Calcium Sulfoaluminate

Material Safety Data Sheet (MSDS)

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifier

Calcium sulfoaluminate / calcium sulfoaluminate clinker EINECS: None

CAS: None

Reference number C&L notification: 02-2119755750-36-0000

Sold under the product name "Calcium Sulfoaluminate"

Calcium Sulfoaluminate is finely ground calcium sulfoaluminate clinker, which is a cement clinker, and contains no other substances. Cement clinker is exempt from registration under REACH Regulation (EC) 1907/2006 by application of Art 2.7 (b) and Annex V.10 of REACH.

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

Calcium sulfoaluminate is primarily used as an additive for the production of special cements or other hydraulic binders in industrial installations. It may be used as a hydraulic binder on its own.

Cement and hydraulic binders are used for the production of concrete, mortars and grouts in the production of building materials and in construction by professional users or consumers.

The identified uses of cements and cement containing mixtures cover the dry products and the products in a wet suspension (paste).

PROC	Identified Uses - Use Description	Manufacture/ Formulation of building and construction materials	Professional/ Industrial use of building and construction materials
2	Use in closed, continuous process with occasional controlled exposure	X	X
3	Use in closed batch process	X	X
5	Mixing or blending in batch process for formulation of preparations and articles	X	X
7	Industrial spraying		X
8a	Transfer of substance or preparation from/to vessels/large containers at non-dedicated facilities		X
8b	Transfer of substance or preparation from/to vessels/large containers a dedicated facilities	X	X
9	Transfer of substance or preparation into small containers	X	X
10	Roller application or brushing		X
11	Non-Industrial spraying		X
13	Treatment of articles by dipping and pouring		X
14	Production of preparations or articles by tabletting, compression extrusion, pelletisation	X	X
19	Hand-mixing with intimate contact and only PPE available		X
22	Potentially closed processing operations with minerals/metals at elevated temperature Industrial setting		X
26	Handling of solid inorganic substances at ambient temperature	X	X

1.3 Details of the supplier of the Material Safety Data Sheet

Company name: Castle Cement Ltd trading as Hanson Cement

Full address: Ketton, Stamford, Lincolnshire, PE9 3SX

Telephone number: 01780 720501

E-mail address of person responsible for the MSDS: cement.technical.help@hanson.biz

1.4 Emergency telephone number

Emergency telephone number: 0845 722 7853

Hours of operation: 08.45 – 17.00 (Mon-Thur) 08.45 – 16.00 (Friday)

Service is provided in the following language: English

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

2.1.1 According to Regulation (EC) No 1272/2008

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

Hazard statements

H318: Causes serious eye damage

H315: Causes skin irritation

H317: May cause an allergic skin reaction

H335: May cause respiratory irritation

2.1.2 According to Directive 1999/45/EC

Xi: Irritant

R37/38: Irritating to respiratory system and skin

R41: Risk of serious damage to eyes

R43: May cause sensitisation by skin contact

Calcium sulfoaluminate dust may cause irritation of the respiratory system.

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

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

Calcium sulfoaluminate is naturally low in soluble chromium VI [<2mg/kg (0.0002%)] according to legislation specified under Section 15.

2.2 Label elements

According to Regulation (EC) No 1272/2008

[As of 1 December 2012 or as of the date as of which the common cement is classified according to the CLP Regulation]

- **H318:** Causes serious eye damage
- **H315:** Causes skin irritation
- **H317:** May cause an allergic skin reaction
- **H335:** May cause respiratory irritation
- **P102:** Keep out of reach of children
- **P280:** Wear protective gloves/protective clothing/eye protection/face protection
- **P305+P351+P338+P310:** IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON 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.
- **P501:** Dispose of contents/container to an approved waste disposal.

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

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

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.2 Mixtures

Calcium Sulfoaluminate is finely ground calcium sulfoaluminate clinker which is a multiconstituent substance consisting of 4 main constituents; Calcium sulphoaluminate, dicalcium silicate, tetra calcium alumino ferrite and calcium titanate. It is made by mineralogical transformation of a precisely specified mixture of raw materials based on oxides of Calcium, sulfur, silicon, aluminium and iron and small quantities of other elements.

