

77 - COLEMANITE

Safety Data Sheet

In compliance with Regulation (EC)1907/2006 (REACH)

Regulation (EC) 1272/2008 (CLP)

Date of issue: 03/03/2011 Revision date: 16/10/2022

1. IDENTIFICATION OF THE SUBSTANCE AND THE COMPANY

1.1 Identification of the substance

Name of the substance:	Colemanite
Annex VI Index number:	-
EC number:	-
REACH registration number:	Exempted from registration under REACH Regulation according to Article 2(7)(b). Colemanite is a natural occurring mineral which is not chemically modified, therefore, considered within the scope of Annex V of the REACH Regulation.
CAS number:	12291-65-5
Synonyms:	Calcium borate, di-calcium hexaborate pentahydrate
Chemical formula	$\text{Ca}_2\text{B}_6\text{O}_{11} \cdot 5\text{H}_2\text{O}$, $(2\text{CaO} \cdot 3\text{B}_2\text{O}_3 \cdot 5\text{H}_2\text{O})$
Molecular weight:	411,08

1.2 Relevant identified uses of the substance and uses advised against

Identified uses:	The product is used in industrial manufacturing, in particular in: Textile grade fibreglass Boron alloys Metallurgical fluxing Borosilicate glass
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1.3 Supplier identification

Supplier:	CTM Potters Supplies
Address:	Unit 8, Broomhouse Lane Ind Est
Town:	Doncaster, South Yorkshire
Post code:	DN12 1EQ
Country:	United Kingdom
Telephone number:	01709 770801
E-mail:	doncaster@ctmpottersservices.co.uk

1.4 Emergency telephone number NCES 01865 407333 Out of hours - 111

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance

2.1.1 Classification of the substance according to Regulation (EC) Nr. 1272/2008 [CLP]

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2.1.2 Classification of the substance according to Directive 67/548/CEE

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2.2 Labelling of the substance

2.2.1 Labelling of the substance according to Regulation (EC) Nr. 1272/2008 [CLP]

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2.2.2 Labelling of the substance according to the Directive 67/548/CEE

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2.3 Potential health effects

The primary routes of exposure are inhalation, skin and eyes:

Inhalation

Occasional mild irritation effects to the nose and throat may occur from inhalation of borate dusts at levels greater than 10 mg/m³.

Eye contact

May irritate the eyes upon contact.

Skin contact

None known but may irritate the skin upon contact.

Ingestion

Colemanite is not intended for ingestion. Inorganic borate salts have low acute toxicity.

Acute effects (short term)

This product may cause mild irritation, redness, tearing and blurred vision to the eyes, and may cause mouth, throat and gastrointestinal tract irritation. It contains small amounts of orpiment and realgar (arsenic sulphides) as contaminant, which have low toxicity. Acute arsenic intoxication usually occur via ingestion, specifically arsenic trioxide, with homicidal or suicidal intent, although there have been reports of unusual cases resulting from occupational or environmental exposure. See section 8 for exposure controls.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical nature of the substance

Common name	Chemical name	CAS Nr.	Weight content (%)
Colemanite	Di-calcium hexaborate pentahydrate	12291-65-5	65-95
Calcite/Dolomite	Calcium-magnesium carbonate	16389-88-1	10-20
Ulexite	Sodium-calcium pentaborate octahydrate	1319-33-1	2-6
Moisture	Water	7732-18-5	2-6
Realgar Orpiment	Arsenic sulphide Arsenic trisulphide	12044-30-3 12255-89-9	As As ₂ O ₃ < 3500 ppm

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4. FIRST-AID MEASURES

4.1 Description of the first-aid measures

4.1.1 General indications

In case of persisting adverse effects, consult a physician and show him this safety data sheet.

4.1.2 Inhalation

Symptoms and effects:

May cause breathing difficulties

Instructions:

Move exposed person to fresh air. Keep person warm and at rest. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a belt or waistband. If unconscious, place in recovery position. Consult a physician.

4.1.3 Skin contact

Symptoms and effects:

May cause reddening

Instructions:

Wash skin with plenty of water or shower for 15 minutes at list. Remove contaminated clothes and wash them carefully. If the irritation persists, consult a physician.

