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

1.1 Product identifier

- Cements according to DIN EN 197 and DIN 1164
  CEM I Portland cements, CEM II Portland-composite cements, CEM III Blast furnace cements, CEM IV Pozzolanic cements and CEM V Composite cements of all strength classes (32.5, 42.5 and 52.5)
- Hydraulic road binder according to DIN EN 13282
  HRB of all strength classes (E – 2, 3, 4 and 4-RS) and compositions
- Masonry cement according to DIN EN 413
  MC of all strength classes (5, 12.5 and 22.5)
- Hydraulic lime according to DIN EN 459
  HL of all strength classes (2, 3.5 and 5)
- Special binding agent Euromix

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

Cements/binding agents are directly applied or used in industrial installations to manufacture/formulate hydraulic products, such as ready-mixed concrete, dry mortar, plasters, etc.
In the final application, cements/binding agents and hydraulic products made from them are used for the manufacturing of building materials and structural components both by industrial and professional users (professionals in the building sector) as well as by private end consumers. For this purpose, cements and cement-containing hydraulic binding agents are mixed with water, homogenized and manufactured into the desired building material and component. Related activities include the handling of dry materials (powder) and of materials mixed with water (suspension).

Identified uses for professionals including process categories and descriptors according to ECHA Guidance R.12 (ECHA-2010-G-05) are listed in Section 16.

1.3. Details of the supplier of the Safety Data Sheet

Manufacturer/Supplier:	HeidelbergCement AG		
Street address/P.O. Box:	Berliner Str. 6		
Country ID/Postcode/Place:	69120 Heidelberg, Germany		
Telephone number:	+49 6221 / 481 – 0		
Telefax:	+49 6221 / 481 13 – 554		
Information provided by:	Technical Consulting North	Phone:	+49 2524 / 29 – 51 291
E-mail address of competent person responsible for the SDS:	sdb-z@heidelbergcement.com		

Production locations: Burglengenfeld Plant in D-93133 Burglengenfeld, Ennigerloh-North and Ennigerloh-South Plants in D-59320 Ennigerloh, Elsa and Milke Plants in D-59590 Geseke, Hannover Plant in D-30559 Hannover, Königs Wusterhausen Plant in D-15711 Königs Wusterhausen, Leimen Plant in D-69181 Leimen, Lengfurt Plant in D-97855 Triefenstein, Mainz Plant in D-55130 Mainz, Paderborn Plant in D-33106 Paderborn, Schelklingen Plant in D-89601 Schelklingen.

1.4. Emergency telephone number

Emergency telephone number: +49 6131 / 19 240 (Poison Control Center in Mainz, Germany)
Hours of operation: 24 hours / 7 days
Service is provided in the following languages: German, English

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

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

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

2.1.2 Additional information

Full text of the hazard statements and EU hazard statements is listed in Section 16.

When cement/binding agent comes into contact with water or becomes damp, a strong alkaline solution is produced. Due to the high alkalinity, wet cements/binding agents may provoke skin and eye irritation.

2.2. Label elements

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

Hazard pictograms:		
Signal word:	Danger	
Hazard statements:	H315	Causes skin irritation.
	H318	Causes serious eye damage.
	H335	May cause respiratory irritation.
Precautionary statements:	P280	Wear protective gloves/protective clothing/eye protection.
	P305+P351+P338 and P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/physician.
	P302+P352 and P333+P313	IF ON SKIN: Wash with plenty of soap and water. If skin irritation or rash occurs: Get medical advice/attention.

	P261 and P304+ P340 and P312	Avoid breathing dust. IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.
	If the product is offered or sold to the general public, additionally:	
	P102	Keep out of reach of children.
	P501	Dispose of contents/container to suitable waste collection points.
Supplementary information:	On the delivery note or on the bag, it is indicated for how many months after consignment date the product will remain low-chromate in case of appropriate, dry storage.	

2.3. Other hazards

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

Product contains chromate reducing agent. Therefore, the cement/binder contains less than 0.0002% of water-soluble Chromium(VI). If the storage conditions are not appropriate (exposure to humidity) or the storage period is exceeded, the effectiveness of the present reducing agent can be diminished prematurely, and the cement/binder can become skin sensitizing (H317 or EUH203, respectively).