It also contains small quantities of calcium sulphate CAS 14798-04-0, calcium aluminate CAS 12042-68-1 and dicalcium alumino silicate CAS 12252-33-4 together with trace amounts of lime alkalis, chlorides and chromium compounds

4. FIRST AID MEASURES

4.1 Description of first aid measures

General notes

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

Following contact with eyes

Do not rub eyes in order to avoid possible cornea damage as a result of mechanical stress. Remove contact lenses if any. Incline head to injured eye, open the eyelid(s) widely and flush eye(s) immediately by thoroughly rinsing with plenty of clean water for at least 20 minutes to remove all particles. Avoid flushing particles into uninjured eye. If possible, use isotonic water (0.9% NaCl). Contact a specialist of occupational medicine or an eye specialist.

Following skin contact

For dry calcium sulfoaluminate, remove and rinse abundantly with water.

For wet calcium sulfoaluminate, wash skin with plenty of water.

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

Seek medical treatment in all cases of irritation or burns.

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.

Following inhalation

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

Following ingestion

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

4.2 Most important symptoms and effects, both acute and delayed

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

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

Prolonged skin contact with wet calcium sulfoaluminate 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 dust of calcium sulfoaluminate over a long period of time increases the risk of developing lung diseases.

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

4.3 Indication of any immediate medical attention and special treatment needed

When contacting a physician, take this SDS with you.

5. FIRE-FIGHTING MEASURES

5.1 Extinguishing media

Calcium sulfoaluminate is not flammable.

5.2 Special hazards arising from the substance or mixture

Calcium sulfoaluminate is non-combustible and non-explosive and will not facilitate or sustain the combustion of other materials.

5.3 Advice for fire-fighters

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

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

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 calcium sulfoaluminate down sewage and drainage systems or into bodies of water (e.g. streams).

6.3 Methods and material for containment and cleaning up

Collect the spillage in a dry state if possible.

Dry calcium sulfoaluminate

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 slurrying with water (see wet calcium sulfoaluminate).

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 calcium sulfoaluminate and contact with skin. Place spilled materials into a container. Solidify before disposal as described under Section 13.

Wet calcium sulfoaluminate

Clean up wet calcium sulfoaluminate 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.

7. HANDLING AND STORAGE

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

7.1 Precautions for safe handling

7.1.1 Protective measures

Follow the recommendations as given under Section 8.
To clean up dry calcium sulfoaluminate, see Subsection 6.3.

Measures to prevent fire

Not applicable.

Measures to prevent aerosol and dust generation

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

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 calcium sulfoaluminate should be stored in silos that are waterproof, dry (i.e. with internal condensation minimised), 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 calcium sulfoaluminate without taking the proper security measures. Calcium sulfoaluminate can build-up or adhere to the walls of a confined space. The calcium sulfoaluminate 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 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)

Calcium sulfoaluminate is naturally low in soluble chromium VI [<2mg/kg (0.0002%)] according to legislation specified under Section 15.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

WEL 8hr Time Weighted Average (TWA)
10mg/m3 total inhalable dust
4mg/m3 respirable dust

DNEL dermal: Not applicable

DNEL oral: Not relevant

For workers, no DNEL for dermal exposure are available, neither from human hazard studies nor from human experience. Since calcium sulfoaluminate is classified as irritating to skin and eyes, dermal exposure has to be minimised as far as technically feasible.

PNEC water: Not applicable

PNEC sediment: Not applicable

PNEC soil: Not applicable

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

8.2 Exposure controls

8.2.1 Appropriate engineering controls

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

Exposure Scenario	PROC*	Exposure	Localised controls	Efficiency
Industrial manufacture/ formulation of hydraulic building and construction materials	2, 3	Duration is not restricted (up to 480 minutes per shift, 5 shifts a week)	Not required	-
	14, 26		A) Not required or B) Generic local exhaust ventilation	-
	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	Duration is not restricted (up to 480 minutes per shift, 5 shifts a week)	Not required	17%
	14, 22, 26		A) Not required or B) Generic local exhaust ventilation	- 78%
	5, 8b, 9		A) General ventilation or B) Generic local exhaust ventilation	17% 78%
Industrial uses of wet suspension of hydraulic building and construction materials	7	Duration is not restricted (up to 480 minutes per shift, 5 shifts a week)	A) Not required or B) Generic local exhaust ventilation	- 78%
	2, 5, 8b, 9, 10, 13, 14		Not required	-
Professional use of dry hydraulic building and construction material (indoor, outdoor)	2	Duration is not restricted (up to 480 minutes per shift, 5 shifts a week)	Not required	-
	9, 26		A) Not required or B) Generic local exhaust ventilation	- 72%
	5, 8a, 8b, 14		A) Not required or B) Integrated local exhaust ventilation	- 87%
	19		Localised controls are not applicable, process only in good ventilated rooms or outdoor	50%
Professional uses of wet suspensions of hydraulic building and construction materials	11		A) Not required or B) Generic local exhaust ventilation	- 72%
	2, 5, 8a, 8b, 9, 10, 13, 14, 19		Not required	-

