SECTION 1: IDENTIFICATION OF MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifier

Substance name:	Mixture of dolomite and calcium oxide
Synonyms:	Cresco Optimal Mg, Tehokalkki
Chemical name and formula:	Calcium magnesium carbonate - $CaMg(CO_3)_2$, Calcium oxide - CaO
Trade name:	Cresco Optimal Mg

1.2 Relevant identified uses of the substance and uses advised against

Use of the mixture:

The mixture is intended for the following non-exhaustive list of uses:

Agricultural pH and magnesium adjustment, water treatment

Uses advised against

No use identified in Table 1 of the Appendix of this MSDS is advised against.

1.3 Details of the supplier of the safety data sheet

	Finland
Name:	SMA Mineral Oy
Address:	Selleenkatu 281
	95450 Tornio
Phone number:	+358 40 712 2360
E-mail of responsible of MSDS:	sds@smamineral.com

1.4 Emergency telephone number

European Emergency No.:	112
Poison Information Centre, Finland	+358 9 4711
Poison Information Centre, Norway	+ 47 2259 1300
Poison Information Centre, Sweden	+46 10 456 6700
Poison Information Centre, United Kingdom	+44 191 260 6182/+44 191 260 6180 (24H)

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of the substance

Classification according to Regulation (EC) 1272/2008

Eye Dam. 1, H318

2.2 Label elements

Signal word: Danger

Hazard pictogram:

Hazard statements:

H318: Causes serious eye damage

Precautionary statements:

P102: Keep out of reach of children

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.

P310: Immediately call a poison center or doctor/physician.

2.3 Other hazards

No other hazards identified.

The substance does not meet the criteria for PBT or vPvB substance according to Regulation (EC) No 1907/2006, Annex XIII.

The substance not included in the Candidate List of substances of very high concern for Authorisation.

The substance is not identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Not applicable

3.2 Mixture

CAS number	EC number	REACH Registration No.	Identification name	Weight % content (or range)	Classification according to Regulation (EC) No 1272/2008 [CLP]
1305-78-8	215-138-9	01-2119475325-36	Calcium oxide	Circa 7 %	Eye Dam. 1, H318 Skin irrit. 2, H315 STOT SE 3, H335 - Route of exposure: Inhalation
60937-55-5	262-530-0		Calcium magnesium carbonate	>30%	
471-34-1	207-439-9		Calcium carbonate	>30%	

Hazardous impurities: No impurities relevant for classification and labelling.

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measures

General notes

No known delayed effects. Consult a physician for all exposures.

Following eye contact

Rinse eyes immediately with plenty of water and seek medical advice. Remove contact lenses if possible.

Self-protection of the first aid

Avoid contact with skin, eyes, and clothing – wear suitable protective equipment (see section 8).

Avoid inhalation of dust – ensure that sufficient ventilation or suitable respiratory protective equipment is used, wear suitable protective equipment (see section 8).

4.2 Most important symptoms and effects, both acute and delayed

Calcium oxide of mixture is not acutely toxic via the oral, dermal, or inhalation route. The substance is classified as irritating eyes. There is no concern for adverse systemic effects because local effects (pH-effect) are the major health hazard.

4.3 Indication of any immediate medical attention and special treatment needed

Follow the advises given in section 4.1

SECTION 5: FIRE FIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

The product is not combustible. Use a dry powder, foam or CO_2 fire extinguisher to extinguish the surrounding fire.

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

Unsuitable extinguishing media

Do not use water. Avoid humidification.

5.2 Special hazards arising from the substance or mixture

Calcium oxide in mixture reacts with water and generates heat. This may cause risk to flammable material.

5.3 Advice for fire fighters

Avoid generation of dust. Use respirator. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel

Ensure adequate ventilation.

Keep dust levels to a minimum.

Keep unprotected persons away.

Avoid contact with eyes– wear suitable protective equipment (see section 8).

For emergency responders

Keep dust levels to a minimum.

Ensure adequate ventilation.

Keep unprotected persons away.

Avoid contact with skin, eyes, and clothing – wear suitable protective equipment (see section 8).

6.2 Environmental precautions

Contain the spillage. Keep the material dry if possible. Cover area if possible to avoid unnecessary dust hazard. Avoid uncontrolled spills to watercourses and drains (pH increase). Any large spillage into watercourses must be alerted to the Environment Agency or other regulatory body.

6.3 Methods and material for containment and cleaning up

In all cases avoid dust formation.

Keep the material dry if possible.

Pick up the product mechanically.

Use vacuum suction unit, or shovel into bags.

