

## SAFETY DATA SHEET

# Norcem Portlandsementer, Norcem Portlandflygeaskesement, Norcem Portlandblandingssement og ENCI Slaggsement (CEM I, II og III, NS-EN 197; Type I/II, ASTM C-150; API 10A Class G)

The safety data sheet is in accordance with Commission Regulation (EU) 2015/830 of 28 May 2015 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

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

Date issued	22.06.2009
Revision date	21.06.2018

### 1.1. Product identifier

Product name	Norcem Portlandsementer, Norcem Portlandflygeaskesement, Norcem Portlandblandingssement og ENCI Slaggsement (CEM I, II og III, NS-EN 197; Type I/II, ASTM C-150; API 10A Class G)
Synonyms	Norcem Anleggsement, Norcem Anleggsement FA, Norcem Brønnsement Norwell, Norcem Industriseмент, Norcem Standardsement FA, Slemmestad Mursement, Aalborg White , Cementa Bygg- og Anlægningssement, Cementa Injekteringssement, Cementa Mursement Skövde, Lavkarbonsement, ENCI Slaggsement, Norcem Micro
Article no.	31L000964, 31L000965, 31L000966, 31L000967, 31L000969, 31L000970, 31L000971, 31L000973
GTIN No.	5709328104807, 7047930000154, 7047930000161, 7047930000147, 7047930000093, 7047930000192, 7047930000178, 7047930000208, 7047930000185, 7047930000260, 7047930000246, 7047930000253, 7047930000277, 7047930000284, 7047930000062, 7047930000079, 7047930000116, 7047930000130, 7047930000123, 7047930000086, 7047930000222, 7047930000239, 7047930000215, 7047930000215

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

Use of the substance / preparation	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
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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). See section 16 for a complete list.

### 1.3. Details of the supplier of the safety data sheet

#### Manufacturer

Company name	NORCEM A.S
Office address	Lilleakerveien 2b
Postal address	Postboks 143 Lilleaker
Postcode	0216
City	OSLO
Country	NORWAY
Telephone number	+4722878400
Fax	+4722878402
Email	jorunn.gundersen@norcem.no
Website	<a href="http://www.norcem.no/">http://www.norcem.no/</a>
Enterprise No.	934949145

### 1.4. Emergency telephone number

Emergency telephone	Telephone number: +47 22 59 13 00 Description: Norwegian Poisons Information
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## SECTION 2: Hazards identification

### 2.1. Classification of substance or mixture

Classification according to Regulation (EC) No 1272/2008 [CLP / GHS]	Eye Dam. 1; H318; On basis of test data; Skin Irrit. 2; H315; On basis of test data; STOT SE 3; H335; Expert opinion;
Substance / mixture hazardous properties	Cement is either naturally low in soluble chromium VI or reducing agents have been added to control the levels of sensitising soluble chromium (VI) to below 2 mg/kg (0.0002%) of the total dry weight of the cement ready for use according to legislation specified under Section 15. If the product is not stored according to section 72. or if the storage period has exceeded 6 months, the effect of the chromate reduction may wear off.

### 2.2. Label elements

#### Hazard pictograms (CLP)



Signal word	Danger
Hazard statements	H318 Causes serious eye damage. H315 Causes skin irritation. H335 May cause respiratory irritation.
Precautionary statements	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 + P 313 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 in accordance with local regulation.
Supplemental label information	When cement reacts with water, for instance when making concrete or mortar, or when the cement becomes damp, a strong alkaline solution is produced. Due to the high alkalinity, wet cement may provoke skin and eye irritation. Skin contact with wet cement, fresh concrete or mortar may cause irritation or corrosive burns. May cause damage of products produced of aluminum or other not noble metals.

