

Cement

Hydraulic Road Binder

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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: | | UFI |
| Portland cement | CEM I | 5S10-Y05U-900A-XNYN |
| Portland limestone cement | CEM II/ -LL | E920-00A7-4009-XQGG |
| Portland slag cement | CEM II/ -S | 4V10-F0V7-K00U-M0JS |
| Portland composite cement | CEM II/B-M, CEM II/C-M | VD20-H00M-E00T-K22M |
| Blast-furnace cement | CEM III | 4V10-F0V7-K00U-M0JS |
| Portland cement according to DIN EN 197 / cement for grouting according to DIN EN 445-447: rheoment® | | 5S10-Y05U-900A-XNYN |
| Hydraulic Road Binder according to DIN EN 13282: rheoroad® | | |
| | HRB | |
| | plant Erwitte | E920-00A7-4009-XQGG |
| | plant Dornburg | V420-Y0XE-H00A-K1A5 |
| | plant Karsdorf | 180C-SUCK-JW07-8SHS |

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

Cements/binding agents directly enter the final use 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 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

| | | |
|-----------------------------------|-----------------------------------|---------------------------------|
| Company name: | thomas zement GmbH & Co. KG | |
| plant: | Dornburg | Erwitte |
| street: | In der Oberaue | Bahnhofstraße 40 |
| city: | D-07774 Dornburg-Camburg | D-59597 Erwitte |
| phone: | +49 36427 861 - 0 | +49 2943 9757 - 0 |
| Fax: | +49 36427 22295 | +49 2943 9757 - 57 |
| Department providing information: | Laboratory / Quality assurance | Laboratory / Quality assurance |
| Phone: | +49 36427 861 - 140 | +49 2943 9757 - 68 |
| Email address: | matthias.schmidt@thomas-gruppe.de | nicole.boekamp@thomas-gruppe.de |

| | | |
|-----------------------------------|------------------------------------|--|
| Company name: | thomas zement GmbH | |
| plant: | Karsdorf | |
| street: | Straße der Einheit 25 | |
| city: | D-06638 Karsdorf | |
| phone: | +49 34461 73 | |
| Fax: | +49 34461 74 555 | |
| Department providing information: | Application consulting | |
| Phone: | +49 34461 74527 | |
| Email address: | alexander.paatsch@thomas-gruppe.de | |

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1.4 Emergency phone number

| | |
|------------------------|--|
| Emergency information: | Poison Center Mainz - phone +49 6131 19240 |
| Availability: | 7d / 24h, in German and English |

SECTION 2: Possible hazards

2.1 Classification of the substance or mixture

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

| | |
|----------------|---|
| Skin irrit. 2, | H315: Causes skin irritation. |
| Eye dam. 1, | H318: Causes serious eye damage. |
| STOT SE 3, | H335: May cause respiratory irritation. |

2.1.2 Other information

Full text of the hazard statements, hazard warnings 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 According to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms:



Signal Word: Danger

| | | |
|------------------|------|-----------------------------------|
| Hazard Warnings: | H315 | Causes skin irritation. |
| | H318 | Causes serious eye damage. |
| | H335 | May cause respiratory irritation. |

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| | | |
|--------------------------|---|---|
| Precautionary statements | P280 | Wear protective gloves/protective clothing/eye protection. |
| | P305+P351+P338 and P310 | IN CASE OF CONTACT WITH THE EYES: Rinse 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+P312 | IN CASE OF CONTACT WITH THE 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: Move victim to fresh air and keep at rest in a position comfortable for breathing. Call the POISON CENTER or doctor/physician if feeling unwell. |
| | <i>If the product is offered or sold to the general public, additionally:</i> | |
| | 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 production date the product will remain low-chromate in case of appropriate, dry storage. |
|---------------------------|---|

Special arrangement according to Annex XVII Reach Regulation.

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

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SECTION 3: Composition / information on ingredients

3.1 Substances

Not applicable, as the products are mixtures.

