

SAFETY DATA SHEET

prepared in accordance with Annex II of the REACH Regulation (EC) 1907/2006, Regulation (EC) 1272/2008, Regulation (EU) 453/2010, Regulation (EU) 2015/830, Regulation (EU) 2019/521 and Regulation (EU) 2020/878.

Version 12.1

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SECTION 1: Identification of the substance/mixture and of the company/undertaking 1.1. Product identifier

Product name Synonyms **H06** Dolomite calcined, Half-burnt dolomite, Half-calcined dolomite, Calcium magnesium carbonate oxide, Dolomitic lime. Please note that this list may not be exhaustive.

Trade name

H06

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

Find hereunder a general description of uses. All the identified combinations of use descriptors are listed in Table 1 of the Annex.

Other activities related to manufacture and services Water treatment chemicals

No uses identified in Table 1 of the Annex are advised against.

1.3. Details of the supplier of the safety data sheet

<u>Company</u>	UEBERALL GmbH
Address	Marlowring 21
	22525 Hamburg
	Germany
Telephone	+494069632530
Telefax	+4940696325399
E-mail of competent person responsible	
for SDS in the MS or in the EU:	mail@ueberall.de

1.4. Emergency telephone number

Emergency telephone number (Europe)	112 This telephone number is available 24 hours per day, 7 days per week.
Poison Information Centre telephone number	+44 (0)121 507 4123 - 0870 600 6266 (emergency – UK only)



	+49 4069632530
Emergency telephone number (Company)	This telephone number is available 24 hours per
	day, 7 days per week.

SECTION 2: Hazards identification 2.1. Classification of the substance or mixture

Skin Irrit.2, H315, Exposure: Dermal Eye Dam.1, H318, STOT SE3, H335, Exposure: Inhalation

Further information

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2. Label elements

Hazard pictograms



<u>Signal word</u> Danger

Hazard statements

H315: Causes skin irritation.H318: Causes serious eye damage.H335: May cause respiratory irritation.

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.

P302 + P352: IF ON SKIN: Wash with plenty of soap and water.

P310: Immediately call a POISON CENTER/ doctor.

P261: Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.

P304 + P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

P501: Dispose of contents/container in accordance with local regulation.

Hazardous components which must be listed on the label

CAS-No.: 83897-84-1	Calcium magnesium carbonate oxide
CAS-No.: 58398-71-3	Calcium magnesium (di)hydroxide oxide

2.3. Other hazards



This mixture contains no substance considered to be persistent, bioaccumulating and toxic (PBT)., This mixture contains no substance considered to be very persistent and very bioaccumulating (vPvB). The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients 3.2. Mixture

Identification of the mixture: H06 Composition/information on ingredients:

Chemical name	CAS-No.	EC-No.	UK REACH No.	Weight percent	REGULATION (EC) No 1272/2008
Calcium magnesium carbonate oxide	83897-84-1	281-192-5	UK REACH On-going	>=95 - <99	Skin Irrit. 2, H315 Eye Dam. 1, H318 STOT SE 3, H335
Calcium magnesium (di)hydroxide oxide	58398-71-3	261-235-4	UK REACH On-going	>=1 - <5	Skin Irrit. 2, H315 Eye Dam. 1, H318 STOT SE 3, H335

Degree of purity (%): No impurities relevant for classification and labelling For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures 4.1. Description of first aid measures

General advice

No known delayed effects. Consult a physician for all exposures except for minor instances.

Move source of dust or move person to fresh air. Obtain medical attention immediately.

Skin contact

Inhalation



act Carefully and gently brush the contaminated body surfaces in order to remove all traces of product. Wash affected area immediately with plenty of water.

Remove contaminated clothing.

If skin irritation persists, call a

physician.

Eye contact

Rinse immediately with plenty of water and seek medical advice.







Ingestion

Clean mouth with water and drink afterwards plenty of water. Do NOT induce vomiting. Obtain medical attention.

4.2. Most important symptoms and effects, both acute and delayed

The substance is not acutely toxic via the oral, dermal, or inhalation route. The substance is classified as irritating to skin and the respiratory tract, and entails a risk of serious damage to the eye. 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 advice given in section 4.1.

SECTION 5: Firefighting measures 5.1. Extinguishing media

Suitable extinguishing media

The product is not combustible. Use a dry powder, foam or CO2 fire extinguisher to extinguish the surrounding fire. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable	exting	uishing	media

DO NOT use water. Avoid humidification.

5.2. Special hazards arising from the substance or mixture

None

5.3. Advice for firefighters

Avoid dust formation. Use breathing apparatus. 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

6.1.1. Advice for non-emergency Ensure adequate ventilation. **personnel** Keep dust levels to a minimum.

Keep unprotected persons away.



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).

6.1.2. Advice for emergency responders See section 6.1.1

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 rising). 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

Avoid dust formation. Keep the material dry if possible. Pick up the product mechanically in a dry way. 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 the safety data sheet.

SECTION 7: Handling and storage 7.1. Precautions for safe handling

7.1.1. Protective measures	Avoid contact with skin and eyes. For personal protection see section 8. Keep dust levels to a minimum. Minimise dust generation. Enclose dust sources, use exhaust ventilation (dust collector at handling points). Handling systems should preferably be enclosed. When handling bags usual precautions should be paid to the risks outlined in the Council Directive 90/269/EEC.
7.1.2. Advice on general occupational hygiene	Avoid inhalation, 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

Store in a dry place.Minimise exposure to air and moisture to avoid degradation.Bulk storage should be in purpose designed silos.Keep out of the reach of children.Keep away from acids, significant quantities of paper, straw and nitro compounds.DO NOT use aluminium for transport and 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

Occupational exposure limit

Chemical name	Form	Limit value	Legal basis
Calcium magnesium carbonate oxide	STEL 15 min Respirable dust	No data available	No data available
	8h TWA Respirable dust	No data available	No data available
Calcium magnesium (di)hydroxide oxide	8h TWA Respirable dust	No data available	No data available
	STEL 15 min Respirable dust	No data available	No data available

Derived No Effect Level

Workers

Chemical name	Exposure routes	Acute local effects	Acute systemic effects	Long-term local effects	Long-term systemic effects
	Oral	Not required	Not required	Not required	Not required
Calcium magnesium carbonate oxide	Inhalation	4 mg/m3 Respirable dust	No data available	1 mg/m3 Respirable dust	No data available
	Dermal	No data available	No data available	No data available	No data available
	Oral	Not required	Not required	Not required	Not required
Calcium magnesium (di)hydroxide oxide	Inhalation	4 mg/m3 Respirable dust	No data available	1 mg/m3 Respirable dust	No data available
	Dermal	No data available	No data available	No data available	No data available

Consumers

Chemical name	Exposure routes	Acute local effects	Acute systemic effects	Long-term local effects	Long-term systemic effects
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	Oral	No data available	No data available	No data available	No data available
Calcium magnesium carbonate oxide	Inhalation	4 mg/m3 Respirable dust	No data available	1 mg/m3 Respirable dust	No data available
	Dermal	No data available	No data available	No data available	No data available
	Oral	No data available	No data available	No data available	No data available
Calcium magnesium (di)hydroxide oxide	Inhalation	4 mg/m3 Respirable dust	No data available	1 mg/m3 Respirable dust	No data available
	Dermal	No data available	No data available	No data available	No data available

Predicted No Effect Concentration

Chemical	Environmental protection targe							
name	Fresh water	Fresh water sediment	Marine water	Marine sediment	Food chain	Microorganisms in sewage treatment	Soil	Air
Calcium magnesium carbonate oxide	0.47 mg/l	No data available	0.303 mg/l	No data available	Does not bioaccumulate.	2,850 mg/l	1,023.1 mg/kg soil dw	No data available
Calcium magnesium (di)hydroxid e oxide	0.38 mg/l	No data available	0.25 mg/l	No data available	Does not bioaccumulate.	2.32 mg/l	833.7 mg/kg soil dw	No data available

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 Appendix/available via your supplier.

