



## Calcium hydroxide nanoparticles in aqueous suspension

### Safety Data Sheet

compliant with (EC) Regulation No. 453/2010

<b>SECTION 1: Identification of the substance/mixture and the company/undertaking</b>	
<b>1.1 Product Identifier</b>	
Product form	Mixture
Name of the mixture	Calcium hydroxide in water
EC number	215-137-3
CAS number	1305-62-0
Formula	Ca(OH) <sub>2</sub>
<b>1.2 Relevant identified uses of the substance or mixture and inadvisable uses</b>	
Description/Use	Consolidating agent for natural stone materials, stucco and historical mortar, dispersed in water and perfectly compatible with all carbonate matrix substrates
<b>1.3 Information on the supplier of the safety data sheet</b>	
Manufacturer (under licence of Patent 2880.101.B1.2016 of the University of L'Aquila) Distributor	Sustainable Nanoparticles Production and Technologies S.R.L. (SNAPTECH S.R.L.) Piazzale Pontieri 1, 67100 L'Aquila Tel. No. 0862.434234 <a href="mailto:snaptech.srl@gmail.com">snaptech.srl@gmail.com</a>  IBIX S.r.L. VIA DELL'INDUSTRIA, 43 48022 LUGO (RA) (ITALY) - TEL: +39 0545 994589 – info@ibix.it
<b>1.4 Emergency telephone number</b>	
Telephone	+39 0862434234 (office hours)

<b>SECTION 2: Hazards identification</b>			
<b>2.1 Classification of the substance or mixture</b>			
Classification in accordance with (EC) Regulation No. 1272/2008 [CLP] Mixture/Substance: SDS UE 2015: in compliance with (EU) Regulation 2015/830 (REACH Enclosure II)			
<b>GHS classification</b>			
Section	Hazard class	Hazard category class	Hazard indicator
3.2	skin corrosion/irritation	(Skin Irrit. 2)	H315
3.3	serious eye damage/irritation	(Eye Dam. 1)	H318
3.8R	specific target organ toxicity - single exposure (irritation of the respiratory tract)	(STOT SE 3)	H335
<b>Adverse physical-chemical effects, for human health and the environment</b>			
No further information available			
<b>2.2 Label elements</b>			
Labelling in accordance with (EC) regulation No. 1272/2008 [CLP]			

Hazard pictograms (CLP)	 GHS05  GHS07
Hazard indications (CLP)	H315 Causes skin irritation H318 Causes serious eye damage H335 May irritate respiratory tract
Precautionary advice - <b>prevention</b> (CLP)	P233 Keep the container tightly closed P260 - Do not breathe in dust/fumes/gas/mist/vapours/aerosols P280 Wear gloves/protect eyes/face
Precautionary advice - <b>reaction</b> (CLP)	P302+P352 IN THE EVENT OF CONTACT WITH SKIN: wash with plenty of water. P305+P351+P338 IN THE EVENT OF CONTACT WITH EYES: rinse thoroughly for several minutes. Remove possible contact lenses if it is easy to do so. Continue to rinse. P310 Immediately contact a POISON CENTRE/doctor P312 If you feel unwell, contact a doctor
<b>2.3 Other hazards</b>	
Other hazards which do not contribute to the classification	There is no additional information

<b>SECTION 3: Composition/information on the ingredients</b>	
<b>3.1 Substances</b>	
Not applicable	
<b>3.2 Mixtures</b>	
1 - 4% Calcium hydroxide	REACH Register No. 01-2119475151-45-0264; EC number: 215-137-3; Molecular formula: $H_2CaO_2$ CAS number: 1305-62-0 Molar mass: 74.09 g/mol Classification 1272/2008 (CLP): skin irrit. 2 H315; Eye dam. 1 H318; STOT SE 3 H335
96 – 99% Water	