4.1.4 Eye contact

Symptoms and effects:

May cause reddening

Instructions:

Separate eyelids and flush eyes with plenty of water for at least 15 minutes (remove contact lenses if this can be easily done). Consult a physician if irritation persists.

4.1.5 Ingestion

Symptoms and effects:

May cause unwell feeling

Instructions:

Observe the individual. If he has swallowed a big amount, and symptoms persist, consult a physician. Drink water to dilute the material in the stomach.

5. FIRE-FIGHTING MEASURES

5.1 Extinguishing media

Suitable:

All extinguishing agents are allowed. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable:

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5.2 Special exposure hazards arising from the substance

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None. Colemanite is not flammable, combustible or explosive

5.3 Protection for fire fighters

Wear self-contained breathing equipment.

6. ACCIDENTAL RELEASE MEASUREMENT

6.1 Personal precautions, protective equipment and emergency procedures

Protective equipment: See point 8.2.2

Emergency procedure: Avoid dust production. Assure appropriate ventilation of the affected area.

6.2 Methods and materials for containment and clean-up

Land spill

Sweep up avoiding dust formation and take to officially authorised dump. As an alternative, use wet cleaning methods. Ventilate the affected area.

Water spill

This material will dissolve in water. See section 9.

Air release

This material will settle out of the air. It can then be scooped up for disposal as a non-hazardous waste, avoiding dust formation.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

7.1.1 General protection measures

No special storage or handling procedures are required for this material

7.1.2 General advice on occupational health:

Do not eat, drink, or smoke in work areas.

Avoid skin contact.

Wash your hands after use.

Avoid eye contact.

Avoid inhaling dust.

Contaminated clothes must be changed and carefully cleaned.

Take off contaminated clothes and protection equipment when you leave the work area.

Ensure there are shower facilities and, if possible, lockers with separate compartments for work clothes and daywear.

Keep the work area clean.

Keep the packaging/containers labelled and the conduits clean.

Avoid spillages.

There shall not be a larger quantity of substance in the work area than needed for the process.

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7.2 Conditions for safe storage, including any incompatibility

Requirements of the storage site and containers:

Store in dry, covered warehouse

General:

No special storage or handling procedures are required for this material.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

8.1 Control parameters

8.1.1 Occupational exposure limit values

ACGIH TLV-TWA: 5 mg/m

OSHA PEL-TWA: 15 mg/m as total dust

8.1.2 Biological limit values

Acute toxicity of colemanite (calcium borate)

	LD50 in rats, oral dosage ^a (mg/kg)	Toxicity rating
Colemanite (calcium borate)	5600	Practically nontoxic

^a Lethal dose killing 50% of the population

Source: Registry of Toxic Effects of Chemical Substances (RTECS), U.S. National Library of Medicine, Toxicology Data Network (TOXNET), National Institute for Occupational Safety and Health (NIOSH)

8.2 Exposure controls

8.2.1 Appropriate engineering controls

General dilution ventilation and/or local exhaust ventilation should be provided as necessary to maintain exposures below regulatory limits. Dust collection systems may be necessary in some operations.

8.2.2 Personal protection

Eye and face protection: Safety goggles recommended in dusty areas.

Skin protection: Use of gloves recommended.

Respiratory protection: In case of prolonged exposure to airborne dust concentrations, wear respiratory protective equipment that complies with the requirements of national legislation.

Other information: Not absorbed when in contact with healthy skin or eyes. Clean with plenty of water.

8.2.3 Environmental exposure controls

No special requirements. Emissions from ventilation or extraction equipment should be

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controlled for compliance with the legal requirements of environmental protection. In some cases, will require the installation of purification equipment to reduce emissions to acceptable levels.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20 °C and 1013 hPa:

Physical state:	Solid (dust or crushed)
Colour:	Light grey or tan
Odour:	Odourless
pH:	9,1
Boiling point:	Not applicable
Flash point:	Not applicable
Flammability	Not applicable
Explosive properties:	Not applicable
Oxidising properties:	Not applicable
Vapour pressure	Not applicable
Density:	2400 kg/m ³ at 20°C
Solubility in water:	0.81 g/l (25 °C)
Viscosity:	Not applicable (solid)
Vapour density (air = 1):	Not applicable
Evaporation rate:	Not applicable
Bulk density:	1400-1650 kg/m ³ at 20°C
Freezing point	Not applicable
Melting point	986°C

10. STABILITY AND REACTIVITY

Stability	Stable under ordinary conditions of use and storage
Incompatible materials and conditions to avoid	None
Hazardous decomposition products	None
Hazardous polymerization	Will not occur
Thermal decomposition	When heated above 260° in the oven, it starts losing water of hydration. On continued heating, dehydration proceeds until all the water is removed at around 415°C.