8.2.1. Appropriate engineering controls

Handling systems should preferably be enclosed or suitable ventilation installed to maintain atmospheric dust below the OES, if not wear suitable protective equipment.

8.2.2. Individual protection measures, such as personal protective equipment

8.2.2.1. 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.



8.2.2.2. Skin protection

Use approved nitrile impregnated gloves having CE marks.

Use clothing fully covering skin, full length pants, long sleeved overalls, with close fittings at openings.



Footwear resistant to caustics and avoiding dust penetration.



8.2.2.3. 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.

- 8.2.2.4. Thermal hazards The substance does not represent a thermal hazard, thus special consideration is not required.
- All ventilation systems should be filtered before 8.2.3. Environmental exposure controls discharge to atmosphere. 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 rising). Any large spillage into watercourses must be alerted to the Environment Agency or other regulatory body.

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 9: Physical and chemical properties 9.1. Information on basic physical and chemical properties

Physical state:	Solid material of varying sizes: lump, granular or fine powder.
Colour:	white, off-white, beige, grey, light brown
Odour:	odourless
Melting point/freezing point:	> 450 °C; study result, EU A.1 method
Boiling point:	Not applicable (solid with a melting point > 450° C)
Flammability:	The product is not flammable.; study result, EU A.10 method Lower flammability limit: No data available Upper flammability limit: No data available
Lower and upper explosion limit:	Non explosive (void of any chemical structures commonly associated with explosive properties). <u>Upper/Lower explosion limit</u> upper: No data availablelower: No data available



Flash point:	Not applicable (solid with a melting point > 450°C)
Auto-ignition temperature (°C):	No relative self-ignition temperature below 400°C (study result, EU A.16 method)
Decomposition temperature:	study result, EU A.1 method; Possible decomposition from approx. 320° C When heated above 580° C, calcium dihydroxide decomposes to produce calcium oxide (CaO) and water (H2O): Ca(OH)2 \rightarrow CaO + H2O.
pH:	11.7; 20 °C; saturated solution
Kinematic viscosity:	Not applicable (solid with a melting point > 450°C)
Solubility(ies):	study result, EU A.6 method; slightly soluble
Partition coefficient n-octanol/water (log value):	Not applicable (inorganic substance).
Vapour pressure:	Not applicable (solid with a melting point > 450°C)
Density:	2,760 g/cm3
Relative vapour density:	Not applicable
Particle characteristics:	Solid material of varying sizes: lump, granular or powder. Lump: >15 mm Granular: 5-15 mm Powder: <5 mm Particle size distribution by manual dry sieving. The product is derived from naturally occurring minerals and is not intentionally manufactured in the nano scale although it may contain particles with one or more external dimensions in the size range 1 nm100 nm.

9.2. Other information

No data available

SECTION 10: Stability and reactivity 10.1. Reactivity

slightly soluble

10.2. Chemical stability



Under normal conditions of use and storage (dry conditions), the product is stable.

10.3. Possibility of hazardous reactions

T > 580°C: Ca(OH)2.MgO \rightarrow CaO + H2O + MgO

When heated above 600°C, calcium carbonate decomposes to produce calcium oxide (CaO) and carbon dioxide (CO2). Calcium oxide reacts with water and generates heat. This may cause risk to flammable material.

The product reacts exothermically with acids.

10.4. Conditions to avoid

For information on conditions to avoid, please see SECTION 7.

10.5. Incompatible materials

The product reacts exothermically with acids to form salts.

Reacts with aluminium and brass in the presence of moisture leading to the production of hydrogen. Ca(OH)2.MgO + 2AI + 7H2O \rightarrow MgO + Ca(AI(OH)4)2 + 3H2

10.6. Hazardous decomposition products

none

Further information

When heated above 600°C, calcium carbonate decomposes to produce calcium oxide (CaO) and carbon dioxide (CO2).

The product absorbs moisture and carbon dioxide from air to form calcium magnesium carbonate (dolomite), which is a common material in the nature.

SECTION 11: Toxicological information 11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

Acute toxicity

CaCO3MgO

Calcium magnesium oxide is not acutely toxic. Oral: LD50 > 2000 mg/kg bw (OECD 425, rat) Dermal: no data available Inhalation: no data available Classification for acute toxicity is not warranted. By read across these results are also applicable to the product.



Ca(OH)2MgO

Oral LD50 > 2000 mg/kg bw (OECD 425, rat, test substances: CaMgO2 and CaMg(OH)4). By read across these results are also applicable to calcium magnesium (di)hydroxide oxide.

Dermal no data available

Inhalation no data available

Calcium magnesium (di)hydroxide oxide is not acutely toxic. Classification for acute toxicity is not warranted.

Skin corrosion/irritation

CaCO3MgO

Calcium oxide is irritating to skin (in vivo, rabbit). Based on experimental results, calcium oxide requires classification as irritating to skin [Skin Irrit 2 (H315 – Causes skin irritation)].

Ca(OH)2MgO

Calcium dihydroxide is irritating to skin (OECD 404, in vivo, rabbit).

Based on experimental results, calcium dihydroxide requires classification as irritating to skin [Skin Irrit 2 (H315 – Causes skin irritation)].



By read across these results are also applicable to the product.

Serious eye damage/eye irritation

CaCO3MgO

Calcium oxide causes irreversible lesions in the eye (OECD 405, in vivo, rabbit).

By read across these results are also applicable to the product. Based on experimental results on a similar substance utilized by read-across, the product requires classification as severely irritating to the eye [Eye Damage 1 (H318 - Causes serious eye damage)].

Ca(OH)2MgO

Calcium dihydroxide entails a risk of serious damage to the eye (eye irritation studies (in vivo, rabbit)). Based on experimental results, calcium dihydroxide requires classification as severely irritating to the eye [Eye Damage 1 (H318 - Causes serious eye damage)].

By read across these results are also applicable to the product.

Respiratory or skin sensitisation

Ca(OH)2MgO

No data available.

The product is considered not to be a skin sensitiser, based on the nature of the effect (pH shift) and the essential requirement of calcium and magnesium for human nutrition. Classification for sensitisation is not warranted.

CaCO3MgO

No data available.

The product is considered not to be a skin sensitiser, based on the nature of the effect (pH shift) and the essential requirement of calcium and magnesium for human nutrition. Classification for sensitisation is not warranted.

Germ cell mutagenicity

CaCO3MgO

There is no indication for genotoxic/mutagenic effects of either calcium dihydroxide or other calcium or magnesium salts in in vitro studies (gene mutation in bacteria).

In view of the omnipresence and essentiality of Ca and Mg and of the physiological non-relevance of any pH shift induced in aqueous media, the product is obviously void of any genotoxic potential, including germ cell mutagenicity.

