

SAFETY DATA SHEET

According to Regulation (EC) 1907/2006 (REACH), Regulation (EC) 1272/2008 and Regulation (EC) 453/2010



Section 1:

IDENTIFICATION

1.1 Product identifier

According to MKC EN 197-1:

CEM I 42,5R; CEMII/B-M (V-P-L) 42,5 N; CEM II/ B-M (V-L) 42,5N; CEMII/ A-V 42,5R;

According to MKC EN 413-1:

Usjemal - Masonry cement MC 5

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

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

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

1.3. Details of the supplier of the safety data sheet

Company name: "Cementarnica Usje A.D. Skopje"

Full address: Boris Trajkovski 94, 1000 Skopje, R. Macedonia Telephone number: +389 2 2786 240; +389 2 2786 300

E-mail address of competent person responsible for the SDS: Health and safety: ivana@usje.com.mk

Environment: natasak@usje.com.mk

1.4. Emergency telephone number: +389 2 786 240

University clinic of toxicology

Street Vodnjanska 17, 1000 Skopje, R. Macedonia

Clinic: + 389 2 3147635, availability 24 hours/ 7 days

E-mail: contact@toxicocenter.com.mk

Web: www.toxicocenter.com.mk



Section 2:

HAZARD(S) IDENTIFICATION

2.1. Classification of the substance or mixture

2.1.1 According to Regulation (EC) no. 1272/2008

Hazard Class	Hazard Category	Hazard Statements
Skin irritation	2	H315: Causes skin irritation
Serious eye damage/eye irritation	1	H318: Causes serious eye damage
Skin sensitization	18	H317: May cause an allergic skin reaction
Specific target organ toxicity single exposure respiratory tract irritation	3	H335: May cause respiratory irritation

2.2. Label elements

2.2.1 According to Regulation (EC) no. 1272/2008

Hazard pictograms



Attention

Danger

Hazard statements

H318	Causes serious eye damage
H315	Causes skin irritation
H317	May cause an allergic skin reaction
H335	May cause respiratory irritation

Precautionary statements

- P102: Keep out of reach of children
- P264: Wash thoroughly after handling
- P272: Contaminated work clothing should not be allowed out of the workplace
- 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 CENTER or doctor/physician
- 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/fume/gas/mist/vapours/spray. 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.
- P321: Specific treatment
- P362: Take off contaminated clothing and wash before reuse
- P501: Dispose of contents/container according to current regulations



Supplemental information

Skin contact with wet cement, fresh concrete or mortar may cause irritation, dermatitis or burns. May cause damage to products made of aluminium or other non-noble metals.

2.3. Other hazards

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

Cement dust can cause irritation of the respiratory system. When the cement reacts with water, for example when concrete or plaster is made, or when the cement is becoming wet, a strong alkaline solution is created. As a result of the high alkalinity, the wet cement can cause irritation of the skin and eyes.

In some individuals it can cause an allergic reaction as a result of the contents of water soluble chromium Cr(VI).

Usually, there is a low water soluble chromium Cr (VI) in the cement, or reduction agents are added to control the hypersensitivity of the water soluble chromium Cr(VI) under 2 mg/kg {0.0002%} of the total weight of dry cement ready to be used according to the legislation in Section 15.



Section 3:

COMPOSITION / INFORMATION ON INGREDIENTS

3.1. Substances

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

3.2. Cement Composition

According to Table 1: MKC EN 197-1 and MKC EN 413-1

* Other minor materials used: Calcium sulphate (Gypsum), reduction agent for example FeSO_4 and grinding additives.

SUBSTANCE	Percent (mass) %	Classification according to Directive 1272/2008/EC (CLP)		CAS	EC
		Hazard class & category	H phrases		
Portland cement clinker	45 - 94%	Skin irritation, 2	H315	65997-15-1	266-043-4
		Skin sensitization, 1B	H317		
		Serious eye damage, eye irritation, 1	H318		
		Specific target organ toxicity	H335		
		Single exposure respiratory tract irritation, 3	H335		
Reduction agent ferrous sulfate FeSO_4	0-0,5 0-0,05	Harmful to health if swallowed, 4 (extremely toxic)	H302	7720-78-7	
		Skin irritation, 2	H315		
		Serious eye damage/eye irritation, 2	H319		
Other (Reduction agents and grinding additives)	0-0,5 0-0,05	Used according to CLP 1272/2008			

*Mass percentage of Portland cement clinker in masonry cement MC 5 > 25%



Section 4:

EMERGENCY & FIRST AID PROCEDURES

4.1. Description of first aid measures

General notes

No personal protective equipment is needed for first aid responders. First aid workers should avoid contact with wet cement or wet cement containing mixtures.