### 2.3. Other hazards

Other hazards	Cement does not meet the criteria for PBT or vPvB in accordance with Annex XIII of REACH (Regulation (EC) No 1907/2006).
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## SECTION 3: Composition / information on ingredients

### 3.2. Mixtures

Substance	Identification	Classification	Contents
Portland Cement Clinker	CAS No.: 65997-15-1 EC No.: 266-043-4	STOT SE3; H335 Skin Irrit. 2; H315 Eye Dam. 1; H318 Skin Sens. 1; H317	60 - 98 %
Flue dust, Portland Cement	CAS No.: 68475-76-3 EC No.: 270-659-9 REACH Reg. No.: 01-2119486767-17-0073	Skin Irrit. 2; H315 Eye Dam. 1; H318 Skin Sens. 1; H317 STOT SE3; H335	0 < 1 %
Ashes (residues) , coal	EC No.: 931-322-8 REACH Reg. No.: 01-2119491179-27		0 -30 %

Remarks, substance	Portland Cement Clinker is exempted from REACH registration.
Substance comments	See detailed information in section 16.

## SECTION 4: First aid measures

### 4.1. Description of first aid measures

Inhalation	Move the person to fresh air. Dust in throat and nasal passages should clear
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	spontaneously. Contact a physician if irritation persists or later develops or if discomfort, coughing or other symptoms persist.
Skin contact	For dry cement, remove and rinse abundantly with water. For wet cement, 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.
Eye contact	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 30 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.
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.
Recommended personal protective equipment for first aid responders	No personal protective equipment is needed for first aid responders. First aid workers should avoid contact with wet cement or wet cement containing preparations.

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

Delayed symptoms and effects	<p>Eyes: Eye contact with cement (dry or wet) may cause serious and potentially irreversible injuries.</p> <p>Skin: Cement 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 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 Ref. 1 in section 16.</p> <p>Inhalation: Repeated inhalation of dust of common cements over a long period of time increases the risk of developing lung diseases.</p> <p>Environment: Under normal use, common cement is not hazardous to the environment.</p>
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## 4.3. Indication of any immediate medical attention and special treatment needed

Other information	When contacting a physician, take this SDS with you.
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# SECTION 5: Firefighting measures

## 5.1. Extinguishing media

Suitable extinguishing media	Cement is not flammable. Extinguishing media according to other materials at the site of the fire.
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## 5.2. Special hazards arising from the substance or mixture

Fire and explosion hazards	Cements are non-combustible and non-explosive and will not facilitate or sustain the combustion of other materials.
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## 5.3. Advice for firefighters

Personal protective equipment	Cement poses no fire-related hazards. No need for special protective equipment for fire fighters.
Other information	Be aware that water in contact with cement may get corrosive due to increased alkalinity (high pH)

## SECTION 6: Accidental release measures

### 6.1. Personal precautions, protective equipment and emergency procedures

Protective equipment	Wear protective equipment as described under Section 8 and follow the advice for safe handling and use given under Section 7.
For emergency responders	Emergency procedures are not required. However, respiratory protection is needed in situations with high dust levels.

### 6.2. Environmental precautions

Environmental precautionary measures	Do not wash cement down sewage and drainage systems or into bodies of water (e.g. streams).
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### 6.3. Methods and material for containment and cleaning up

Clean up	<p>Collect the spillage in a dry state if possible.</p> <p><b>Dry cement</b> 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.</p> <p><b>Wet cement</b> Clean up wet cement and place in a container. Allow material to dry and solidify before disposal as described under Section 13.</p>
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### 6.4. Reference to other sections

Other instructions	See sections 8 and 13 for more details.
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## SECTION 7: Handling and storage

### 7.1. Precautions for safe handling

Handling	Follow the recommendations given under Section 8 and the "Good practice guide" referred to in Section 15.1. To clean up dry cement, see Subsection 6.3.
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### Protective safety measures

Safety measures to prevent fire	Not relevant.
Preventitive 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.
Preventitive measures to protect the environment	No particular measures
Advice 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

Storage	Bulk cement should be stored in silos that are waterproof, dry (i.e. with internal condensation minimised), clean and protected from contamination.  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.
Conditions to avoid	Do not use aluminium containers due to incompatibility of the materials.

### Conditions for safe storage

Technical measures and storage conditions	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 0.0002 % of the total dry weight of the cement ready for use, according to NS-EN 196-10. They will also indicate the appropriate storage conditions for maintaining the effectiveness of the reducing agent.
Requirements for storage rooms and vessels	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.