Classification for genotoxicity is not warranted.

Ca(OH)2MgO

There is no indication for genotoxic/mutagenic effects of either calcium dihydroxide or other calcium or magnesium salts in in vitro studies (gene mutation in bacteria).

Classification for genotoxicity is not warranted.



Carcinogenicity

CaCO3MgO Both calcium (administered as Ca-lactate) and magnesium (administered as Mg-chloride) are not carcinogenic (experimental results, rat/mouse). The pH effect of the product does not give rise to a

carcinogenic risk.

Human epidemiological data support lack of any carcinogenic

potential of the product.

Classification for carcinogenicity is not warranted.

Ca(OH)2MgO

Both calcium (administered as Ca-lactate) and magnesium (administered as Mg-chloride) are not carcinogenic (experimental results, rat/mouse). The pH effect of the product does not give rise to a carcinogenic risk. Human epidemiological data support lack of any carcinogenic potential of the product. Classification for carcinogenicity is not warranted.

Reproductive toxicity

CaCO3MgO

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 the product. Both in animal studies and human clinical studies on various calcium and magnesium salts no reproductive or developmental effects were detected. Also see the Scientific Committee on Food (Section 16.6). Thus, the product is not toxic for reproduction and/or development.



Classification for reproductive toxicity according to regulation (EC) 1272/2008 is not required.

Ca(OH)2MgO

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 the product. Both in animal studies and human clinical studies on various calcium and magnesium salts no reproductive or developmental effects were detected. Also see the Scientific Committee on Food (Section 16.6). Thus, the product is not toxic for reproduction and/or development. Classification for reproductive toxicity according to regulation (EC) 1272/2008 is not required.

STOT - single exposure CaCO3MgO

From human data it is concluded that calcium oxide is irritating to the respiratory tract.

As summarised and evaluated in the SCOEL recommendation (Anonymous, 2008), based on human data calcium oxide is classified as irritating to the respiratory system [STOT SE 3 (H335 – May cause respiratory irritation)]. By read across these results are also applicable to the product.

Ca(OH)2MgO

From human data it is concluded that Ca(OH)2 is irritating to the respiratory tract.

As summarised and evaluated in the SCOEL recommendation



(Anonymous, 2008), based on human data calcium dihydroxide is classified as irritating to the respiratory system [STOT SE 3 (H335 – May cause respiratory irritation)]. By read across these results are also applicable to the product.

STOT - repeated exposure CaCO3MgO

Toxicity of calcium and magnesium 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, and UL = 250 mg/d, corresponding to 3.6 mg/kg bw/d (70 kg person) for magnesium. Toxicity of the product 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 calcium oxide 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). Therefore, classification of the product for toxicity upon prolonged exposure is not required.

Ca(OH)2MgO

Toxicity of calcium and magnesium 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, and UL = 250 mg/d, corresponding to 3.6 mg/kg bw/d (70 kg





person) for magnesium.

Toxicity of the product 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 calcium oxide 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). Therefore, classification of the product for toxicity upon prolonged exposure is not required.

Aspiration hazard

CaCO3MgO

The product is not known to present an aspiration hazard.

Ca(OH)2MgO

The product is not known to present an aspiration hazard.

11.2. Information on other hazards

Based on the available data on the ingredients, there are no indications to suggest that the product fulfils any of the criteria to be identified as an endocrine disruptor as described in the Regulations (EC) No 1907/2006, (EU) 2017/2100 and (EU) 2018/605.

SECTION 12: Ecological information 12.1. Toxicity

Toxicity to fishLC50 (96h) for freshwater fish: 50.6 mg/l (calcium
dihydroxide)
LC50 (96h) for marine water fish: 457 mg/l (calcium
dihydroxide)Toxicity to aquatic invertebratesEC50 (48h) for freshwater invertebrates: 49.1 mg/l
(calcium dihydroxide)
LC50 (96h) for marine water invertebrates: 158 mg/l
(calcium dihydroxide)



Toxicity to aquatic plants	EC50 (72h) for freshwater algae: 184.57 mg/l (calcium dihydroxide) NOEC (72h) for freshwater algae: 48 mg/l (calcium dihydroxide)
<u>Toxicity to microorganisms / Toxicity to</u> <u>bacteria</u>	At high concentration, through the rise of temperature and pH, the product is used for disinfection of sewage sludge.
Toxicity to daphnia and other aquatic invertebrates	NOEC (14d) for marine water invertebrates: 32mg/l (calcium dihydroxide)
<u>Toxicity to soil dwelling organisms</u>	EC10/LC10 or NOEC for soil macroorganisms: 2000 mg/kg soil dw (calcium dihydroxide) EC10/LC10 or NOEC for soil microorganisms: 12000 mg/kg soil dw (calcium dihydroxide)
Toxicity to terrestrial plants	NOEC (21d) for terrestrial plants: 1080 mg/kg (calcium dihydroxide)
<u>Other effects</u>	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.
Other information	The results by read across are also applicable to the product.

12.2. Persistence and degradability

Not relevant for inorganic substances.

12.3. Bioaccumulative potential

Not relevant for inorganic substances.

12.4. Mobility in soil

The product reacts with carbon dioxide to form calcium magnesium carbonate, which is sparingly soluble, and so present a low mobility in most ground.

12.5. Results of PBT and vPvB assessment

Not relevant for inorganic substances.

12.6. Endocrine disrupting properties



Based on the available data on the ingredients, there are no indications to suggest that the product fulfils any of the criteria to be identified as an endocrine disruptor as described in the Regulations (EC) No 1907/2006, (EU) 2017/2100 and (EU) 2018/605.

12.7. Other adverse effects

No other adverse effects are identified.

SECTION 13: Disposal considerations 13.1. Waste treatment methods

Reuse or recycle whenever possible.

If the reuse or recycling is not possible, disposal must be made according to local and national regulation.

Processing, use or contamination of this product may change the waste management options. Waste classification code must be determined at the point of waste generation.

Dispose of container and unused contents in accordance with applicable member state and local requirements.

The used packaging is only meant for packing this product; it should not be reused for other purposes. If the used packaging contains more than 3 % of the lime product, it must be considered as hazardous.

SECTION 14: Transport information

The product is not classified as hazardous for transport (ADR (Road), RID (Rail), IMDG (maritime), IATA/ICAO (air)).

14.1. UN number or ID number

Not regulated as a dangerous good

14.2. UN proper shipping name

Not regulated as a dangerous good

14.3. Transport hazard class(es)

Not regulated as a dangerous good

14.4. Packing group

Not regulated as a dangerous good

14.5. Environmental hazards



None

14.6. Special precautions for user

Avoid any release of dust during transportation, by using air-tight tanks.

14.7. Maritime transport in bulk according to IMO instruments

not regulated

SECTION 15: Regulatory information 15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

Authorisations	Not required
Restrictions on use	None
REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59).	None of the substances currently listed in Annex XIV of the REACH regulation 1907/2006/EC or in the SVHC Candidate List are known to be incorporated in this product in quantities >= 0.1 % w/w.
Other regulations (European Union)	The product is not a SEVESO substance, not an ozone depleting substance and not a persistent organic pollutant.
National regulatory information	Ordinance on facilities for handling substances that are hazardous to water (AwSV) slightly hazardous to water (WGK 1)

15.2. Chemical safety assessment

A Chemical Safety Assessment has 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. Hazard statements

Preparation	H315: Causes skin irritation. H318: Causes serious eye damage. H335: May cause respiratory irritation.
<u>Components</u> Calcium magnesium carbonate oxide	H315: Causes skin irritation. H318: Causes serious eye damage. H335: May cause respiratory irritation.