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

For each individual PROC, downstream users can choose from either option A) or B) in the table above, according to what is best suited to their specific situation. If one option is chosen, then the same option has to be chosen in the table from section "8.2.2 Individual protection measures such as personal protection equipment" - Specification of respiratory protective equipment.

8.2.2 Individual protection measures such as personal protection equipment

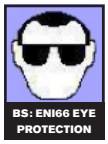
General: During work avoid kneeling in fresh mortar or concrete wherever possible. If kneeling is absolutely necessary then appropriate waterproof personal protective equipment must be worn.

Do not eat, drink or smoke when working with calcium sulfoaluminate to avoid contact with skin or mouth.

Before starting to work with calcium sulfoaluminate, apply a barrier cream and reapply it at regular intervals.

Immediately after working with calcium sulfoaluminate or calcium sulfoaluminate-containing materials, workers should wash or shower or use skin moisturisers.

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



IF CONTACT LIKELY

Eye/face protection

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

Skin protection

Use waterproof clothing, waterproof footwear and waterproof golves as well as skin care products (including barrier creams) to protect the skin from prolonged contact with wet calcium sulfoaluminate. Particular care should be taken to ensure that wet calcium sulfoaluminate does not enter the boots.

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Respiratory protection

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

Thermal hazards

Not applicable.

Exposure Scenario	PROC*	Exposure	Specification of respiratory protective equipment (RPE)	RPE efficiency -assigned protection factor (APF)
Industrial manufacture/ formulation of hydraulic building and construction materials	2, 3	Duration is not restricted (up to 480 minutes per shift, 5 shifts a week) not required	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 uses of dry hydraulic building and construction materials (indoor, outdoor)	2	Duration is not restricted (up to 480 minutes per shift, 5 shifts a week) not required	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 uses of wet suspension of hydraulic building and construction materials	7	Duration is not restricted (up to 480 minutes per shift, 5 shifts a week) not required	A) P1 mask (FF, FM) 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	Duration is not restricted (up to 480 minutes per shift, 5 shifts a week) not required	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
Professional uses of wet suspensions of hydraulic building and construction materials	11	Duration is not restricted (up to 480 minutes per shift, 5 shifts a week) not required	A) P2 mask (FF, FM) or B) P1 mask (FF, FM)	APF = 10 APF = 4
	2, 5, 8a, 8b, 9, 10, 13, 14, 19		Not required	-

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

For each individual PROC, downstream users must choose option A) or B) in the table above, according to what was chosen in section "8.2.1 Appropriate engineering controls" – localised controls.

An overview of the APFs of different RPE (according to EN 529:2005) can be found in the glossary of MEASE (16).

Any RPE as defined above shall only be worn if the following principles are implemented in parallel: The duration of work (compare with "duration of exposure" above) should reflect the additional physiological stress for the worker due to the breathing resistance and mass of the RPE itself, dueto the increased thermal stress by enclosing the head. In addition, it shall be considered that the worker's capability of using tools and of communicating are reduced during the wearing of RPE.

For reasons as given above, the worker should therefore be (i) healthy (especially in view of medical problems that may affect the use of RPE), (ii) have suitable facial characteristics reducing leakages between face and mask (in view of scars and facial hair). The recommended devices above which rely on a tight face seal will not provide the required protection unless they fit the contours of the face properly and securely.

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

8.2.3 Environmental exposure controls

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

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

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

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

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

Tier 3: Measure the pH in the receiving water after the discharge point. If pH is below 9, safe use is reasonably demonstrated. If pH is found to be above 9, risk management measures have to be implemented: the effluent has to undergo neutralisation, thus ensuring safe use of cement during production or use phase.

