



Material Safety data sheet

Calcium Chloride

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY

1.1 Product Identifier

Product Name Calcium Chloride Flake 77%

Trade Name CC Tech® 77%

REACH Registration Number 01-2119494219-28-XXXX

Index Number 017-013-00-2

CAS Number 10043-52-4

EINECS Number 233-140-8

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

Identified use(s)

Dust suppression, process aid during oil drilling, dehumidifying, road de-icing, food additive, cooling media.

No uses advised against are identified.

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

2.1.1 Regulation 1272/2008 (CLP)

Serious eye damage/eye irritation, Hazard Category 2; H319 Causes serious eye irritation.

2.2 Label elements

2.2.1 According to Regulation (EC) No. 1272/2008 (CLP).

Hazard Pictogram



Signal word: Warning.

Hazard statements

H319: Causes serious eye irritation

Precautionary statements

P280: Wear protective gloves/protective clothing/eye protection/face protection

P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing

P337+P313: If eye irritation persists: Get medical attention.

Other labels

Content: Calcium chloride 75 – 99%

2.3 Other hazards

This product can cause minor skin irritation and dry skin

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.2 Mixtures

EC No.	CAS No.	REACH Reg. No.	Component	Conc. wt/wt %	Classification (CLP)
233-140-8	10043-52-4	01-2119494219-28-XXXX	Calcium chloride	75 – 99	Eye irritation, Category 2; H319
-	10035-04-8		Calcium chloride dihydrate	varying	Eye irritation, Category 2; H319
-	25094-02-4		Calcium chloride tetrahydrate	varying	Eye irritation, Category 2; H319
-	7774-34-7		Calcium chloride hexahydrate	varying	Eye irritation, Category 2; H319
215-137-3	1305-62-0		Calcium hydroxide	<1%	Corrosive Category 1; H314

Comments: In the REACH registration of calcium chloride, the different hydrates in the product are regarded as the same substance as anhydrous with reference to the exemption to register hydrates in Annex V of REACH. All forms could be present in the products. Probable Contaminants: Calcium Carbonate, Calcium Oxide, Alkali Metal Chlorides, Alkaline Earth Metal Chlorides. Typical content of calcium hydroxide < 1 %.

4. FIRST AID MEASURES

4.1 Description of first aid measures

Inhalation

Remove to fresh air, keep warm and at rest. If symptoms persist; Seek medical attention.

Skin contact

Remove contaminated clothing. Wash off any skin contamination immediately with plenty of water
Launder clothes
before re-use.

Eye contact

Remove contact lenses if present. Rinse eye thoroughly with eye wash solution or clean water for a least 10 minutes.

Eyelids should be held away from the eyeball to ensure thorough rinsing. Seek medical attention.

Ingestion

DO NOT induce vomiting. Wash out mouth with water and give plenty of water to drink (at least 300 ml).
Obtain
medical advice if symptoms persist.

4.2 Most important symptoms and effects, both acute and delayed

Inhalation: Inhalation of aerosols from the product could irritate the respiratory systems. For single exposure no irreversible effect is known.

Skin contact: Could cause moderate skin irritation. The product will not give delayed symptoms.

Eye contact: Could cause severe irritation of the eye. If the eye is not washed thoroughly, there is a risk of irreversible eye damage.

Ingestion: Could cause irritation of oesophagus and the stomach. The product will probably not give delayed or irreversible damages.

4.3 Indication of any immediate medical attention and special treatment needed

DO NOT induce vomiting. The product could be strengthened with the hydrogen chloride from the stomach and cause irritation on oesophagus or it might irritate the respiratory system. Wash out mouth with water and give plenty of water to drink (at least 300 ml.) and observe the patient.

5. FIRE FIGHTING MEASURES

5.1 Extinguishing Media

Not combustible. Use fire extinguishing methods suitable to surrounding conditions

5.2 Special hazards arising from the substance or mixture

No further information

5.3 Advice for fire-fighters

Dependent on surrounding fire

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

For personal protection see Section 8

6.2 Environmental precautions

Prevent uncontrolled discharges into the environment (rivers, water courses, sewers etc.).