Calcium magnesium (di)hydroxide oxide	H315: Causes skin irritation. H318: Causes serious eye damage. H335: May cause respiratory irritation.
16.2. 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. P302 + P352: IF ON SKIN: Wash with plenty of soap and water. P310: Immediately call a POISON CENTER/ doctor. P261: Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray. P304 + P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. P501: Dispose of contents/container in accordance with local regulation.
16.3 Abbreviations	

16.3. Abbreviations

DNEL: Derived no effect level EC50: median effective concentration LC50: median lethal concentration LD50: median lethal dose NOEC: no observable effect concentration OEL: occupational exposure limit PBT: persistent, bioaccumulative, toxic chemical PNEC: predicted no-effect concentration SDS: Safety data sheet STEL: short-term exposure limit STOT: specific target organ toxicity TWA: time weighted average vPvB: very persistent, very bioaccumulative chemical

16.4. Literary reference

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

Unless identified otherwise, the classification of the mixture is derived by hazard assessment of the individual mixture constituents [Regulation (EC) No 1272/2008].



16.5. Additions, Deletions, Revisions

Changes since the last version are highlighted in the margin. This version replaces all previous versions.

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.

APPENDIX: EXPOSURE SCENARIOS

The current document includes all relevant occupational and environmental exposure scenarios (ES) for the production and use of calcium magnesium carbonate oxide (calcium magnesium carbonate oxide) as required under the REACH Regulation (Regulation (EC) No 1907/2006). For the development of the ES the Regulation and the relevant REACH Guidance have been considered. For the description of the covered uses and processes, the "R.12 – Use descriptor system" guidance (Version: 2, March 2010, ECHA-2010-G-05-EN), for the description and implementation of risk management measures (RMM) the "R.13 – Risk management measures" guidance (Version: 1.1, May 2008), for the occupational exposure estimation the "R.14 – Occupational exposure estimation" guidance (Version: 2, May 2010, ECHA-2010-G-09-EN) and for the actual environmental exposure assessment the "R.16 – Environmental Exposure Assessment" (Version: 2, May 2010, ECHA-10-G06-EN) was used.

Methodology used for environmental exposure assessment

The environmental exposure scenarios only address the assessment at the local scale, including municipal sewage treatment plants (STPs) or industrial waste water treatment plants (WWTPs) when applicable, for industrial and professional uses as any effects that might occur is expected to take place on a local scale.

1) Industrial uses (local scale)

The exposure and risk assessment is only relevant for the aquatic environment, when applicable including STPs/WWTPs, as emissions in the industrial stages mainly apply to (waste) water. The aquatic effect and risk assessment only deal with the effect on organisms/ecosystems due to possible pH changes related to OH⁻ discharges. The exposure assessment for the aquatic environment only deals with the possible pH changes in STP effluent and surface water related to the OH⁻ discharges at the local scale and is performed by assessing the resulting pH impact: the surface water pH should not increase above 9 (In general, most aquatic organisms can tolerate pH values in the range of 6-9). Risk management measures related to the environment aim to avoid discharging calcium magnesium carbonate oxidesolutions into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes. Regular control of the pH value during introduction into open waters is required. Discharges should be carried out such that pH changes in receiving surface waters are minimised. The effluent pH is normally measured and can be neutralised easily, as often required by national laws. <u>2) Professional uses (local scale)</u>

The exposure and risk assessment is only relevant for the aquatic and terrestrial environment. The aquatic effect and risk assessment is determined by the pH effect. Nevertheless, the classical risk characterisation ratio (RCR), based on PEC (predicted environmental concentration) and PNEC (predicted no effect concentration) is calculated. The professional uses on a local scale refer to



applications on agricultural or urban soil. The environmental exposure is assessed based on data and a modelling tool. The modelling FOCUS/ Exposit tool is used to assess terrestrial and aquatic exposure (typically conceived for biocidal applications).

Details and scaling approach indications are reported in the specific scenarios.

Methodology used for occupational exposure assessment

By definition an exposure scenario (ES) has to describe under which operational conditions (OC) and risk management measure (RMMs) the substance can be handled safely. This is demonstrated if the estimated exposure level is below the respective derived no-effect level (DNEL), which is expressed in the risk characterisation ratio (RCR).

For workers, the repeated dose DNEL for inhalation as well as the acute DNEL for inhalation are based on the respective recommendations of the scientific committee on occupational exposure limits (SCOEL) being 1 mg/m³ and 4 mg/m³, respectively.

In cases where neither measured data nor analogous data are available, occupational exposure is assessed with the aid of a modelling tool. At the first tier screening level, the MEASE tool (<u>http://www.ebrc.de/mease.html</u>) is used to assess inhalation exposure according to the ECHA guidance (R.14).

Page 17 of 100

Since the SCOEL recommendation refers to <u>respirable dust</u> while the exposure estimates in MEASE reflect the <u>inhalable</u> fraction, an additional safety margin is inherently included in the exposure scenarios below when MEASE has been used to derive exposure estimates.

Methodology used for consumer exposure assessment

By definition an ES has to describe under which conditions the substances, preparation or articles can be handled safely. In cases where neither measured data nor analogous data are available, exposure is assessed with the aid of a modelling tool.

For consumers, the repeated dose DNEL for inhalation as well as the acute DNEL for inhalation are based on the respective recommendations of the Scientific Committee on Occupational Exposure Limits (SCOEL), being 1 mg/m³ and 4 mg/m³, respectively.

For inhalation exposure to powders the data, derived from van Hemmen (van Hemmen, 1992: Agricultural pesticide exposure data bases for risk assessment. Rev Environ ContamToxicol. 126: 185.), has been used to calculate the inhalation exposure. The inhalation exposure for consumers is estimated at 15 μ g/hr or 0.25 μ g/min. For larger tasks the inhalation exposure is expected to be higher. A factor of 10 is suggested when the product amount exceeds 2.5 kg, resulting in the inhalation exposure of 150 μ g/hr. To convert these values in mg/m³ a default value of 1.25 m³/hr for the breathing volume under light working conditions will be assumed (van Hemmen, 1992) giving 12 μ g/m³ for small tasks and 120 μ g/m³ for larger tasks.

When the preparation or substance is applied in granular form or as tablets, reduced exposure to dust was assumed. To take this into account if data about particle size distribution and attrition of the granule are lacking, the model for powder formulations is used, assuming a reduction in dust formation by 10 % according to Becks and Falks (Manual for the authorisation of pesticides. Plant protection products. Chapter 4 Human toxicology; risk operator, worker and bystander, version 1.0., 2006).

For dermal exposure and exposure to the eye a qualitative approach has been followed, as no DNEL could be derived for this route due to the irritating properties of calcium oxide. Oral exposure was not assessed as this is not a foreseeable route of exposure regarding the uses addressed. Since the SCOEL recommendation refers to respirable dust while the exposure estimates by the model from van Hemmen reflect the inhalable fraction, an additional safety margin is inherently included in the exposure scenarios below, i.e. the exposure estimates are very conservative. The exposure assessment of calcium magnesium carbonate oxideprofessional and industrial and consumer use is performed and organized based on several scenarios. An overview of the scenarios and the coverage of substance life cycle is presented in Table 1.