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

The Storing, loading or unloading of cement clinker in bulk prior to further transportation in bulk requires a permit under the Environmental Permitting Regulations 2010.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

This information applies to the whole mixture.

a. Appearance: Dry cement is a finely ground solid inorganic material (grey or white powder). Main particle size: 5-30 µm

b. Odour: Odourless

c. Odour threshold: No odour threshold, odourless

d. pH: (T = 20°C in water, water-solid ratio 1:2): 11-13.5

e. Melting point: > 1 250 °C

f. Initial boiling point and boiling range: Not applicable as under normal atmospheric conditions, melting point >1 250°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 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. 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; Apparent density: 0.9-1.5 g/cm^3

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 mixture

p. Auto-ignition temperature: Not applicable (no pyrophoricity – no organo-metallic, organo-metalloid or organo-phosphine bindings or of their derivatives, and no other pyrophoric constituent in the composition)

q. Decomposition temperature: Not applicable as no organic peroxide present

r. Viscosity: Not applicable as not a liquid

s. Explosive properties: Not applicable. Not explosive or pyrotechnic. Not in itself capable by chemical reaction of producing gas at such temperature and pressure and at such a speed as to cause damage to the surroundings. Not capable of a self-sustaining exothermic chemical reaction.

t. Oxidising properties: Not applicable as does not cause or contribute to the combustion of other materials

9.2 Other information

Not applicable.

10. STABILITY AND REACTIVITY

10.1 Reactivity

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

10.2 Chemical stability

Dry calcium sulfoaluminate is stable as long as it is 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 calcium sulfoaluminate is alkaline and incompatible with acids, with ammonium salts, with aluminium or other non-noble metals. Calcium sulfoaluminate dissolves in hydrofluoric acid to produce corrosive silicon tetrafluoride gas. Calcium sulfoaluminate reacts with water to form silicates and calcium hydroxide. Silicates in calcium sulfoaluminate react with powerful oxidizers such as fluorine, boron trifluoride, chlorine trifluoride, managanese trifluoride, and oxygen difluoride.

10.3 Possibility of hazardous reactions

Calcium sulfoaluminate does not cause hazardous reactions.

10.4 Conditions to avoid

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

10.5 Incompatible materials

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

10.6 Hazardous decomposition products

Calcium sulfoaluminate will not decompose into any hazardous products.

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

(Note: The main constituents of Calcium Sulfo-Aluminate are present in Portland cement and Portland cement clinker. Uses and applications are similar. In the absence of test data on Calcium sulfoaluminate clinker data on Portland cement and cement clinkers has been used for the classification of Calcium Sulfo-Aluminate. This is summarised below.)

Hazard class	Cat	Effect	Reference
Acute toxicity - dermal	-	Limit test, rabbit, 24 hours contact, 2,000 mg/kg body weight – no lethality. Based on available data, the classification criteria are not met.	(2)
Acute toxicity- inhalation	-	No acute toxicity by inhalation observed. Based on available data, the classification criteria are not met.	(9)
Acute toxicity - oral	-	No indication of oral toxicity from studies with cement kiln dust. Based on available data, the classification criteria are not met.	Literature survey
Skin corrosion/ irritation	2	Cement in contact with wet skin may cause thickening, cracking or fissuring of the skin. Prolonged contact in combination with abrasion may cause severe burns.	(2) Human experience
Serious eye damage/ irritation	1	Portland cement clinker caused a mixed picture of corneal effects and the calculated irritation index was 128. Common cements contain varying quantities of Portland cement clinker, fly ash, blast furnace slag, gypsum, natural pozzolans, burnt shale, silica fume and limestone. Direct contact with cement may cause corneal damage by mechanical stress, immediate or delayed irritation or inflammation. Direct contact by larger amounts of dry cement or splashes of wet cement may cause effects ranging from moderate eye irritation (e.g. conjunctivitis or blepharitis) to chemical burns and blindness.	(10), (11)
Skin sensitisation	1	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)
Respiratory sensitisation	-	There is no indication of sensitisation of the respiratory system. Based on available data, the classification criteria are not met.	(1)

