



Safety Data Sheet

According To Regulation (EC) No 1907/2006 (REACH)

CEM IV/B (P-V) 32.5 N PUZZOLANIC CEMENT

Version: 1.0
Form No: SDS/005

Preparation Date : 17.05.2011
Revision Date: 17.05.2011

1. IDENTIFICATION OF THE PRODUCT AND OF THE COMPANY/UNDERTAKING

1.1 Product Identifier

Product Name	CEM IV/B (P-V) 32.5 N) PUZZOLANIC CEMENT
SDS No	173005
Description	Puzzolanic cement (CEM IV/B (P-V) 32.5 N) is a powder mainly insoluble in water. When mixed with water it hardens
REACH Registration No.	Addition of fly ash is also used in 20-25 % for cement production - Cas number: 68131-74-8 <u>Reach registration number: 01-2119491179-27-0154</u> Addition of MAPE/ Cr05LV is also used in 0,04 % for cement production as Chromium hexavelent reducing agent, - Cas number: 1309-64-4 <u>Reach registration number: 01-2119475613-35-0006</u>

1.2 Relevant Identified Uses Of The Product And Uses Advised Against

Relevant Identified Uses	Cement is used as a binder in concrete and mortars that are widely used in construction. Used in all kinds of reinforced concrete structures, sliding mold, mold tuner, pre -stressed concrete, bridges, viaducts, prefabricated concrete elements, concrete pipes, concrete roads, railway sleepers, and is used for general purposes.
Uses Advised Against	See chapter 16 for a general overview

1.3 Details Of The Supplier Of The Safety Data Sheet

Supplier (Manufacturer)	BURSA CIMENTO FABRIKASI A.S
Address – Head Office	P.K:15 16451 Kestel-BURSA
Telephone	+90 224 372 15 60
Fax	+90 224 372 16 60
Company E-mail	bim@bursacimento.com.tr
Company Web Page	www.bursacimento.com.tr

1.4 Information Providing Authority About Safety Data Sheet

M.Bilgin ATAÇ - b.atac@bursacimento.com.tr

1.5 Emergency Telephone Number

Company Emergency	+90 224 372 15 60
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2. HAZARDS IDENTIFICATION

2.1 Classification Of The Product

2.1.1 Classification According to Regulation (EC) No 1272/2008

- Skin corrosion/irritation, Category 2, H315
- Serious eye damage/Eye irritation, Category 1, H318

2.1.2 Classification According to Regulation to 67/548/EC

- Risk of serious damage to eyes, (Xi;R41)
- Irritating to skin, (Xi;R38)



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2.2 Label elements

2.2.1. Labeling According to Regulation (EC) No 1272/2008 [CLP¹/GHS²]

Product Identifier

Hazard Component for Labeling
· Clinker

Hazard Pictograms



Signal Word

DANGER

Hazard Statements

H315 Causes skin irritation.
H318 Causes serious eye damage

Precautionary Statements

Prevention

P261 Avoid breathing dust .
P280 Wear protectic gloves/protective clothing/eye protection/face protection .

Response

P302+P352 IF ON SKIN: Wash with plenty of soap and water.
P304+P341 IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P333+313 If skin irritation or rash occurs: Get medical advice/attention.

Storage

P405 Store locked up

Disposal

P501 Dispose of contents/container to in accordance with local regulations

Supplemental Hazard Information (EU) Statements

No data available.

2.2.2. Labeling According to Regulation to 67/548/EEC

Hazard Description

According to the EC Regulation No. 67/548/EEC This product is classified as follows:

- Risk of serious damage to eyes, (Xi;R41)
- Irritating to skin, (Xi;R38)

Hazard Component for Labeling

· Clinker

Hazard Symbols

· Xi-Irritant





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Risk Phrases	
R38	<i>Irritating to skin.</i>
R41	<i>Risk of serious damage to eyes.</i>
Safety Phrases	
S22	<i>Do not breathe dust.</i>
S24	<i>Avoid contact with skin.</i>
S26	<i>In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.</i>
S28	<i>After contact with skin, wash immediately with plenty of water</i>
S37/39	<i>Wear suitable gloves and eye/face protection.</i>
S64	<i>If swallowed, rinse mouth with water (only if the person is conscious).</i>
2.2.3. Special Rules For Supplemental Label Elements For Certain Mixtures	
<i>None.</i>	
2.2.4. Additional Labeling	
<i>Not required.</i>	
2.3 Hazard Identification	
<i>Alkalis in cement may give hazardous alkaline solutions. Hexavalent chromium which cause allergic contact dermatitis in this type of cement mixed with water will give rise to potentially hazardous solution.</i>	
2.3.1. Skin Contact	
<i>Irritating to skin. Discomfort or pain cannot be relied upon to alert a person to hazardous skin exposure. Consequently, the only effective means of avoiding skin injury or illness involves minimizing skin contact, particularly with wet cement. Exposed persons may not feel discomfort until hours after the exposure has ended and significant injury has occurred. Dry cement contacting wet skin or exposure to moist or wet portland cement may cause more severe skin effects including thickening, cracking or fissuring of the skin. Prolonged exposure can cause severe skin damage in the form of (alkali) chemical burns. Some individuals may exhibit an allergic response upon exposure to portland cement, possibly due to trace elements of chromium. The response may appear in a variety of forms ranging from a mild rash to severe skin ulcers. Persons already sensitized may react to their first contact with the product. Other persons may first experience this effect after years of contact with Portland cement products.</i>	
2.3.2. Eye Contact	
<i>Risk of serious damage to eyes. Exposure to airborne dust may cause immediate or delayed irritation or inflammation. Eye contact by large amounts of dry powder or splashes of wet portland cement may cause effects ranging from moderate eye irritation to chemical burns or blindness. Such exposures require immediate first aid (see Section 4) and medical attention to prevent significant damage to the eye.</i>	
2.3.3. Ingestion	
<i>May cause discomfort if swallowed.</i>	



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Cement may contain trace amounts of free crystalline silica.
Prolonged exposure to respirable free silica can aggravate other lung conditions and cause silicosis, a disabling and potentially fatal lung disease.
Exposure to portland cement may cause irritation to the moist mucous membranes of the nose, throat, and upper respiratory system.
It may also leave unpleasant deposits in the nose.