Following contact with eyes: If the eyes come in contact with cement dust (dry or wet), it can cause serious and potentially permanent injuries. Do not rub your eyes so you can prevent any corneal damage with mechanical stress (the eye is not supposed to be rubbed at all). Remove contact lenses if any. Incline head to injured eye, open the eyelid(s) widely and flush eye(s) immediately by thoroughly rinsing with plenty of clean water for at least 20 minutes to remove all particles. Avoid flushing particles into uninjured eye. If possible, use isotonic water (0.9% NaCl). Contact a specialist of occupational medicine or an eye specialist.

Following skin contact: The cement can have irritating effect on wet skin (as a result of sweating or air humidity) after elongated contact, it can cause contact dermatitis. Elongated contact of cement dust and wet skin can cause irritation, dermatitis or burns to the skin. For dry cement, remove and rinse abundantly with water. For wet/damp cement, wash skin with plenty of water. Remove contaminated clothing, footwear, watches, etc. and clean thoroughly before re-using them. For more information see Ref. 1.

Following inhalation: Reoccurring inhalation of cement dust over a long period of time increases the risk of developing lung diseases. Move the person to fresh air. Dust in throat and nasal passages should be removed spontaneously. Contact a physician if irritation persists or later develops or if discomfort, coughing or other symptoms persist.

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

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

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

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

Skin: Cement may have an irritating effect on wet skin skin (due to sweat or humidity) after prolonged contact or may cause contact dermatitis after repeated contact. Prolonged skin contact with wet cement or wet concrete may cause serious burns because they develop without pain being felt (for example when kneeling in wet concrete even when wearing trousers). For more details see Reference (1).

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

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

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

When contacting a physician, take this SOS with you.

Data on clinical testing and medical monitoring, for delayed effects that the chemical may cause: Not available.



Section 5:

FIRE & EXPLOSION DATA

5.1. Extinguishing media

Cement is not flammable.

5.2. Special hazards arising from the substance or mixture

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

5.3. Advice for firefighters

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

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 under Section 8 and follow the advice for safe handling and use given under Section 7.

6.1.2 For emergency responders

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

6.2. Environmental precautions

Do not wash cement down sewage and drainage systems or into bodies of water (e.g. streams).

6.3. Methods and material for containment and deaning up

Collect the spillage in a dry state if possible. Collect in separate container.

Dry cement

Use cleanup methods such as vacuum clean-up or vacuum extraction (industrial portable units, equipped with high efficiency air filters (EPA and HEPA filters, EN 1822-1:2009) or equivalent technique) which do not cause airborne dispersion. Never use compressed air.

Alternatively, wipe up the dust by mopping, wet brushing or by using water sprays or hoses (fine mist to avoid that the dust becomes airborne) and remove slurry. If not possible, remove by slurring with water (see wet cement).

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

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

Wet cement

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

6.4. Reference to other sections

See sections 8 and 13 for more details.



Section 7:

HANDLING AND STORAGE

7.1. Precautions for safe handling

7.1.1 Protective measures

Follow the recommendations as given under Section 8. For cleaning of dry cement, see chapter 6.3.

Measures for collection and cleanup of spilled or inadvertently cast chemical and storage of the collected material

If it is possible, collect the spilled material in dry condition and storage it in a container.

Measures to prevent fire

Not applicable.

Measures to prevent aerosol and dust generation

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

Measure to protect the environment

No particular measures.

7.1.2 Information on general occupational hygiene

Do not handle or store near food and beverages or smoking materials. In dusty environment, wear dust mask and protective goggles. Use protective gloves to avoid skin contact.