### 7.3. Specific end use(s)

Specific use(s)	No additional information for the specific end uses (see section 1.2).
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## SECTION 8: Exposure controls / personal protection

## 8.1. Control parameters

Substance	Identification	Value	TWA Year
Portland Cement Clinker	CAS No.: 65997-15-1	TWA (8h) : 5resp/10tot mg/m <sup>3</sup>	

Other Information about threshold limit values	<p>The DNEL refers to respirable dust. In contrast, the tool used for the risk assessment (MEASE) works with the inhalable fraction. Therefore, an additional safety margin is inherently included in the outcome of the assessment and the derived risk management measures.</p> <p>For workers, no DNEL for dermal exposure are available, neither from human hazard studies nor from human experience. Since cements are classified as irritating to skin and eyes, dermal exposure has to be minimised as far as technically feasible.</p>
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## DNEL / PNEC

DNEL	<p>Route of exposure: Long term (repeated) - Inhalation Value: 5 mg/m<sup>3</sup></p> <p>Route of exposure: Dermal Value: not applicable</p> <p>Route of exposure: Oral Value: not relevant</p>
PNEC	<p>Route of exposure: Soil Value: not applicable</p> <p>Route of exposure: Sediment Value: not applicable</p> <p>Route of exposure: Water Value: not applicable</p>
Summary of risk management measures, environment	<p>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.</p>

## 8.2. Exposure controls

### Safety signs



### Precautionary measures to prevent exposure

Appropriate engineering controls	<p>Avoid kneeling in fresh mortar or concrete wherever possible. If kneeling is absolutely necessary then appropriate waterproof personal protective equipment must be worn.</p> <p>Do not eat, drink or smoke when working with cement to avoid contact with skin or mouth. Before starting to work with cement, apply a barrier creme and reapply it at regular intervals. Immediately after working with cement or cement-containing materials, workers should wash or shower or use skin moisturisers.</p>
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Technical measures to prevent exposure

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

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

Use: Industrial manufacture/formulation of hydraulic building and construction materials.

1. PROC 2 or 3. Localised controls not required. Respiratory protective equipment not required.
2. PROC 14 or 26. Localised controls not required (use P1 mask with APF=4) or generic local exhaust ventilation with 78 % efficiency (respiratory protective equipment not required).
3. PROC 5, 8b or 9. Either localised control not required (use P2 mask with APF=10) or generic local exhaust ventilation with 82 % efficiency (respiratory protective equipment not required).

Use: Industrial uses of dry hydraulic building and construction materials (indoor, outdoor).

1. PROC 2. Localised controls not required. Respiratory protective equipment not required.
2. PROC 14, 22 or 26. Localised controls not required (use P1 mask with APF=4) or generic local exhaust ventilation with 78 % efficiency (respiratory protective equipment not required).
3. PROC 5, 8b, 9. Either general ventilation with 17 % efficiency (use P2 mask with APF=10) or generic local exhaust ventilation with 82 % efficiency (respiratory protective equipment not required).

Use: Industrial uses of wet suspension of hydraulic building and construction materials.

1. PROC 7. Localised controls not required (use P2 mask with APF=10) or generic local exhaust ventilation with 78 % efficiency (respiratory protective equipment not required).
2. PROC 2, 5, 8b, 9, 10, 13 or 14. Localised controls not required. Respiratory protective equipment not required.

Use: Professional use of dry hydraulic building and construction material (indoor, outdoor).

1. PROC 2. Either localised controls not required (use P1 mask with APF=4) or general ventilation with 29 % efficiency (respiratory equipment not required).
2. PROC 9 or 26. Localised controls not required (use P2 mask with APF=10) or generic local exhaust ventilation with 77 % efficiency (respiratory protective equipment not required).
3. PROC 5, 8a, 8b or 14. Localised controls not required (use P3 mask with APF=20) or generic local exhaust ventilation with 72 % efficiency (use P1 mask with APF=4).
4. PROC 19. Localised controls are not applicable, process only in good ventilated rooms or outdoor. Efficiency 50 %. Use P2 mask with APF=10.

Use: Professional uses of wet suspensions of hydraulic building and construction materials.

1. PROC 11. Localised controls not required (use P2 mask with APF=10) or generic local exhaust ventilation with 77 % efficiency (respiratory protective equipment not required).
2. PROC 2, 5, 8a, 8b, 9, 10, 13, 14, 19. Localised controls not required.



