layers of concrete or mortar are applied or it is levelled, trousers or waterproof kneepads have to be used.

Breathing apparatus:



When a person is potentially exposed to dust concentrations above the limits allowed, appropriate breathing apparatus must be used. The type of breathing apparatus must be adapted to the concentration of particles present and in accordance with the standards laid down in harmonised standards (for example UNE EN149) or other national standards.

Thermal hazards:

Not applicable.

Exposure scenarios	PROC*	Exposure	Specification of the Breathing Apparatus (BA)	BA Efficiency - Assigned Protection Factor (FPA).
Industrial manufacturing/formulation of hydraulic binders and construction materials	2, 3	The duration is not limited (up to 480 min/shift; 5 shifts/week)	Not required	-
	14, 26		A) Breathing apparatus P1 or B) Not required	FPA = 4 -
	5, 8b, 9		A) Breathing apparatus P2 or B) Breathing apparatus P1	FPA = 10 FPA = 4
Industrial uses of dry hydraulic binders and construction materials (interior, exterior)	2		Not required	-
	14, 22, 26		A) Breathing apparatus P1 or B) Not required	FPA = 4 -
	5, 8b, 9		A) Breathing apparatus P2 or B) Breathing apparatus P1	FPA = 10 FPA = 4
Industrial uses of wet suspensions of hydraulic binders and construction materials	7		A) Breathing apparatus P1 or B) Not required	FPA = 4 -
	2, 5, 8b, 9, 10, 13, 14		Not required	-
Professional uses of dry hydraulic binders and construction materials (interior, exterior)	2		Breathing apparatus P1	FPA = 4
	9, 26		A) Breathing apparatus P2 or B) Breathing apparatus P1	FPA = 10 FPA = 4
	5, 8a, 8b, 14		A) Breathing apparatus P3 or B) Breathing apparatus P1	FPA = 20 FPA = 4
	19		Breathing apparatus P2	FPA = 10
Professional uses of wet suspensions of hydraulic binders and construction materials	11	A) Breathing apparatus P2 or B) Breathing apparatus P1	FPA = 10 FPA = 4	
	2, 5, 8a, 8b, 9, 10, 13, 14, 19	Not required	-	

* PROC are uses identified and defined in section 16.2.

A summary of the Assigned Protection Factors (FPA) for the various BA can be found in the MEASE glossary (16), in accordance with the standard UNE EN 529:2005.

Any of the BA mentioned above can only be worn if the following measures are introduced in parallel: the duration of the work (compared with the “duration of exposure” mentioned above) should reflect the additional psychological stress for the worker when breathing and the weight of the BA itself, as well as the increase in thermal stress caused by covering the head. It should also be borne in mind that the capacity of the worker to handle the tools and to communicate is reduced while wearing the BA.

For the reasons mentioned above, the worker must therefore be (I) healthy (especially with regards to medical conditions which may affect the use of the BA), (II) have the necessary facial features to ensure minimum risk of leaks between the face and the mask (taking into account scars and facial hair). The devices recommended in the table are based on a tight fit to the face, and they will not provide the protection required unless they are adapted to the contours of the face sufficiently securely.

The employer and self-employed workers are legally obliged to provide and maintain breathing apparatus, and ensuring its correct use in the workplace. Therefore, they must define and document an appropriate breathing apparatus policy and programme, including the training of workers.

8.2.3. Environmental exposure controls

Air: The control to avoid the dispersion of particles of cement into the environment must be in accordance with the available technology and the standard on dust particle emissions.

Water: Do not pour cement either into sewerage systems or in surface waters to prevent increasing the pH. A pH greater than 9 can cause negative eco-toxicological impacts.

Floor and surrounding land: No special emission control measures are required for exposure to the surrounding land.

For further information, see section 6, “Measures in the event of accidental spillages”.

9. Physical and chemical properties

9.1. Information on basic physical and chemical properties

This information applies to any/all of the mixture.