3.2 Mixtures

Cements / standard cements according to DIN EN 197 and DIN 1164,
Hydraulic Road Binder according to DIN EN 13282

Hazardous ingredients

| substance | Portland cement clinker | Flue Dust (b) * |
|---|---|---|
| Concentration range [M.-%] | 5 – 100 | 0,1 - 10 |
| EG-Number | 266-043-4 | 270-659-9 |
| CAS-Number | 65997-15-1 | 68475-76-3 |
| Registration Number (REACH) | (a) | 01-2119486767-17-xxxx |
| Classification according to Regulation (EG) Nr. 1272/2008 (CLP) | Skin irrit. 2 Skin Sens. 1B Eye dam. 1 STOT SE 3 | H315 H317 H318 H335 |
| | | Skin irrit. 2 Skin Sens. 1B Eye dam. 1 STOT SE 3 |
| | | H315 H317 H318 H335 |

* Flue Dust is only available in plant Erwitte and Karsdorf.

- (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“ ist a substance (UVCB), produced during cement clinker production; other common names are cement kiln dust, bypass dust, filter dust, EGR 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.

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.

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. Clean these thoroughly before re-using them. Consult a physician in case of skin discomfort.

Inhalation:

Provide fresh air. Quickly remove dust from throat and nose. Consult physician in case of discomfort, cough or persisting irritation.

Ingestion:

Do not induce vomiting. If conscious, rinse mouth and drink plenty of water. Consult physician or poisoning emergency center.

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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 possibly irreversible eye damages.

Skin:

Prolonged contact of the cement/binding agent with wet skin (due to perspiration or humidity) may have an irritating effect. Contact of cement/binding agents with damp skin may cause skin irritation, dermatitis or severe skin damage. *For additional information, see (1).*

Inhalation:

Repeated inhalation of large amounts of cement 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 immediate medical attention or special treatment

Please submit this safety data sheet if visiting a physician.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Cement/binding agents are not flammable.

5.2 Special hazards arising from the mixture

Cement/binding agents are neither explosive nor combustible nor will they facilitate or sustain the combustion of other materials.

5.3 Notes for firefighting

No special measures required since cement/binding agent does not constitute any fire-relevant hazard.

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SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

6.1.1 For non-emergency personnel

see section 7
see section 8

6.1.2 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 absolutely used. Avoid inhalation of cement/binding agent dust and skin contact. Place spilled material back into the 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 Recommendations for protective measures

Please follow the recommendations in section 8.
To clean up dry cement/binding agent, see section 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.

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7.1.2 Advice on general hygiene measures

Do not eat, drink or smoke when working. Wear dust respirator and safety goggles in dusty environment. Wear 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 suffocate. In such confined spaces cement/binding agents can form walls and bridges which, however, may collapse unexpectedly.

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

For cement/binding agents containing chromate-reducing agents (see Section 15), please note that the effectiveness of the chromate-reducing agent decreases over time if not stored properly (exposure to humidity) or if the storage period is exceeded 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 uses

These products are assigned to GISCODE ZP 1 (cement-containing products, low chromate), (see 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: Limitation and monitoring of exposure / personal protective equipment

8.1 Control parameters

| Type of evaluation value | Evaluation value | Peak limitation / exceedance factor | source | Monitoring procedure, e.g. |
|---------------------------------|--|-------------------------------------|-------------------------------|----------------------------|
| General dust limit value | | | | |
| Maximum Allowable Concentration | 8h 1,25mg/m ³ (A) 10 mg/m ³ (E) | 2 (II) 15min 20 (E) | TRGS 900 | TRGS 402 |
| Water-soluble chromium (VI) | | | | |
| Restriction condition | 2 ppm in cement | Not defined | Regulation (EC) Nr. 1907/2006 | EN 196-10 |

(A): Respirable dust fraction; (E): Inhalable dust fraction

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8.2 Limitation and monitoring of the exposure

Maximum Allowable Concentrations can often only be complied with by employing technical and/or individual protective measures. 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 (Section 16). The tables shall be read so that only A-A combinations and B-B combinations are possible. 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 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.

| Application | PROC* | Exposure | Technical Installation | Effizienz |
|--|--|---|--|------------|
| 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 suspensions of 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% |
| Commercial use of dry suspensions of 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 | 50% | |
| Commercial 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 | - | |

*definition in section 16

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8.2.2 individual protection measures such as personal protective equipment

General

Do not eat, drink or smoke when working. Before breaks and at the end of work, wash hands and shower, if necessary, to remove adhering cement/binding agent dusts. Avoid contact with eyes and skin. After working with cement/binding agents workers should wash or shower and use skin moisturisers. Clean contaminated clothing, shoes, watches, etc. before using them again.