2.3.4. Inhalation

May cause cancer by inhalation.
Although small quantities of dust are not known to be harmful, ill effects are possible if larger quantities are consumed.
Portland cement should not be eaten.

2.3.5. Long term effects

May cause sensitization by inhalation and skin contact.
Repeated and long term exposure may cause skin dryness or cracking.

2.3.6. Adverse Environmental Effects

Take the necessary precautions if the spread of the environment and should act in accordance with local regulations.
Cement can harden within 2-3 hours if it is touch with water. So, this product should not be discharged into the water channels.

2.4. Additional Information

Full text of R-, H- and EUH-phrases: see section 16

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Description Of The Substance

- PUZZOLANIC CEMENT (CEM IV/B (P-V) 32.5 N) - Puzzolanic cement consist of grey clinker, fly ash and puzzolan.
- The clinker contains four main phases which are tricalcium silicate, dicalcium silicate, and tricalcium aluminate and tetra calcium alumina ferrite.
- Minor amounts of alkalis and sulphates and trace amount of chloride are also present in cement.

3.2 Hazardous ingredients

NAME	EINECS NO	CAS NO.	CONTENT	CLASSIFICATION	
				DSD	CLP
Grey Clinker	266-043-4	65997-15-1	% 45-64	Xi;R38,R41	DANGER Skin Corr./Irr. Cat 2;H315 Ser.Eye Dam./Eye Irr.Cat1; H318
Ashes (residues)	268-627-4	68131-74-8	% 31-50	This substance is not classified as dangerous according to the EC Regulations 67/548/EEC and 1272/2008/EC	
Puzzolan	-	71243-67-9		This substance is not classified as dangerous according to the EC Regulations 67/548/EEC and 1272/2008/EC	

3.3 Additional information

- Full text of R-, H- and EUH-phrases: see section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

4.1.1 General information



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	<ul style="list-style-type: none"> Remove contaminated or saturated clothing. 	
4.1.2	Following inhalation	
	<ul style="list-style-type: none"> Take affected persons out into the fresh air. Seek medical help if coughing and other symptoms do not subside. 	
4.1.3	Following skin contact	
	<ul style="list-style-type: none"> Wash skin with cool water and pH-neutral soap or a mild detergent. Seek medical treatment in all cases of prolonged exposure to wet cement, cement mixtures, liquids from fresh cement products, or prolonged wet skin exposure to dry cement. 	
4.1.4	Following eye contact	
	<ul style="list-style-type: none"> Immediately flush eyes thoroughly with water. Continue flushing eye for at least 15 minutes, including under lids, to remove all particles. Call physician immediately. 	
4.1.5	Following ingestion	
	<ul style="list-style-type: none"> Do not induce vomiting. If conscious, have the victim drink plenty of water and call a physician immediately. If symptoms persist, call a physician 	
4.1.6	Self-protection of the first aider	
	<ul style="list-style-type: none"> Protect skin and eyes. 	
4.1.7	Notes for the doctor	
	<p>Symptoms :</p> <ul style="list-style-type: none"> irritation eyes, skin, nose; cough, expectoration; exertional dyspnea (breathing difficulty), wheezing, chronic bronchitis; dermatitis <p>Medical conditions which may be aggravated be, inhalation or dermal exposure:</p> <ul style="list-style-type: none"> Pre-existing upper respiratory and lung diseases. Unusual (hyper) sensitivity to hexavalent chromium (chromium+6) salts. 	

5. FIRE-FIGHTING MEASURES

5.1 General Information and Flammable Properties

- The product itself does not burn.
- Noncombustible Solid

5.2 Extinguishing media:

It is compatible with standard firefighting technique (e.g. use of water, carbon dioxide, dry powder, sand and chemical foam extinguishers).

Suitable extinguishing media

Unsuitable extinguishing media

- Solid streams of water may be ineffective.

5.3 Special hazards arising from the product

- Decomposition may produce toxic fumes of: silicon dioxide (SiO₂), metal oxides.
- May emit poisonous fumes.
- May emit corrosive fumes.



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5.4 Advice for fire-fighters

- Employ protective equipment commonly used in the event of fire.

5.5 Additional information

- Water used to extinguish fire should not enter drainage systems, soil, or stretches of water.
- Ensure there are sufficient retaining facilities for water used to extinguish fire.
- Contaminated fire-extinguishing water must be disposed of in accordance with the regulations issued by the appropriate local authorities

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

- Ensure adequate ventilation.
- Avoid actions that cause dust to become airborne.
- Avoid inhalation of dust and contact with skin.
- Wear personal protective equipment;
- See section 8.

6.2 Environmental precautions

- Try to prevent the material from entering drains or water courses.
- Do not let product enter drains.
- Spillages or uncontrolled discharges into watercourses must be alerted to the Environmental Agency or other appropriate regulatory body.

6.3 Methods and material for containment and cleaning up

6.3.1 For containment

- Isolate hazarded area.
- Keep unnecessary and unprotected personnel from entering.
- Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local / national regulations.