SECTION 3: Composition/information on ingredients

3.1. Substances

Not applicable, as these products are mixtures, not substances.

3.2. Mixtures

Cement/standard cements according to DIN EN 197 and DIN 1164, hydraulic road binder according to DIN EN 13282, masonry cement according to DIN EN 413, hydraulic lime according to DIN EN 459 or where applicable, binding agent according to approval notification by Deutsches Institut für Bautechnik.

Hazardous ingredients:

Constituent	Concentration Range (M. %)	EC No.	CAS No.	Registration No. (REACH)	Classification according to (EC) No. 1272/2008 (CLP)	
Portland cement clinker	5-100	266-043-4	65997-15-1	(a)	Skin Irrit. 2 Skin Sens. 1B Eye Dam. 1 STOT SE 3	H315 H317 H318 H335
Flue Dust (b)	0.1-5	270-659-9	68475-76-3	01-2119486767-17-xxxx	Skin Irrit. 2 Skin Sens.1B Eye Dam. 1 STOT SE 3	H315 H317 H318 H335

(a) Portland cement clinker is, according to Art. 2.7(b) and Annex V.10 of EC Regulation 1907/2006 (REACH), exempt from the registration requirement.
(b) "Flue Dust" is a substance (UVCB), arising during production of cement clinker; other conventional names are cement kiln dust, bypass dust, bypass meal, filter dust, ESP dust and clinker dust.

SECTION 4: First aid measures

4.1. Description of first aid measures

General notes
No special personal protective equipment is required for first aiders. First aiders should, however, avoid contact with wet cement/binding agents.

Following eye contact
Do not rub eyes dry, because mechanical stress may cause additional damage to the cornea. Where applicable, remove contact lenses and immediately rinse the eye, while open, under running water for at least 20 minutes in order to remove all particles. If possible, use isotonic eye-cleansing solution (0.9 % NaCl). Always consult an occupational physician or ophthalmologist.

Following skin contact
Remove dry cement/binding agent and rinse abundantly with water. Rinse wet cement/binding agent with plenty of water. Remove contaminated clothing, footwear, watches, etc. and clean these thoroughly before re-using them. Seek medical treatment in all cases of irritation or burns.

Following inhalation
Seek fresh air. Dust should quickly be removed from throat and nose. Consult a physician, should symptoms such as discomfort, coughing or persistent irritation occur.

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 poison control center.

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

Eyes: Eye contact with cement/binding agent (dry or wet) may cause serious and potentially irreversible eye damage.

Skin: Sustained contact with cement/binding agents may cause irritation on damp skin (due to sweating or humidity).
Contact of cement/binding agents with damp skin may cause skin irritation, dermatitis or severe skin damage.
For more details see reference (1).

***Inhalation*:** Repeated inhalation of large amounts of cement/binding agent dust over a long period of time increases the risk of developing lung diseases.

Environment: Under normal use, cement/binding agents are 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.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Cement/binding agents are not flammable.

5.2. Special hazards arising from the substance or mixture

Cement/binding agents are non-combustible and non-explosive, and will not facilitate or sustain the combustion of other materials.

5.3. Advice for firefighters

No special measures are required, as cement/binding agents do not pose any fire-related hazards.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1 For non-emergency personnel

Wear protective equipment as described in Section 8. Follow the advice for safe handling and use given in Section 7.

6.1.2 For emergency responders

Emergency action plans are not required.
However, respiratory protection is needed in situations with high dust levels.

6.2. Environmental precautions

Cement/binding agents should not penetrate the sewage water system, surface water or groundwater.

6.3. Methods and material for containment and cleaning up

Absorb spilled cement/binding agent and reuse, if possible.
Where possible, use dry methods to clean, such as vacuum exhaust (portable devices with highly efficient filter systems (EPA and HEPA filters, EN 1822-1:2009) or equivalent techniques), which do not generate dust formation. Never use compressed air for cleaning.
If dust is formed applying a dry cleaning method, personal protective equipment must be used.
Avoid inhalation of cement/binding agent dust and skin contact. Place spilled material into a container for potential subsequent use.

6.4. Reference to other sections

See Sections 8 and 13 for further details.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

7.1.1 Protective measures

Follow the recommendations as given in Section 8.
To clean up dry cement/binding agent, see Subsection 6.3.

Measures to prevent fire
Not applicable.