Respiratory protective equipment not required.

## Eye / face protection

Suitable eye protection

Wear approved glasses or safety goggles according to NS-EN 166 when handling dry or wet cement to prevent contact with eyes.

## Hand protection

Suitable gloves type

Wear waterproof, abrasion and alkali-resistant gloves. Leather gloves are not suitable due to their water penetrability, and can release chromate-containing compounds. For handling cement/binders, special gloves for chemicals (Cat. III) are not required. Investigations have proven that nitrile impregnated cotton gloves (layer thickness of about 0.15 mm) provide sufficient protection over a period of 480 minutes. Change soaked gloves. Have spare gloves ready.

## Skin protection

Suitable protective clothing

Use boots, closed long-sleeved protective clothing as well as skin care products (including barrier creams) to protect the skin from prolonged contact with wet cement. Particular care should be taken to ensure that wet cement does not enter the boots.  
In some circumstances, such as when laying concrete or screed, waterproof trousers or kneepads are necessary.

## Respiratory protection

Respiratory protection necessary at

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 NS-EN standard. Minimum P2-filter is recommended.

Recommended type of equipment

Depending of ventilation and use; see Technical measures to prevent exposure.

Respiratory protection, comments

NS-EN 149, NS-EN 140, NS-EN 14387, NS-EN 1827

## Thermal hazards

Thermal hazards

Not applicable.

## Appropriate environmental exposure control

Environmental exposure controls

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.

Do not wash cement into sewage systems or into bodies of water, to avoid high pH. Above pH 9 negative ecotoxicological impacts are possible.

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

Physical state	Powder
Colour	Grey
Odour	Odourless
Odour limit	Comments: Not applicable
pH	Status: In aqueous solution Value: 11 - 13,5 Comments: T = 20°C in water, water-solid ratio 1:2
Melting point / melting range	Value: > 1250 °C
Boiling point / boiling range	Comments: Not applicable as under normal atmospheric conditions, melting point >1 250°C
Flash point	Comments: Not applicable as not a liquid
Evaporation rate	Comments: Not applicable as not a liquid
Flammability (solid, gas)	Not applicable
Explosion limit	Comments: Not applicable
Vapour pressure	Comments: Not applicable
Vapour density	Comments: Not applicable
Specific gravity	Comments: Relative density: 2.75-3.20; Apparent density: 0.9-1.5 g/cm <sup>3</sup>
Solubility	Medium: Water Value: 0,1 -1,5 g/l Temperature: 20 °C
Partition coefficient: n-octanol/water	Comments: Not relevant.
Spontaneous combustability	Comments: Not relevant.
Decomposition temperature	Comments: Not relevant.
Viscosity	Comments: Not applicable as not a liquid
Explosive properties	Not applicable
Oxidising properties	Not applicable

## 9.2. Other information

### SECTION 10: Stability and reactivity

#### 10.1. Reactivity

Reactivity	When mixed with water, cements will harden into a stable mass that is not reactive in normal environments.
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#### 10.2. Chemical stability

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.
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Contact with incompatible materials should be avoided.  
Wet cement is alkaline and incompatible with acids, with ammonium salts, with aluminium or other non-noble metals. Cement dissolves in hydrofluoric acid to produce corrosive silicon tetrafluoride 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

Possibility of hazardous reactions      Cements do not cause hazardous reactions

### 10.4. Conditions to avoid

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

### 10.5. Incompatible materials

Materials to avoid      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

Hazardous decomposition products      Cements will not decompose into any hazardous products.

## SECTION 11: Toxicological information

### 11.1. Information on toxicological effects

#### Other information regarding health hazards

Acute toxicity, mixture estimate	<p>Route of exposure: Dermal Comments: Limit test, rabbit, 24 hours contact, 2,000 mg/kg body weight – no lethality. Based on available data, the classification criteria are not met. See ref. 2.</p> <p>Route of exposure: Oral Comments: No indication of oral toxicity from studies with cement kiln dust. Based on available data, the classification criteria are not met. Literature survey</p> <p>Route of exposure: Inhalation (dust) Comments: No acute toxicity by inhalation observed. Based on available data, the classification criteria are not met. See ref. 9.</p>
Assessment of skin corrosion / irritation, classification	<p>Skin corrosion/irritation cat 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. Reference: Human experience and ref. 2.</p>
Assessment of eye damage or irritation, classification	<p>Serious eye damage/irritation-cat 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</p>