6.3.2 For cleaning up

- Collect dry material using a scoop
- Pick up mechanically and collect in a suitable container.
- Avoid formation of dust.
- Scrape up wet material and place in an appropriate container.
- Allow the material to "dry" before disposal.

6.3.3 Other information

- Do not attempt to wash portland cement down drains.
- Dispose of waste material according to local, state and federal regulations.

6.4 Reference to other sections

- Dispose of contaminated material as waste in accordance with section 13.
- See Section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling



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7.1.1 Protective measures

Personal preventions

- No particular measures required if used correctly.
- Ensure there is good room ventilation.
- Do not breathe dust.

Fire preventions

- No data available.

Aerosol and dust generation preventions:

- Avoid production of dust.

Environmental precautions:

- Ensure adequate ventilation.
- Dispose of waste material according to local, state and federal regulations.

7.1.2 Advice on general occupational hygiene

- Do not eat, drink, or smoke in areas where the material is used.
- Wash thoroughly after handling the material.
- Remove contaminated clothing and protective equipment before entering eating areas.
- Promptly remove dusty clothing or clothing which is wet with cement fluids and launder before reuse.
- Wash thoroughly after exposure to dust or wet cement mixtures or fluids.

7.2 Conditions for safe storage, including any incompatibilities

- Keep portland cement dry until used.
- Normal temperatures and pressures do not affect the material.
- Keep containers tightly closed in a dry, cool and well-ventilated place.

STORAGE INCOMPATIBILITY

- Calcium oxide:
 - reacts violently with water, evolving high quantities of heat
 - reacts violently, with possible ignition or explosion, with acids, anilinium perchlorate, bromine pentafluoride, chlorine trifluoride, fluorine, hydrogen fluoride, hydrazine, hydrogen sulfide, hydrogen trisulfide, isopropyl isocyanide dichloride, light metals, lithium, magnesium, powdered aluminium, phosphorus, potassium, sulfur trioxide increase the explosive sensitivity of azides, nitro alkanes (e.g. nitroethane, nitromethane, 1-nitropropane etc.)
 - is incompatible with boric acid, boron trifluoride, carbon dioxide, ethanol, halogens (such as fluorine), metal halides, phosphorus pentoxide, selenium oxychloride, sulfur dioxide and many organic materials
 - Metals and their oxides or salts may react violently with chlorine trifluoride and bromine trifluoride.
 - These trifluorides are hypergolic oxidizers. They ignites on contact (without external source of heat or ignition) with recognized fuels - contact with these materials, following an ambient or slightly elevated temperature, is often violent and may produce ignition.
 - The state of subdivision may affect the results.
 - Avoid strong acids, acid chlorides, acid anhydrides and chloroformates.
 - Avoid contact with copper, aluminium and their alloys.

7.1 Advice on common storage



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- Keep away from food, drink and animal feeding stuffs.
- Store in original containers.
- Keep containers securely sealed.
- Store in a cool, dry, well-ventilated area.
- Store away from incompatible materials and foodstuff containers.
- Protect containers against physical damage and check regularly for leaks.
- Observe manufacturer's storing and handling recommendations.

7.2 Specific precautions on storage

- Observe the national and local regulations concerning handling and storage.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters

Preventive industrial and medical examinations must be carried out according to the application area.

8.1.1 Occupational exposure limits

Substance Name	EINECs No	CAS No.	Limit Value Type (Country of Origin)	Occupational exposure limit value				Special	Source
				Long Term TWA ³ (8 Hr.)		Short Term STEL ⁴ (15 Min)			
				mg/m ³ ⁵	ppm ⁶	mg/m ³	ppm		
Portland Cement Clinker	266-043-4	65997-15-1	TLV (US)	10	-	15 (total) 5 (Respirable)	-	ACGIH OSHA	

- The concentration of dust, for application of respirable dust limits, is to be determined from the fraction that penetrates a separator whose size collection efficiency is described by a cumulative log-normal function with a median aerodynamic diameter of 4.0 μm (+-) 0.3 μm and with a geometric standard deviation of 1.5 μm (+-) 0.1 μm , i.e. generally less than 5 μm .
- Portland cement is considered to be a nuisance dust that does not cause fibrosis and has little potential to induce adverse effects on the lung.
- According to current knowledge this concentration should neither impair the health of, nor cause undue discomfort to, nearly all workers.
- These Exposure Standards are guides to be used in the control of occupational health hazards.
- All atmospheric contamination should be kept to as low a level as is workable.
- These exposure standards should not be used as fine dividing lines between safe and dangerous concentrations of chemicals.
- They are not a measure of relative toxicity.

8.2 Exposure controls

8.2.1 Appropriate engineering controls:

- Eventual aspiration in case of dusts.
- Technical protection measures have always priority over personal protection equipment.
- See Section 7

8.2.2 Personal protection equipment

8.2.2.1 Eye / Face protection:

- Where potentially subject to splashes or puffs of cement, wear safety glasses with side shields or goggles.
- In extremely dusty environments and unpredictable environments wear unvented or indirectly vented goggles to avoid eye irritation or injury.
- Contact lenses should not be worn when working with portland cement or fresh cement products.





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8.2.2.2 Skin protection

Hand protection

- Handle with gloves.
- Recommended: suitable protective gloves e.g. nitrile-butadiene rubber (NBR) gloves.
- Prevention is essential to avoiding potentially severe skin injury. Avoid contact with unhardened portland cement. If contact occurs, promptly wash affected area with soap and water. Where prolonged exposure to unhardened portland cement products might occur, wear impervious clothing and gloves to eliminate skin contact.
- Wear sturdy boots that are impervious to water to eliminate foot and ankle exposure.
- Do not rely on barrier creams: barrier creams should not be used in place of gloves.
- Periodically wash areas contacted by dry portland cement or by wet cement or concrete fluids with a pH neutral soap. Wash again at the end of work. If irritation occurs, immediately wash the affected area and seek treatment. If clothing becomes saturated with wet concrete, it should be removed and replaced with clean dry clothing.