- a) **Physical state:** dry cement is a finely ground solid inorganic material (fine powder).
General grain size: 5-30 µm.
- b) **Colour:** grey or white.
- c) **Odour:** odourless.
- d) **Melting point/freezing point:** melting point: > 1,250°C.
- e) **Initial boiling point and boiling range:** not applicable, as the boiling point is > 1,250°C under normal atmospheric conditions.
- f) **Flammability (solid, gas, liquid):** not applicable, as it is a non-flammable solid and can neither cause fire nor contribute to causing fire by friction.
- g) **Upper and lower explosive limit:** not applicable as it is not a flammable gas.
- h) **Flash point:** not applicable as it is not a liquid.
- i) **Auto-ignition temperature:** not applicable (not pyrophoric – no organo-metallic, organo-phosphate or organo-metalloid bonds or their derivatives. There are no other pyrophoric constituents in its composition).
- j) **Decomposition temperature:** not applicable as no organic peroxides are present.
- k) **pH:** (Temp. = 20°C; in water, water-solid ratio 1:2): basic between 11 and 13.5.
- l) **Viscosity:** not applicable as it is not a liquid.

- m) **Solubility in water:** (T 20°C): slight (0.1-1.5 g/L).
- n) **Partition coefficient n-octanol/water:** not applicable as it is an inorganic substance.
- o) **Vapour pressure:** not applicable as its boiling point is >1,250°C
- p) **Density and/or relative density:** 2.75-3.20 g/cm³ at 20°C; bulk density 0.9-1.5 g/cm³ at 20°C.
- q) **Relative vapour density:** not applicable as it is a solid substance.
- r) **Characteristics of the particles:** typical particle size 5-30 µm.

9.2. Other data

Not applicable.

10. Stability and reactivity

10.1. Reactivity

When mixed with water, cements harden forming a stable stone mass resistant to normal environmental conditions.

10.2. Chemical stability

Dry cements are stable, as long as they are stored correctly (see section 7) and compatible with most other construction materials. They must be kept dry.

It must be prevented from coming into contact with incompatible materials.

Wet cement is alkaline and incompatible with acids, ammonium salts, aluminium or other non-precious metals. Cement is dissolved in hydrofluoric acid producing corrosive silicon tetrafluoride gas. Cement reacts with water forming silicates and calcium hydroxide. Silicates in cement react with strong oxidising agents such as fluoride; boron trifluoride; chlorine trifluoride; manganese trifluoride and oxygen difluoride.

10.3. Possibility of a dangerous reactions

Cements do not cause a dangerous reaction.

10.4. Conditions that must be avoided

Moisture during its storage can cause the hardening of the cement and a loss of quality of the product.

10.5. Incompatible materials

Acids, ammonium salts, aluminium or other non-precious metals. Uncontrolled use of aluminium powder with wet cement must be avoided as on reacting it releases hydrogen.

10.6. Hazardous decomposition products

Cement is not decomposed into dangerous products.

11. Toxicological information

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

Hazard class	Cat	Effect	Reference
Acute skin toxicity	-	Test parameters: rabbit, 24 hours of contact, 2000 mg/kg body weight - not lethal. According to the data available it does not meet the criteria for its classification.	(2)
Acute toxicity from inhalation	-	No acute toxicity from inhalation has been observed. According to the data available it does not meet the criteria for its classification.	(9)
Acute oral toxicity	-	According to studies conducted with dust from the	Bibliographical