6.4 Reference to other sections

For more information on exposure controls/personal protection or disposal considerations, please check section 8 and 13 and the Annex of this safety data sheet.

SECTION 7: HANDLING AND STORAGE

7.1 Precautions for safe handling

Protective measures

Avoid contact with skin and eyes. Wear protective equipment (refer to section 8 of this safety data sheet). Do not wear contact lenses when handling this product. It is also advisable to have individual pocket eyewash. Keep dust levels to a minimum. Minimize dust generation. Enclose dust sources, use exhaust ventilation (dust collector at handling points). Handling systems should preferably be enclosed.

7.1.1 Advice on general occupational hygiene

Avoid inhalation or ingestion and contact with skin and eyes. General occupational hygiene measures are required to ensure safe handling of the substance. These measures involve good personal and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no drinking, eating and smoking at the workplace. Shower and change clothes at end of work shift. Do not wear contaminated clothing at home.

7.2 Conditions for safe storage, including any incompatibilities

The substance should be stored under dry conditions. Any contact with air and moisture should be avoided. Bulk storage should be in purpose – designed silos. Keep away from acids, significant

quantities of paper, straw, and nitro compounds. Keep out of reach of children. Do not use aluminium for transport or storage if there is a risk of contact with water.

7.3 Specific end use(s)

Please check the identified uses in table 1 of the Appendix of this SDS.

For more information please see the relevant exposure scenario, available via your supplier/given in the Appendix, and check section 2.1: Control of worker exposure.

SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters

DNELs(Part of mixture:CaO):

	Workers			
Route of exposure	**Acute effect local**	**Acute effects systemic**	**Chronic effects local**	**Chronic effects systemic**
Oral	Not required			
Inhalation	4 mg / m³ (Respirable dust)	No hazard identified	1 mg / m³ (Respirable dust)	No hazard identified
Dermal	Hazard identified but no DNEL available	No hazard identified	Hazard identified but no DNEL available	No hazard identified

	Consumers			
Route of exposure	**Acute effect local**	**Acute effects systemic**	**Chronic effects local**	**Chronic effects systemic**
Oral	No exposure expected	No hazard identified	No exposure expected	No hazard identified
Inhalation	4 mg / m³ (Respirable dust)	No hazard identified	1 mg / m³ (Respirable dust)	No hazard identified
Dermal	Hazard identified but no DNEL available	No hazard identified	Hazard identified but no DNEL available	No hazard identified

PNECSs (CaO):

Environment protection target	PNEC	Remarks
Fresh water	0.37 mg / L	
Freshwater sediments	No PNEC available	Insufficient data available
Marine water	0.24 mg / L	

Marine sediments	No PNEC available	Insufficient data available
Food (bioaccumulation)	No hazard identified	No potential for bioaccumulation
Microorganisms in sewage treatment	2.27 mg / L	
Soil (agricultural)	817.4 mg / kg soil dw	
Air	No hazard identified	

For the Calcium oxide:
SCOEL recommendation (SCOEL/SUM/137 February 2008; see Section 16.6):
Occupational Exposure Limit (OEL), 8 h TWA: 1 mg/m³ respirable fraction
Short-term exposure limit (STEL), 15 min: 4 mg/m³ respirable fraction

National OELS:

Finland (STM (538/2018))

Calcium hydroxide	8h	15 min
-Inhalable dust	1 mg/m³	4 mg/m³
Calcium oxide		
-Inhalable dust	1 mg/m³	4 mg/m³
Dust, inorganic	10 mg/m³	

Sweden (AFS 2018:1):

Calcium hydroxide	Level limit value (NGV)	Short-term value (KGV)
-Inhalable dust	1 mg/m³	4 mg/m³
Calcium oxide		
-Inhalable dust	1 mg/m³	4 mg/m³
Dust, inorganic		
-inhalable dust	5 mg/m³	
-respirable dust	2,5 mg/m³	

8.2 Exposure controls

To control potential exposures, generation of dust should be avoided. Further, appropriate protective equipment is recommended. Eye protection equipment (e.g. goggles or visors) must be worn, unless potential contact with the eye can be excluded by the nature and type of application (i.e. closed process). Additionally, face protection, protective clothing and safety shoes are required to be worn as appropriate.

Please check the relevant exposure scenario, given in the available via your supplier.

Appropriate engineering controls

If user operations generate dust, use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne dust levels below recommended exposure limits.