Inhalation	<p>limestone.</p> <p>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. See ref. 10 and 11.</p> <p>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.</p>
Ingestion	<p>Irritation of the digestive system may occur if you swallow large amounts of cement.</p>
Sensitisation	<p>Skin sensitisation-Cat 1:</p> <p>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.</p> <p>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)]. See ref. 3 and 4.</p> <p>Respiratory sensitisation:</p> <p>There is no indication of sensitisation of the respiratory system.</p> <p>Based on available data, the classification criteria are not met. See ref. 1.</p>
Mutagenicity	<p>No indication.</p> <p>Based on available data, the classification criteria are not met. See ref. 12 and 13.</p>
Carcinogenicity, other information	<p>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.</p> <p>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.).</p> <p>Based on available data, the classification criteria are not met. See ref. 1 and 14.</p>
Reproductive toxicity	<p>Based on available data, the classification criteria are not met. Reference: No evidence from human experience.</p>
STOT-single exposure, test results	<p>Toxicity type: Acute</p> <p>Comments: Cat. 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.</p> <p>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. See ref. 1.</p> <p>Toxicity type: Chronic</p> <p>Comments: There is an indication of COPD. The effects are acute and due to</p>

Aspiration hazard, comments	<p>high exposures. No chronic effects or effects at low concentration have been observed.</p> <p>Based on available data, the classification criteria are not met. See ref. 15.</p>
Aspiration hazard, comments	Not applicable

## Symptoms of exposure

Other information	Inhaling cement 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.
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## SECTION 12: Ecological information

### 12.1. Toxicity

Ecotoxicity	The product is not hazardous to the environment. Ecotoxicological tests with Portland cement on <i>Daphnia magna</i> [Reference (5)] and <i>Selenastrum coli</i> [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.
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### 12.2. Persistence and degradability

Persistence and degradability, comments	Not relevant as cement is an inorganic material. After hardening, cement presents no toxicity risks
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### 12.3. Bioaccumulative potential

Bioaccumulative potential	Not relevant as cement is an inorganic material. After hardening, cement presents no toxicity risks
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### 12.4. Mobility in soil

Mobility	Not relevant as cement is an inorganic material. After hardening, cement presents no toxicity risks
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### 12.5. Results of PBT and vPvB assessment

PBT assessment results	Not relevant as cement is an inorganic material. After hardening, cement presents no toxicity risks
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### 12.6. Other adverse effects

Other adverse effects, comments	Not relevant.
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## SECTION 13: Disposal considerations

### 13.1. Waste treatment methods

Specify the appropriate methods of disposal	Product - cement that has exceeded its shelf life (and when demonstrated that it contains more than 0.0002% soluble Cr (VI)):
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	<p>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.</p> <p>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"</p> <p>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".</p> <p>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.</p> <p>To be disposed of according to FOR 2004-06-01 nr 930: Norwegian Regulations concerning recycling and treatment of waste. The given EWC-code(s) are guidelines only. The end user has to chose the correct code(s) based on the actual use of the product.</p> <p>Dry cement powder due to the product classification is hazardous waste. Due to the inertisation, concrete waste is not dangerous waste. Harden with water before disposal.</p>
EWC waste code	EWC waste code: 101314 waste concrete and concrete sludge
	EWC waste code: 170101 concrete
EWL packing	EWC waste code: 150101 paper and cardboard packaging
Other information	Do not dispose of into sewage systems or surface waters. Completely empty the packaging and process it according to local legislation.

## SECTION 14: Transport information

### 14.1. UN number

Comments Not relevant.

### 14.2. UN proper shipping name

Comments Not relevant.

### 14.3. Transport hazard class(es)

Comments Not relevant.

### 14.4. Packing group

Comments Not relevant.