Face-/ Eye protection



In case of dust development or risk of spraying, wear closely fitting safety goggles EN 166.

Skin protection



Wear watertight, abrasion and alkaline resistant protective gloves.

Leather gloves are not suitable because of their permeability to water and may release chromate-containing compounds.

When processing cement/binding agents no chemical gloves (Cat III) are necessary. Studies have shown that nitrile-soaked cotton gloves (film thickness approx. 0.15 mm) provide adequate protection for a period of at least 480 min. Replace wet gloves. Keep gloves ready for change.



General information on skin protection is provided by the occupational association rule BGR/GUV-R 195.

Wear closed, long-sleeve protective clothing and tight shoes. If contact with wet cement/binding agent cannot be avoided, the protective clothing should also be watertight. Make sure that no wet cement/binding agent runs into shoes or boots from the top. Observe the skin protection plan. Use skin care products especially after completing work.

Respiratory protection



When a person is potentially exposed to levels above exposure limits, e.g. when handling open powdery, dry products use an appropriate breathing mask:

Mixing and transferring dry cement/binding agent in open systems, e.g. mixing cement / binding agent glue or cementitious mortar, loading bagged products into mixers by hand: If compliance with the Maximum Allowable Concentrations through dust containment measures, e.g. local extraction devices, is not possible, particle-filtering half masks of the type FFP (tested according to EN 149) shall be used (see Table).

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| Application | PROC* | Exposure | Type of respiratory protection | Efficiency of respiratory protection (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) P1 mask (FF, FM) or B) not required | APF = 4 - |
| | 5, 8b, 9 | | A) P2 mask (FF, FM) or B) P1 mask (FF, FM) | APF = 10 APF = 4 |
| Industrial use of wet suspensions of hydraulic binding agents and building materials (indoor, outdoor) | 2 | | Not required | - |
| | 14, 22, 26 | | A) P1 mask (FF, FM) or B) not required | APF = 4 - |
| | 5, 8b, 9 | | A) P2 mask (FF, FM) or B) P1 mask (FF, FM) | 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) P1 mask (FF, FM) or B) not required | APF = 4 - |
| Commercial use of dry suspensions of hydraulic binding agents and building materials (indoor, outdoor) | 2 | | P1 mask (FF, FM) | APF = 4 |
| | 9, 26 | | A) P2 mask (FF, FM) or B) P1 mask (FF, FM) | APF = 10 APF = 4 |
| | 5, 8a, 8b, 14 | | A) P3 mask (FF, FM) or B) P1 mask (FF, FM) | APF = 20 APF = 4 |
| | 19 | | P2 mask (FF, FM) | APF = 10 |
| Commercial use of wet suspensions of hydraulic binding agents and building materials (indoor, outdoor) | 11 | A) P1 mask (FF, FM) or B) not required | APF = 4 - | |
| | 2, 5, 8a, 8b, 9, 10, 13, 14, 19 | Not required | - | |

* definition in section 16.

No respiratory protection is necessary for the manual and machine processing of ready-to-use cementitious glue, cement mortar and concrete.

General information is provided by the occupational association rule BGR/GUV-R 190.

Instruction of the employees with the correct use of personal protective equipment is required to ensure the necessary effectiveness.

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8.2.3 Limitation and monitoring of environmental exposure

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 waste water systems. 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 waste water system or surface water should therefore not lead to such a relevant pH value. Waste water and groundwater regulations must be observed.