6.3 Methods and material for containment and cleaning up

If large releases to a sensitive environment area; embank with sand or other inert material and collect the material.

Clean up contaminations/spillages as soon as they occur. Collect as much as possible in a suitable clean container,

preferably for re-use, otherwise for disposal. Wash the spillage area with large quantities of water. Do not wash out with water in a sensitive environment.

6.4 Reference to other sections

See also Section 13 for disposal considerations

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Operate in a well-ventilated area, atmospheric levels should be controlled in compliance with the exposure scenarios and occupational exposure limits. Avoid inhalation of dusts. Avoid contact with skin and eyes. Wash contaminated skin or clothes immediately after contact with the product. Report any skin problems that may develop. See section 8 for personal protection and ventilation control measurements. Do not eat, drink or smoke when handling the product. Wash hands after finishing working with the product.

7.2 Conditions for safe storage, including any incompatibilities

Store at a dry place, not above normal room temperature.

Do not store with acids or strong oxidizing or reducing agents. Avoid excessive ventilation during storage as the product can absorb moisture from the air. No special exhaust ventilation required.

7.3 Specific end use(s)

No further information

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

CAS-no	Substance name	WEL 8 h	WEL 5 min	WEL 15 min
	Dust (inhalable amount of any dust)	10 mg/m ³		
	Respirable dust	4 mg/m ³		
1305-62-0	Calcium hydroxide	5 mg/m ³		

WEL=Workplace Exposure Limit

Derived No Effect Level (DNEL)

CAS-no	Substance name	DNEL (way of exposure)
10043-52-4	Calcium chloride	Worker DNEL inhalation - long term 5 mg/m ³
10043-52-4	Calcium chloride	Worker DNEL inhalation – short term 10 mg/m ³
10043-52-4	Calcium chloride	Consumer, general population DNEL, inhalation – long term 2.5 mg/m ³
10043-52-4	Calcium chloride	Consumer, general population DNEL inhalation – short term 5 mg/m ³
10043-52-4	Calcium chloride	The DNEL dermal acute needs only be derived if an acute toxicity hazard (leading to classification and labelling) has been identified and peak exposures are likely to occur. The available data do not trigger classification for acute systemic dermal toxicity.
10043-52-4	Calcium chloride	DNEL dermal long-term effects. DNEL not derived.

10043-52-4	Calcium chloride	DNEL inhalation long-term systemic effects: No DNEL is derived. No long-term effects are expected, also taking into account the recommended daily intake of 1000 mg/kg bw CaCl ₂ .
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Predicted No Effect Concentration (PNEC)

CAS-no	Substance name	PNEC (compartment environment)
10043-52-4	Calcium chloride	Deposition onto soil and plants: NE- dep* 150 g/m ²
10043-52-4	Calcium chloride	Sensitive terrestrial plants: 215 mg chloride/kg
10043-52-4	Calcium chloride	Because the calcium and chloride concentration vary between aquatic ecosystems (0.06-210 mg/L), it is not considered useful to derive a generic PNEC water or PNEC marine (neither added nor intermittent values)
10043-52-4	Calcium chloride	No toxicity data on freshwater or marine sediment organisms are available. Calcium chloride is present in the environment as calcium and chloride ions, which implies that it will not adsorb on particulate matter, and it is not considered useful to derive a PNEC freshwater or PNEC marine sediment
10043-52-4	Calcium chloride	No reliable and relevant toxicity data on terrestrial organisms are available. Calcium chloride is present in the environment as calcium and chloride ions, which implies that it will not adsorb on particulate matter, and it is not considered useful to derive a PNEC terrestrial.
10043-52-4	Calcium chloride	No toxicity tests on the effect of calcium chloride on sewage treatment plant (STP) organisms are available. Because the calcium and chloride concentration varies significantly between aquatic ecosystems, it is not considered useful to derive a generic PNECSTP or PNECS TP added.
10043-52-4	Calcium chloride	In view of the nutritional aspects, the metabolism, and the mechanisms of action of calcium and chloride ions, it is not considered useful to derive a PNE Coral (secondary poisoning).