Hazard class	Cat	Effect	Reference
Germ cell mutagenicity	-	No indication. Based on available data, the classification criteria are not met.	(12), (13)
Carcinogenicity	-	No causal association has been established between Portland cement exposure and cancer. The epidemiological literature does not support the designation of Portland cement as a suspected human carcinogen Portland cement is not classifiable as a human carcinogen (According to ACGIH A4: Agents that cause concern that they could be carcinogenic for humans but which cannot be assessed conclusively because of a lack of data. In vitro or animal studies do not provide indications of carcinogenicity that are sufficient to classify the agent with one of the other notations.). Based on available data, the classification criteria are not met.	(1) (14)
Reproductive toxicity	-	Based on available data, the classification criteria are not met.	No evidence from human experience
STOT-single exposure	3	Cement dust may irritate the throat and respiratory tract. Coughing, sneezing, and shortness of breath may occur following exposures in excess of occupational exposure limits. Overall, the pattern of evidence clearly indicates that occupational exposure to cement dust has produced deficits in respiratory function. However, evidence available at the present time is insufficient to establish with any confidence the dose-response relationship for these effects.	(1)
STOT-repeated exposure	-	There is an indication of COPD. The effects are acute and due to high exposures. No chronic effects or effects at low concentration have been observed. Based on available data, the classification criteria are not met.	(15)
Aspiration hazard	-	Not applicable as cements are not used as an aerosol.	

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

Medical conditions aggravated by exposure

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

12. ECOLOGICAL INFORMATION

12.1 Toxicity

The product is not hazardous to the environment. Ecotoxicological tests with Portland cement (see Note in section 11.1) on Daphnia magna [Reference (5)] and Selenastrum coli [Reference (6)] have shown little toxicological impact. Therefore LC50 and EC50 values could not be determined [Reference (7)]. There is no indication of sediment phase toxicity [Reference (8)]. The addition of large amounts of cement to water may, however, cause a rise in pH and may, therefore, be toxic to aquatic life under certain circumstances.

12.2 Persistence and degradability

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

12.3 Bioaccumulative potential

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

12.4 Mobility in soil

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

12.5 Results of PBT and vPvB assessment

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

12.6 Other adverse effects

Not relevant.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Do not dispose of into sewage systems or surface waters.

Product - unused residue or dry spillage

Pick up dry unused residue or dry spillage as is. Mark the containers. Possibly reuse depending upon 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.

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

Packaging

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

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

14. TRANSPORT INFORMATION

Calcium sulfoaluminate is not covered by the international regulation on the transport of dangerous goods (IMDG, IATA, ADR/RID), therefore 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

14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code

Not relevant

15. REGULATORY INFORMATION

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

Cement clinker is exempt from registration (Art 2.7 (b) and Annex V.10 of REACH).

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

1. Cement and cement-containing mixtures shall not be placed on the market, or used, if they contain, when hydrated, more than 2 mg/kg (0.0002 %) soluble chromium VI of the total dry weight of the cement.
2. If reducing agents are used, then without prejudice to the application of other Community provisions on the classification, packaging and labelling of substances and mixtures, suppliers shall ensure before the placing on the market that the packaging of cement or cement-containing mixtures is visibly, legibly and indelibly marked with information on the packing date, as well as on the storage conditions and the storage period appropriate to maintaining the activity of the reducing agent and to keeping the content of soluble chromium VI below the limit indicated in paragraph 1.
3. By way of derogation, paragraphs 1 and 2 shall not apply to the placing on the market for, and use in, controlled closed and totally automated processes in which cement and cement-containing mixtures are handled solely by machines and in which there is no possibility of contact with the skin.

The so-called “Good practice guides” which contain advice on safe handling practices can be found from: http://www.nepsi.eu/good-practice-guide.aspx. These good practices have been adopted under the Social Dialogue “Agreement on Workers’ Health Protection through the Good Handling and Use of Crystalline Silica and Products Containing it by Employee and Employer European sectoral associations, among which CEMBUREAU.

15.2 Chemical Safety Assessment

No chemical safety assessment has been carried out.