Hazard class	Cat	Effect	Reference
		clinker furnace, there is no indication of oral toxicity. According to the data available it does not meet the criteria for its classification.	study
Skin corrosion or irritation	2	If the cement comes into contact with moist skin, without adequate protection, this can cause skin thickening, cracking or fissures on the skin. Prolonged contact in combination with abrasion can cause severe burns. Some individuals exposed to wet cement dust may develop eczema, caused by the high level of pH, which can cause an irritating contact dermatitis after a long period of time in contact.	(2) Experience in humans
Severe eye injuries or eye irritation	1	Portland cement clinker caused different effects on the cornea and the irritation index calculated was 128. Cements contain variable amounts of Portland cement clinker, fly ash, slag blast furnace, gypsum. Natural Pozzolanas, calcined shale, silica fumes and limestone. Direct contact with cement dust can cause damage to the cornea by from mechanical stress, immediate or delayed irritation and inflammation. Direct contact with large amounts of dry cement dust or splashing of wet cement can cause keratopathies of a different nature that can range from moderate irritations (for example conjunctivitis or blepharitis) to chemical burns and blindness.	(10), (11)
Skin sensitization		Some individuals exposed to wet cement dust may develop eczema due to an immunological reaction against the soluble Cr (VI) which causes an allergic contact dermatitis. The reaction may appear in several ways, ranging from a mild rash to a severe dermatitis. If the cement contains a soluble Cr (VI) reducing agent, as long as the reduction effectiveness period for the chromates is not exceeded, the sensitizing effect against chromates is not expected to occur [Reference 3]. Therefore, in accordance with the consultation published by ECHA, its classification is not considered appropriate.	(3), (4), (17), (18)
Respiratory sensitization	-	There are no indications that it causes sensitization of the respiratory system. According to the data available it does not meet the criteria for its classification.	(1)
Mutagenicity in germ cells	-	There are no indications. According to the data available it does not meet the criteria for its classification.	(12), (13)
Carcinogenicity	-	No causal relationship has been established between exposure to Portland cement and the development of cancer. The epidemiological data present in the literature do not support the consideration of Portland cement as a suspected of being carcinogenic in humans. Portland cement is not classifiable as carcinogenic in humans (in accordance with the ACIGH A4 Agents that are feared to be carcinogenic in humans), but this cannot be concluded definitively due to a lack of evidence to corroborate this fact. The <i>in vitro</i> tests and tests animals do not provide sufficient evidence to	(1), (14)

Hazard class	Cat	Effect	Reference
		classify the agent in relation to carcinogenicity in some of the other categories). According to the data available it does not meet the criteria for its classification.	
Toxicity for the reproduction	-	According to the data available it does not meet the criteria for its classification.	There is no evidence from experience in humans
Specific target organ toxicity (STOT) — single exposure	3	Cement dust may cause irritation of the throat and the respiratory tract. Exposures to concentrations above exposure limit values can cause coughing, sneezing and suffocation. In general, historical data indicates that exposure in the workplace to cement dust causes a deficit in the respiratory function. However, currently there is a lack of sufficient data to establish a dose-response relationship for these effects.	(1)
Specific target organ toxicity (STOT) — repeated exposures	-	Long-term exposure to respirable cement dust above the exposure limit values may result in coughing, choking sensation and chronic obstructive changes in the respiratory tract. No chronic effects have been seen at low concentrations. According to the data available it does not meet the criteria for its classification.	(15)
Danger from inhalation	-	Not applicable as cements are not used as aerosols.	-

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

Worsening of previous diseases by exposure

Breathing cement dust can aggravate the symptoms of previously diagnosed diseases such as respiratory pathologies, emphysema, asthma, eye pathologies and skin pathologies.

11.2. Information on other hazards

11.2.1. Endocrine disrupting properties

Not relevant.

12. Ecological information

12.1. Toxicity

The product is not hazardous for the environment. Ecotoxicity tests of Portland cement with *Daphnia magna* [Reference (5)] and *Selenastrum coli* [Reference (6)] have shown a minimum toxicological impact, and therefore it has not been possible to determine values of LC50 and EC50 [Reference (7)]. There is no indication on toxicity of the sediment phase [Reference (8)]. In the event of accidental spillages of large amounts of cement into water, a slight increase in its pH may occur, which under certain circumstances could represent some toxicity for aquatic life.

12.2. Persistence and degradability

Not relevant. After hardening, cement has no risk of toxicity.

12.3. Potential for bioaccumulation

Not relevant. After hardening, cement has no risk of toxicity.

12.4. Mobility in the soil

Not relevant. After hardening, cement has no risk of toxicity.

12.5. Results of the PBT and vPvB valuation

Not relevant. After hardening, cement has no risk of toxicity.

12.6. Endocrine disrupting properties

Not relevant.

12.7. Other adverse effects

Not relevant.

13. Considerations regarding disposal

13.1. Methods for the treatment of waste

Do not pour cement either into the sewage system or surface water.

Product - cement with a chromium reducer that has exceeded its effectiveness period

EPR code: 10 13 99 (waste not specified in another category)

(and if it contains more than 0.0002% of soluble Cr (VI)): It should not be used or sold except for use in closed and totally automated processes, or must be recycled or disposed of in accordance with local legislation or treated again with a reducing agent.