* A tentative "PNEC", a so-called "no-effect-deposition" (NEdep) was derived for the exposure route for deposition of calcium via road salts or dust suppressors. It should be noted, that although the units refer to exposure via air, this value reflects effects caused by CaCl₂ deposited from air into soil or onto a plants' surface.

Biological limit values: None

Recommended surveillance procedure

Normally not necessary. If there is a suspicion that occupational exposure limits or DNEL for inhalation values could be surpassed; Measurements of calcium chloride dust (total dust as worst case) could be done.

Recommended technical control measures

Handling of calcium chloride with low dustiness, for appropriate engineering controls and ventilation. Normally use of calcium chloride, in granule or flake form, does not demand any special exhaust ventilation.

8.2 Exposure controls

Eye protection

Use suitable eye protection if eye contact is likely. Most materials for protective goggles and face visors will probably be suitable e.g. polycarbonate.

Skin protection

Normal working clothes are suitable.

Hand protection

Wear gloves (tested to EN374) if hand contamination is likely. Wash off any skin contamination immediately. Suitable glove materials are neoprene (chloroprene) and nitrile rubber. Permeation time for the material > 0.5 mm is probably 8 hours. The recommended materials are also suitable for normally occurring impurities in calcium chloride.

Contaminated gloves should be carefully rinsed with water before reuse.

Non suitable materials: Leather gloves (material decomposition).

Respiratory protection

Normally not necessary

Environmental exposure limits

None

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Form Powder/solid

Colour	White; the substance could have small impurities of iron that gives light nuance colouration to the end product depending on the state of oxidation of iron itself (off-white, yellow, pink)
Odour	None
Odour threshold	Not applicable
pH	7 – 11 in 10% water solution
Melting point/freezing point	782oC
Initial boiling point	>1600°C
Flash point	Not applicable
Evaporation rate	Not applicable
Flammability (solid, gas)	The substance is non-flammable
Upper/lower flammability or explosive limits	Not applicable
Explosion limits	The substance is non-explosive
Vapour pressure	Negligible
Vapour density	Non applicable

Relative density	2.15 g/cm ³ at 25oC
	2.15 g/cm ³ at 15oC
Solubility (water)	745 g/l at 20oC
	1590 g/l at 100oC
Partition coefficient noctanol/ Water	Not applicable for an inorganic substance
Auto-ignition temperature	Not applicable
Decomposition temperature	Not applicable
Viscosity	Not applicable for a solid product
Explosive properties	The substance is non-explosive
Oxidising properties	The substance is non-oxidising

Particle size distribution Typical calcium chloride powder: D10 = 8.2 µm (RSD = 35.0%);
D50 = 93.2 µm (RSD = 12.3%), D90 = 304.2 µm (RSD = 2.5%). D10%,
D50% and D90% are the respective percentiles of the volume size
distribution. RSD = Relative standard deviation

9.2 Other information

None

10. STABILITY AND REACTIVITY

10.1 Reactivity

The substance could react with strong reducing or oxidising agents.

10.2 Chemical stability

Stable under recommended storage and handling conditions.

10.3 Possibility of hazardous reactions

Calcium chloride could react violently with some strong reducing and oxidizing agents.

10.4 Conditions to avoid

Strong reducing and oxidizing agents.

10.5 Incompatible materials

Calcium chloride can cause pitting of and corrosion of some grades of stainless steel and under high temperature and stress conditions can promote stress corrosion cracking.

10.6 Hazardous decomposition products

None when used according to identified uses.