7.2. Conditions for safe storage, including any incompatibilities

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

Engulfment hazard: To prevent engulfment or suffocation, do not enter a confined space, such as a silo, bin, bulk truck, or other storage container or vessel that stores or contains cement without taking the proper security measures. Cement can build-up or adhere to the walls of a confined space. The cement can release, collapse or fall unexpectedly.

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

Bags should be stacked in a stable manner.

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

7.3. Specific end use(s)

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

7.4. Control of soluble Cr (VI)

For cements treated with a Cr (VI) reducing agent according to the regulations given in Section 15, the effectiveness of the reducing agent diminishes with time. Therefore, cement bags and/or delivery documents will contain information on the packaging date, the storage conditions and the storage period appropriate to maintaining the activity of the reducing agent and to keeping the content of soluble chromium VI below 2 mg/kg (0.0002 %) of the total dry weight of the cement ready for use, according to MKC EN 196-10. They will also indicate the appropriate storage conditions for maintaining the effectiveness of the reducing agent.



Section 8:

CONTROL MEASURES

8.1. Control parameters

Defined maximum concentration of exposition for the cement dust (MDK):

MDK is 10 mg/m³ for total dust and **5 mg/m³** for respiratory dust.

According to the "rulebook for minimal health and safety requirements for the employees exposed to risks of exposure to chemical substances", "Official Gazette of RM" no. 46/2010:

	CAS	EC
521 Portland cement (dust)	68475-76-3	270-659-9

Exposure limits (inhalable) for cement dust in the working environment is 5 mg/m³ (8 hours).

8.2. Exposure controls

For each individual process, users can choose from either option A) or option B), from the localized control measures aimed for decrease of the exposure level to respiratory dust as presented in the table below, according to what is best suited to their specific situation. If one option from the localized control measures (table 8.2.1- Localized control measures) is chosen, then the same option has to be chosen from the table "8.2.2 - Specification of respiratory personal protective equipment" from section "8.2.2 Individual protection measures such as personal protection equipment". Only combinations between A) - A) and B) - B) between both tables (8.2.1 - Localized control measures and 8.2.2 - Specification of respiratory personal protective equipment) are possible.

8.2.1 Appropriate engineering controls

Measures to reduce generation of dust and to avoid dust propagating in the environment such as de-dusting exhaust ventilation and dry clean-up methods which do not cause airborne dispersion.

The European cement association "CEMBUREAU" has made an identification and classification of all known usages of cement, and of hydraulic binders containing cement as well (table 16.2).

The table 8.2.1- "Localized control measures", presents a review made by "CEMBUREAU", over the localized control measures aimed at decrease of the exposure to respiratory dust, for each of the identified usages of cement and hydraulic binders containing cement.

In accordance with the recommendations of "CEMBUREAU", for all of the identified uses of cement and hydraulic binders containing cement, a review of the localized control measures that can be selected in order to decrease the exposure of the user to respiratory dust is presented in the table "8.2.1 - Localized control measures", for each specific use of cement or of a hydraulic binders that contains cement.

The efficiency data for some of the localized control measures like a general ventilation or a generic local exhaust ventilation, which are presented in the table "8.2.1 - Localized control measures", are obtained from the researches made by "The European cement Association - CEMBUREAU". The Identified uses of the cement, and of the processes in which the cement is used, are defined in the chapter 16.2



Use	PROC*	Exposure	Localized controls	Efficiency
Industrial manufacture/formulation of hydraulic building and construction materials	2,3	**	not required	-
	14, 26		A) general ventilation or B) generic local exhaust ventilation	-
	5, 8b, 9		A) general ventilation or B) generic local exhaust ventilation	78%
Industrial uses of dry hydraulic building and construction materials (indoor, outdoor)	2	**	not required	-
	14, 22, 26		A) not required or B) generic local exhaust ventilation	-
	5, 8b, 9		A) general ventilation or B) generic local exhaust ventilation	78%
Industrial uses of wet suspension of hydraulic building and construction materials	7	**	A) not required or B) generic local exhaust ventilation	-
	2, 5, 8b, 9, 10, 13, 14		not required	78%
Professional use of dry hydraulic building and construction material (indoor, outdoor)	2	**	not required	-
	9, 26		A) not required or B) generic local exhaust ventilation	-
	5, 8a, 8b, 14		A) not required or B) generic local exhaust ventilation	-
	19		localised controls are not applicable, process only in good ventilated rooms or outdoor	-