Product - remains not used or spillages of dry material

EPR code: 10 13 06 (particles and dust)

Collect the dust. Label the containers. Reuse is possible depending on the period of effectiveness of the chromium reducer (deadlines indicated on the sack or delivery note) and the requirements to avoid exposure to the dust. If you want to dispose of it, mix with water, leave to harden and dispose of in accordance with the indications of the "Product - hardened cement after adding water"

Wet product - material

Leave to harden, avoid pouring it into the sewerage network, drainage systems or surface waters (for example streams) and dispose of as indicated in paragraph "Hardened product - cement after addition of water".

Hardened product - cement after addition of water

Dispose of in accordance with local legislation. Avoid pouring it into the sewerage systems. Dispose of the hardened product as concrete waste. Hardened cement is an inert and non-hazardous waste.

EPR code: 10 13 14 (waste from manufacture of cement - concrete waste and concrete sludge) or 17 01 01 (waste from construction and demolition - concrete).

Packaging waste

Manage packaging waste completely empty and according to local legislation. EPR code: 15 01 01 (waste paper and cardboard packaging)

14. Transport information

Cement is not affected by the law of international transport of Dangerous Goods (IMDG, IATA, ADR/RID). Non-hazardous good according to transport regulations.

It is not necessary to adopt any special precautions apart from those mentioned in section 8.

14.1. UN number or ID number

Not relevant.

14.2. Official designation of transport of the United Nations

Not relevant.

14.3. Class(es) of danger for transport

Not relevant.

14.4. Packing group

Not relevant.

14.5. Dangers for the environment

Not relevant.

14.6. Special precautions for users

Not relevant.

14.7. Transport in bulk according to IMO instruments

Not relevant.

15. Regulatory information

15.1. Regulation and legislation on health, safety and environmental matters specific for the substance or the mixture

European Union regulatory information

According to REACH, cement is a preparation, and is therefore not subject to registration. Cement clinker is exempt from registration (Art. 2.7 (b) and Annex V.10 of REACH).

The marketing of cement is subject to restrictions on the content of Cr (VI) (Annex XVII of REACH, section 47 Chromium compounds (VI):

1. "Cement and mixtures containing cement may not be used or marketed if, once hydrated, their content of soluble chromium (VI) is greater than 2 mg/kg (0.0002%) of the total dry weight of the cement".
2. "When using reducing agents, and notwithstanding the application of other Community provisions on classification, packaging and labelling of substances and mixtures, suppliers shall ensure, before marketing, that the packaging of the cement or mixtures containing cement is marked in a visible, legible and indelible form with information about the date of packaging, as well as on the storage conditions and the time of storage suitable for maintaining the activity of the reducing agent and the content of soluble chromium (VI) below the limit indicated in point 1".
3. "As an exception, points 1 and 2 will not apply to the marketing and use in controlled, closed and totally automated process in which the cement and mixtures containing cement are only handled by machines and in which there is no possibility of contact with the skin".
4. The standard adopted by the European Committee for Standardisation (CEN) to conduct tests on the water-soluble chromium (VI) content in the cement, or in the mixture which contains it, shall be used as a testing method for verifying compliance with point 1.

State regulatory information

The marketing of cement is subject to restrictions on the content of Cr (VI) detailed in Order PRE/1954/2004, which are equivalent to the specifications in the REACH Regulation mentioned in the section above.

In compliance with Article 41 of Law 31/1995 on Occupational Risk Prevention, "Obligations of manufacturers, importers and suppliers", it is noted that the product may contain traces or

impurities of crystalline silica (fine fraction), as well as traces (impurities) of hexavalent chromium and nickel. The possible contents of these substances are lower than the requirements for classification of this product, in accordance with Regulation (EC) No. 1272/2008 and for information necessary for section 3 of this Safety Data Sheet, in accordance with Regulation (EC) No. 1907/2006. Work involving exposure to respirable crystalline silica dust generated by a work process, as well as to hexavalent chromium and nickel substances, are included in different sections of Directive 2004/37/EC, as amended by Directive (EU) 2017/2398 and, consequently, will be included in Royal Decree 665/1997. For that reason, appropriate preventive measures must be adopted where appropriate.

15.2. Evaluation of chemical safety

There has been no evaluation of chemical safety.

16. Other Information.

16.1. Control of changes

This version is in accordance with Regulation (EC) No. 1907/2006 (REACH) and its subsequent amendments. It has been written according to Cembureau's guide "Guidelines for the safety data sheet template for common cements" of 2020.