Soil:

Compliance with the German Federal Soil Protection Act (BBodSchG) and the German Federal Soil Protection and Contamination Ordinance (BBodSchV). 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 as a finely ground inorganic solid (grey or white powder) |
| b) | Odour: | Odourless |
| c) | Odour threshold: | No odour threshold since odourless |
| d) | pH: | 11 - 13,5 (T = 20°C in water, water-solid-ratio 1:2) |
| e) | Melting point: | > 1.250 °C |
| f) | Boiling point or 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 is a solid and non-flammable material |
| j) | Upper / lower flammability or explosive limits: | Not applicable as is not gaseous |
| k) | Vapour pressure: | Not applicable, as melting point > 1250°C |
| l) | Vapour density: | Not applicable, as melting point > 1250°C |
| m) | Relative density: | 2.75 – 3.20 g/cm ³ ; bulk density: 0.9 – 1.5 g/cm ³ |
| n) | Solubility in water (T = 20°C): | low (0.1 – 1.5 g/l) |
| o) | Partition coefficient: | Not applicable, as it is inorganic |
| 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 may react with strongly oxidizing agents such as flourides. |

9.2 Other information

Not applicable.

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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/binding agent 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 stored properly and dry (see Section 7). 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 be avoided

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

10.5 Incompatible materials

Acids, ammonium salts, aluminum or other base metals.

10.6 Hazardous decomposition products

No hazardous decomposition products are known.

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SECTION 11: Toxicological information

11.1 Information to toxicological effects

| Hazard class | Cat. | Effect | Reference |
|-------------------------------|------|--|---------------------------------|
| Acute toxicity – dermal | - | Limit test, rabbit, 24 hour exposure, 2,000 mg/kg body weight – not lethal. Based on available data, the classification criteria are not fulfilled. | (4) |
| Acute toxicity – inhalation | - | Limit test, rat, with 5 g/m ³ , 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 together with mechanical abrasion may cause serious skin damage. | (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" is 128. Direct contact with cement can lead to cornea damage due to either mechanical stress or an immediate or delayed irritation or inflammation. Direct contact with larger amounts of dry cement or splashes of wet cement may have effects ranging from a moderate eye irritation (e.g. conjunctivitis or blepharitis) to serious eye damages and blindness. | (11), (12) and human experience |
| Skin sensitization | 1B | With some persons, skin eczema may develop after contact with wet cement. They are triggered either by the pH level (irritating contact dermatitis) or through immunologic 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) |

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SECTION 12: Ecological information

12.1 Toxicity

Cement/binding agents are not considered hazardous to the environment. 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, since cement/binding agent is an inorganic mineral material. After hydration, residual cement/binding agents present no toxicological risk.

12.3 Bioaccumulative potential

Not applicable, since 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, since 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, since 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: Information on disposal

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 any more, except it is used in well-controlled, closed and fully automated processes or it is retreated with Chromium(VI) reducing agent.

Unused residual amounts of the dry product

Pick up dry. Mark container. If possible, reuse material, avoid dust exposure (observe 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

Allow moist products and product sludge to harden and prevent from entering the sewer system or bodies of water. Dispose of as described under "Products cured after water addition".

Products cured after water addition

Dispose of in compliance with the local official regulations. Do not allow to enter the sewer system. Disposal of the cured product such as 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).

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SECTION 14: Transport information

Cement/binding agent is not subject to the international hazardous goods regulations (IMDG, IATA, ADR/RID). No dangerous goods classification is therefore required.

14.1 UN number

Not applicable.

14.2 UN proper shipping name

Not applicable.

14.3 Transport hazard class

Not applicable.

14.4 Packaging 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 regulations

Restriction by use:

According to Annex XVII, paragraph 47 of EC Regulation 1907/2006 (REACH), cements and cement-containing preparations are subject to a prohibition of use and placing on the market,

1. Cement and cement-containing preparations may not be used or placed on the market if their content of soluble chromium (VI) after hydration is more than 0.0002% of the dry mass of the cement.
2. Without prejudice to the application of other Community provisions on the classification, packaging and labelling of dangerous substances and preparations, where reducing agents are used, the packaging of cement and cementitious preparations shall clearly and indelibly indicate when the product was packaged and under what conditions and for how long it can be stored without the reducing agent losing its effect and the soluble chromium (VI) content exceeding the limit specified in point 1.
3. By way of derogation, points 1 and 2 shall not apply to the placing on the market with regard to controlled, closed and fully automated processes and to the use in such processes where cement and cement-containing preparations come into contact only with machinery. And there is no risk of skin contact.
4. The standard adopted by the European Committee for Standardisation (CEN) for testing the water-soluble chromium (VI) content of cement and cementitious mixtures shall be used as the method for demonstrating compliance with paragraph 1.