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Calcium chloride is easily dissociated into calcium and chloride ions in water. The absorption, the distribution and the excretion of the ions are regulated separately. Calcium and chloride are essential constituents of the body of all animal species. Calcium is essential for the formation of skeletons and the regulation of neural transmission, muscle contraction and coagulation of the blood. Chloride is required for regulating intracellular osmotic pressure and buffering. Calcium and chloride are both essential nutrients for humans and a daily intake of more than 1000 mg for each of the ions is recommended. As for healthy humans, the tolerable upper intake level for calcium is set at 2500 mg per day (equivalent to 6.9 g CaCl₂ per day) (Standing Committee on the Scientific Evaluation of Dietary Reference Intakes, 1999). For chloride, the reference nutrient intake is set at 2500 mg/day (equivalent to 3.9 g CaCl₂ per day) (Department of Health, UK,

1991). The estimated intake of calcium chloride in a form of food additives (160-345 mg/ day) is considerably smaller than these values. Consistent with this, the establishment of an ADI for calcium chloride has not been deemed necessary by JECFA (Joint FAO/WHO Expert Committee on Food Additives; 1974, 2001) Therefore small amounts of the product are normally not harmful except if in contact with the eye.

Acute Toxicity

Short term exposure

Ingestion: Calcium chloride could irritate esophagus and the stomach. LD50: 2301 mg/kg bw (rat male/female).

Method OECD 401.

Inhalation: Could cause irritation of mucus membranes of pharynx and throat and unpleasant sensation in mouth

already after the first inhalations if high concentrations of dust levels. In accordance with column 2 of REACH Annex VIII, the study of acute inhalation does not need to be conducted, as reliable information on acute toxicity by two other routes of exposure, oral and dermal, is available. See however "Other information" below about experience in humans.

Eye contact: Calcium chloride is classified as irritating to eyes, category 2. The effect is however local and uptake or other systemic toxic effects through eye contact are not expected.

Skin contact: LD50 (dermal) > 5000 mg/kg bw (male/female).

Long term exposure:

Ingestion: Taking into account the recommended daily intake of 1000 mg/kg bw CaCl no adverse long-term exposure is expected if ingested.

Inhalation: Based on the available data and taking into account the toxicokinetics and normal physiological role of calcium chloride systemic effects are not anticipated after repeated exposure.

Eye contact: No toxic effect is expected except from the irritation properties of calcium chloride. See below about eye irritation.

Skin contact: No toxic systemic effect is expected at long term dermal exposure of calcium chloride. The skin uptake is probably slow and calcium and chloride are normally occurring ions in the body.

Skin corrosion/irritation

Calcium chloride could give moderate irritation to the skin, especially the anhydrous calcium chloride. Calcium chloride is however not classified as a skin irritant. Not irritating on rabbit according to OECD 404.

Long term effects:

Calcium chloride is not irritating to skin; thus, it is not expected to induce local effects by dermal exposure. However, all long term exposure with water solution with mild irritants could give atopic dermatitis and skin irritations for sensitive individuals.

Serious eye damage/irritation

Anhydrous calcium chloride (rabbit): Highly irritating OECD 405.

Calcium chloride di- and tetrahydrates (rabbit): Irritating (OECD 405) Calcium chloride hexahydrate (rabbit): Moderately irritating (OECD 405)

The difference in eye irritation between the water free substance and the hydrates could be explained by the reaction when the water free calcium chloride takes up crystal water from the eye. This reaction is exothermic and irritates the eye by drying the lenses and causes injuries when heat is evolved.

Long term contact with the eye or not washing the eye properly at short time exposure contact could give irreversible damage to the eye.

Respiratory or skin sensitization

Calcium chloride is not a respiratory or skin sensitizer. In accordance with section 1 of REACH Annex XI, testing does not appear scientifically necessary; Calcium chloride is considered not to have any sensitising properties, based on the physiological role of both its constituent ions, as well as the fact that sensitising effects of both ions have never been reported, despite long-term historical and wide dispersive use (e. g. via food and medication).