Measures to prevent aerosol and dust generation
Do not sweep. Where possible, use dry methods for cleaning, such as vacuum exhaust, which do not generate dust formation.

Measures to protect the environment
No special measures required.

7.1.2 Advice on general occupational hygiene

Do not eat, drink or smoke when working. Wear dust respirator and protective goggles in dusty environment. Use protective gloves to avoid skin contact.

7.2. Conditions for safe storage, including any incompatibilities

Cement/binding agents should be stored under dry (minimizing internal condensation), water-protected conditions, clean and protected from contamination.
Do not enter storage areas for cement/binding agents such as silos, tanks, silo vehicles or other containers without suitable safety measures, because there is a danger of being buried and suffocated. In such confined spaces, cement/biding agent can form walls and bridges, which can, however, collapse or fall unexpectedly.

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

For cement/binding agents containing Chromium(VI) reducing agents (see Section 15), please note that the effectiveness of the reducing agent decreases over time. Therefore, cement/binding agent bags and/or delivery documents include information on the packing date, the storage conditions and the storage period appropriate to maintain the activity of the reducing agent , keeping the content of water-soluble Chromium(VI) below 0.0002% of the total dry weight of the cement ready for use (determination according to EN 196-10). The manufacturer's instructions on proper storage must be followed. As a result of inappropriate storage (ingress of moisture) or expiration, the contained chromate reducers can lose their effectiveness, and a sensitizing effect of cement/binding agents upon skin contact cannot be excluded (see Section 2.3).

Storage class: VCI Storage class 13 (non-flammable solids).

7.3. Specific end use(s)

These products are assigned to GISCODE ZP 1 (cement-containing products, low chromate, see also Section 15). Further information about safe handling, protective measures and rules of conduct can be gathered from GISCODE ZP 1. It is available as part of the hazardous substance information system of the Occupational Insurance Association of the Construction Industry at "http://www.gisbau.de".

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Type of Evaluation Value	Evaluation Value		Peak Limitation		Source	Monitoring Procedure, e.g.
General Dust Limit Value						
Maximum Allowable Concentration	8 h	1.25 mg/m^3 (R) 10 mg/m^3 (I)	2 (II) 15 min	20 (I)	TRGS 900	TRGS 402
Water-soluble Chromium(VI)						
Restriction Condition		2 mg/kg in cement	Not determined.		Regulation (EC) No 1907/2006	EN 196-10

(R): Respirable dust fraction.
(I): Inhalable dust fraction.

8.2. Exposure controls

To comply with occupational exposure limits, combinations of technical and/or individual protective measures are often required. If no adequate workplace measurements are available for exposure, an exposure assessment and selection of appropriate protective measures based on the MEASE tool (Reference 3) may be carried out. Engineering controls (Table in 8.2.1) and individual protective measures (Table in 8.2.2) are recommended for the identified uses in the professional sector (Subsection 16.3). In this context, option A can only be combined with A, and B can only be combined with B. Furthermore, it must be taken into consideration that the indications apply to a continuous exposure of 8 hours per day and 5 days per week.

For the private end consumer applies that the products shall only be used outdoors or in well-ventilated rooms and that personal protective equipment shall be worn (general indications in Subsection 8.2.2).

8.2.1 Appropriate engineering controls

Measures to prevent generation and spreading of dust, for example suitable ventilation systems and cleaning methods, which do not stir up dust.

Exposure Scenario	PROC*	Exposure	Technical Installation	Efficiency
Industrial manufacturing/formulation of hydraulic binding agents and building materials	2, 3	Duration is not restricted (up to 480 minutes per shift, 5 shifts per week).	not required	-
	14, 26		A) not required or B) local exhaust ventilation	- 78%
	5, 8b, 9		A) general ventilation or B) local exhaust ventilation	17% 78%
Industrial use of dry hydraulic binding agents and building materials (indoor, outdoor)	2		not required	-
	14, 22, 26		A) not required or B) local exhaust ventilation	- 78%
	5, 8b, 9		A) general ventilation or B) local exhaust ventilation	17% 78%
Industrial use of wet suspensions of hydraulic binding agents and building materials (indoor, outdoor)	2, 5, 8b, 9, 10, 13, 14		not required	-
	7		A) not required or B) local exhaust ventilation	- 78%
Professional use of dry hydraulic binding agents and building materials (indoor, outdoor)	2		not required	-
	9, 26		A) not required or B) local exhaust ventilation	- 72%
	5, 8a, 8b, 14		A) not required or B) local exhaust ventilation	- 87%
	19		Exhaust ventilation is not required, but process only in well-ventilated rooms or outdoors.	-
Professional use of wet suspensions of hydraulic binding agents and building materials (indoor, outdoor)	11		A) not required or B) local exhaust ventilation	- 72%
	2, 5, 8a, 8b, 9, 10, 13, 14, 19		not required	-

* Defined in Subsection 16.3.