Use	PROC*	Exposure	Localized controls	Efficiency
Professional uses of wet suspensions of hydraulic building and construction materials	11	**	A) not required or B) generic local exhaust ventilation	- 72%
	2, 5, 8a, 8b, 9, 10, 13, 14, 19		not require	-

Table 8.2.1. Localized Control measures

* PROC's are identified uses and defined in section 16.2

** Duration is not restricted (up to 480 minutes per shift, 5 shifts a week)

8.2.2 Individual protection measures such as personal protection equipment

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

Do not eat, drink or smoke while working with cement, in order to avoid skin or mouth contact. Before starting to work with cement, apply a protective cream and reapply it at regular time intervals. After working with a cement or with materials containing cement, the workers should wash themselves or take a shower, and apply protective skin cream as well.

Remove contaminated clothing, footwear, watches, etc. and clean them thoroughly before reusing them.

Eye/face protection: Wear approved glasses or safety goggles according to MKC EN 166:2007 when handling dry or wet cement to prevent contact with eyes.

Skin protection: Use watertight, wear- and alkali-resistant protective gloves (e.g. nitrile soaked cotton gloves with CE labeling) internally lined with cotton; boots; closed long-sleeved protective clothing as well as skin care products (e.g. barrier creams) to protect the skin from prolonged contact with wet cement.

Respiratory protection: When a person is potentially exposed to dust levels above exposure limits, use appropriate respiratory protection. The type of respiratory protection should be adapted to the dust level and conform to the relevant MKC EN standard (example: MKC EN 149:2007+A1:2011, MKC EN140:2007, MKC EN 14387+A1:2011, MKC EN 1827+A1:2011).

Following is a specification (table 8.2.2) of the Respiratory Personal Protective Equipment that has to be used, when the level of exposure to respiratory dust can't be decreased by the control measures listed in the table "8.2.1. Localized control measures", or when the level of exposure to respiratory dust can't be decreased to under 5 mg/m³ while using one of the listed control measures in the table 8.2.1 (Localized control measures).

Only a combination between the options A) - A) or B) - B) between the two tables (table 8.2.1. - Localized control Measures and table 8.2.2. - Specification of respiratory personal protective equipment) is possible.



According to the recommendations of the European cement association "CEMBUREAU", if the user can't reduce the level of exposure to respiratory dust under the legal limit, or if the control measure he is using (using different types of ventilations) is not efficient enough to provide exposure level below the legal limit, then the control of the exposure to respiratory dust is done by using adequate respiratory personal protective equipment.

For example, for "*Professional uses of dry suspensions of hydraulic construction materials*" for the process no. 9 and the process 26 (see chapter 16.2) the user can choose between the following options:

- Option A) from table 8.2.1 (not to use control measure) for decreasing the level of exposure to respiratory dust
- Option B) from table 8.2.1 (to use generic local exhaust ventilation) as a localized control measure for decreasing of the level of exposure to respiratory dust

If the user decides not to use control measures for decreasing of the level of exposure to respiratory dust (option A from the table 8.2.1), then the user must choose the proper option A when selecting the respiratory protective equipment from the table 8.2.2. (for the same uses of cement and the same processes, process no. 9 and no. 26). In such case, the user must use respiratory mask with FFP2 protection (option A when selecting the Respiratory Personal Protective Equipment, for the same use of cement and the same processes).

If the user decides to use generic local ventilation for exhaust gases, as a localized control measure for decreasing of the level to respiratory dust (option B from the table 8.2.1 for the same use of cement and the same processes, process no. 9 and no. 26), then the user must use respiratory mask with FFP1 protection (option B when selecting the Respiratory Personal Protective Equipment, for the same use of cement and the same processes). In such case, a respiratory mask with FFP1 protection must be used, because the efficiency of the generic ventilation according to the data from "European cement association CEMBUREAU" is 72%.