This safety data sheet replaces and supersedes all previous versions.

16.2. Identified uses, descriptors and usage categories

The following table gives a summary of all relevant uses identified for the cement or mixtures which contain it (hydraulic binders). All of the uses have been grouped into these identified uses based on specific conditions of exposure for the health of humans and the environment. For each of these uses, a series of risk management measures or localised controls has been presented (see section 8), which must be implemented by the user of the cement or mixtures which contain it (hydraulic binders) in order to attain an acceptable level of exposure.

Process category (PROC)	Identified uses - Description of use	Manufacturing/Formulation of	Industrial/professional use of
		construction and building materials	
2	Use in continuous and closed processes with sporadic controlled exposures.	X	X
3	Use in closed processes by batches / dosing	X	X
5	Mix by dosing processes to formulate preparations or articles	X	X
7	Industrial pulverisation		X
8a	Transfer of substances or preparations from/to vessels/large containers to non-dedicated/non-specific facilities		X
8b	Transfer of substances or preparations from/to vessels/large containers to dedicated/specific facilities	X	X
9	Transfer of substances or preparations to smaller containers	X	X
10	Application by roller or brushing		X
11	Non-industrial pulverisation		X
13	Treatment of articles by		X

Process category (PROC)	Identified uses - Description of use	Manufacturing/Formulation of	Industrial/professional use of
		construction and building materials	
	immersion and pouring		
14	Production of preparations or articles via tableting, extrusion-compression, pelletisation	X	X
19	Manual mixing with close contact always and when you have PPE		X
22	Processing operations of minerals/metals, potentially closed, at high temperatures. Industrial context		X
26	Management of solid inorganic substances at room temperature	X	X

16.3. Abbreviations and Acronyms

ACGIH	American Conference of Industrial Hygienists
ADR/RID	European Agreement concerning the international carriage of dangerous goods by road / Regulations concerning the international carriage of dangerous goods by rail.
CAS	Chemical Abstracts Service, is a division of the American Chemical Society.
CLP	Classification, Labelling and Packaging of substances and mixtures (European Regulation, no. 1272/2008).
DNEL	Derived no-effect level.
ECHA	European Chemicals Agency.
ES	Exposure scenario.
EINECS	European Inventory of Existing Chemical Substances.
EPA	Efficient air filter for particles.
COPD	Chronic obstructive pulmonary disease.
FDS	Safety data sheet (Spanish acronym for "ficha de datos de seguridad").
FPA	Assigned Protection Factor (FPA).
FF P	Particle filtering mask (disposable).
HEPA	High efficiency particle air filter.
IATA	International Air Transport Association.
IMDG	International Maritime Dangerous Goods code.
LC50	Lethal dose of a compound in the air or water that kills 50% of organisms studied in specific conditions.
ELW	European list of wastes.
EC50	Concentration, calculated statistically, which is expected to produce a non-lethal effect defined in 50% of a population of organisms in certain conditions.
MS	Member State.
MEASE	Tool for the estimation of exposure to metals and inorganic compounds, EBRC Consulting GmbH for Eurometaux, http://www.ebrc.de/ebrc/ebrc-mease.php
PBT	persistent, bioaccumulative and toxic.
PNEC	Predicted No Effect Concentration.
PROC	Process category.
REACH	Registration, Evaluation, Authorisation and Restriction of chemical substances and preparations (Regulation (EC) No. 1907/2006).
SCOEL	Scientific Committee for Occupational Exposure Limits to Chemical Agents.

STOT	Specific target organ toxicity
UVCB	Substances of unknown or variable composition, complex reaction products or biological materials.
vPvB	Very persistent and very bioaccumulative.
VLA/ED	Occupational Limit Value - Daily Exposure

16.4. References

- 1) Portland Cement Dust - Hazard assessment document EH75/7, UK Health and Safety Executive, 2006. Available from: <http://www.hse.gov.uk/pubns/web/portlandcement.pdf>
- 2) Observations on the effects of skin irritation caused by cement, Kietzman et al, *Dermatosen*, 47, 5, 184-189 (1999).
- 3) 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) 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/ebrc/ebrc-mease.php>.
- 17) Occurrence of allergic contact dermatitis caused by chromium in cement. A review of epidemiological investigations, Kare 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>.