8.2.2 Individual protection measures, such as personal protective equipment

General information: Do not eat, drink or smoke when working. Wash hands and if necessary shower before breaks and after work to remove adherent cement/binding agent. Avoid contact with eyes and skin. After working with cement/binding agent, workers should wash or shower and use skin care products. Clean contaminated clothing, footwear, watches, etc. thoroughly before re-using them.

Eye/face protection

Use tight-fitting safety goggles according to EN 166 where dust is formed or in case of risk of spilling.

Skin protection

Wear waterproof, abrasion and alkali-resistant gloves. Leather gloves are not suitable due to their water penetrability, and can release chromate-containing compounds. For handling cement/binders, special gloves for chemicals (Cat. III) are not required. Investigations have proven that nitrile impregnated cotton gloves (layer thickness of about 0.15 mm) provide sufficient protection over a period of 480 minutes. Change soaked gloves. Have spare gloves ready.
General information about skin protection can be found in the rule BGR/GUV-R 195 of the German Accident Prevention & Insurance Association.
Wear tight footwear and long-sleeved clothing. If contact with moist cement/binder cannot be avoided, protective clothing should also be waterproof. Take care that no moist cement/binder is running in shoes or boots from above. Observe skin protection plan. Apply skin care products, in particular after work.

Respiratory protection

Use adequate respirator masks when there is a risk that exposure limit values are exceeded (e.g. during open handling of dry powder products).

Mixing and transferring dry cement/binder in open systems, e.g. manual mixing of cement paste or cement mortar, transferring bagged products to batch mixers: If compliance with maximum allowable concentrations cannot be guaranteed by dust-limiting measures, e.g. local exhaust ventilation, particle-filtering half-masks of the type FFP (according to EN 149) must be used (see table).

Exposure Scenario	PROC*	Exposure	Specification of respiratory protective equipment (RPE)	RPE efficiency – assigned protection factor (APF)
Industrial manufacturing/formulation of hydraulic binding agents and building materials	2, 3	Duration is not restricted (up to 480 minutes per shift, 5 shifts per week).	not required	-
	14, 26		A) FFP1 mask or B) not required	APF = 4 -
	5, 8b, 9		A) FFP2 mask or B) FFP1 mask	APF = 10 APF = 4
Industrial use of dry hydraulic binding agents and building materials (indoor, outdoor)	2		not required	-
	14, 22, 26		A) FFP1 mask or B) not required	APF = 4 -
	5, 8b, 9		A) FFP2 mask or B) FFP1 mask	APF = 10 APF = 4
Industrial use of wet suspensions of hydraulic binding agents and building materials (indoor, outdoor)	2, 5, 8b, 9, 10, 13, 14		not required	-
	7		A) FFP1 mask or B) not required	APF = 4 -
Professional use of dry hydraulic binding agents and building materials (indoor, outdoor)	2		FFP1 mask	APF = 4
	9, 26		A) FFP2 mask or B) FFP1 mask	APF = 10 APF = 4
	5, 8a, 8b, 14		A) FFP3 mask or B) FFP1 mask	APF = 20 APF = 4
	19		FFP2 mask	APF = 10
Professional use of wet suspensions of hydraulic binding agents and building materials (indoor, outdoor)	11		A) FFP1 mask or B) not required	APF = 4 -
	2, 5, 8a, 8b, 9, 10, 13, 14, 19		not required	-

* Defined in Subsection 16.3.

For the **manual and mechanical handling of ready-made cement paste, cement mortar and concrete**, respiratory protective equipment is not required.

General information can be found in the rule BGR/GUV-R 190 of the German Accident Prevention & Insurance Association.

An instruction of employees on the appropriate application of the personal protection equipment is essential in order to guarantee the required effectiveness.