H06 - Page 23/107

Page 18 of 100

Table 1: Overview on exposure scenarios and coverage of substance life cycle

ES number	Exposure scenario title		ldentified uses		ed	Resultin g life cycle stage	ntified Use					Environmental
			Formulation	End use	Consumer	use Service life for articles	Linked to Ide		Chemical Product	Process category (PROC)	Article categor y (AC)	release category (ERC)
9.1	Manufacture and industrial uses of aqueous solutions of lime substances	x	x	x		х	1		1, 2, 3, 7, 8, 9a, 9b, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40	1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 12, 13, 14, 15, 16, 17, 18, 19	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 13	6c, 6d, 7, 12a, 12b,
9.2	Manufacture and industrial uses of low dusty solids/powders of lime substances	x	x	x		x	2		1, 2, 3, 7, 8, 9a, 9b, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40	1, 2, 3, 4, 5, 6, 7, 8a, 8b, 9, 10, 13, 14, 15, 16, 17, 18, 19, 21, 22, 23, 24, 25, 26, 27a, 27b	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 13	1, 2, 3, 4, 5, 6a, 6b, 6c, 6d, 7, 12a, 12b, 10a, 10b, 11a, 11b
9.3	Manufacture and industrial uses of medium dusty solids/powders of lime substances	Х	x	х		x	3	3; 1, 2a, 2b, 4, 5, 6a, 6b, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 23, 24	1, 2, 3, 7, 8, 9a, 9b, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40	1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 14, 15, 16, 17, 18, 19, 22, 23, 24, 25, 26, 27a, 27b	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 13	1, 2, 3, 4, 5, 6a, 6b, 6c, 6d, 7, 12a, 12b, 10a, 10b, 11a, 11b



ES number	Exposure scenario title	Manufacture	Identified uses		ed	Resultin g life cycle stage	life ⊃ ycle ⊅					Environmental
			Formulation	End use	Consumer	use Service life for articles	Linked to Ide		Chemical Product Category (PC)	Process category (PROC)	Article categor y (AC)	release category (ERC)
9.4	Manufacture and industrial uses of high dusty solids/powders of lime substances	x	x	х		x	4	3; 1, 2a, 2b, 4, 5, 6a, 6b, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 23, 24	1, 2, 3, 7, 8, 9a, 9b, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40	1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 14, 15, 16, 17, 18, 19, 22, 23, 24, 25, 26, 27a, 27b	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 13	6c, 6d, 7, 12a, 12b,
9.5	Manufacture and industrial uses of massive objects containing lime substances	х	x	х		х	5	3; 1, 2a, 2b, 4, 5, 6a, 6b, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 23, 24	1, 2, 3, 7, 8, 9a, 9b, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40	6, 14, 21, 22, 23, 24, 25	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 13	
9.6	Professional uses of aqueous solutions of lime substances		x	х		х	6	22; 1, 5, 6a, 6b, 7, 10, 11, 12, 13, 16, 17, 18, 19, 20, 23, 24	1, 2, 3, 7, 8, 9a, 9b, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40	2, 3, 4, 5, 8a, 8b, 9, 10, 12, 13, 15, 16, 17, 18, 19	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 13	2, 8a, 8b, 8c, 8d, 8e, 8f



9.7	Professional uses of low dusty solids/powders of lime substances	x	x		х	7	22; 1, 5, 6a, 6b, 7, 10, 11, 12, 13, 16, 17, 18, 19, 20, 23, 24	1, 2, 3, 7, 8, 9a, 9b, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40	2, 3, 4, 5, 8a, 8b, 9, 10, 13, 15, 16, 17, 18, 19, 21, 25, 26	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 13	2, 8a, 8b, 8c, 8d, 8e, 8f
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ES number	Exposure scenario title				-	Exposure	Exposure	ure	Identified uses		ed	Resultin g life cycle stage	ntified Use			Dresses	Article	Environmental
		Manufacture	Formulation	End use	Consumer	use Service life for articles	Linked to Ide		Chemical Product	Process category (PROC)	Article categor y (AC)	release category (ERC)						
9.8	Professional uses of medium dusty solids/powders of lime substances		x	х		x	8	22; 1, 5, 6a, 6b, 7, 10, 11, 12, 13, 16, 17, 18, 19, 20, 23, 24	1, 2, 3, 7, 8, 9a, 9b, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40	2, 3, 4, 5, 8a, 8b, 9, 10, 13, 15, 16, 17, 18, 19, 25, 26	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 13	2, 8a, 8b, 8c, 8d, 8e, 8f, 9a, 9b						
9.9	Professional uses of high dusty solids/powders of lime substances		x	х		х	9	22; 1, 5, 6a, 6b, 7, 10, 11, 12, 13, 16, 17, 18, 19, 20, 23, 24	1, 2, 3, 7, 8, 9a, 9b, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40	2, 3, 4, 5, 8a, 8b, 9, 10, 13, 15, 16, 17, 18, 19, 25, 26	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 13	2, 8a, 8b, 8c, 8d, 8e, 8f						



9.10	Professional use of lime substances in soil treatment	x	х		10	22	9b	5, 8b, 11, 26		2, 8a, 8b, 8c, 8d, 8e, 8f
9.11	Professional uses of articles/container s containing lime substances		х	х	11	22; 1, 5, 6a, 6b, 7, 10, 11, 12, 13, 16, 17, 18, 19, 20, 23, 24		0, 21, 24, 25	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 13	10a, 11a, 11b, 12a, 12b

	Exposure scenario title		lde use	ntifie es	əd	Resultin g life cycle stage	ntified Use			D	Article	Environmental
		Manufacture	Formulation	End use	Consumer	use Service life for articles	Linked to Ide		Chemical Product	Process category (PROC)	Article categor y (AC)	release category (ERC)
9.12	Consumer use of building and construction material (DIY)				x		x	21	9b, 9a			8
9.13	Consumer use of CO ₂ absorbent in breathing apparatuses				х		х	21	2			8



H06 - Page 28/107

9.14	Consumer use of garden lime/fertilizer		x	х	21	20, 12		8e
9.15	Consumer use of lime substances as water treatment chemicals in aquaria		x	х	21	20, 37		8
9.16	Consumer use of cosmetics containing lime substances		x	х	21	39		8

ES number 9.1: Manufacture and industrial uses of aqueous solutions of lime substances