16.5. Training

To complement training programmes for workers in the environment and health and safety field, companies must ensure that workers read, understand and apply the requirements of this safety data sheet (FDS).

16.6. Other information

Not applicable.

16.7. Classification and procedure used to establish the classification for mixtures in accordance with Regulation (EC) no. 1272/2008 (CLP)

Classification according to Regulation (EC) No. 1272/2008	Hazard indications
Skin irritation 2 H315	Results of tests
Serious eye damage / eye irritation 1 H318	Results of tests
Specific Target Organ Systemic Toxicity (single exposure) 3, H335	Experience in humans

16.8. Legal Notice/Explanatory Note/Disclaimer

The information provided in this sheet reflects the knowledge currently available and trusting that the product is used under the conditions laid down and according to the indications that appear on the packaging or in technical guides. Any other use not specified for the product, including its use in conjunction with other products or in other processes, shall be under the exclusive responsibility of the user.

It is the responsibility of the user to take appropriate protection measures, use the cement within its recommended term and comply with all legal requirements that are applicable to its activity.

Annex: Additional tables with appropriate technical controls and individual protective measures for section 8.2

1. DNEL inhalation of 1 mg/m³

8.2.1. Appropriate technical controls

Exposure scenarios	PROC*	Exposure	Localised controls	Efficiency
Industrial manufacturing/formulation of hydraulic binders and construction materials	2, 3	The duration is not limited (up to 480 minutes/shift; 5 shifts/week)	Not required	-
	14, 26		A) Not required or B) Localised vacuuming	- 78 %
	5, 8b, 9		Localised vacuuming	78 %
Industrial uses of dry hydraulic binders and construction materials (interior, exterior)	2		Not required	-
	14, 22, 26		A) Not required or B) Localised vacuuming	- 78 %
	5, 8b, 9		Localised vacuuming	78%
Industrial uses of wet suspensions of hydraulic binders and construction materials	7		A) Not required or B) Localised vacuuming	- 78 %
	2, 5, 8b, 9, 10, 13, 14		Not required	-
Professional uses of dry hydraulic binders and construction materials (interior, exterior)	2		A) Not required or B) Localised vacuuming	- 72 %
	9, 26		A) Not required or B) Localised vacuuming	- 72 %
	5, 8a, 8b, 14		Localised vacuuming	72 %
	19 (#)		Localised controls are not applicable, the process can only be carried out in well ventilated spaces or outdoors.	-
Professional uses of wet suspensions of hydraulic binders and construction materials	11	A) Not required or B) Localised vacuuming	- 72 %	
	2, 5, 8a, 8b, 9, 10, 13, 14, 19	Not required	-	

* PROC are uses identified and defined in section 16.2.

8.2.2. Individual protective measures, such as personal protective equipment

Exposure scenarios	PROC*	Exposure	Specification of the Breathing Apparatus (BA)	BA Efficiency - Assigned Protection Factor (FPA).
Industrial manufacturing/formulation of hydraulic binders and construction materials	2, 3	The duration is not limited (up to 480 minutes/shift; 5 shifts/week)	Not required	-
	14, 26		A) Breathing apparatus P2 or B) Breathing apparatus P1	FPA = 10 FPA = 4
	5, 8b, 9		Breathing apparatus P2	FPA = 10
Industrial uses of dry hydraulic binders and construction materials (interior, exterior)	2		Not required	-
	14, 22, 26		A) Breathing apparatus P2 or B) Breathing apparatus P1	FPA = 10 FPA = 4
	5, 8b, 9		Breathing apparatus P2	FPA = 10
Industrial uses of wet suspensions of hydraulic binders and construction materials	7		A) Breathing apparatus P3 or B) Breathing apparatus P2	FPA = 20 FPA = 10
	2, 5, 8b, 9, 10, 13, 14		Not required	-
Professional uses of dry hydraulic binders and construction materials (interior, exterior)	2		A) Breathing apparatus P2 or B) Breathing apparatus - mask P1	FPA = 10 FPA = 4
	9, 26		A) Breathing apparatus P3 or B) Breathing apparatus P2	FPA = 20 FPA = 10
	5, 8a, 8b, 14		Breathing apparatus P3	FPA = 20
	19 (#)		Breathing apparatus P3	FPA = 20
Professional uses of wet suspensions of hydraulic binders and construction materials	11	A) Breathing apparatus P3 or B) Breathing apparatus P2	FPA = 20 FPA = 10	
	2, 5, 8a, 8b, 9, 10, 13, 14, 19	Not required		

* PROC are uses identified and defined in section 16.2.