8.2.3 Environmental exposure controls

Air: Compliance with dust emission limit values in accordance with the Technical Instructions on Air Quality.

Water: Do not discharge cement/binding agents into groundwater or wastewater systems in larger quantities. An increase in pH value is possible through exposure. At a pH value above 9, ecotoxicological effects may occur. Water directed or drained off into the wastewater system or surface water should therefore not lead to such a relevant pH value. Wastewater and groundwater regulations must be observed.

Soil: Compliance with the German Federal Soil Protection Act and the German Federal Soil Protection and Contamination Ordinance. No special control measures required.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

(a) Appearance: Cement/binding agent is a finely ground inorganic solid (grey or white powder)
(b) Odor: Odorless
(c) Odor threshold: No odor threshold, odorless
(d) pH (T = 20 °C in water, water-solid ratio 1:2): 11-13.5
(e) Melting point / freezing point: > 1250 °C
(f) Initial boiling point and boiling range: Not applicable, as under normal atmospheric conditions the melting point is above 1250 °C.
(g) Flash point: Not applicable, as is not a liquid
(h) Evaporation rate: Not applicable, as is not a liquid
(i) Flammability (solid, gas): Not applicable, as it is a solid and non-flammable material
(j) Upper/lower flammability or explosive limits: Not applicable, as it is not gaseous
(k) Vapor pressure: Not applicable, as melting point > 1250 °C
(l) Vapor density: Not applicable, as melting point > 1250 °C
(m) Relative density: 2.75-3.20 g/cm³; bulk density: 0.9-1.5 g/cm³
(n) Solubility(ies): low (0.1-1.5 g/l)
(o) Partition coefficient: n-octanol/water: Not applicable, as it is an inorganic mixture
(p) Auto-ignition temperature: Not applicable (not pyrophoric – no organo-metallic, organo-metalloid or organo-phosphine bindings or derivatives, and no other pyrophoric components)
(q) Decomposition temperature: Not applicable, as no inorganic peroxides are present
(r) Viscosity: Not applicable, as it is no liquid
(s) Explosive properties: Not explosive and not pyrotechnical. No gas development or self-sustaining exothermic chemical reactions.
(t) Oxidizing properties: Not applicable, as cement/binding agent has no oxidizing properties.

9.2. Other information

Not applicable.

SECTION 10: Stability and Reactivity

10.1. Reactivity

Cement/binding agent is a hydraulic material. When mixed with water, an intended reaction takes place. As a result, cement hardens and forms a solid mass, which does not react with its environment.

10.2. Chemical stability

Cement/binding agent is stable, as long as it is properly stored (see Section 7). It should be kept dry. Contact with incompatible materials should be avoided. Wet cement/binding agent is alkaline and incompatible with acids, ammonium salts, aluminum and other base metals. Here, hydrogen can be formed. Cement/binding agent dissolves in hydrofluoric acid, forming corrosive silicon tetrafluoride gas. Avoid contact with these incompatible materials.
With water, cement/binding agent forms calcium silicate hydrates, calcium aluminate hydrates and calcium hydroxide.
The calcium silicates of the cement/binding agent may react with strongly oxidizing agents such as fluorides.

10.3. Possibility of hazardous reactions

Not applicable.

10.4. Conditions to avoid

Moisture during storage can lead to lumping and loss of product quality.

10.5. Incompatible materials

Acids, ammonium salts, aluminum or other base metals.

10.6. Hazardous decomposition products

Cement/binding agent does not decompose into hazardous components.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Hazard Class	Cat.	Effect	Reference
Acute toxicity – dermal	-	Limit test, rabbit, 24 hour exposure, 2,000 mg/kg body weight – no lethality Based on available data, the classification criteria are not fulfilled.	(4)
Acute toxicity – inhalation	-	Limit test, rat, with 5 g/m³, no acute toxicity. Study was conducted with Portland cement clinker, the main component of cement. Based on available data, the classification criteria are not fulfilled.	(10)
Acute toxicity – oral	-	No acute oral toxicity was found in animal studies with cement kiln dusts and cement dusts. Based on available data, the classification criteria are not fulfilled.	Literature survey
Skin corrosion/irritation	2	Cement has an irritating effect on skin and mucous membranes. Dry cement in contact with moist skin or skin in contact with damp or wet cement can lead to various irritating and inflammatory skin reactions, e.g. redness and chaps. Prolonged contact in combination with mechanical abrasion may cause severe skin damages.	(4) and human experience