The assigned protection factor (APF), according to the Occupational Safety and Health Administration (OSHA) of the USA, marks the level of respiratory protection in the working environment, that a certain respirator or a class of respirators are expected to provide to the employees, whose employers apply continuous and efficient respiratory protection program. According to OSHA, the respiratory mask should be tested for face adjustment, in order to ensure the required APF.

APF values for a certain respiratory protection are obtained through researches and simulations in the working environment. For respiratory half - masks with FFP 1, FFP 2 and FFP 3 class of protection, the values of the APF according to the MKC EN 149 standard are:

- APF = 4, for respiratory half - mask with FFP1 protection according to MKC EN 149
- APF = 10, for respiratory half - mask with FFP2 protection according to MKC EN 149
- APF = 20, for respiratory half - mask with FFP3 protection according to MKC EN 149



Use	PROC*	Exposure	Specification of respiratory protective equipment (RPE)	RPE efficiency-assigned protection factor (APF)
Industrial manufacture/formulation of hydraulic building and construction materials	2, 3	**	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 uses of dry hydraulic building and construction 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 uses of wet suspension of hydraulic building and construction materials	7	**	A) FFP1 mask or B) not required	APF = 4 -
	2, 5, 8b, 9, 10, 13, 14		not required	-
Professional use of dry hydraulic building and construction material (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



Use	PROC*	Exposure	Specification of respiratory protective equipment (RPE)	RPE efficiency-assigned protection factor (APF)
Professional uses of wet suspensions of hydraulic building and construction materials	11 2, 5, 8a, 8b, 9, 10, 13, 14, 19	**	A) FFP2 mask or B) FFP1 mask not required	APF = 10 APF = 4 -

Table 8.2.2. - Respiratory Personal Protective equipment

* PROC's are identified uses and defined in section 16.2.

** Duration is not restricted (up to 480)

Thermal Hazards
Not applicable.

8.2.3 Environmental exposure controls

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

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



Section 9:

PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

- (a) Appearance: Cement is a grey or white, granular inorganic solid material. Main particle size: 5-30 μm .
- (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: > 1250 °C
- (f) Initial boiling point and boiling range: Not applicable as under normal atmospheric conditions, melting point >1250°(
- (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 which is non combustible and does not cause or contribute to fire through friction
- (j) Upper/lower flammability or explosive limits: Not applicable as is not a flammable gas
- (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; Apparent density: 0.9-1.5 g/cm³
- (n) Solubility(ies) in water (T = 20 °C): slight (0.1-1.5 g/l)
- (o) Partition coefficient: n-octanol/water: Not applicable as is inorganic substance
- (p) Auto-ignition temperature: Not applicable (no pyrophoricity - no organ-metallic, organ-metalloid or organo-phosphine bindings or of their derivatives, and no other pyrophoric constituent in the composition)
- (q) Decomposition temperature: not applicable as any organic peroxide present
- (r) Viscosity: Not applicable as not a liquid
- (s) Explosive properties: Not applicable. Not explosive or pyrotechnic. Not in itself capable of producing gas by chemical reaction at temperature and pressure and at a speed as to cause damage to the surroundings. Not capable of a self-sustaining exothermic chemical reaction.
- (t) Oxidizing properties: Not applicable as does not cause or contribute to the combustion of other materials.

9.2. Other information

Not applicable.



Section 10:

STABILITY AND REACTIVITY

10.1. Reactivity

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

10.2. Chemical stability

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

Contact with incompatible materials should be avoided.

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

10.3. Possibility of hazardous reactions

Not applicable.

Cements aren't liable to polymerization reactions, or other reactions that can create hazardous products.

10.4. Conditions to avoid

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

10.5. Incompatible materials

Cements in contact with water become a base and like that are not compatible with:

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

10.6. Hazardous decomposition products

Cement will not decompose in to any hazardous components.