<b>SECTION 5: Firefighting measures</b>	
<b>5.1 Extinguishing media</b>	
Suitable extinguishing media	Adapt extinguishing equipment to the surrounding fire environment. Nebulised water. Dry powder. Foam.
<b>5.2 Special hazards arising from the substance or mixture</b>	
Danger of fire	DIRECT DANGER OF FIRE: Non-combustible. INDIRECT DANGER OF FIRE: Reactions causing risk of fire: see "Reactivity danger"
Danger of explosion	INDIRECT DANGER OF EXPLOSION: Reactions causing risk of explosion: see "Reactivity"
Dangerous combustion products in case of fire	Possible development of toxic fumes
<b>5.3 Advice for firefighters</b>	

Fire extinction instructions	Protective gloves. Protective visor. Protective clothing. Dust dispersion: compressed air/oxygen respirator. Dust dispersion: dust-tight clothing.
Protection during fire fighting	Fire/heating: compressed air/oxygen respirator. Do not work without appropriate protective equipment. Self-contained insulating respirator. Full body protection.

<b>SECTION 6: Measures in the event of accidental release</b>
<b>6.1 Personal precautions, protective equipment and emergency procedures</b>
Wear gloves, protective clothing, safety goggles.
<b>6.2 Environmental precautions</b>
Keep away from drains, surface water and groundwater
<b>6.3 Methods and materials for containment and cleaning up</b>
Drain covers. Mechanical containment. In the event of solid product avoid dust formation. Place in appropriate containers for disposal.

<b>SECTION 7: Handling and storage</b>
<b>7.1 Precautions for safe handling</b>
Avoid contact with skin and eyes. Do not use empty containers until they have been cleaned. Ensure there are no residual incompatible materials in the containers before transfer operations. Contaminated clothing must be changed before entering the dining areas. Wash hands before breaks and at the end of work.
<b>7.2 Conditions for safe storage, including any incompatibilities</b>
Keep container tightly closed. Store in a dry place. Respect compatible storage of chemicals. Use local and general ventilation. Recommended storage temperature: 15 - 25 °C.
<b>7.3 Specific end uses</b>
There is no information available.

<b>SECTION 8: Exposure controls/personal protection</b>																																					
<b>8.1 Control parameters</b>																																					
Workplaces should be adequately ventilated. Where possible, install effective general air exchange systems. If these measures are not sufficient to keep concentrations of particulate materials below the exposure limit, appropriate respiratory tract protective equipment must be used. <b>Occupational exposure values (workplace exposure limits):</b> Irrelevant <b>Relevant DNEL/DMEL/PNEC and other threshold levels</b>																																					
<ul style="list-style-type: none"> <li><b>values related to human health</b></li> </ul> <table border="1"> <thead> <tr> <th>Endpoint</th> <th>Threshold level</th> <th>Protection target, route of exposure</th> <th>Intended for</th> <th>Exposure time</th> </tr> </thead> <tbody> <tr> <td>DNEL</td> <td>4 mg/m<sup>3</sup></td> <td>human, via inhalation</td> <td>workers (industrial)</td> <td>acute - systemic effects</td> </tr> <tr> <td>DNEL</td> <td>1 mg/m<sup>3</sup></td> <td>human, via inhalation</td> <td>workers (industrial)</td> <td>chronic - systemic effects</td> </tr> <tr> <td>DNEL</td> <td>4 mg/m<sup>3</sup></td> <td>human, via inhalation</td> <td>workers (industrial)</td> <td>acute - local effects</td> </tr> <tr> <td>DNEL</td> <td>1 mg/m<sup>3</sup></td> <td>human, via inhalation</td> <td>workers (industrial)</td> <td>chronic - local effects</td> </tr> </tbody> </table> <ul style="list-style-type: none"> <li><b>environmental values</b></li> </ul> <table border="1"> <thead> <tr> <th>Endpoint</th> <th>Threshold level</th> <th>Environ</th> <th>Exposure time</th> </tr> </thead> <tbody> <tr> <td>PNEC</td> <td>0.49 mg/l</td> <td>freshwater</td> <td>short-term (isolated case)</td> </tr> <tr> <td>PNEC</td> <td>0.32 mg/l</td> <td>seawater</td> <td>short-term (isolated case)</td> </tr> </tbody> </table>	Endpoint	Threshold level	Protection target, route of exposure	Intended for	Exposure time	DNEL	4 mg/m <sup>3</sup>	human, via inhalation	workers (industrial)	acute - systemic effects	DNEL	1 mg/m <sup>3</sup>	human, via inhalation	workers (industrial)	chronic - systemic effects	DNEL	4 mg/m <sup>3</sup>	human, via inhalation	workers (industrial)	acute - local effects	DNEL	1 mg/m <sup>3</sup>	human, via inhalation	workers (industrial)	chronic - local effects	Endpoint	Threshold level	Environ	Exposure time	PNEC	0.49 mg/l	freshwater	short-term (isolated case)	PNEC	0.32 mg/l	seawater	short-term (isolated case)
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PNEC	3 mg/l	Waste water treatment plant (STP)	short-term (isolated case)
PNEC	1,080 mg/kg	soil	short-term (isolated case)
PNEC	0.49 mg/l	water	continual