Serious eye damage/irritation	1	In the in vitro test, Portland cement clinker (the main component of cement) showed varying degrees of impact on the cornea. The calculated “irritation index” was 128. Direct contact with cement can lead to cornea damage, due to either an immediate or delayed irritation or inflammation, or the mechanical stress. Direct contact with large amounts of dry cement or splashes of wet cement may have effects ranging from moderate eye irritation (e.g. conjunctivitis or blepharitis) to serious eye damage and blindness.	(11), (12) and human experience
Skin sensitization	1B	Some individuals may develop eczema after contact with wet cement. This is triggered either by pH value (irritant contact dermatitis) or by immunological reactions with water-soluble Chromium(VI) (allergic contact dermatitis).	(5), (13)
Respiratory sensitization	-	There is no indication of respiratory sensitization. Based on available data, the classification criteria are not fulfilled.	(1)
Germ cell mutagenicity	-	No indication of germ cell mutagenicity. Based on available data, the classification criteria are not fulfilled.	(14), (15)
Carcinogenicity	-	A causal relationship between cement exposure and cancer has not been determined. Epidemiological studies were not indicative of an association between exposure to cement and cancer. Portland cement is not classified as a human carcinogen according to ACGIH A4: "Agents causing concern that they could be carcinogenic for humans, but cannot be assessed conclusively because of a lack of data. In vitro tests or animal experiments do not provide sufficient evidence of carcinogenicity to assign this substance to another classification.” Portland cement contains more than 90% Portland cement clinker. Based on available data, the classification criteria are not fulfilled.	(1) (16)
Reproductive toxicity	-	Based on available data, the classification criteria are not fulfilled.	No evidence from human experience.
Specific target organ toxicity (STOT) – single exposure	3	Cement dust exposure can lead to irritation of the respiratory system (throat, neck, lungs). Coughing, sneezing, and shortness of breath can be the result if the exposure is above the occupational exposure limit. Occupational exposure to cement dust can lead to impairment of respiratory functions. However, currently there is insufficient evidence to deduce a dose-effect relationship.	(1)
Specific target organ toxicity (STOT) – repeated exposure	-	Long-term exposure to respirable cement dust above the occupational exposure limit may cause coughing, shortness of breath and chronic obstructive changes in the respiratory tract. No chronic effects have been observed at low concentrations. Based on available data, the classification criteria are not fulfilled.	(17)
Aspiration hazard	-	Not applicable, as cement/binder is not available as an aerosol.	

Cements (common cements)/binding agents and Portland cement clinkers have the same toxicological and ecotoxicological properties.

Medical conditions aggravated by exposure

Cement/binding agent may aggravate existing skin, eye and respiratory tract diseases, for example emphysema or asthma.

SECTION 12: Ecological information

12.1. Toxicity

Cement/binding agents are not considered hazardous to the environment. Ecotoxicological studies with Portland cement on Daphnia magna (U.S. EPA, 1994a) [Reference (6)] and Selenastrum coli (U.S. EPA, 1993) [Reference (7)] have shown little toxicological impact. Therefore, LC50 and EC50 values could not be determined [Reference (8)]. No toxic effects on sediments were determined either [Reference (9)]. The release of large amounts of cement in water can, however, lead to rise in pH and thus be toxic for aquatic life under certain circumstances.

12.2. Persistence and degradability

Not applicable, as cement/binding agent is an inorganic mineral material. After hydration, residual cement/binding agents present no toxicological risk.

12.3. Bioaccumulative potential

Not applicable, as cement/binding agent is an inorganic mineral material. After hydration, residual cement/binding agents present no toxicological risk.

12.4. Mobility in soil

Not applicable, as cement/binding agent is an inorganic mineral material. After hydration, residual cement/binding agents present no toxicological risk.

12.5. Results of PBT and vPvB assessment

Not applicable, as cement/binding agent is an inorganic mineral material. After hydration, residual cement/binding agents present no toxicological risk.