Body protection

- Safety shoes.

Other protection

- Handle in accordance with good industrial hygiene and safety practice.
- Wash hands before breaks and at the end of workday.
- Wash thoroughly after using product.
- Wash hands before eating or drinking.



8.2.2.3 Respiratory protection

- Avoid actions that cause dust to become airborne.
- Use local or general exhaust ventilation to control exposures below applicable exposure limits.
- Use NIOSH/MSHA approved (under 30 CFR 11) or NIOSH approved (under 42 CFR 84) respirators in poorly ventilated areas, if an applicable exposure limit is exceeded, or when dust causes discomfort or irritation. (Advisory: Respirators and filters purchased after June 10, 1998 must be certified under 42 CFR 84.)



Respirator Recommendations

NIOSH

Up to 50 mg/m3:

(APF = 5) Any quarter-mask respirator.

Up to 100 mg/m3:

(APF = 10) Any particulate respirator equipped with an N95, R95, or P95 filter (including N95, R95, and P95 filtering facepieces) except quarter-mask respirators. The following filters may also be used: N99, R99, P99, N100, R100, P100.

(APF = 10) Any supplied-air respirator

Up to 250 mg/m3:

(APF = 25) Any supplied-air respirator operated in a continuous-flow mode

(APF = 25) Any powered, air-purifying respirator with a high-efficiency particulate filter.

Up to 500 mg/m3:

(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100



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filter.

(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode

(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter

(APF = 50) Any self-contained breathing apparatus with a full facepiece

(APF = 50) Any supplied-air respirator with a full facepiece

Up to 5000 mg/m3:

(APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:

(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter. Any appropriate escape-type, self-contained breathing apparatus

8.2.3 Environmental exposure controls

- Legislation for the protection of the environment must be met in full.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Important health, safety and environmental information

9.2 Appearance

Form/Physical state	Particulate Grey Powder
Color	Gray
Odor	Odorless

9.3 Safety relevant basic data

	Value
pH (in water)	12-13
Freezing point/range (°C)	N/A
Boiling point/range (°C)101,3 kPa	N/A
Flash Point (°C)closed cup	Not Known
Ignition temperature (°C)	N/A
Specific Gravity (H2O=1)	2,74-2,84
Density (kg/m ³)	1000 – 1200
Solubility in water %	N/A
Partition coefficient n-Octanol/Water (log Po/w)	N/A
Explosive Property	None explosive
Oxidation Property	None
Seed size, Micron	1-100

Note: The above features were determined according to prescribed methods at the Classification, Packaging and Labeling of Hazardous. Substances Regulation Section A-3 or a method comparable to the other.



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10. STABILITY AND REACTIVITY

10.1 Reactivity

10.2 Chemical stability

- Stable.

10.3 Possibility of hazardous reactions

- No dangerous reaction known under conditions of normal use.

10.4 Conditions to avoid:

- Avoid contact with humidity and strong acids.

10.5 Incompatible materials:

- Wet Portland cement is alkaline.
- As such it is incompatible with acids, ammonium salts and phosphorous.

10.6 Hazardous decomposition products:

- Will not spontaneously occur.
- Adding water produces (caustic) calcium hydroxide

10.7 Hazardous polymerization:

- Will not occur.

11. TOXICOLOGICAL INFORMATION

11.1 General Information

- Exposure Routes: inhalation, ingestion, skin and/or eye contact
- Symptoms or effects that may arise if the product is mishandled and overexposure occurs are: please refer to health Effects Section for acute effects.

11.2 Acute toxicity

- Portland Cement (CAS# 65997-15-1)
LD50 : No data available
IDLHs⁷: 5000 mg/m³

11.3 Skin corrosion/irritation and Eye damage/irritation:

- Irritating to skin and mucous membranes.
- Risk of serious damage to eyes.

11.4 CMR effects (Carcinogenity) :

- Portland cement is not listed as a carcinogen by NTP, OSHA, or IARC. It may however, contain trace amounts of substances listed as carcinogens by these organizations.
- Portland Cement may contain crystalline silica.
Crystalline silica is classified by the IARC as a known human carcinogen. Some human studies indicate potential for lung cancer from crystalline silica exposure.
Risk depends on duration and level of exposure.

11.5 CMR effects (Mutagenicity and Toxicity for reproduction) :

- Reason for no classification: conclusive but not sufficient for classification

11.6 Other Toxicological Effects:

Allergic Effects	No data available
Effects on Repeated Doses	Repeated or prolonged exposure to corrosives may result in the