16. OTHER INFORMATION

16.1 Indication of changes

Version 1date issued

16.2 Abbreviations and acronyms

ACGIH	American Conference of Industrial Hygienists
ADR/RID	European Agreements on the transport of Dangerous goods by Road/Railway
APF	Assigned protection factor
CAS	Chemical Abstracts Service
CLP	Classification, labelling and packaging (Regulation (EC) 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
GefStoffV	Gefahrstoffverordnung
HEPA	Type of high efficiency air filter
H&S	Health and Safety
IATA	International Air Transport Association
IMDG	International agreement on the Maritime transport of Dangerous Goods
LC50	Median lethal dose
MEASE	Metals estimation and assessment of substance exposure, EBRC Consulting GmbH for Eurometaux, http://www.ebrc.de/ebrc/ebrc-mease.php
MS	Member State
OELV	Occupational exposure limit value
PBT	Persistent, bio-accumulative and toxic
PNEC	Predicted no-effect concentration
PROC	Process category
RE	Repeated exposure
REACH	Registration, Evaluation and Authorisation of Chemicals
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	Technische Regeln für Gefahrstoffe
VLE-MP	Exposure limit value-weighted average in mg by cubic meter of air
vPvB	Very persistent, very bio-accumulative
w/w	Weight by weight
WWTP	Waste water treatment plant

16.3 Key literature references and sources of data

1. Portland Cement Dust - Hazard assessment document EH75/7, UK Health and Safety Executive, 2006. Available from: http://www.hse.gov.uk/pubns/web/portlandcement.pdf.
2. Observations on the effects of skin irritation caused by cement, Kietzman et al, Dermatosen, 47, 5, 184-189 (1999).
3. European Commission's Scientific Committee on Toxicology, Ecotoxicology and the Environment (SCTEE) opinion of the risks to health from Cr (VI) in cement (European Commission, 2002). http://ec.europa.eu/health/archive/ph_risk/committees/sct/documents/out158_en.pdf.
4. Epidemiological assessment of the occurrence of allergic dermatitis in workers in the construction industry related to the content of Cr (VI) in cement, NIOH, Page 11, 2003.
5. U.S. EPA, Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, 3rd ed. EPA/600/7-91/002, Environmental Monitoring and Support Laboratory, U.S. EPA, Cincinnati, OH (1994a) and 4th ed. EPA-821-R-02-013, US EPA, office of water, Washington D.C. (2002).
6. U.S. EPA, Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, 4th ed. EPA/600/4-90/027F, Environmental Monitoring and Support Laboratory, U.S. EPA, Cincinnati, OH (1993) and 5th ed. EPA-821-R-02-012, US EPA, office of water, Washington D.C. (2002).
7. Environmental Impact of Construction and Repair Materials on Surface and Ground Waters. Summary of Methodology, Laboratory Results, and Model Development. NCHRP report 448, National Academy Press, Washington, D.C., 2001.
8. Final report Sediment Phase Toxicity Test Results with Corophium volutator for Portland clinker prepared for Norcem A.S. by AnalyCen Ecotox AS, 2007.
9. TNO report V8801/02, An acute (4-hour) inhalation toxicity study with Portland Cement Clinker CLP/GHS 03-2010-fine in rats, August 2010.
10. TNO report V8815/09, Evaluation of eye irritation potential of cement clinker G in vitro using the isolated chicken eye test, April 2010.
11. TNO report V8815/10, Evaluation of eye irritation potential of cement clinker W in vitro using the isolated chicken eye test, April 2010.
12. Investigation of the cytotoxic and proinflammatory effects of cement dusts in rat alveolar macrophages, Van Berlo et al, Chem. Res. Toxicol., 2009 Sept; 22(9):1548-58.
13. Cytotoxicity and genotoxicity of cement dusts in A549 human epithelial lung cells in vitro; Gminski et al, Abstract DGPT conference Mainz, 2008.
14. Comments on a recommendation from the American Conference of governmental industrial Hygienists to change the threshold limit value for Portland cement, Patrick A. Hessel and John F. Gamble, EpiLung Consulting, June 2008.
15. Prospective monitoring of exposure and lung function among cement workers, Interim report of the study after the data collection of Phase I-II 2006-2010, Hilde Notø, Helge Kjuus, Marit Skogstad and Karl-Christian Nordby, National Institute of Occupational Health, Oslo, Norway, March 2010.
16. MEASE, Metals estimation and assessment of substance exposure, EBRC Consulting GmbH for Eurometaux.

16.4 Training advice

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

16.5 Further information

See Annex(es) for the ES of the following substances.