12.6. Other adverse effects

Not applicable.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Product exceeding the effective date of the reducing agent
(and if its content of water-soluble Chromium(VI) is higher than 0.0002%): The product must not be used or placed on the market anymore, except it is used in well-controlled, closed and fully automated processes or it is retreated with Chromium(VI) reducing agent.

Unused residual amount of dry product
Gather dryly. Label container. If possible, reuse material, avoiding dust exposure and observing date of expiry. In case of disposal, cure with water and dispose of as described under “Products cured after water addition”.

Moist products and product sludge
Let moist products and product sludge cure. Do not dispose of in wastewater or surface water. Dispose of as described under “Products cured after water addition”.

Products cured after water addition
Dispose of in strict accordance with local official directives. Do not dispose of in the sewage water system. Dispose of the cured products like of concrete waste and concrete sludge. Waste code according to EWC (European Waste Catalogue), depending on the source:
As 17 01 01 (concrete) or 10 13 14 (waste concrete and concrete sludge).

Packaging
Empty packaging completely and recycle. Otherwise, dispose of the completely emptied packaging according to waste code EWC:
15 01 01 (paper and cardboard packaging) or 15 01 05 (composite packaging).

SECTION 14: Transport information

Cement/binding agent is not subject to the international regulation on the transport of dangerous goods (IMDG, IATA, ADR/RID). Therefore, no dangerous goods classification is required.

14.1. UN number

Not applicable.

14.2. UN proper shipping name

Not applicable.

14.3. Transport hazard class(es)

Not applicable.

14.4. Packing group

Not applicable.

14.5. Environmental hazards

Not applicable.

14.6. Special precautions for user

Not applicable.

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable.

SECTION 15: Regulatory information

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

EU Regulatory Information

Restrictions on use:

According to Annex XVII Paragraph 47 of EC Regulation 1907/2006 (REACH), the marketing and use of cements and cement-containing preparations is subject to restriction:

1. Cement and cement-containing mixtures shall not be used or placed on the market if they contain, when hydrated, more than 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 dangerous substances and mixtures, suppliers shall ensure, before placing on the market, that the labeling of cement and cement-containing mixtures is clearly readable and durably indicating when the product was packaged and under what conditions and for how long it can be stored without the effect of the reducing agent decreasing and the content of soluble Chromium(VI) exceeding the limit value specified in Number 1.
3. By way of derogation, Numbers 1 and 2 shall not apply to the placing on the market with regard to well-controlled, closed and fully automated processes, and to use in 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.
4. The standard, which has been adopted by the European Committee for Standardization (CEN) for the determination of the content of water-soluble Chromium(VI) of cement and cement-containing mixtures, has to be applied as the procedure to provide evidence of compliance with Number 1.

Within the scope of the “Agreement on Workers’ Health Protection through the Good Handling and Use of Crystalline Silica and Products containing it”, manufacturers of cement have committed themselves to implement “Best Practices” for safe handling (http://www.nepsi.eu/good-practice-guide.aspx).

National legislation/requirements

- Ordinance on Hazardous Substances (GefStoffV)
- Water Hazard Class: WGK 1 (slightly hazardous to water), self-assessment according to VwVwS from 17.05.1999
- GISCODE: ZP 1 (cement-containing products, low in chromate)
- Storage class according to TRGS 510: Storage class 13 (non-flammable solids)
- Directive on the European List of Waste Materials
- Technical Rules for Hazardous Substances 900 “Maximum Allowable Concentrations” (TRGS 900)
- Technical Rules for Hazardous Substances 402 “Determination and Evaluation of Hazards during Operations with Hazardous Substances” (TRGS 402)

15.2. Chemical Safety Assessment

A chemical safety assessment has not been carried out.

SECTION 16: Other information

16.1 Indication of changes

Compared to Version 2.0, the references to the classification according to Directive 1999/45/EC and 67/548/EEC have been removed. Subsections 2.1; 2.3; 3.2 and 16.4.