Section 11:

TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects

Hazard class	Cat	Effect	Reference
Acute toxicity - dermal	-	Limit test, rabbit, 24 hours contact, 2,000 mg/kg body weight - no lethality. Based on available data, the classification criteria are not met.	(2)
Acute toxicity - inhalation	-	No acute toxicity by inhalation observed. Based on available data, the classification criteria are not met.	(9)
Acute toxicity - oral	-	No indication of oral toxicity from studies with cement kiln dust. Based on available data, the classification criteria are not met.	Literature survey
Skin corrosion/irritation	2	Cement in contact with wet skin may cause thickening, cracking or fissuring of the skin. Prolonged contact in combination with abrasion may cause severe burns.	(2) Human experience
Serious eye damage/irritation	1	Portland cement clinker caused a mixed picture of corneal effects and the calculated irritation index was 128. Common cements contain varying quantities of Portland cement clinker, fly ash, gypsum, natural pozzolans and limestone. Direct contact with cement may cause corneal damage by mechanical stress, immediate or delayed irritation or inflammation. Direct contact by larger amounts of dry cement or splashes of wet cement may cause effects ranging from moderate eye irritation (e.g. conjunctivitis or blepharitis) to chemical burns and blindness.	(10), (11)
Skin sensitization	1B	Some individuals may develop eczema upon exposure to wet cement dust, caused either by the high pH which induces irritant contact dermatitis after prolonged contact, or by an immunological reaction to soluble Cr (VI) which elicits allergic contact dermatitis. The response may appear in a variety of forms ranging from a mild rash to severe dermatitis and is a combination of the two above mentioned mechanisms. If the cement contains a soluble Cr (VI) reducing agent and as long as the mentioned period of effectiveness of the chromate reduction is not exceeded, a sensitising effect is not expected [Reference (3)].	(3), (4), (17)
Respiratory sensitization	-	There is no indication of sensitization of the respiratory system. Based on available data, the classification criteria are not met.	(1)
Germ cell mutagenicity	-	No indication. Based on available data, the classification criteria are not met.	(12), (13)



Section 12:

ECOLOGICAL INFORMATION

12.1. Toxicity

The product is not hazardous to the environment. Ecotoxicological tests with Portland cement -on Daphnia magna [Reference (4)] Selenastrum coli [Reference (5)] have shown little toxicological impact. Therefore LCSO and ECSO values could not be determined [Reference (6)]. There is no indication of sediment phase toxicity [Reference (7)]. The addition of large amounts of cement to water may, however, cause a rise in pH and may, therefore, be toxic to aquatic life under certain circumstances.

12.2. Persistence and degradability

Not relevant as cement is an inorganic material. After hydration, cement lumps present no toxicity risks.

12.3. Bioaccumulative potential

Not relevant as cement is an inorganic material. After hydration, cement lumps present no toxicity risks.

12.4. Mobility in soil

Not relevant as cement is an inorganic material. After hydration, cement lumps present no toxicity risks.

12.5. Results of PBT and vPvB assessment

Not relevant as cement is an inorganic material. After hydration, cement lumps present no toxicity risks.

12.6. Other adverse effects

Not relevant.

Section 13:

DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Do not dispose of into sewage systems or surface waters.

Product - cement that has exceeded its shelf life

(and when demonstrated that it contains more than 2 mg/kg (0.0002%) soluble Cr (V)): shall not be used/sold other than for use in controlled closed and totally automated processes or should be recycled or disposed of according to local legislation or treated again with a reducing agent.

Product - unused residue or dry spillage

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

Product - slurries

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



Product - after addition of water, hardened

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

Packaging

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

Section 14:

TRANSPORTATION INFORMATION

Cement is not covered by the international regulation on the transport of dangerous goods (IMDG, IATA, ADR/RID); no classification is required.

No special precautions are needed apart from those mentioned under Section 8.

14.1. UN number

Not relevant.

14.2. UN proper shipping name

Not relevant.

14.3. Transport hazard class(es)

Not relevant.

14.4. Packing group

Not relevant.

14.5. Environmental hazards

Not relevant.

14.6. Special precautions for user

Not relevant.



Section 15:

REGULATORY INFORMATION

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

According to the Guideline 2003/56/EU, cement contains water soluble Cr (VI) under 2 mg/kg (0.0002% w/w). Usage of the substance FeSO_4 in the cement, eliminates the parameter H 317 from the cement clinker.

According to REACH, the cement is a mixture and is not subject to a registration. The cement (clinker) is exempt from registration (Art 2.7 and Annex V.10 FROM REACH).