## 8.2 Exposure controls

### Suitable technical controls

Ensure good ventilation of the workplace

### Personal protective equipment

#### Protection of skin and hands

Wear rubber gloves approved according to the EN374 standard. Respiratory protection Respiratory masks must be worn in workplaces that are insufficiently ventilated and during work with mechanical spraying equipment.

#### Suitable respirator

In the event of inadequate ventilation, exceeding the limit values in the workplace, excessive olfactory disturbance or in the presence of aerosols, mists and smoke, a respiratory tract protective mask independent of the ambient air or a respiratory tract protective mask with type A filter or a corresponding combination filter (presence of aerosols, mists and smoke, e.g. A-P2 or ABEK-P2) according to the EN 141 standard must be used.

#### Hygiene measures and general safety

Do not eat, drink or smoke in the workplace. Use suitable protective measures for hands, eyes, skin and respiratory system. The manufacturer of the protective equipment must ensure that the equipment is suitable for the product.

### Symbol(s) Personal protective equipment



### Environmental exposure controls:

Do not release into the environment

## SECTION 9: Physical and chemical properties

### 9.1 Information on basic physical and chemical properties

Appearance:	Liquid
Colour:	Milky
Odour:	Characteristic
Boiling point:	100°C
Melting/freezing point:	no data available
pH	12.6 (water: 1.7 g/l, 20 °C)
Flash point	not applicable
Evaporation rate	no data available
Flammability (solids, gases)	Not flammable
Explosion limits	
- lower explosion limit (LEL)	this information is not available
- upper explosion limit (UEL)	this information is not available
- Lower explosion limits of dust clouds	this information is not available
- Vapour pressure	this information is not available
Density	1.00 g/cm <sup>3</sup>
Solubility	poorly soluble in water. Soluble in glycerine, in acids and in ammonium chloride
Partition coefficient	
n-octanol/water (log KOW)	this information is not available
Auto-ignition temperature	no information available
Decomposition temperature	When heated above 580°C it decomposes to produce

Viscosity	calcium oxide (CaO) and water
Explosive properties	no data available
Oxidising properties	none
<b>9.2 Other information</b>	
VOC content:	0%
There is no additional information.	

<b>SECTION 10: Stability and reactivity</b>	
<b>10.1 Reactivity</b>	
It absorbs CO <sub>2</sub> from the environment. It is reactive if exposed to air, transforming into calcium carbonate in the form of calcite	
<b>10.2 Chemical stability</b>	
The product is stable when packaged under normal handling and storage conditions. If exposed to air it absorbs CO <sub>2</sub> and transforms into calcium carbonate	
<b>10.3 Possibility of hazardous reactions</b>	
It reacts exothermically with acids. When heated above 580°C it decomposes to produce calcium oxide (CaO) and water. Calcium oxide reacts with water to generate heat, which can be a hazard in the presence of flammable material.	
<b>10.4 Conditions to avoid</b>	
Protect from exposure to air and moisture to prevent transformation into calcium carbonate.	
<b>10.5 Incompatible materials</b>	
Aluminium. Acids. Fluorine.	
<b>10.6 Hazardous decomposition products</b>	
None	