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National legislation/requirements (Germany)

- Verordnung zum Schutz vor Gefahrstoffen (Gefahrstoffverordnung – GefStoffV)
- water hazard class: WGK 1 (slightly hazardous to water), self-assessment according to AwSV from 18/04/2017
- GISCODE: ZP 1 (cement-containing products, low-chromate content)
- storage class according to TRGS 510: Lagerklasse 13 (non-flammable solids)
- Directive on the European List of Waste Materials (Abfallverzeichnis-Verordnung)
- technical Rules of Hazardous Substances 900 maximum allowable concentrations (TRGS 900)
- technical Rules of Hazardous Substances 402 Determination and Evaluation of Hazards during operations with hazardous Substances: Inhalation Exposition (TRGS 402)

15.2 Substance safety assessment

The mixture was not subjected to a substance safety assessment.

SECTION 16: Other data

16.1 Indication of chances

Editorial changes were made in sections 1.1, 1.3, 2.1.2, 2.1.3, 2.3, 3.1, 3.2, 8.2.2, 13.1, 15.1, 15.2 and 16.

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 (Schutzfaktor von Atemschutzmasken) |
| AwSV | Verordnung über Anlagen zum Umgang mit wassergefährdenden Stoffen |
| CAS | Chemical Abstracts Service |
| CLP | Classification, labelling and packaging (Verordnung (EG) Nr. 1272/2008) |
| EC50 | Half maximal effective concentration (mittlere effective Konzentration) |
| ECHA | European Chemicals Agency (Europäische Chemikalienbehörde) |
| EINECS | European Inventory of Existing Commercial chemical Substances |
| EPA | Type of high efficiency air filter (hoch effizienter Luftfiltertyp) |
| HEPA | Type of high efficiency air filter (hoch effizienter Luftfiltertyp) |
| 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 (mittlere tödliche Dosis) |
| MEASE | Metals estimation and assessment of substance exposure |
| PBT | Persistent, bio-accumulative and toxic (persistent, bioakkumulativ, toxisch) |
| PROC | Process category (Prozesskategorie/Verwendungskategorie) |
| REACH | Registration, Evaluation, Authorisation and restriction of Chemicals (Verordnung (EG) 1907/2006) |
| SDB | Sicherheitsdatenblatt, safety data sheet |
| STOT | Specific target organ toxicity (spezifische Zielorgantoxizität) |
| TRGS | Technische Regeln für Gefahrstoffe |
| UVCB | Substances of Unknown or Variable composition, Complex reaction products or Biological Materials |
| VCI | Verband der chemischen Industrie e.V. |
| vPvB | Very persistent, very bioaccumulative (sehr persistent, sehr bioakkumulativ) |

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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 | Commercial/ industrial use of |
|------|--|---|-------------------------------------|
| 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 hazard warnings, safety advice and safety instructions

| | |
|--------|---|
| 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 cause allergic reactions |

16.5 Literature references and sources for data

- (1) Portland Cement Dust - Hazard assessment document EH75/7, UK Health and Safety Executive, 2006: <http://www.hse.gov.uk/pubns/web/portlandcement.pdf>.
- (2) Technische Regel für Gefahrstoffe „Arbeitsplatzgrenzwerte“, Ausgabe: Januar 2006 BArBI Heft 1/2006 S. 41-55 zuletzt geändert und ergänzt: GMBI 2014 S. 271-274 v. 2.4.2014 [Nr. 12].
- (3) MEASE 1.02.01 Exposure assessment tool for metals and inorganic substances, EBRC Consulting GmbH für 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).

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- (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 (Europäische Kommission, 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 Methods according to Article 9 of the Regulation (EC) No. 1272/2008 [CLP] for the assessment of information for the purpose of classification

| Assessment according to Regulation (EC) 1272/2008 | Classification process |
|---|------------------------|
| Skin irrit. 2, H315 | based on test data |
| Eye dam. 1, H318 | based on 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 in this safety data sheet describes the safety requirements of our products and is based on the current level available knowledge. They do not represent an assurance of product properties. Existing legislation, regulations and bodies of rules, including those not specified in this data sheet, are to be observed by the recipient of our products as his own responsibility.