2 DNEL inhalation of 5 mg/m³

8.2.1 Appropriate technical controls

Exposure scenarios	PROC*	Exposure	Localised controls	Efficiency
Industrial manufacturing/formulation of hydraulic binders and construction materials	2, 3	The duration is not limited (up to 480 minutes/shift; 5 shifts/week)	Not required	-
	14, 26		A) Not required or B) Localised vacuuming	- 78 %
	5, 8b, 9		A) Not required or B) Localised vacuuming	- 82 %
Industrial uses of dry hydraulic binders and construction materials (interior, exterior)	2		Not required	-
	14, 22, 26		A) Not required or B) Localised vacuuming	- 78 %
	5, 8b, 9		A) General ventilation or B) Localised vacuuming	- 82 %
Industrial uses of wet suspensions of hydraulic binders and construction materials	7		A) Not required or B) Localised vacuuming	- 78 %
	2, 5, 8b, 9, 10, 13, 14		Not required	-
Professional uses of dry hydraulic binders and construction materials (interior, exterior)	2		A) Not required or B) General ventilation	- 29 %
	9, 26		A) Not required or B) Localised vacuuming	- 77 %
	5, 8a, 8b, 14	A) Not required or B) Localised vacuuming	- 72 %	
	19	Localised controls are not applicable, the process can only be carried out in well ventilated spaces or outdoors.	-	
Professional uses of wet suspensions of hydraulic binders and construction materials	11	A) Not required or B) Localised vacuuming	- 77 %	
	2, 5, 8a, 8b, 9, 10, 13, 14, 19	Not required	-	

* PROC are uses identified and defined in section 16.2.

8.2.2 Individual protective measures, such as personal protective equipment

Exposure scenarios	PROC*	Exposure	Specification of the Breathing Apparatus (BA)	BA Efficiency - Assigned Protection Factor (FPA).
<i>Industrial manufacturing/formulation of hydraulic binders and construction materials</i>	2, 3	<i>The duration is not limited (up to 480 minutes/shift; 5 shifts/week)</i>	<i>Not required</i>	-
	14, 26		<i>A) Breathing apparatus P1 or B) Not required</i>	<i>FPA = 4</i> -
	5, 8b, 9		<i>A) Breathing apparatus P2 or B) Not required</i>	<i>FPA = 10</i> -
<i>Industrial uses of dry hydraulic binders and construction materials (interior, exterior)</i>	2		<i>Not required</i>	-
	14, 22, 26		<i>A) Breathing apparatus P1 or B) Not required</i>	<i>FPA = 4</i> -
	5, 8b, 9		<i>A) Breathing apparatus P2 or B) Not required</i>	<i>FPA = 10</i> -
<i>Industrial uses of wet suspensions of hydraulic binders and construction materials</i>	7		<i>A) Breathing apparatus P2 or B) Not required</i>	<i>FPA = 10</i> -
	2, 5, 8b, 9, 10, 13, 14		<i>Not required</i>	-
<i>Professional uses of dry hydraulic binders and construction materials (interior, exterior)</i>	2		<i>A) Breathing apparatus P1 or B) Not required</i>	<i>FPA = 4-</i>
	9, 26		<i>A) Breathing apparatus P2 or B) Not required</i>	<i>FPA = 10</i> -
	5, 8a, 8b, 14		<i>A) Breathing apparatus P3 or B) Breathing apparatus P1</i>	<i>FPA = 20</i> <i>FPA = 4</i>
	19		<i>Breathing apparatus P2</i>	<i>FPA = 10</i>
<i>Professional uses of wet suspensions of hydraulic binders and construction materials</i>	11		<i>A) Breathing apparatus P2 or B) Not required</i>	<i>FPA = 10</i> -
	2, 5, 8a, 8b, 9, 10, 13, 14, 19		<i>Not required</i>	-

* PROC are uses identified and defined in section 16.2.