<b>SECTION 11: Toxicological information</b>	
<b>11.1 Reactivity</b>	
Calcium dihydroxide is classified as irritating to the skin and respiratory tract and poses a risk of serious eye damage.	
<u>- Acute toxicity</u>	
Oral	LD50 > 2,000 mg/kg weight (OECD 425, rat)
Dermal	LD50 > 2,500 mg/kg weight (OECD 402, rabbit)
By inhalation	no data available
Calcium dihydroxide is not acutely toxic. Classification for acute toxicity is not guaranteed.	
<u>- Skin corrosion/irritation</u>	
Calcium hydroxide is irritating to skin (from in vivo studies, on rabbits). Based on available data, the substance is to be classified as irritating to skin.	
<u>- Serious eye damage / irritation</u>	
Calcium dihydroxide poses a serious risk of eye damage and is irritating to the skin (from in vivo studies, on rabbits). Based on experimental data, calcium dihydroxide requires classification as very irritating to eyes.	
<u>- Respiratory or skin sensitisation</u>	
No data available. Calcium dihydroxide is not considered a skin sensitiser, based on the nature of the effect (pH shift) and the need for calcium in human nutrition. Classification for sensitisation is not guaranteed.	
<u>- Germ cell mutagenicity</u>	
Bacterial reverse mutation assay (Ames test, OECD 471): Negative Mammalian chromosome aberration test: Negative Due to the enormous diffusion and essentiality of Ca and the physiological irrelevance of any pH shift caused by calcium dihydroxide in aqueous media, the substance is devoid of any genotoxic properties.	

The classification of carcinogenicity is not guaranteed.

- Reproductive toxicity

Calcium (administered as calcium carbonate) is not toxic to reproduction (experimental rat data). The pH effect of the oxide does not lead to an increased risk of reprotoxicity. Epidemiological data on humans support the lack of any reprotoxic potential of calcium dihydroxide. In both animal studies and human clinical studies with various calcium salts, no reprotoxic effect was detected. Therefore, calcium dihydroxide is not reprotoxic or developmentally toxic.

Classification for reprotoxic properties according to Regulation (EC) 1272/2008 is not required.

- Single exposure toxicity

From data on humans, it can be concluded that calcium dihydroxide is irritating to the respiratory tract. As summarised and evaluated in the SCOEL recommendation (Anonymous, 2008), from data on humans calcium dihydroxide is classified as irritating to the respiratory tract [R37, Irritating to respiratory system; STOT SE 3 (H335 - May cause respiratory irritation)].

- Prolonged exposure toxicity

Oral calcium toxicity is determined by the maximum intake levels (UL) for adults determined by the Scientific Committee on Food (SCF), and these are:

UL = 2,500 mg/d, corresponding to 36 mg/kg bw/d (70 kg person) for calcium.

The toxicity of calcium dihydroxide via the skin is not considered relevant due to negligible absorption through the skin and due to local irritation as the primary cause of health hazards (pH shift).

The toxicity of calcium dihydroxide via the inhalation route (local effect, mucous membrane irritation) is determined by an 8-h TWA determined by the Scientific Committee on Occupational Exposure Limits (SCOEL) of 1 mg/m<sup>3</sup> of respirable dust (see section 8.1).

Therefore no classification of calcium dihydroxide for prolonged exposure toxicity is necessary.

## SECTION 12: Ecological information

### 12.1 Toxicity

LC50 (fish-96h):	LC50 (96h) for freshwater fish: 50.6 mg/l LC50 (96h) for marine fish: 457 mg/l
EC50 (daphnies-48h):	EC50 (48h) for freshwater invertebrates: 49.1 mg/l LC50 (96h) for marine invertebrates: 158 mg/l
LC50 (algae-72h):	EC50 (72h) for freshwater algae: 184.57 mg/l NOEC (72h) for freshwater algae: 48 mg/l
Toxicity for micro-organisms	At high concentrations, through increasing temperature and pH, calcium dihydroxide is used for disinfection of sewage effluents.
Chronic toxicity for aquatic organisms:	NOEC (14d) for marine invertebrates: 32 mg/l
Toxicity for soil organisms:	EC10/LC10 or NOEC for soil macro-organisms: 2,000 mg/kg soil dw EC10/LC10 or NOEC for soil micro-organisms: 12,000 mg/kg soil dw
Toxicity for terrestrial plants:	NOEC (21d) for terrestrial plants: 1,080 mg/kg