## 14.5. Environmental hazards

Comments	Not relevant.
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## 14.6. Special precautions for user

Special safety precautions for user	Not relevant.
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## 14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Pollution category	Not relevant.
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## Additional information

Additional information	Cement 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.
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## SECTION 15: Regulatory information

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

References (laws/regulations)	FOR 2012-06-16 nr 622: Norwegian Regulations for classification and labelling of substances and mixtures (CLP). FOR 2008-05-30 nr 516: Norwegian REACH regulation. REACH (Regulation (EC) No 1907/2006 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 18 December 2006) FOR 2004-06-01 nr 930: Norwegian Regulations concerning recycling and treatment of waste, as amended. International Transport Regulation: ADR/RID, IMDG, IATA. FOR 2011-12-06: Norwegian regulations concerning performing work. FOR 2011-12-06 nr. 1358 Norwegian Occupational Exposure Limits Annex VI to Regulation (EC) No 1272/2008 includes lists of harmonised classification and labelling <a href="http://www.ecb.jrc.ec.europa.eu/classification-labelling/clp/">www/ecb.jrc.ec.europa.eu/classification-labelling/clp/</a> . COMMISSION REGULATION (EU) No 453/2010 of 20 May 2010, amending Regulation (EC) No 1907/2006 REACH.
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Comments	Cement is a mixture according to REACH and is not subject to registration. 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
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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.

Declaration No. 305220

## 15.2. Chemical safety assessment

Chemical safety assessment performed No

## SECTION 16: Other information

Supplier's notes	<p>The information on this data sheet reflects the currently available knowledge 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 responsibility of the user.</p> <p>It is implicit that the user is responsible for determining appropriate safety measures and for applying the legislation covering his/her own activities.</p>
List of relevant H-phrases (Section 2 and 3)	<p>H315 Causes skin irritation.</p> <p>H317 May cause an allergic skin reaction.</p> <p>H318 Causes Serious eye damage.</p> <p>H318 Causes serious eye damage.</p> <p>H335 May cause respiratory irritation.</p>
Classification according to Regulation (EC) No 1272/2008 [CLP / GHS]	<p>Eye Dam. 1; H318; On basis of test data;</p> <p>Skin Irrit. 2; H315; On basis of test data;</p> <p>STOT SE 3; H335; Expert opinion;</p>
Training advice	<p>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.</p>
Recommended restrictions on use	<p>PROC2 Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3 Use in closed batch process (synthesis or formulation)</p> <p>PROC5 Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)</p> <p>PROC7 Industrial spraying</p> <p>PROC8a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</p> <p>PROC8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>PROC9 Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p>

	<p>PROC10 Roller application or brushing PROC11 Non-industrial spraying PROC13 Treatment of articles by dipping and pouring PROC14 Production of preparations or articles by tableting, compression, extrusion, pelletisation PROC19 Hand-mixing in close conditions and only PPE available. PROC22 Potentially closed processing operations with minerals/metals at elevated temperature Industrial setting PROC26 Handling of solid inorganic substances at ambient temperature</p>
<p>Additional information</p>	<p>Cement in dry state consists mainly of: <math>3\text{CaO-SiO}_2</math>, <math>2\text{CaO-SiO}_2</math>, <math>3\text{CaO-Al}_2\text{O}_3</math>, <math>4\text{CaO-Al}_2\text{O}_3\text{-Fe}_2\text{O}_3</math>, <math>\text{CaSO}_4</math> and <math>\text{MgO}</math>. There are also small amounts of alkalis, lime and chlorides together with traces of chromium compounds. Other metals will also be present as trace elements.</p> <p>When cement is mixed with water and while it is in plastic state before curing, some components pose a health hazard:</p> <p>a) Lime, calcium silicates and alkalis in the cement is water soluble and when these are mixed with water a corrosive alkaline solution is formed.</p> <p>b) Hexavalent chromium salts in the cement are soluble and can be mixed with water forming a hazardous solution. Upon the addition of iron sulfate for reduction from 6- to 3-valent chromium, this health risk is significantly reduced. This cement is added iron sulfate. Reduction is effective for 6 months after packing date, if the cement is stored dry.</p> <p>Hazards do not apply to dry cement, only when it occurs in moist or wet environment.</p> <p>CEM II cements can contain up to 30 % fly ash. Fly ash may contain respirable quartz, but &lt; 2%.</p>
<p>Key literature references and sources for data</p>	<p>The Safety Data Sheet has been prepared using a template and information from the European cement industry's trade association Cembureau (<a href="http://www.cembureau.eu">www.cembureau.eu</a>), 15.12.2014.</p> <p>(1) Portland Cement Dust - Hazard assessment document EH75/7, UK Health and Safety Executive, 2006. Available from: <a href="http://www.hse.gov.uk/pubns/web/portlandcement.pdf">http://www.hse.gov.uk/pubns/web/portlandcement.pdf</a>.</p> <p>(2) Observations on the effects of skin irritation caused by cement, Kietzman et al, <i>Dermatosen</i>, 47, 5, 184-189 (1999).</p> <p>(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). <a href="http://ec.europa.eu/health/archive/ph_risk/committees/sct/documents/out158_en.pdf">http://ec.europa.eu/health/archive/ph_risk/committees/sct/documents/out158_en.pdf</a>.</p> <p>(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.</p> <p>(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).</p>