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<i>Chronic Exposures</i>	<p><i>erosion of teeth, inflammatory and ulcerative changes in the mouth and necrosis (rarely) of the jaw. Bronchial irritation, with cough, and frequent attacks of bronchial pneumonia may ensue. Gastrointestinal disturbances may also occur. Chronic exposures may result in dermatitis and/or conjunctivitis. Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure.</i></p> <p><i>Cement dermatitis can be characterised by fissures, eczematous rash, dystrophic nails, and dry skin; acute contact with highly alkaline mixtures may cause localised necrosis.</i></p> <p><i>Cement eczema may be due to chromium in feed stocks or contamination from materials of construction used in processing the cement. Repeated, prolonged severe inhalation exposure may cause pulmonary oedema and rarely, pulmonary fibrosis. Workers may also suffer from dust-induced bronchitis with chronic bronchitis reported in 17% of a group occupationally exposed to high dust levels.</i></p> <p><i>Respiratory symptoms and ventilatory function were studied in a group of 591 male Portland cement workers employed in four Taiwanese cement plants, with at least 5 years of exposure (1). This group had a significantly lowered mean forced vital capacity (FCV), forced expiratory volume at 1 s (FEV1) and forced expiratory flows after exhalation of 50% and 75% of the vital capacity (FEF50, FEF75). The data suggests that occupational exposure to Portland cement dust may lead to a higher incidence of chronic respiratory symptoms and a reduction of ventilatory capacity.</i></p> <p><i>Chun-Yuh et al; Journal of Toxicology and Environmental Health 49: 581-588, 1996.</i></p> <p><i>Red blood cells and rabbit alveolar macrophages exposed to calcium silicate insulation materials in vitro showed haemolysis in one study but not in another. Both studies showed the substance to be more cytotoxic than titanium dioxide but less toxic than asbestos. In a small cohort mortality study of workers in a wollastonite quarry, the observed number of deaths from all cancers combined and lung cancer were lower than expected. Wollastonite is a calcium inosilicate mineral (CaSiO₃). In some cases, small amounts of iron (Fe), and manganese (Mn), and lesser amounts of magnesium (Mg) substitute for calcium (Ca) in the mineral formulae (e.g., rhodonite)</i></p> <p><i>In an inhalation study in rats no increase in tumour incidence was observed but the number of fibres with lengths exceeding 5 µm and a diameter of less than 3 µm was relatively low. Four grades of wollastonite of different fibre size were tested for carcinogenicity in one experiment in rats by intrapleural implantation. There was no information on the purity of the four samples used. A slight increase in the incidence of pleural sarcomas was observed with three</i></p>
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grades, all of which contained fibres greater than 4 µm in length and less than 0.5 µm in diameter.

In two studies by intraperitoneal injection in rats using wollastonite with median fibre lengths of 8.1 µm and 5.6 µm respectively, no intra-abdominal tumours were found.

Evidence from wollastonite miners suggests that occupational exposure can cause impaired respiratory function and pneumoconiosis. However animal studies have demonstrated that wollastonite fibres have low biopersistence and induce a transient inflammatory response compared to various forms of asbestos. A two-year inhalation study in rats at one dose showed no significant inflammation or fibrosis.

Overexposure to respirable dust may cause coughing, wheezing, difficulty in breathing and impaired lung function. Chronic symptoms may include decreased vital lung capacity, chest infections

Repeated exposures, in an occupational setting, to high levels of fine- divided dusts may produce a condition known as pneumoconiosis which is the lodgement of any inhaled dusts in the lung irrespective of the effect. This is particularly true when a significant number of particles less than 0.5 microns (1/50,000 inch), are present. Lung shadows are seen in the X-ray. Symptoms of pneumoconiosis may include a progressive dry cough, shortness of breath on exertion (exertional dyspnea), increased chest expansion, weakness and weight loss. As the disease progresses the cough produces a stringy mucous, vital capacity decreases further and shortness of breath becomes more severe. Other signs or symptoms include altered breath sounds, diminished lung capacity, diminished oxygen uptake during exercise, emphysema and pneumothorax (air in lung cavity) as a rare complication.

Removing workers from possibility of further exposure to dust generally leads to halting the progress of the lung abnormalities. Where worker-exposure potential is high, periodic examinations with emphasis on lung dysfunctions should be undertaken

Dust inhalation over an extended number of years may produce pneumoconiosis.. Pneumoconiosis is the accumulation of dusts in the lungs and the tissue reaction in its presence. It is further classified as being of noncollagenous or collagenous types. Noncollagenous pneumoconiosis, the benign form, is identified by minimal stromal reaction, consists mainly of reticulin fibres, an intact alveolar architecture and is potentially reversible.

Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a



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	<p><i>non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.</i></p>
Sensitization	<p><i>As long as material is used within shelf life sensitization is not to be expected.</i></p> <p><i>There is some evidence that inhaling this product is more likely to cause a sensitisation reaction in some persons compared to the general population.</i></p> <p><i>There is limited evidence that, skin contact with this product is more likely to cause a sensitisation reaction in some persons compared to the general population.</i></p> <p><i>Cement contact dermatitis (CCD) may occur when contact shows an allergic response, which may progress to sensitisation.</i></p> <p><i>Sensitisation is due to soluble chromates (chromate compounds) present in trace amounts in some cements and cement products.</i></p> <p><i>Soluble chromates readily penetrate intact skin.</i></p> <p><i>Sensitisation to chromium may be the leading cause of nickel and cobalt sensitivity and the high alkalinity of cement is an important factor in cement dermatoses [ILO].</i></p>
Developmental Toxicity (Teratogenicity)	None
Fertility	None
Toxicokinetics	No data available
11.7 STOT-single/repeated exposures:	
STOT-single exposure	Eyes, skin, respiratory system
STOT-repeated exposure	Eyes, skin, respiratory system
11.8 Symptoms related to the physical, chemical and toxicological characteristics:	
In case of inhalation	<p><i>May cause cancer by inhalation. Although small quantities of dust are not known to be harmful, ill effects are possible if larger quantities are consumed. Portland cement should not be eaten.</i></p>
In case of skin contact	<p><i>Irritating to skin. Discomfort or pain cannot be relied upon to alert a person to hazardous skin exposure. Consequently, the only effective means of avoiding skin injury or illness involves minimizing skin contact, particularly with wet cement. Exposed persons may not feel discomfort until hours after the exposure has</i></p>