Individual protection measures, such as personal protective equipment

a) Eye/face protection

Do not wear contact lenses. For powders, tight fitting goggles with side shields, or wide vision full goggles. It is also advisable to have individual pocket eyewash.

b) Skin protection

Since calcium oxide in mixture is classified as irritating to skin, dermal exposure has to be minimised as far as technically feasible. The use of protective gloves (nitrile), protective standard working clothes fully covering skin, full length trousers, long sleeved overalls, with close fittings at openings and shoes resistant to caustics and avoiding dust penetration are required to be worn.

c) Respiratory protection

Local ventilation to keep levels below established threshold values is recommended. A suitable particle filter mask is recommended, depending on the expected exposure levels - please check the relevant exposure scenario, given in the Appendix/available via your supplier.

d) Thermal hazards

The substance does not represent a thermal hazard, thus special consideration is not required.

Environmental exposure controls

All ventilation systems should be filtered before discharge to atmosphere.

Avoid releasing to the environment.

Contain the spillage. Any large spillage into watercourses must be alerted to the regulatory authority responsible for environmental protection or other regulatory body.

For detailed explanations of the risk management measures that adequately control exposure of the environment to the substance please check the relevant exposure scenario, available via your supplier.

For further detailed information, please check the Appendix of this SDS.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Physical state	solid
b)	Colour	White or off white (beige)
c)	Odour	odourless
d)	Melting point/freezing point	> 450 °C (study result, EU A.1 method)
e)	Boiling point or initial boiling point and boiling range	not applicable (solid with a melting point > 450 °C)
f)	Flammability	non flammable (study result, EU A.10 method)
g)	Lower and upper explosion limit	non explosive (void of any chemical structures commonly associated with explosive properties)

h)	Flash point	not applicable (solid with a melting point > 450 °C)
i)	Auto-ignition temperature	no relative self-ignition temperature below 400 °C (study result, EU A.16 method)
j)	Decomposition temperature	not applicable
k)	pH	12.3 (saturated solution at 20 °C)
l)	Kinematic viscosity	not applicable (solid with a melting point > 450 °C)
m)	Solubility	not studied
n)	Partition coefficient n-octanol/water (log value)	not applicable
o)	Vapour pressure	not applicable
p)	Density and/or relative density	depends on grain size distribution
q)	Relative vapour density	not applicable
r)	Particle characteristics	varying sizes: lump, granular or fine powder

9.2 Other information

Information with regard to physical hazard classes

Non explosive (considered to be ”inert” in the context of explosivity, since it represents calcium and oxygen being already in their preferred oxidation state).

no oxidizing properties (Based on the chemical structure, the substance does not contain a surplus of oxygen or any structural groups known to be correlated with a tendency to react exothermally with combustible material).

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity

Calcium oxide in mixture reacts exothermically with water to form Calcium dihydroxide.

10.2 Chemical stability

Under normal conditions of use and storage (dry conditions), calcium oxide is stable.

10.3 Possibility of hazardous reactions

Calcium oxide in mixture reacts exothermically with acids to form calcium salts.

10.4 Conditions to avoid

Minimise exposure to air and moisture to avoid degradation.

10.5 Incompatible materials

Calcium oxide in mixture reacts exothermically with water to form calcium dihydroxide:
$CaO + H_2O \rightarrow Ca(OH)_2 + 1155$ kJ/kg CaO
Calcium oxide reacts exothermically with acids to form calcium salts.
Calcium oxide reacts with aluminium and brass in the presence of moisture leading to the production of hydrogen: $CaO + 2\ Al + 7\ H_2O \rightarrow Ca(Al\ (OH)_4)_2 + 3\ H_2$

10.6 Hazardous decomposition products

None.

Further information: calcium oxide in mixture absorbs moisture and carbon dioxide from air to form calcium carbonate, which is a common material in nature.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

For the calcium oxide in mixture:

a) Acute toxicity

Oral LD_{50} > 2000 mg/kg bw (OECD 425, rat)

Dermal no data available.

Inhalation no data available

Calcium oxide or calcium magnesium oxide is not acutely toxic.

b) Skin corrosion/irritation

Calcium dihydroxide is irritating to skin (*in vivo*, rabbit).

Calcium dihydroxide is not corrosive to skin (*in vitro*, OECD 431). By read across these results are also applicable to calcium oxide.

c) Serious eye damage/irritation

Calcium oxide entails a risk of serious damage to the eye (*in vivo*, rabbit).

d) Respiratory or skin sensitisation

No data available. Calcium oxide is considered not to be a skin sensitiser, based on the nature of the effect (pH shift) and the essential requirement of calcium for human nutrition. Additionally magnesium is essential in human nutrition.

e) Germ cell mutagenicity

Calcium dihydroxide is not genotoxic (*in vitro, OECD 471, 473 and 476*). By read across these results are also applicable to calcium oxide.