Exposure Scenario	ο Format (1) addressing uses carried οι	It by workers
1. Title		
Free short title	Manufacture and industrial uses of a	queous solutions of lime substances
Systematic title based on use descriptor	SU3, SU1, SU2a, SU2b, SU4, SU5, SU6a, SU6b, SU15, SU16, SU17, SU18, PC1, PC2, PC3, PC7, PC8, PC9a, PC9b, PC11, PC19, PC20, PC21, PC23, PC24, PC25, PC26, PC34, PC35, PC36, PC AC1, AC2, AC3, AC4, AC5, AC6	SU7, SU8, SU9, SU10, SU11, SU12, SU13, SU14, , SU19, SU20, SU23, SU24 PC12, PC13, PC14, PC15, PC16, PC17, PC18, PC27, PC28, PC29, PC30, PC31, PC32, PC33, C37, PC38, PC39, PC40 6, AC7, AC8, AC10, AC11, AC13 s are given in Section 2 below)
Processes, tasks and/or activities covered	Processes, tasks and/or activities cov	ered are described in Section 2 below.
Assessment Method	The assessment of inhalation exposure is ba	sed on the exposure estimation tool MEASE.
2. Operational con	ditions and risk management measures	3
PROC/ERC	REACH definition	Involved tasks
PROC 1	Use in closed process, no likelihood of exposure	
PROC 2	Use in closed, continuous process with occasional controlled exposure	
PROC 3	Use in closed batch process (synthesis or formulation)	
PROC 4	Use in batch and other process (synthesis) where opportunity for exposure arises	
PROC 5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	
PROC 7	Industrial spraying	
PROC 8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities	
PROC 8b	Transfer of substance or preparation (charging/ discharging) from/to vessels/large containers at dedicated facilities	
PROC 9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Further information is provided in the ECHA Guidance on information requirements and
PROC 10	Roller application or brushing	chemical safety assessment, Chapter R.12: Use descriptor system (ECHA-2010-G-05-EN).
PROC 12	Use of blowing agents in manufacture of foam	
PROC 13	Treatment of articles by dipping and pouring	
PROC 14	Production of preparations or articles by tabletting, compression, extrusion, pelletisation	
PROC 15	Use as laboratory reagent	
PROC 16	Using material as fuel sources, limited exposure to unburned product to be expected	
PROC 17	Lubrication at high energy conditions and in partly open process	
PROC 18	Greasing at high energy conditions	
PROC 19	Hand-mixing with intimate contact and only PPE available	
ERC 1-7, 12	Manufacture, formulation and all types of industrial uses	
ERC 10, 11	Wide-dispersive outdoor and indoor use of longlife articles and materials	



2.1 Control of workers exposure

Product characteristic

According to the MEASE approach, the substance-intrinsic emission potential is one of the main exposure determinants. This is reflected by an assignment of a so-called fugacity class in the MEASE tool. For operations conducted with solid substances at ambient temperature the fugacity is based on the dustiness of that substance. Whereas in hot metal operations, fugacity is temperature based, taking into account the process temperature and the melting point of the substance. As a third group, high abrasive tasks are based on the level of abrasion instead of the substance intrinsic emission potential. The spraying of aqueous solutions (PROC7 and 11) is assumed to be involved with a medium emission

PROC	Use in preparation	Content in preparation	Physical form	Emission potential
PROC 7	not restricted		aqueous solution	medium
All other applicable PROCs	not res	stricted	aqueous solution	very low

Amounts used

The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation (industrial vs. professional) and level of containment/automation (as reflected in the PROC) is the main determinant of the process intrinsic emission potential.

Frequency and duration of use/exposure

PROC	Duration of exposure
PROC 7	≤ 240 minutes
All other applicable PROCs	480 minutes (not restricted)

Human factors not influenced by risk management

The shift breathing volume during all process steps reflected in the PROCs is assumed to be 10 m³/shift (8 hours).

Other given operational conditions affecting workers exposure

Since aqueous solutions are not used in hot-metallurgical processes, operational conditions (e.g. process temperature and process pressure) are not considered relevant for occupational exposure assessment of the conducted processes.

Technical conditions and measures at process level (source) to prevent release

Risk management measures at the process level (e.g. containment or segregation of the emission source) are generally not required in the processes.

Technical conditions and measures to control dispersion from source towards the worker

		Localised controls (LC)	Efficiency of LC (according to MEASE)	Further information
PROC 7	Any potentially required separation of workers from the emission source is indicated above under	local exhaust ventilation	78 %	-
	"Frequency and duration of exposure". A reduction of exposure duration can be	not applicable	na	-
All other applicable	achieved, for example, by the installation of ventilated (positive pressure) control rooms or by removing the worker from workplaces involved with relevant exposure.	not required	na	-

Avoid inhalation or ingestion. General occupational hygiene measures are required to ensure a safe handling of the substance. These measures involve good personal and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating and smoking at the workplace, the wearing of standard working clothes and shoes unless otherwise stated below. Shower and change clothes at end of work shift. Do not wear contaminated clothing at home. Do not blow dust off with compressed air.



Conditions and measur	es related to personal pr	otection, hygiene and he	ealth evaluation	
PROC	Specification of respiratory protective equipment (RPE)	RPE efficiency (assigned protection factor, APF)	Specification of gloves	Further personal protective equipment (PPE)
PROC 7	FFP1 mask	APF=4	Since calcium magnesium carbonate oxide is considered as	Eye protection equipment (e.g. goggles or visors) must be worn, unless potential contact with the eye can be
All other applicable PROCs	not required	na	irritating to skin, the use of protective gloves is mandatory for all process steps.	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.
Any RPE as defined abov	ve shall only be worn if the	following principles are in	plemented in parallel: The	
(compare with "duration of resistance and mass of th considered that the worke For reasons as given abo the use of RPE), (ii) have hair). The recommended contours of the face prop The employer and self-er devices and the manager for a respiratory protectiv An overview of the APFs	of exposure" above) should ne RPE itself, due to the in er's capability of using tool ove, the worker should the suitable facial characteris devices above which rely erly and securely. mployed persons have lega ment of their correct use in e device programme inclu-	d reflect the additional physicreased thermal stress by s and of communicating arefore be (i) healthy (espectics reducing leakages before a tight face seal will no al responsibilities for the must be workplace. Therefore ding training of the workers g to BS EN 529:2005) can	siological stress for the wo enclosing the head. In address re reduced during the weat cially in view of medical pro- ween face and mask (in vi- t provide the required prote- taintenance and issue of re- they should define and do	rker due to the breathing dition, it shall be ring of RPE. oblems that may affect ew of scars and facial ection unless they fit the espiratory protective ocument a suitable policy
The daily and annual amo exposure.	ount per site (for point sou	rces) is not considered to l	be the main determinant fo	or environmental
Frequency and duration	n of use			
Intermittent (< 12 time pe	r year) or continuous use/	release		
Environment factors no	ot influenced by risk man	agement		
Flow rate of receiving sur	face water: 18000 m³/day			
Other given operational	I conditions affecting en	vironmental exposure		
Effluent discharge rate: 2	2			
Technical onsite condit	ions and measures to re	duce or limit discharges	, air emissions and relea	ses to soil
surface water, in case sur introduction into open wa waters are minimised (e.s	ch discharges are expecte ters is required. In general g. through neutralisation). he description of standard	d to cause significant pH o l discharges should be car In general most aquatic or	ying lime solutions into mur changes. Regular control o ried out such that pH chan ganisms can tolerate pH va rganisms. The justification	f the pH value during ges in receiving surface alues in the range of 6-9.
Conditions and measur	res related to waste			
Solid industrial waste of li	ime should be reused or d	ischarged to the industrial	wastewater and further ne	utralized if needed.

3. Exposure estimation and reference to its source

Occupational exposure



The exposure estimation tool MEASE was used for the assessment of inhalation exposure. The risk characterisation ratio (RCR) is the quotient of the refined exposure estimate and the respective DNEL (derived no-effect level) and has to be below 1 to demonstrate a safe use. For inhalation exposure, the RCR is based on the DNEL for calcium magnesium carbonate oxide of 1 mg/m³ (as respirable dust) and the respective inhalation exposure estimate derived using MEASE (as inhalable dust). Thus, the RCR includes an additional safety margin since the respirable fraction being a sub-fraction of the inhalable fraction according to EN 481.