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	<p>ended and significant injury has occurred. Dry portland cement contacting wet skin or exposure to moist or wet portland cement may cause more severe skin effects including thickening, cracking or fissuring of the skin. Prolonged exposure can cause severe skin damage in the form of (alkali) chemical burns. Some individuals may exhibit an allergic response upon exposure to portland cement, possibly due to trace elements of chromium. The response may appear in a variety of forms ranging from a mild rash to severe skin ulcers. Persons already sensitized may react to their first contact with the product. Other persons may first experience this effect after years of contact with Portland cement products.</p>
In case of eye contact	<p>Risk of serious damage to eyes. Exposure to airborne dust may cause immediate or delayed irritation or inflammation. Eye contact by large amounts of dry powder or splashes of wet portland cement may cause effects ranging from moderate eye irritation to chemical burns or blindness. Such exposures require immediate first aid (see Section 4) and medical attention to prevent significant damage to the eye.</p>
In case of ingestion	<p>May cause discomfort if swallowed. Portland cement may contain trace amounts of free crystalline silica. Prolonged exposure to respirable free silica can aggravate other lung conditions and cause silicosis, a disabling and potentially fatal lung disease. Exposure to portland cement may cause irritation to the moist mucous membranes of the nose, throat, and upper respiratory system. It may also leave unpleasant deposits in the nose.</p>

11.9 Additional Toxicological Information:

- Toxicological classifications are based on available knowledge and information
- EEC classification: Xi: Irritant (Irritating to skin. Risk of serious damage to eyes)
- The special effects to health are considered by taking into account the information in section 3.
- RTECS (Portland Cement) : VV8770000

12. ECOLOGICAL INFORMATION

12.1 Ecotoxicity:

DICALCIUM SILICATE: CALCIUM IRON ALUMINATE CA₂FEAL₂O₅: MAGNESIUM OXIDE: CALCIUM SILICATE CA₃SI₂O₅:

Metal-containing inorganic substances generally have negligible vapour pressure and are not expected to partition to air. Once released to surface waters and moist soils their fate depends on solubility and dissociation in water. Environmental processes (such as oxidation and the presence of acids or bases) may transform insoluble metals to more soluble ionic forms. Microbiological processes may also transform insoluble metals to more soluble forms. Such ionic species may bind to dissolved ligands or sorb to solid particles in aquatic or aqueous media. A significant proportion of dissolved/ sorbed metals will end up in sediments through the settling of suspended particles. The remaining metal ions can then be taken up by aquatic organisms.

When released to dry soil most metals will exhibit limited mobility and remain in the upper layer; some will leach locally into ground water and/ or surface water ecosystems when soaked by rain or melt ice. Environmental processes may also be important in changing solubilities.



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Even though many metals show few toxic effects at physiological pHs, transformation may introduce new or magnified effects.

A metal ion is considered infinitely persistent because it cannot degrade further.

The current state of science does not allow for an unambiguous interpretation of various measures of bioaccumulation.

The counter-ion may also create health and environmental concerns once isolated from the metal.

Under normal physiological conditions the counter-ion may be essentially insoluble and may not be bioavailable. Environmental processes may enhance bioavailability.

DICALCIUM SILICATE: CALCIUM ALUMINATE ALO₃. 3/2CA: CALCIUM IRON ALUMINATE CA₂FEALO₅: GYPSUM: CALCIUM OXIDE: MAGNESIUM OXIDE: CALCIUM SILICATE CA₃SIO₅: DO NOT discharge into sewer or waterways.

for inorganic sulfates:

Environmental fate:

Data from tap water studies with human volunteers indicate that sulfates produce a laxative effect at concentrations of 1000 - 1200 mg/litre, but no increase in diarrhoea, dehydration or weight loss. The presence of sulfate in drinking-water can also result in a noticeable taste; the lowest taste threshold concentration for sulfate is approximately 250 mg/litre as the sodium salt. Sulfate may also contribute to the corrosion of distribution systems. No health-based guideline value for sulfate in drinking water is proposed. However, there is an increasing likelihood of complaints arising from a noticeable taste as concentrations in water increase above 500 mg/litre.

Sulfates are removed from the air by both dry and wet deposition processes. Wet deposition processes including rain-out (a process that occurs within the clouds) and washout (removal by precipitation below the clouds) contribute to the removal of sulfate from the atmosphere.

In soil, the inorganic sulfates can adsorb to soil particles or leach into surface water and groundwater. Sulfates can be taken up by plants and be incorporated into the parenchyma of the plant.

Sulfate in water can also be reduced by sulfate bacteria (Thiobacilli) which use them as a source of energy.

In anaerobic environments sulfate is biologically reduced to (hydrogen) sulfide by sulfate reducing bacteria, or incorporated into living organisms as source of sulfur, and thereby included in the sulfur cycle. Sodium sulfate is not reactive in aqueous solution at room temperature. Sodium sulfate will completely dissolve, ionise and distribute across the entire planetary "aquasphere". Some sulfates may eventually be deposited, the majority of sulfates participate in the sulfur cycle in which natural and industrial sodium sulfate are not distinguishable The BCF of sodium sulfate is very low and therefore significant bioconcentration is not expected. Sodium and sulfate ions are essential to all living organisms and their intracellular and extracellular concentrations are actively regulated. However some plants (e.g. corn and Kochia Scoparia), are capable of accumulating sulfate to concentrations that are potentially toxic to ruminants.

Ecotoxicity:

For sulfate in general:

Fish LC50: toxic from 7000 mg/l

Bacteria: toxic from 2500 mg/l

Algae were shown to be the most sensitive to sodium sulfate; EC50 120 h = 1,900 mg/l. For invertebrates (Daphnia magna) the EC50 48 h = 4,580 mg/l and fish appeared to be the least sensitive with a LC50 96h = 7,960 mg/l for Pimephales promelas. Activated sludge showed a very low sensitivity to sodium sulfate. There was no effect up to 8 g/l. Sodium sulfate is not very toxic to terrestrial plants. Picea banksiana was the most sensitive species, an effect was seen at 1.4 g/l. Sediment dwelling organisms were not very sensitive either, with an LC50 96h = 660 mg/l for Trycorythus sp. Overall it can be concluded that sodium sulfate has no acute adverse effect on



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aquatic and sediment dwelling organisms.