Calcium magnesium oxide is not genotoxic (*in vitro, OECD 471, 473 and 476*).

In view of the omnipresence and essentiality of Ca and Mg, and of the physiological non-relevance of any pH shift induced by calcium oxide in aqueous media, CaO is obviously void of any genotoxic potential.

f) Carcinogenicity

Both calcium (administered as Ca-lactate) and magnesium (administered as Mg-chloride) are not carcinogenic (experimental results, rat/mouse).

The pH effect of calcium magnesium oxide does not give rise to a carcinogenic risk.

Human epidemiological data support lack of any carcinogenic potential of calcium magnesium oxide.

g) Reproductive toxicity

Both calcium (administered as Ca-carbonate) and magnesium (administered as Mg-sulphate) are not toxic to reproduction (experimental results, mouse/rat).The pH effect does not give rise to a reproductive risk. Human epidemiological data support lack of any potential for reproductive toxicity

of calcium oxide. Both in animal studies and human clinical studies on various calcium salts no reproductive or developmental effects were detected. Also see the Scientific Committee on Food (Section 16.6).

Thus, calcium oxide is not toxic for reproduction and/or development.

h) STOT-single exposure

From human data it is concluded that CaO and $Ca(OH)_2$ are irritating to the respiratory tract.

As summarised and evaluated in the SCOEL recommendation (Anonymous, 2008), based on human data calcium oxide is irritating to the respiratory system.

i) STOT-repeated exposure

Toxicity of calcium via the oral route is addressed by upper intake levels (UL) for adults determined by the Scientific Committee on Food (SCF), being

UL = 2500 mg/d, corresponding to 36 mg/kg bw/d (70 kg person) for calcium.

Toxicity of CaO via the dermal route is not considered as relevant in view of the anticipated insignificant absorption through skin and due to local irritation as the primary health effect (pH shift).

Toxicity of CaO via inhalation (local effect, irritation of mucous membranes) is addressed by an 8-h TWA determined by the Scientific Committee on Occupational Exposure Limits (SCOEL) of 1 mg/m³ respirable dust (see Section 8.1).

j) Aspiration hazard

Calcium oxide is not known to present an aspiration hazard.

11.2 Information on other hazards

11.2.1 Endocrine disrupting properties

Available data for the substance have been considered against the criteria laid down in Regulations ((EC) No 1907/2006, (EU) 2017/2100, (EU) 2018/605) and found not to apply.

11.2.2 Other information

None

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity

12.1.1 Acute/Prolonged toxicity to fish

LC_{50} (96h) for freshwater fish: 50.6 mg/l (calcium dihydroxide)

LC_{50} (96h) for marine water fish: 457 mg/l (calcium dihydroxide)

12.1.2 Acute/Prolonged toxicity to aquatic invertebrates

EC_{50} (48h) for freshwater invertebrates: 49.1 mg/l (calcium dihydroxide)

LC_{50} (96h) for marine water invertebrates: 158 mg/l (calcium dihydroxide)

12.1.3 Acute/Prolonged toxicity to aquatic plants

EC_{50} (72h) for freshwater algae: 184.57 mg/l (calcium dihydroxide)

NOEC (72h) for freshwater algae: 48 mg/l (calcium dihydroxide)

12.1.4 Toxicity to micro-organisms e.g. bacteria

At high concentration, through the rise of temperature and pH, calcium oxide is used for disinfection of sewage sludges

12.1.5 Chronic toxicity to aquatic organisms

NOEC (14d) for marine water invertebrates: 32 mg/l (calcium dihydroxide)

12.1.6 Toxicity to soil dwelling organisms

EC_{10}/LC_{10} or NOEC for soil macroorganisms: 2000 mg/kg soil dw (calcium dihydroxide)

EC_{10}/LC_{10} or NOEC for soil microorganisms: 12000 mg/kg soil dw (calcium dihydroxide)

12.1.7 Toxicity to terrestrial plants

NOEC (21d) for terrestrial plants: 1080 mg/kg (calcium dihydroxide)

12.1.8 General effect

Acute pH-effect. Although this product is useful to correct water acidity, an excess of more than 1 g/l may be harmful to aquatic life. pH-value of > 12 will rapidly decrease as result of dilution and carbonation

12.1.9 Further information

The results by read across are also applicable to calcium oxide, since in contact with moisture calcium hydroxide is formed

12.2 Persistence and degradability

Not relevant for inorganic substances

12.3 Bioaccumulative potential

Not relevant for inorganic substances

12.4 Mobility in soil

Calcium oxide reacts with water and/or carbon dioxide to form respectively calcium dihydroxide and/or calcium carbonate, which are sparingly soluble, and present a low mobility in most soils.