Germ cell mutagenicity

Bacterial reverse mutation assay: Negative for Salmonella. Typhimurium, other: TA92, TA1535, TA100, TA1537,

TA94, TA98 (all strains/cell types tested); met. act.: with; cytotoxicity: no, but tested up to limit concentrations. In

vitro mammalian chromosome aberration test (chromosome aberration), negative for Chinese hamster lung fibroblasts (V79) (all strains/cell types tested) All tests for genotoxic properties were negative.

Calcium and chloride are normal constituents of the body. The substance is not expected to be genotoxic.

Carcinogenicity

Calcium chloride is not genotoxic in vivo. Calcium and chloride are both essential nutrients for humans and a daily intake of more than 1000 mg for each of the ions is recommended. Based on this information, it is concluded that the substance is not carcinogenic.

Reproductive toxicity

Calcium chloride will usually not reach the foetus or the male and female reproductive organs when exposed orally, dermally or by inhalation, as it does not become available systemically. An oral developmental study was performed in 3 species (mouse, rat and rabbit). In all three species no maternal or teratogenic effects were noted with calcium chloride, and NOAEL's were above the highest dose given. Thus calcium chloride is not expected to have any reproductive toxicity.

STOT-single exposure

Respiratory tract: not irritating.

STOT-repeated exposures

Respiratory tract: not irritating.

Aspiration hazard

Not relevant for a solid substance.

Other information

Experience of calcium chloride inhalation in humans (Vinnikov): Sixty-five tuberculosis patients (51 males, 14 females; age from below 30 till over 50) were treated with aerosol inhalations of 2-5% aqueous solution of calcium chloride. The number of inhalations varied from below 10 (24 patients), till over 30 (2 patients). Several patients reported irritation of mucus membranes of pharynx and throat and unpleasant sensation in mouth already after the first inhalations. However, the frequency of such cases was described as minor by the authors. Overall calcium chloride inhalations were said to have beneficiary effects on disease symptoms.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Calcium chloride is not classified as hazardous for the environment. Calcium and chloride are normally occurring ions in the entire ecosystem and release to the environment are not expected to have any long-term negative effects. High amounts of chloride ions could however cause local disturbance and damage in a sensitive environment.

Acute toxicity

Fish (*Pimephales promelas*) LC50 (96 h): 4630 mg/l

LC50 (48 h): > 6560 mg/l

LC50 (24 h): > 6660 mg/l

Method: Other: EPA/600/4-90/027, EPA/600/6-91/003 Crustaceans (*Daphnia magna*) LC50 (48 h): 2400 mg/L based on: mobility (static OECD 202)

Algae: *Selenastrum capricornutum* (new name: *Pseudokirchneriella subcapitata*)

EC50 (72 h): 2900 mg/L based on: biomass EC50 (72 h): > 4000 mg/L based on: growth rate EC20 (72 h):

1000 mg/l based on: biomass OECD Guideline 201 (Alga, Growth Inhibition Test) algae/cyanobacteria:

Pseudokirchneriella subcapitata (as *Selenastrum capricornutum*. EC50 (72 h) 2.9 and EC20 1.0 mg/l, OECD guideline 201.

Long term toxicity

Fish: No reliable studies are available.

Crustaceans: (*Daphnia magna*): EC50 (21 d): 610 mg/l based on: reproductive impairment EC16 (21 d): 320 mg/l based on: reproductive impairment LC50 (21 d): 920 mg/l based on: mortality.

Method not mentioned

Algae: EC10/LC10 or NOEC for freshwater algae: 1000 mg/l

Terrestrial organisms

Calcium chloride is dissociated into calcium and chloride ions and chloride ions will not adsorb on particulate matter. The calcium ions may bind to particulate matter or may form stable inorganic salts with sulphate and carbonate ions, but calcium is naturally present in soil. Therefore, exposure or adverse effects of the soil compartment is unlikely.