Toxicity to terrestrial plants is also low.

No data were found for long term toxicity. The acute studies all show a toxicity of sodium sulfate higher than 100 mg/l, no bioaccumulation is expected,

12.2 Photo degradation

No data available.

12.3 Effects on Waste Water Treatment Plants

Product has inhibitory effects on the activities of micro-organisms, whether the information is not related, the likely impact on waste water treatment plants is unknown.

12.4 Mobility

Solid (Powder).

Solubility in water: N/A

Refer to ecotoxicity.

<i>Water threat class</i>	<i>No data available</i>
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<i>Clean Water Impact</i>	<i>No data available</i>
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<i>Known or predicted environmental distribution</i>	<i>No data available</i>
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12.5 Results of PBT and vPvB assessment

<i>Biotic</i>	
<i>Ready biodegradability:</i>	<i>Not applicable</i>
<i>Abiotic:</i>	
<i>Hydrolysis as a function of pH:</i>	<i>Not applicable</i>
<i>Photolysis:</i>	<i>Not applicable</i>
<i>Atmospheric oxidation:</i>	<i>Not applicable</i>

· **Persistence and degradability:**

<i>Decomposition Potential of the products</i>	<i>None.</i>
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<i>The half-life of degradation</i>	<i>Not known</i>
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<i>Potential degradation of product content in the evaluation of wastewater treatment plants</i>	<i>No data available</i>
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· **Bioaccumulation Potential :**

<i>Biological environment (biota) accumulation potential</i>	<i>Not applicable</i>
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<i>Potential - nutrients pass through</i>	<i>Not applicable</i>
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<i>Reference Values - Log K_{ow} , S_w and BCF</i>	<i>No data available</i>
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12.6 Additional information

- Aquatic toxicity: Do not cause any long-term adverse effects in the aquatic environment*
- Do not allow to be released into the environment*
- See the sections 6, 7, 13, 14 and 15.*

13. DISPOSAL CONSIDERATIONS

13.1 Product / Packaging disposal

- Disposal according to local authority regulations.*

13.2 Contaminated packaging

- If there is product residue in the emptied container, follow directions for handling on the container's label.*
- Contaminated packaging must be emptied of all residues and can be recycled following appropriate cleaning.*



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- Avoid dust formation.

13.3 Disposal Methods

- Dispose of chemicals waste or in accordance with local regulations.
- Follow all applicable local laws, rules and regulations regarding the proper disposal of this material.
- If this product has been altered or contaminated with other hazardous materials, appropriate waste analysis may be necessary to determine proper method for disposal.

13.4 European Waste Catalogue

- Hardens after contact with water, hardened material can be disposed of as construction and demolition waste – concrete (EWC-Code 170101).
- The listed waste number according to the European Waste Code (EWC) is a recommendation.
- Uncleaned packaging must be disposed of in accordance with official local regulations (EWC-Code 150105 composite packaging (Paper/PE-foil)).
- The final classification has to be done together with the local waste disposal company / authority.

14. TRANSPORT INFORMATION

	ADR ⁸ /RID ⁹	ADNR	IMDG ¹⁰	ICAO ¹¹ /IATA ¹²
TRANSPORTATION	Road	River	Marine	Airways
PROPER SHIPPING NAME	Not classified as dangerous in the meaning of transport regulations.			
UN/ID No.	-	-	-	-
CLASS	-	-	-	-
PACKAGING GROUP				
LABELLING NO	-			
CLASSIFICATION CODE	-	-	-	-
HAZARD NO (HIN NO)	-			
EmS			-	
MARINE Pollutant			-	

Road Transport Notes: This product is NOT regulated as a hazardous material.

15. REGULATORY INFORMATION

15.1 Safety, Health And Environmental Regulations / Legislation Specific For The Substance portland cement (CAS: 65997-15-1) is found on the following regulatory lists;

- "European Union - European Inventory of Existing Commercial Chemical Substances (EINECS) (English)",
- "OECD Representative List of High Production Volume (HPV) Chemicals",
- "UK Workplace Exposure Limits (WELs)"

Regulations for ingredients

calcium silicate Ca₃SiO₅ (CAS: 12168-85-3) is found on the following regulatory lists;

- "European Union - European Inventory of Existing Commercial Chemical Substances (EINECS) (English)", "OECD Representative List of High Production Volume (HPV) Chemicals"

dicalcium silicate (CAS: 10034-77-2) is found on the following regulatory lists;

- "European Chemicals Agency (ECHA) List of substances identified for registration in 2010"
- "European Union - European Inventory of Existing Commercial Chemical Substances"



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(EINECS) (English)"

calcium aluminate $AlO_3 \cdot 3/2Ca$ (CAS: 12042-78-3,161063-05-4) is found on the following regulatory lists;

- "European Chemicals Agency (ECHA) List of substances identified for registration in 2010",
- "European Customs Inventory of Chemical Substances (English)",
- "European Union – European Inventory of Existing Commercial Chemical Substances (EINECS) (English)"

calcium iron aluminate Ca_2FeAlO_5 (CAS: 12068-35-8) is found on the following regulatory lists;

- "European Union – European Inventory of Existing Commercial Chemical Substances (EINECS) (English)"

calcium oxide (CAS: 1305-78-8) is found on the following regulatory lists;