12.5 Results of PBT and vPvB assessment

Not relevant for inorganic substances

12.6 Endocrine disrupting properties

Available data for the substance have been considered against the criteria laid down in Regulations ((EC) No 1907/2006, (EU) 2017/2100, (EU) 2018/605) and found not to apply.

12.7 Other adverse effects

No other adverse effects are identified

According to the criteria of the European classification and labelling system, the substance does not require classification as hazardous for the environment.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Disposal of mixture including calcium oxide should be in accordance with local and national legislation. Processing, use or contamination of this product may change the waste management options. Dispose of container and unused contents in accordance with applicable member state and local requirements.

The used packing is only meant for packing this product; it should not be reused for other purposes. After usage, empty the packing completely.

SECTION 14: TRANSPORT INFORMATION

14.1 UN-Number

Not regulated

14.2 UN proper shipping name

Calcium oxide mixture

14.3 Transport hazard class(es)

Class 8 (ICAO/IATA)

Mixture or Calcium oxide is not classified as hazardous for transport (ADR (Road), RID (Rail), IMDG / GGVSea (Sea).

14.4 Packing group

Group III (Air transport (ICAO/IATA))

14.5 Environmental hazards

None

14.6 Special precautions for user

Avoid any release of dust during transportation, by using air-tight tanks for powders and covered trucks for pebbles.

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

Not regulated.

SECTION 15: REGULATORY INFORMATION

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

Authorisations:	Not required
Restrictions on use:	None
Other EU regulations:	Calcium oxide is not a SEVESO substance, not an ozone depleting substance and not a persistent organic pollutant.
National regulations:	Calcium oxide: Water endangering class 1 (Germany)

15.2 Chemical safety assessment

A chemical safety assessment has not been carried out for this substance.

SECTION 16: OTHER INFORMATION

Data are based on our latest knowledge but do not constitute a guarantee for any specific product features and do not establish a legally valid contractual relationship.

16.1 Abbreviations

DNEL: derivated no-effect level

EC_{50}: median effective concentration

LC_{50}: median lethal concentration

LD_{50}: median lethal dose

NOEC: no observable effect concentration

IATA: international air transport association

TWA: time weighted average

OEL: occupational exposure limit

PBT: persistent, bioaccumulative, toxic chemical

PNEC: predicted no-effect concentration

STEL: short-term exposure limit

TWA: time weighted average

vPvB: very persistent, very bioaccumulative chemical

ICAO: international civil aviation organization

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

ADN: European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways

IMDG: International Maritime Dangerous Goods Code

RID: Regulations concerning the international railway transport of dangerous goods

16.2 Key literature references

Anonymous, 2006: Tolerable upper intake levels for vitamins and minerals Scientific Committee on Food, European Food Safety Authority, ISBN: 92-9199-014-0 [SCF document]

Anonymous, 2008: Recommendation from the Scientific Committee on Occupational Exposure Limits (SCOEL) for calcium oxide (CaO) and calcium dihydroxide ($Ca(OH)_2$), European Commission, DG Employment, Social Affairs and Equal Opportunities, SCOEL/SUM/137 February 2008

16.3 Revision

31-12-2022 (version 2.0/EN)

The SDS has been revised to comply with Regulation (EU) 2020/878 of 18 June 2020 amending Annex II to Regulation (EC) No 1907/2006 of REACH.

Section 2.3: information added

Section 9, 11.2, 12.6: updated according to Regulation (EU) 2020/878

January 2019 (Version 1.1/EN)

Section 3.2 Changed percentages

September 2018 (Version 1.0/EN)

This is a first version of MSDS of Cresco Optimal Mg in English based on Finnish SDS.

Disclaimer

This safety data sheet (SDS) is based on the legal provisions of the REACH Regulation (EC 1907/2006; article 31 and Annex II), as amended. Its contents are intended as a guide to the appropriate precautionary handling of the material. It is the responsibility of recipients of this SDS to ensure that the information contained therein is properly read and understood by all people who may use, handle, dispose or in any way come in contact with the product. Information and instructions provided in this SDS are based on the current state of scientific and technical knowledge at the date of issue indicated. It should not be construed as any guarantee of technical performance, suitability for particular applications, and does not establish a legally valid contractual relationship. This version of the SDS supersedes all previous versions.

APPENDIX

Exposure Scenarios