LIN 401.				
PROC	Method used for inhalation exposure assessment	Inhalation exposure estimate (RCR)	Method used for dermal exposure assessment	Dermal exposure estimate (RCR)
PROC 1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 12, 13, 14, 15, 16, 17, 18, 19	MEASE	<1 mg/m³ (0.001 – 0.66)	considered as irritating t has to be minimised as f A DNEL for dermal effec Thus, dermal exposure	sium carbonate oxide is to skin, dermal exposure ar as technically feasible. to has not been derived. to is not assessed in this scenario.
Environmental exposur	.e			
as emissions of calcium r (waste) water. The aquat changes related to OH- of pH effect. Only the local treatment plants (WWTP expected to take place of carbonate oxide will be for vapour pressure of lime s this exposure scenario. T changes in STP effluent a	sure assessment is only re magnesium carbonate oxic ic effect and risk assessme lischarges, being the toxici scale is being addressed, i s) when applicable, both for n a local scale. The high w bound predominantly in wate substance. Significant emis The exposure assessment and surface water related t g the resulting pH impact: t	le in the different life-cycle ent only deal with the effec- ty of Ca2+ and Mg2+ is ex- ncluding municipal sewag- or production and industria ater solubility and very low er. Significant emissions or sisions or exposure to the to for the aquatic environmer to the OH- discharges at th	stages (production and us to on organisms/ecosystem (pected to be negligible co e treatment plants (STPs) I use as any effects that m vapour pressure indicate r exposure to air are not ex errestrial environment are nt will therefore only deal w ne local scale. The exposu	se) mainly apply to ns due to possible pH mpared to the (potential) or industrial waste water ight occur would be that calcium magnesium spected due to the low not expected either for vith the possible pH
Environmental emissions	The production of calciun and locally increase the c aquatic environment. Wh magnesium carbonate ox	n magnesium carbonate o calcium magnesium carbor en the pH is not neutralise tide production sites may i	xide can potentially result i nate oxide concentration a d, the discharge of effluen mpact the pH in the receiv can be neutralised easily a	nd affect the pH in the t from calcium ing water. The pH of
Exposure concentration in waste water treatment plant (WWTP)	and therefore there is no magnesium carbonate ox	biological treatment. There	xide production is an inorg efore, wastewater streams ormally not be treated in bi control of acid wastewate	from calcium ological waste water
Exposure concentration in aquatic pelagic compartment	and sediment will be neg depending on the buffer of effect on pH will be. In ge waters is regulated by the the carbonate ion (CO32	ligible. When lime is reject capacity of the water. The l meral the buffer capacity p e equilibrium between carb -).	ed to surface water, sorption ed to surface water, the phi higher the buffer capacity of reventing shifts in acidity of bon dioxide (CO2), the bica	H may increase, of the water, the lower the or alkalinity in natural arbonate ion (HCO3-) and
Exposure concentration in sediments	substance: when calcium of to sediment particles is	magnesium carbonate ox negligible.	S, because it is not consic ide is emitted to the aquat	ic compartment, sorption
Exposure concentrations in soil and groundwater	be relevant.		xposure scenario, becaus	
Exposure concentration in atmospheric compartment	substance: when emitted neutralised as a result of the salts (e.g. calcium(bi)	to air as an aerosol in wat its reaction with CO2 (or o carbonate) are washed ou	cause it is considered not a ter, calcium magnesium ca ther acids), into HCO3- ar It from the air and thus the largely end up in soil and	arbonate oxide is nd Ca2+. Subsequently, atmospheric emissions
Exposure concentration relevant for the food chain (secondary poisoning)	Bioaccumulation in organ poisoning is therefore not		ne substance: a risk asses	sment for secondary
poisoning/				

4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

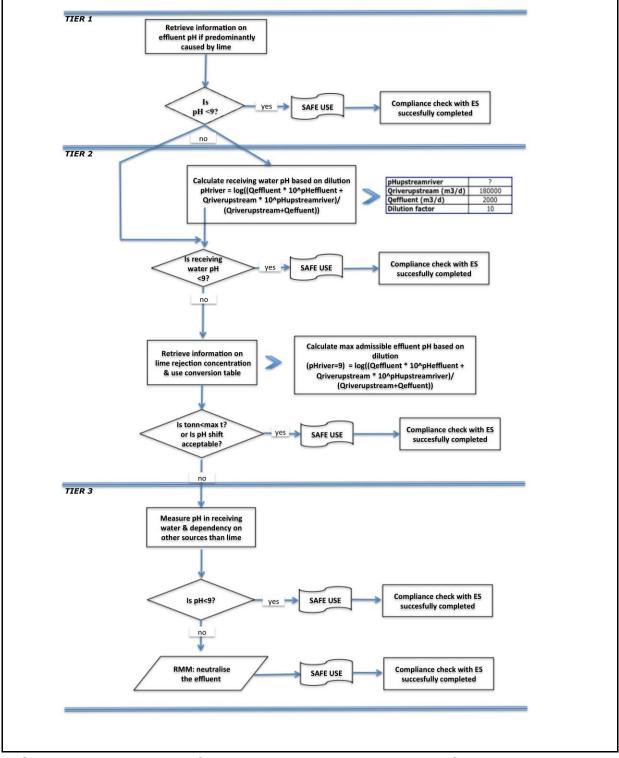
Occupational exposure



The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below. If measured data are not available, the DU may make use of an appropriate scaling tool such as MEASE (www.ebrc.de/mease.html) to estimate the associated exposure. The dustiness of the substance used can be determined according to the MEASE glossary. For example, substances with a dustiness less than 2.5 % according to the Rotating Drum Method (RDM) are defined as "low dusty", substances with a dustiness less than 10 % (RDM) are defined as "medium dusty" and substances with a dustiness ≥10 % are defined as "high dusty".
DNEL _{inhalation} : 1 mg/m ³ (as respirable dust) <u>Important note</u> : The DU has to be aware of the fact that apart from the long-term DNEL given above, a DNEL for acute effects exists at a level of 4 mg/m ³ . By demonstrating a safe use when comparing exposure estimates with the long-term DNEL, the acute DNEL is therefore also covered (according to R.14 guidance, acute exposure levels can be derived by multiplying longterm exposure estimates by a factor of 2). When using MEASE for the derivation of exposure estimates, it is noted that the exposure duration should only be reduced to half-shift as a risk management measure (leading to an exposure reduction of 40 %).
Environmental exposure
If a site does not comply with the conditions stipulated in the safe use ES, it is recommended to apply a tiered approach to perform a more site-specific assessment. For that assessment, the following stepwise approach is recommended.
Tier 1 : retrieve information on effluent pH and the contribution of the calcium magnesium carbonate oxide on the resulting pH. Should the pH be above 9 and be predominantly attributable to lime, then further actions are required to demonstrate safe use.
Tier 2a : retrieve information on receiving water pH after the discharge point. The pH of the receiving water shall not exceed the value of 9. If the measures are not available, the pH in the river can be calculated as follows:
$\Box Qeffluent*10_{pHeffluent} + Qriverupstream*10_{pHupstream} \Box pHriver = Log \Box - \Box$
$\Box \qquad Qriverupstream + Qeffluent \qquad \Box$
(Eq 1)
Q effluent refers to the effluent flow (in m³/day)
Q river upstream refers to the upstream river flow (in m³/day) pH
effluent refers to the pH of the effluent
pH upstream river refers to the pH of the river upstream of the discharge point Please note that initially, default values can be used:
 Q river upstream flows: use the 10th of existing measurements distribution or use default value of 18000 m³/day
 Q effluent: use default value of 2000 m³/day The upstream pH is preferably a measured value. If not available, one can assume a neutral pH of 7 if this
can be justified. Such equation has to be seen as a worst case scenario, where water conditions are standard and not case specific.
Tier 2b : Equation 1 can be used to identify which effluent pH causes an acceptable pH level in the receiving body. In order to do so, pH of the river is set at value 9 and pH of the effluent is calculated accordingly (using default values as reported previously, if necessary). As temperature influences lime solubility, pH effluent might require to be adjusted on a case-by-case basis. Once the maximum admissible pH value in the effluent is established, it is assumed that the OH- concentrations are all dependent on lime discharge and that there is no buffer capacity conditions to consider (this is a unrealistic worst case scenario, which can be modified where information is available). Maximum load of lime that can be annually rejected without negatively affecting the pH of the receiving water is calculated assuming chemical equilibrium. OH- expressed as moles/litre are multiplied by average flow of the effluent and then divided by the molar mass of the lime substance.