11. TOXICOLOGICAL INFORMATION

11.1 Acute effects

Acute toxicity

Not tested. Similar inorganic borate compounds are low in acute oral toxicity; LD50 of colemanite in rats is expected to be greater than 5600 mg/kg of body weight.

Skin

Not tested. Similar inorganic borate compounds are low in acute thermal toxicity; LD50 of colemanite in rabbits is expected to be greater than 2000 mg/kg of body weight

Skin irritating

Not tested. Not expected to be irritating to skin based experience with other similar inorganic borate compounds

Eye irritation

Not tested. Not expected to be irritating to eyes based experience with other similar inorganic borate compounds.

11.2 Chronic effects**Carcinogenicity/Mutagenicity**

Colemanite has not been tested. However, studies conducted with the chemically similar substance boric acid have reported no evidence of carcinogenicity in mice and mutagenic activity in a battery of short-term mutagenicity assays

Reproductive

Colemanite has not been tested. However, human study of occupationally exposed borate worker population showed no adverse reproductive effects. According to investigations on the health effects of boron and its compounds in Bigadiç, Kirka y Emet-Hisarik^[9] :

1- Exposure to the mineral does not interfere with human reproduction primarily, for the frequency of infertile marriages is not higher than the general population, and most probably secondarily. The incidence of infertility runs between 2 and 4%.

2- Spontaneous abortions, stillbirths and fetuses and newborns with congenital malformations similarly display figures to be met in any segment of the country. Childless families due to such defects are around 1%.

3- Infant mortality seems to be rather high in proband families; yet the rates approximate to the general population. And families without offspring because of infant deaths remain about 1%.

4- Complaints and diseases mostly involve gastro-intestinal, cardio-vascular and cerebrovascular systems and are crowded in arthritis-arthritis group.

5- Deaths with a malignant condition appear to be rare event among probands.

Realgar and Orpiment: The toxicity of arsenic ranges from very low to extremely high depending on chemical state. Metallic arsenic and arsenious sulphide have low toxicity; arsine, a gas, is extremely toxic. The toxicity of other organic and inorganic arsenic compound varies. Although metallic arsenic and arsenic sulphides may be handled safely without special precautions, skin contact with all arsenical compounds should be avoided. Inorganic arsenic is a documented human carcinogen and has been classified by IARC in

Group I.

12. ECOLOGICAL INFORMATION

The environmental effects of boron are minimal and most noticeable in the world of plants. Minimal quantities of this element are essential for plant growth and hence boron is added to fertilisers used in boron deficient soils. However, concentrations as low as 1 ppm boron could be critical for sensitive plants (lemon, etc.) and 10 ppm for semi tolerant plants (mustard, radish). There is no permanent effect as boron gradually soluble in water. In diluted aqueous solutions the predominant boron species present is boric acid.

Phytotoxicity

Boron is an essential micronutrient for plants. However, it can be harmful to boron sensitive plants in higher quantities. Acute toxicity (EC50 = 72 h) for algae (*selenastrum capricornutum*) was determined as 53 mg B/l.

Environmental fate

Boron and calcium are both ubiquitous in the environment and occur naturally in various mineral forms. Colemanite should be expected to decompose in the environment to stable calcium and boron containing mineral species.

Fish toxicity

Boron naturally occurs in sea water and average concentration of 5 mg B/l. Acute toxicity (LC50 = 96 hr) for under-yearling Coho salmon (*oncorhynchus kisutch*) in fresh water was determined as 447 mg B/l.