The data and test methods used for the purpose of classification of Portland cement clinker and common cements, are given or referred to in section 11.1.

16.6 Disclaimer

The information in this Safety Data Sheet was believed to be correct at the time of issue. It does not, however, give assurances of product properties and establishes no contract legal rights.

If you have purchased this product for supply to a third party for use at work, it is your duty to take all necessary steps to ensure that any person handling or using the product is provided with the information in this sheet.

If you are an employer, it is your duty to tell your employees and others who may be affected of any hazards described in this sheet and any of the precautions which should be taken.

This Safety Data Sheet does not constitute the user's own assessment of workplace risk, and it is the user's sole responsibility to take all necessary safety precautions when using this product.

The product is to be used exclusively for the applications named in the technical leaflet or in the processing instructions. The receiver of our product is singularly responsible for adhering to existing laws and regulations.

Annex: Additional tables with engineering controls and individual protection measures for section 8.2.

1. Inhalation DNEL of 1 mg/m³

8.2.1. Appropriate engineering controls

Exposure Scenario	PROC*	Exposure	Localised controls	Efficiency
Industrial manufacture/ formulation of hydraulic building and construction materials	2, 3	Duration is not restricted (up to 480 minutes per shift, 5 shifts a week); (#) < 240 min	Not required	-
	14, 26		A) Not required or B) Generic local exhaust ventilation	- 78%
	5, 8b, 9		Generic local exhaust ventilation	78%
Industrial uses of dry hydraulic building and construction materials (indoor, outdoor)	2	Duration is not restricted (up to 480 minutes per shift, 5 shifts a week); (#) < 240 min	Not required	-
	14, 22, 26		A) Not required or B) Generic local exhaust ventilation	- 78%
	5, 8b, 9		Generic local exhaust ventilation	78%
Industrial uses of wet suspension of hydraulic building and construction materials	7	Duration is not restricted (up to 480 minutes per shift, 5 shifts a week); (#) < 240 min	A) Not required or B) Generic local exhaust ventilation	- 78%
	2, 5, 8b, 9, 10, 13, 14		Not required	-
Professional use of dry hydraulic building and construction material (indoor, outdoor)	2	Duration is not restricted (up to 480 minutes per shift, 5 shifts a week); (#) < 240 min	A) Not required or B) Generic local exhaust ventilation	- 72%
	9, 26		A) Not required or B) Generic local exhaust ventilation	- 72%
	5, 8a, 8b, 14		Generic local exhaust ventilation	72%
	19 (#)		Localised controls are not applicable, process only in good ventilated rooms or outdoor	50%
Professional uses of wet suspensions of hydraulic building and construction materials	11	Duration is not restricted (up to 480 minutes per shift, 5 shifts a week); (#) < 240 min	A) Not required or B) Generic local exhaust ventilation	- 72%
	2, 5, 8a, 8b, 9, 10, 13, 14, 19		Not required	-

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

8.2.2. Individual protection measures such as personal protection equipment

Exposure Scenario	PROC*	Exposure	Specification of respiratory protective equipment (RPE)	RPE efficiency -assigned protection factor (APF)
Industrial manufacture/ formulation of hydraulic building and construction materials	2, 3	Duration is not restricted (up to 480 minutes per shift, 5 shifts a week); (#) < 240 min	Not required	-
	14, 26		A) P2 mask (FF, FM) or B) P1 mask (FF, FM)	APF = 10 APF = 4
	5, 8b, 9		P2 mask (FF, FM)	APF = 10
Industrial uses of dry hydraulic building and construction materials (indoor, outdoor)	2	Duration is not restricted (up to 480 minutes per shift, 5 shifts a week); (#) < 240 min	Not required	-
	14, 22, 26		A) P2 mask (FF, FM) or B) P1 mask (FF, FM)	APF = 10 APF = 4
	5, 8b, 9		P2 mask (FF, FM)	APF = 10
Industrial uses of wet suspension of hydraulic building and construction materials	7	Duration is not restricted (up to 480 minutes per shift, 5 shifts a week); (#) < 240 min	A) P3 mask (FF, FM) or B) P2 mask (FF, FM)	APF = 20 APF = 10
	2, 5, 8b, 9, 10, 13, 14		Not required	-
Professional use of dry hydraulic building and construction material (indoor, outdoor)	2	Duration is not restricted (up to 480 minutes per shift, 5 shifts a week); (#) < 240 min	A) P2 mask (FF, FM) or B) P1 mask (FF, FM)	APF = 10 APF = 4
	9, 26		A) P3 mask (FF, FM) or B) P2 mask (FF, FM)	APF = 20 APF = 10
	5, 8a, 8b, 14		P3 mask (FF, FM))	APF = 20
	19 (#)		P3 mask (FF, FM)	APF = 20
Professional uses of wet suspensions of hydraulic building and construction materials	11	Duration is not restricted (up to 480 minutes per shift, 5 shifts a week); (#) < 240 min	A) P3 mask (FF, FM) or B) P2 mask (FF, FM)	APF = 20 APF = 10
	2, 5, 8a, 8b, 9, 10, 13, 14, 19		Not required	-