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, labeling and packaging (Regulation (EC) No 1272/2008)
COPD	Chronic Obstructive Pulmonary Disease

DNEL	Derived no-effect level
EC50	Half maximal effective concentration
ECHA	European Chemicals Agency
EINECS	European Inventory of Existing Commercial Chemical Substances
EPA	Type of high efficiency air filter
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
IUPAC	International Union of Pure and Applied Chemistry
LC50	Median lethal dose
MEASE	Metals estimation and assessment of substance exposure
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, Authorization and Restriction of Chemicals (Regulation (EC) 1907/2006)
RPE	Respiratory protective equipment
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
TRGS	Technical Rules for Hazardous Substances
UVCB	Substances of Unknown or Variable Composition, Complex Reaction Products or Biological Materials
VCI	German Chemical Industry Association
VLE-MP	Exposure limit value-weighted average in mg by cubic meter of air
vPvB	Very persistent, very bioaccumulative
VwVwS	Administrative Regulation on Substances Hazardous to Water

16.3 Process categories and descriptors

For the professional user, process categories and descriptors according to ECHA Guidance R.12 (ECHA-2010-G-05) can be assigned (see table).

PROC	Identified Uses – Use Description	Manufacture/ Formulation of hydraulic binding agents and building materials	Professional/ Industrial use of hydraulic binding agents and building materials
2	Use in closed, continuous process with occasional controlled exposure (e.g. sampling)	**X**	**X**
3	Use in closed batch process (formulation)	**X**	**X**
5	Mixing or blending in batch processes for formulation of mixtures and articles (multiple and/or significant contact)	**X**	**X**
7	Industrial spraying		**X**
8a	Transfer (charging/discharging) from/to vessels/large containers at non-dedicated facilities		**X**
8b	Transfer (charging/discharging) from/to vessels/large containers at dedicated facilities	**X**	**X**
9	Transfer into small containers (dedicated filling plant, including weighing)	**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 mixtures or articles by tableting, compression, extrusion, pelletization	**X**	**X**
19	Hand-mixing with intimate contact and only personal protective equipment (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**

16.4 Relevant H-statements (number and full text)

H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H318 Causes serious eye damage.
H335 May cause respiratory irritation.
EUH203 Contains Chromium(VI). May produce an allergic reaction.

16.5 Key literature references and sources for 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) Technische Regel für Gefahrstoffe „Arbeitsplatzgrenzwerte“ [Technical Rules for Hazardous Substances "Occupational Exposure Limit Values"], 2009, GMBl No. 29 P. 605.

(3) MEASE 1.02.01 Exposure assessment tool for metals and inorganic substances, EBRC Consulting GmbH for Eurometaux, 2010: http://www.ebrc.de/ebrc/ebrc-mease.php.

(4) *Observations on the effects of skin irritation caused by cement*, Kietzman et al, Dermatosen, 47, 5, 184-189 (1999).

(5) *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.

(6) 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).

(7) 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).

(8) *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.

(9) *Final report Sediment Phase Toxicity Test Results with Corophium volutator for Portland clinker* prepared for Norcem A.S. by AnalyCen Ecotox AS, 2007.

(10) TNO report V8801/02, *An acute (4-hour) inhalation toxicity study with Portland Cement Clinker CLP/GHS 03-2010-fine in rats*, August 2010.

(11) TNO report V8815/09, *Evaluation of eye irritation potential of cement clinker G in vitro using the isolated chicken eye test*, April 2010.

(12) TNO report V8815/10, *Evaluation of eye irritation potential of cement clinker W in vitro using the isolated chicken eye test*, April 2010.

(13) *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.

(14) *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.

(15) *Cytotoxicity and genotoxicity of cement dusts in A549 human epithelial lung cells in vitro*; Gminski et al, Abstract DGPT Conference Mainz, 2008.

(16) *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.

(17) *Exposure to thoracic dust, airway symptoms and lung function in cement production workers; Nordby, K.-C., et al; Eur Respir J, 2011. 38(6).*

16.6 Classification and procedure used to derive the classification for mixtures according to Regulation (EC) 1272/2008 [CLP]

Classification according to Regulation (EC) No. 1272/2008	Classification Procedure
Skin Irrit. 2, H315	On basis of test data.
Eye Dam. 1, H318	On basis of test data.
STOT SE 3, H335	Human experience.

16.7 Training advice

In addition to training programs for employees on the topics health, safety and the environment, companies must ensure that their employees are able to read and understand the safety data sheet, and to implement the requirements.

16.8 Disclaimer

The information given in this safety data sheet describes the safety requirements of our product and is based on the currently available knowledge. It does not represent any warranty of end product properties. Existing legislation, ordinances and regulations, including those not mentioned in this safety data sheet, are to be observed by the recipient of our products at his own responsibility.