Bioaccumulation

Species *Crassostrea gigas*

Exposure period 47 days at 8°C

Concentration 40,5 mgB/l

BCF 4,5-8,5

Test substance Sodium metaborate

Low bioaccumulation factor values (BCF) and reduction of tissue concentrations during exposures suggests regulation and that boron will not accumulate to high concentration.

12.1 Mobility

Colemanite is poorly soluble in water and is leachable through normal soil.

12.2 Persistence and degradability

Colemanite is natural occurring and ubiquitous in the environment. Colemanite decomposes in the environment to natural borate.

12.3 Bio accumulative potential

Boron does not fulfil the PBT criteria

13. DISPOSAL CONSIDERATIONS

13.1 Substance

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Where possible, recycling is preferable to disposal. Chemicals are special wastes thus subject to the internal (local and national) regulations of each country. Duly contact the competent authority or legally authorised waste disposal handlers.

European regulations:

Directive 98/2008/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives (OJEU L 312 of 22/11/2008).

13.2 Packaging

Dust formation from residues in packaging should be avoided and suitable worker protection assured. Store used packaging in enclosed receptacles.

The re-use of packaging is not recommended. Recycling and disposal of packaging should be carried out by an authorised waste management company.

Recycling and disposal of packaging should be carried out in compliance with local regulations.

European regulations:

Directive 94/62/EC of the European Parliament and of the Council of 20 December 1994 on packaging and packaging waste (OJEU L 365 of 31/12/1994).

14. TRANSPORT INFORMATION

IMDG

Not applicable

ICAO/IATA

Not applicable.

15. REGULATORY INFORMATION

See sections 8, 13 y 14.

16. OTHER INFORMATION

NFPA rating (National Fire Protection Association)

Health: 0

Flammability: 0

Reactivity: 0

Label hazard warning

Hazard warning

May be harmful if swallowed or inhaled.

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Precautions	Causes irritation if absorbed through damaged skin. Avoid breathing dust Use with adequate ventilation Avoid contact with eyes and damaged skin Wash after handling
First aids	Do not ingest If inhaled, remove to fresh air In case of contact with eyes or skin, flush with plenty of water. If irritation develops, get medical attention.

The information detailed in this safety data sheet is based on our knowledge at the date stated; it refers exclusively to the product indicated and does not constitute a guarantee of particular qualities.

It is the user's responsibility to use the product in accordance with the recommendations in this safety data sheet.

16.1 Abbreviations

CAS:	Chemical Abstracts Service
EC:	European Community
CLP:	Classification, Labelling and Packaging
DL50:	Median lethal dose
DMEL:	Derived minimal effect level
DNEL:	Derived no effect level
DOUE:	Official Journal of the European Union
IATA:	International Air Travel Association
ICAO:	International Civil Aviation Organization
IMDG:	International Maritime Dangerous Goods
REACH:	Registration, Evaluation, Authorisation and restriction of Chemicals

Literature references

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2. Colemanite Health and Safety Data Sheet, Etibank Boron Research Centre, Menderes, İZMİR February 1994.
3. The Economics of Boron "Eleventh Ed., 2006 Roskill Information Services Ltd.
4. SME Mineral Processing Handbook, Vol. 2, N.L. Weiss, Ed.
5. Etibank Pazarlama Satış Dairesi Başkanlığı, Ankara
6. Sittig, M. Handbook of Toxic and Hazardous Chemicals and Carcinogens. 2nd Ed. Noyes, Publications. Park Ridge, NJ. 1985. pp. 137-139.
7. Lewis, R.J., Sr. and R.L. Tatken, Eds. Registry of Toxic Effects of Chemical Substances. Microfiche Ed. National Institute for Occupational Safety and Health. Cincinnati, OH. Quarterly Updates. ED4550000.
8. Weast, R.C., M.J. Astle, and W.H. Beyer, Eds. CRC Handbook of Chemistry and Physics. 67th Ed. CRC Press, Inc. Boca Raton, FL. 1986.
9. Şaylı B.S., Investigations on The Health Effects of Boron and Its Compounds in Bigadiç, Kirka and Emet-Hisarçık Areas, 1998, Ankara

For general information on borates toxicity see ECETOC Technical Report No. 63 (1995); Patty's Industrial Hygiene and Toxicology, 4th Edition Vol. II, (1994) Chap. 42, „Boron“