Law on chemicals with amends and additions, "Official Gazette of RM" no. 113/07, no. 145/10, no. 53/11 consolidated with "Official Gazette of RM" no. 164/2013 (issued by the Ministry of Health of RM -Bureau for Medicaments), "Official Gazette" no. 116 from 09.07.2015; "Official Gazette of RM" no. 149 from 01.09.2015, "Official Gazette of RM" no. 37 from 26.02.2016.

Guidelines for developing a safety data sheet (article 39, paragraph 2, from the Law on Chemicals - "Official Gazette of Republic of Macedonia" no. 145/2010 and 53/2011).

Rulebook for minimum recommendations for health and safety at work, for the employees exposed to risks of exposure to chemicals substances, "Official Gazette of RM" no. 46/2010.

Law on precursors with amends and additions, "Official Gazette" no. 37 /04, no. 40/07, no. 53/11 (issued by the Ministry of Health of RM - Bureau for Medicaments).

List of bans and restrictions for chemical usages, "Official Gazzete of RM" no. 57 /11, Law for amends and additions of the Law for precursors "Official Gazzete of RM" no. 149 from 01.09.2015; "Official Gazzete of RM" no. 37 from 26.02.2016.

Rulebook for the maximum allowed amounts of radionucleides in metals, construction materials, fertilizers, ashes from thermo plants, material waste from quarries and smelters, "Official Gazzete of RM" no. 98/10.

Rulebook for classification and labeling of hazardous chemicals according to the global harmonization system for classification and labeling of the UN ("Official Gazzete of RM" no. 82/2009).

Rulebook for labeling and packing of hazardous chemicals ("Official Gazette of RM" no. 87/2009).

Law for construction products "Official Gazzete of RM" no. 104 from 24.06.2015; "Official Gazzete of RM" no. 192 from 05.11.2015.

Law for consumer protection with amends and additions "Official Gazette of RM" no: 38/04, 77 /07, 103/08, "Official Gazette of RM" no. 164/2013; "Official Gazette of RM" no. 97 /2015; 152/2015.

Law for waste management, "Official Gazette of RM" no. 68/04; 107 /2007; 102/2008; 124/2010; 51/2011; 123/2012; 147/2013; 163/2013; 51/2015; 146/2015; 156/2015; 192/2015; 39/2016; 63/2016.

Law for packing management and packing waste management "Official Gazette of RM" no. 161/09; 17/2011; 47/2011; 136/2011; 6/2012; 39/2012; 163/2013; 146/2015; 39/2016.

15.2. Chemical Safety Assesment

Safety assessment has not been carried out.



Section 16:

OTHER INFORMATION

16.1. Indication of changes

Revised: 30.12.2015 Revision 3.

16.2. Identified uses and use descriptors and categories

The following table (table 16.2) gives an overview of all relevant identified uses of cement or hydraulic binders containing cement. All of the identified uses have been grouped in these groups of uses, because of the specific conditions of exposure for human health and environment. For each specific use, a set of risk management measures or localized controls has been derived (see section 8) which need to be put in place by the user of cement or cement containing hydraulic binders to bring the exposure to an acceptable level.

European cement association “CEMBUREAU” has identified and classified all known uses of cement, as well as hydraulic binders which contain cement (table 16.2).

PROC	Identified Uses - Use Description	Manufacture/Formulation of building & construction materials	Professional/Industrial use of building & construction materials
2	Use in closed, continuous process with occasional controlled exposure, e.g. industrial or professional manufacture of hydraulic binders	X	X
3	Use in closed batch process, e.g. industrial or professional manufacture of ready-mix concrete	X	X
5	Mixing or blending in batch process for formulation of mixtures and articles, e.g. industrial or professional manufacture of pre-cast concrete	X	X
7	Industrial spraying, e.g. industrial use of wet suspensions of hydraulic binders by spraying		X
8a	Transfer of substance or mixture from/to vessels/ large containers at non-dedicated facilities, e.g. use of cement in bags to prepare mortar		X
8b	Transfer of substance or mixture from/to vessels/ large containers a dedicated facilities, e.g. filling of silos, trucks or barges at cement plants	X	X
9	Transfer of substance or mixture into small containers, e.g. filling of cement bags in cement plants	X	X
10	Roller application or brushing, e.g. products to improve adherence between building surfaces and finishing products		X