General effects and further information:	Strong pH effect. Although the product is useful for correcting water acidity, an excess of more than 1 g/l can be dangerous for aquatic life. pH values > 12 decrease rapidly due to dilution and carbonation.
<b>12.2 Persistence and biodegradability</b>	
Not relevant for inorganic substances.	
<b>12.3 Bioaccumulative potential</b>	
Not relevant for inorganic substances.	
<b>12.4 Mobility in soil</b>	
Calcium dihydroxide, which is moderately soluble in water, shows low mobility in most soils.	
<b>12.5 Results of PBT and vPvB assessment</b>	
Not relevant for inorganic substances.	
<b>12.6 Other adverse effects</b>	
None identified	

<b>SECTION 13: Disposal considerations</b>
<b>13.1 Waste treatment methods</b>
Disposal of product/packaging Dispose of in accordance with current regulations

<b>SECTION 14: Transport information</b>
Calcium dihydroxide is not classified as dangerous for transport by road (ADR), rail (RID), or sea (IMDG / GGVSea). IATA transportation (air) not regulated.
<b>14.1 UN number</b>
Not regulated.
<b>14.2 UN shipping name</b>
Not regulated.
<b>14.3 Transport-related hazard classes</b>
Not regulated.
<b>14.4 Packing group</b>
Not regulated.
<b>14.5 Environmental hazards</b>
Not regulated.
<b>14.6 Special precautions for the users</b>
There is no additional information
<b>14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code</b>
Not regulated.

<b>SECTION 15: Regulatory information</b>	
<b>15.1 Substance-specific health, safety and environmental regulations and legislation</b>	
Authorisations:	Not required
Restrictions on use:	None
Other EU regulations:	Calcium dihydroxide is NOT a substance included in the SEVESO Directive, nor is it an ozone depleting substance or a POP (Persistent Organic Pollutant) substance
<b>15.2 Chemical safety assessment</b>	
No assessment of the chemical safety of this substance has been carried out	

## SECTION 16: Other information

The data is based on our most up-to-date knowledge but does not constitute a guarantee for any product specification and does not imply any contractual relationship with the recipient of the data sheet.

### 16.1 Hazard indications

H315: Causes skin irritation

H318: Causes serious eye damage

H335: May irritate respiratory tract

### 16.2 Precautionary advice

P310: Keep out of the reach of children

P280: Wear protective gloves/clothing/protect eyes and face

P305/P351: IN THE EVENT OF CONTACT WITH EYES: Rinse thoroughly for several minutes

P310: Immediately contact a POISON CENTRE or a doctor

P302/P352: IN THE EVENT OF CONTACT WITH SKIN: Wash with plenty of soap and water

P261: Avoid breathing in dust/fumes/gas/mist/vapours/aerosols

P304/P340: IN THE EVENT OF CONTACT WITH SKIN: Carry the injured person out into the fresh air and keep him/her at rest in a position conducive to breathing

P501: Dispose of the product/container at a waste collection point

#### ABBREVIATIONS:

EC50: Effective Concentration

LC50: Lethal Concentration

LD50: Lethal Dose

OEL: Occupational exposure limit

PPE: Personal protective equipment

PBT: Persistent, bioaccumulative and toxic

vPvB: Very persistent and very bioaccumulative

NOEC: No observed effect concentration

PNEC: Predicted no effect concentration

STEL: Short-term exposure limit

TWA: Time weighted average

### 16.3 Key literature references and sources for data

None

#### **Notes for the user**

The information contained in this data sheet is based on our knowledge available as of the date of the latest version. The user must ensure the suitability and completeness of the information in relation to the specific use of the product. This document should not be interpreted as a guarantee of any specific product properties.