(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, <http://www.ebrc.de/industrial-chemicals-reach/projects-and-references/mease.php>.

(17) Occurrence of allergic contact dermatitis caused by chromium in cement. A review of epidemiological investigations, Kåre Lenvik, Helge Kjuus, NIOH, Oslo, December 2011.

#### Abbreviations and acronyms used

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

	<p>CLP Classification, labelling and packaging (Regulation (EC) No 1272/2008)</p> <p>COPD Chronic Obstructive Pulmonary Disease</p> <p>DNEL Derived no-effect level</p> <p>EC50 Half maximal effective concentration</p> <p>ECHA European Chemicals Agency</p> <p>EINECS European INventory of Existing Commercial chemical Substances</p> <p>EPA Type of high efficiency air filter</p> <p>ES Exposure scenario</p> <p>EWC European Waste Catalogue</p> <p>FF P Filtering facepiece against particles (disposable)</p> <p>FM P Filtering mask against particles with filter cartridge</p> <p>GefStoffV Gefahrstoffverordnung</p> <p>HEPA Type of high efficiency air filter</p> <p>H&amp;S Health and Safety</p> <p>IATA International Air Transport Association</p> <p>IMDG International agreement on the Maritime transport of Dangerous Goods</p> <p>LC50 Median lethal dose</p> <p>MEASE Metals estimation and assessment of substance exposure, EBRC Consulting GmbH for Eurometaux, <a href="http://www.ebrc.de/ebrc/ebrc-mease.php">http://www.ebrc.de/ebrc/ebrc-mease.php</a></p> <p>MS Member State</p> <p>OELV Occupational exposure limit value</p> <p>PBT Persistent, bio-accumulative and toxic</p> <p>PNEC Predicted no-effect concentration</p> <p>PROC Process category</p> <p>RE Repeated exposure</p> <p>REACH Registration, Evaluation and Authorisation of Chemicals</p> <p>RPE Respiratory protective equipment</p> <p>SCOEL Scientific Committee on Occupational Exposure Limit Values</p> <p>SDS Safety Data Sheet</p> <p>SE Single exposure</p> <p>STP Sewage treatment plant</p> <p>STOT Specific Target Organ Toxicity</p> <p>TLV-TWA Threshold Limit Value-Time-Weighted Average</p> <p>TRGS Technische Regeln für Gefahrstoffe</p> <p>VLE-MP Exposure limit value-weighted average in mg by cubic meter of air</p> <p>vPvB Very persistent, very bio-accumulative</p> <p>w/w Weight by weight</p> <p>WWTP Waste water treatment plant</p>
Information added, deleted or revised	<p>This safety data sheet applies to all Norcems cement qualities, and replaces the previous safety data sheets for the individual qualities. Replaces earlier versions of the safety data sheet.</p> <p>In version 4 of the SDS, the classification of the product has been changed (section 2.2). As the product is Cr(VI) reduced to below 0,0002%, the product is no longer classified H317 for better harmonisation within the Nordic countries and the European Cement Association, Cembureau. Safety Data Sheet has been revised to meet the requirements acc. Commission Regulation (EC) No 215/830. The classification got wrong in version 4 of the english version of the SDS, that is corrected in this latest version 5.</p>
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