PROC	Identified Uses - Use Description	Manufacture/Formulation of building & construction materials	Professional/Industrial use of building & construction materials
11	Non-industrial spraying, e.g. professional use of wet suspensions of hydraulic binders by spraying		X
13	Treatment of articles by dipping and pouring, e.g. covering of construction products with a layer to improve the performance of the product		X
14	Production of mixtures or articles by tableting, compression extrusion, pelletisation, e.g. production of floor tiling	X	X
19	Hand-mixing with intimate contact and only PPE available, e.g. mixture of wet hydraulic binder on a construction site		X
22	Potentially closed processing operations with minerals/metals at elevated temperature in industrial setting, e.g. production of bricks		X
26	Handling of solid inorganic substances at ambient temperature, e.g. mixture of wet hydraulic binders	X	X

Table 16.2 - Identified uses of cement or hydraulic binders which contain cement

16.3. Abbreviations and acronyms

- ADR/RID European Agreements on the transport of Dangerous goods by Road/Railway
- CAS Chemical Abstracts Service
- CLP Classification, labeling and packaging (Regulation (EC) No 1272/2008)
- COPD Chronic Obstructive Pulmonary Disease
- EC50 Half maximal effective concentration
- EINECS European Inventory of Existing Commercial chemical Substances
- EPA Type of high efficiency air filter
- HEPA Type of high efficiency air filter
- H&S Health and Safety
- IATA International Air Transport Association
- MS Member State



PBT	Persistent, bio-accumulative and toxic
PROC	Process category
REACH	Registration, Evaluation and Authorisation of Chemicals
SDS	Safety Data Sheet
STP	Sewage treatment plant
STOT	Specific Target Organ Toxicity
LC50	Average dead dose
TLV-TWA	Threshold Limit Value-Time-Weighted Average
w/w	Weight by weight
vPvB	Very persistent and very bio accumulative
MDK	Maximal allowed concentration

16.4. The safety data sheet is fully revised according to the regulatory data given in Section 15

16.5. Key literature references and sources of data

- (a) 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>.
- (b) Observations on the effects of skin irritation caused by cement, Kietzman et al, *Dermatosen*, 47, 5, 184-189 (1999).
- (c) 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.
- (d) 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).
- (e) 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).
- (f) 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.
- (g) Final report Sediment Phase Toxicity Test Results with *Corophium volutator* for Portland clinker prepared for Norcem A.S. by AnalyCen Ecotox AS, 2007.
- (h) TNO report V8801/02, An acute (4-hour) inhalation toxicity study with Portland Cement Clinker CLP/GHS 03-2010-fine in rats, August 2010.
- (i) TNO report V8815/09, Evaluation of eye irritation potential of cement, clinker G in vitro using the isolated chicken eye test, April 2010.
- (j) TNO report V8815/10, Evaluation of eye irritation potential of cement, clinker W in vitro using the isolated chicken eye test, April 2010.
- (k) 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.



- (l) 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.
- (m) Cytotoxicity and genotoxicity of cement dusts in A549 human epithelial lung cells in vitro; Gminski et al, Abstract DGPT conference Mainz, 2008.
- (n) 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.
- (o) Prospective monitoring of exposure and lung function among cement workers, Interim report of the study after the data collection of Phase 1-11 2006-2010, Hilde Notç, Helge Kjuus, MaritSkogstad and Karl-Christian Nordby, National Institute of Occupational Health, Oslo, Norway, March 2010.
- (p) CEMBUREAU - The European Cement Association -Guidelines for the Safety Data Sheet template for common cement.
- (q) Occurrence of allergic contact dermatitis caused by chromium in cement. A review of epidemiological investigations, Karelenvik, Helge Kjuus, NIOH, Oslo, December 2011.

16.6. Training advice

In addition to health, safety and environmental training programs for their workers, companies must ensure that workers read, understand and apply the requirements of this SDS.

16.7. 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
Skin sens. 1B, H317	Human experience
STOT SE. 3, H335	Human experience

16.8. Disclaimer

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

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