Plants

Calcium is well known as an essential nutrient for higher plants and has important roles for cell wall formation, cell division and cell elongation. Chloride is an essential micronutrient for plants and has an important role in regulating osmotic pressure of cells (SIDS, 2002). However high doses could harm sensitive plants in one study of Sugar maples (*Acer saccharum*) were exposed to runoff of sodium chloride and calcium chloride for 6 winters (total treatment of 11.2 tonnes /ha per treatment and 15 treatments per winter at weekly intervals, equalling 11.2 kg/m² in total and 1.87 kg/m² in one season). Results: Damage to roadside vegetation has been reported and is attributed largely to the absorption of salt splashed foliage. Leaves of these maple trees contained 3 to 6 times the chloride concentration compared to a control stand. Damage to the maples varied but could be correlated with the chloride concentration in the leaf. One field study with spruce tree (*Picea* sp.) was carried out for ten weeks during a winter season, and a total dose of 1.5 kg/m² NaCl, CaCl or a 75/25 NaCl/CaCl₂ mixture. In the presence of calcium chloride the uptake of Cl⁻ in the root was inhibited. Effects of calcium chloride are present but it depends on the amount of accumulated Cl.

Effects on micro-organisms living in wastewater treatment plants

No study is available. Calcium plays crucial roles in strengthening cell walls. Chloride is also an essential micronutrient for bacteria and has important roles in the photosynthesis and osmoregulation. No adverse effect is suspected for microorganisms living in sewage treatment plants.

12.2 Persistence and degradability

In accordance with column 2 of REACH Annex VII, biodegradability test does not need to be conducted as the substance is inorganic.

12.3 Bio accumulative potential

Calcium chloride is easily dissociated into calcium and chloride ions and both ions are essential constituents of the body of all animals. No bioaccumulation or bio magnifications is expected for calcium chloride.

12.4 Mobility in soil

Calcium chloride is dissociated into calcium and chloride ions and chloride ions will not adsorb on particulate matter. The calcium ion may bind to soil particulate or may form stable inorganic salts with sulphate and carbonate ions, but calcium is naturally present in soil.

12.5 Results of PBT and vPvB assessment

Not applicable for an inorganic substance. According to Annex XIII of the REACH Regulation 1907/2006/EC inorganic substances do not need to be subjected to a PBT assessment.

12.6 Other adverse effects

None specific.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

If recycling or reuse is not practical then the product must be disposed of in accordance with local, state or national regulations. A suitable way of disposal is landfill or controlled emission to a large recipient, with naturally occurring levels of calcium and chloride ions, like the sea. Do not dispose of with acids or strong reducing or oxidising agents.

European waste catalogue

Depends on where the waste is generated. Calcium chloride has a wide dispersive use in many areas and all relevant codes could not be given in this MSDS.

Waste code (ECW) for the container

15 01 02 (plastic packaging); 15 01 05 (big bags of composite packaging)

Uncleaned packages

If recycling or reuse is not practical then the packaging material must be disposed of in accordance with local, state or national regulations. Clean packaging material with water and dispose of the water in accordance with local regulations. Package materials could be incinerated in a plant with a permit from competent authorities.

Further information

This product is not classified as hazardous waste

14. TRANSPORT INFORMATION

Not regulated as hazardous goods

15. REGULATORY INFORMATION

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

See EH44 Dust: General Principles of Protection

15.2 Chemical safety assessment

A Chemical Safety Assessment has been performed

16. OTHER INFORMATION

Full text of H & P Statements referred to under sections 2 and 3

H314: Causes severe skin burns and eye damage.

H319 Causes serious eye irritation.

P280 Wear protective gloves/protective clothing/eye protection/face protection.

P305 + P351 IF IN EYES: Rinse cautiously with water for several minutes.

P337+P313 If eye irritation persists: Get medical advice/attention.

Source of key data used to compile the data sheet

Supplier information

Modifications from last revision

The Safety Data Sheet has been revised in accordance with current requirements

Date: 20/12/16