- "CODEX General Standard for Food Additives (GSFA) - Additives Permitted for Use in Food in General, Unless Otherwise Specified, in Accordance with GMP",
- "EU Directive 2002/72/EC Plastic materials and articles intended to come into contact with foodstuffs - Annex III Section A Incomplete list of additives fully harmonised at Community level",
- "European Chemicals Agency (ECHA) List of substances identified for registration in 2010", "European Customs Inventory of Chemical Substances (English)",
- "European Union - European Inventory of Existing Commercial Chemical Substances (EINECS) (English)",
- "European Union (EU) Inventory of Ingredients used in Cosmetic Products",
- "International Council of Chemical Associations (ICCA) - High Production Volume List",
- "OECD Representative List of High Production Volume (HPV) Chemicals",
- "UK Workplace Exposure Limits (WELs)"

magnesium oxide (CAS: 1309-48-4) is found on the following regulatory lists;

- "CODEX General Standard for Food Additives (GSFA) - Additives Permitted for Use in Food in General, Unless Otherwise Specified, in Accordance with GMP",
- "EU Directive 2002/72/EC Plastic materials and articles intended to come into contact with foodstuffs - Annex III Section A Incomplete list of additives fully harmonised at Community level",
- "European Chemicals Agency (ECHA) List of substances identified for registration in 2010",
- "European Customs Inventory of Chemical Substances (English)",
- "European Union - European Inventory of Existing Commercial Chemical Substances (EINECS) (English)"
- "European Union (EU) Inventory of Ingredients used in Cosmetic Products",
- "International Council of Chemical Associations (ICCA) - High Production Volume List",
- "OECD Representative List of High Production Volume (HPV) Chemicals",
- "UK Workplace Exposure Limits (WELs)"

This safety data sheet is in compliance with the following EU legislation and its adaptations – as far as applicable - :

- 1907/2006/EC ,67/548/EEC, 1999/45/EC, 76/769/EEC, 98/24/EC, 92/85/EEC, 94/33/EC, 91/689/EEC, 1999/13/EC,

15.2 Chemical Safety Assessment

15.2.1 HAZARD



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CLP classification according to Annex VI of CLP (Regulation (EC) No 1272/2008)

- Causes skin irritation.
- Causes serious eye irritation.

15.2.2 RISK

Risk Codes:

- Irritating to skin.
- Risk of serious damage to eyes.

15.3 Label Elements

- This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006 and ISO 11014:2009. This product is classified according to EU Directive 67/548/EC and GHS/CLP.
- System of specific information relating to Dangerous Preparations: 2001/58/EC as amended by Directive 93/112/EC, 2001/58/EC and 2006/8/EC.

16. OTHER INFORMATION

16.1 Other information

- For additional information regarding **BURSA CIMENTO FABRIKASI A.S** Products please contact the **BURSA CIMENTO FABRIKASI A.S** Technical Services Department +90 224 372 15 60
- The above information complies with the 199/45/EC and 1907/2006 Directives and their amendments.
- In all cases of potential poisoning supportive therapy is of the utmost importance.
- If medical professionals require advice regarding first aid treatment, all **BURSA CIMENTO FABRIKASI A.S** products are registered with the Turkish National Poisons Unit (UZEM), UZEM local telephone no : 114

16.2 Related Person

- M.Bilgin ATAÇ - b.atac@bursacimento.com.tr BURSA CIMENTO FABRIKASI A.S
- Prepared by : M. Selcuk Bilgin - Doruk Chemical Management Systems Ltd. www.msdsmarket.com
- Competent Person Accreditation no: TSE GBF-0348 25/5/2009-TR
- info@msdsmarket.com (contact for further information if needed)

16.3 Revision Date, Version and SDS no

- Date : May 27th , 2011
- Version : 1.0/EN
- MSDS No : SDS/005

16.4 Reason of re-issue

- First revision

16.5 Relevant R-, H- and EUH-phrases (number and full text):

H302	Harmful if swallowed
H315	Causes skin irritation.
H318	Causes serious eye damage.
H319	Causes serious eye irritation
H335	May cause respiratory irritation



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R22	<i>Harmful if swallowed.</i>
R36/38	<i>Irritating to eyes and skin</i>
R37/38	<i>Irritating to respiratory system and skin.</i>
R38	<i>Irritating to skin</i>
R41	<i>Risk of serious damage to eyes</i>

16.6 Legal disclaimer

- *The purpose of the above information is to describe the products only in terms of health and safety requirements.*
- *The information given should not, therefore, be construed as guaranteeing specific properties or as specification.*
- *Customers should satisfy themselves as to the suitability and completeness of such information for their own particular use.*
- *The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication.*
- *The above information relates only to the specific material(s) designated herein and may not be valid for such material(s) used in combination with any other materials or in any process or if the material is altered or processed, unless specified in the text.*
- *The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. Due to the many factors outside our control when using this product, we cannot accept liability for any injury, accident, loss or damage caused through its use.*

¹ CLP: Classification Labelling and Packaging

² GHS: Global Harmonised System

³ TWA : A Time-Weighted Average

⁴ STEL : A Short Term Exposure Limit

⁵ Mg/m³: the amount of the Material in milliliters in 1 m³ air At 20 °C & 101, 3 KPa.

⁶ Ppm: parts per million, the amount of the Material in milliliters in 1 m³ air. (ml/m³)

⁷ IDLHs: Dangerous To Life or Health Concentrations

⁸ ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road

⁹ RID: Regulations Concerning the International Transport of Dangerous Goods by Rail

¹⁰ IMDG: International Maritime Code for Dangerous Goods

¹¹ ICAO: International Civil Aviation Organization

¹² IATA: International Air Transport Association