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

2. Inhalation DNEL of 5 mg/m³

8.2.1. Appropriate engineering controls

Exposure Scenario	PROC*	Exposure	Localised controls	Efficiency
Industrial manufacture/ formulation of hydraulic building and construction materials	2, 3	Duration is not restricted (up to 480 minutes per shift, 5 shifts a week)	Not required	-
	14, 26		A) Not required or B) Generic local exhaust ventilation	- 78%
	5, 8b, 9		A) Not required or B) Generic local exhaust ventilation	- 82%
Industrial uses of dry hydraulic building and construction materials (indoor, outdoor)	2	Duration is not restricted (up to 480 minutes per shift, 5 shifts a week)	Not required	-
	14, 22, 26		A) Not required or B) Generic local exhaust ventilation	- 78%
	5, 8b, 9		A) General ventilation or B) Generic local exhaust ventilation	- 82%
Industrial uses of wet suspension of hydraulic building and construction materials	7	Duration is not restricted (up to 480 minutes per shift, 5 shifts a week)	A) Not required or B) Generic local exhaust ventilation	- 78%
	2, 5, 8b, 9, 10, 13, 14		Not required	-
Professional use of dry hydraulic building and construction material (indoor, outdoor)	2	Duration is not restricted (up to 480 minutes per shift, 5 shifts a week)	A) Not required or B) General ventilation	- 29%
	9, 26		A) Not required or B) Generic local exhaust ventilation	- 77%
	5, 8a, 8b, 14		A) Not required or B) Generic local exhaust ventilation	- 72%
	19		Localised controls are not applicable, process only in good ventilated rooms or outdoor	50%
Professional uses of wet suspensions of hydraulic building and construction materials	11	Duration is not restricted (up to 480 minutes per shift, 5 shifts a week)	A) Not required or B) Generic local exhaust ventilation	- 77%
	2, 5, 8a, 8b, 9, 10, 13, 14, 19		Not required	-

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

8.2.2 Individual protection measures such as personal protection equipment

Exposure Scenario	PROC*	Exposure	Specification of respiratory protective equipment (RPE)	RPE efficiency -assigned protection factor (APF)
Industrial manufacture/ formulation of hydraulic building and construction materials	2, 3	Duration is not restricted (up to 480 minutes per shift, 5 shifts a 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) Not required	APF = 10 -
Industrial uses of dry hydraulic building and construction materials (indoor, outdoor)	2	Duration is not restricted (up to 480 minutes per shift, 5 shifts a week)	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) Not required	APF = 10 -
Industrial uses of wet suspension of hydraulic building and construction materials	7	Duration is not restricted (up to 480 minutes per shift, 5 shifts a week)	A) P2 mask (FF, FM) or B) Not required	APF = 10 -
	2, 5, 8b, 9, 10, 13, 14		Not required	-
Professional use of dry hydraulic building and construction material (indoor, outdoor)	2	Duration is not restricted (up to 480 minutes per shift, 5 shifts a week)	A) P1 mask (FF, FM) or B) Not required	APF = 4 -
	9, 26		A) P2 mask (FF, FM) or B) Not required	APF = 10 -
	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
Professional uses of wet suspensions of hydraulic building and construction materials	11	Duration is not restricted (up to 480 minutes per shift, 5 shifts a week)	A) P2 mask (FF, FM) or B) Not required	APF = 10 -
	2, 5, 8a, 8b, 9, 10, 13, 14, 19		Not required	-

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

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