Tier 3: measure the pH in the receiving water after the discharge point. If pH is below 9, safe use is reasonably demonstrated and the ES ends here. If pH is found to be above 9, risk management measures have to be implemented: the effluent has to undergo neutralisation, thus ensuring safe use of lime during production or use phase.





ES number 9.2: Manufacture and industrial uses of low dusty solids/powders of lime substances

Exposure Scenario	Format (1) addressing uses carried out by workers
1. Title	
Free short title	Manufacture and industrial uses of low dusty solids/powders of lime substances



Systematic title based on use descriptor	SU15, SU16, SU17, SU18, PC1, PC2, PC3, PC7, PC8, PC9a, PC9b, PC11, PC19, PC20, PC21, PC23, PC24, PC25, PC26, PC34, PC35, PC36, PC AC1, AC2, AC3, AC4, AC5, AC6	SU7, SU8, SU9, SU10, SU11, SU12, SU13, SU14, SU19, SU20, SU23, SU24 PC12, PC13, PC14, PC15, PC16, PC17, PC18, PC27, PC28, PC29, PC30, PC31, PC32, PC33, C37, PC38, PC39, PC40 S, AC7, AC8, AC10, AC11, AC13 s are given in Section 2 below)
Processes, tasks and/or activities covered	Processes, tasks and/or activities cov	ered are described in Section 2 below.
Assessment Method	The assessment of inhalation exposure is ba	sed on the exposure estimation tool MEASE.
2. Operational con	nditions and risk management measures	i
PROC/ERC	REACH definition	Involved tasks
PROC 1	Use in closed process, no likelihood of exposure	
PROC 2	Use in closed, continuous process with occasional controlled exposure	
PROC 3	Use in closed batch process (synthesis or formulation)	
PROC 4	Use in batch and other process (synthesis) where opportunity for exposure arises	
PROC 5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	
PROC 6	Calendering operations	
PROC 7	Industrial spraying	
PROC 8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities	
PROC 8b	Transfer of substance or preparation (charging/ discharging) from/to vessels/large containers at dedicated facilities	
PROC 9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Further information is provided in the ECHA
PROC 10	Roller application or brushing	Guidance on information requirements and chemical safety assessment, Chapter R.12: Use
PROC 13	Treatment of articles by dipping and pouring	descriptor system (ECHA-2010-G-05-EN).
PROC 14	Production of preparations or articles by tabletting, compression, extrusion, pelletisation	
PROC 15	Use as laboratory reagent	
PROC 16	Using material as fuel sources, limited exposure to unburned product to be expected	
PROC 17	Lubrication at high energy conditions and in partly open process	
PROC 18	Greasing at high energy conditions	
PROC 19	Hand-mixing with intimate contact and only PPE available	
PROC 21	Low energy manipulation of substances bound in materials and/or articles	
PROC 22	Potentially closed processing operations with minerals/metals at elevated temperature Industrial setting	
PROC 23	Open processing and transfer operations with minerals/metals at elevated temperature	
PROC 24	High (mechanical) energy work-up of substances bound in materials and/or articles	
PROC 25	Other hot work operations with metals	
PROC 26	Handling of solid inorganic substances at ambient temperature	



PROC 27a	Production of metal po	owders (hot processes)		
PROC 27b	Production of metal po	wders (wet processes)		
ERC 1-7, 12		and all types of industrial ses		
ERC 10, 11		and indoor use of longlife d materials		
2.1 Control of work	kers exposure			
Product characteristic				
reflected by an assignme ambient temperature the temperature based, takin	ent of a so-called fugacity of fugacity is based on the d ng into account the process	intrinsic emission potential class in the MEASE tool. For ustiness of that substance s temperature and the melt nstead of the substance int	or operations conducted w Whereas in hot metal ope ing point of the substance.	ith solid substances at erations, fugacity is
PROC	Use in preparation	Content in preparation	Physical form	Emission potential
PROC 22, 23, 25, 27a	not res	stricted	solid/powder, molten	high
PROC 24	not res	stricted	solid/powder	high
All other applicable PROCs	not res	stricted	solid/powder	low
Amounts used				
of the scale of operation				
	ss intrinsic emission poten	I) and level of containment tial.	/automation (as reflected i	n the PROC) is the main
determinant of the proce	ss intrinsic emission poten			n the PROC) is the main
determinant of the proces	ss intrinsic emission poten	tial.	f exposure	n the PROC) is the main
determinant of the proces Frequency and duration PROC	ss intrinsic emission poten	tial. Duration o	f exposure ninutes	n the PROC) is the main
determinant of the proces Frequency and duration PROC PROC 22 All other applicable PROCs	ss intrinsic emission poten	tial. Duration o ≤ 240 n 480 minutes (i	f exposure ninutes	n the PROC) is the main
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determinant of the process Frequency and duration PROC PROC 22 All other applicable PROCs Human factors not influ The shift breathing volum	ss intrinsic emission poten n of use/exposure uenced by risk managem	tial. Duration or ≤ 240 n 480 minutes (ent reflected in the PROCs is	f exposure ninutes not restricted)	
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determinant of the process Frequency and duration PROC PROC 22 All other applicable PROCs Human factors not influ The shift breathing volum Other given operational Operational conditions like assessment of the conduction and the system exposure assessment in temperatures are expected estimation. Thus all process	n of use/exposure uenced by risk managem ne during all process steps I conditions affecting wo ke process temperature an ucted processes. In process MEASE is however based ed to vary within the indus ess temperatures are auto	tial. Duration o ≤ 240 n 480 minutes (ent reflected in the PROCs is prkers exposure d process pressure are no s steps with considerably h on the ratio of process ter try the highest ratio was tal	f exposure ninutes not restricted) assumed to be 10 m³/shift t considered relevant for o nigh temperatures (i.e. PR0 nperature and melting poir ken as a worst case assun xposure scenario for PR00	t (8 hours). ccupational exposure DC 22, 23, 25), the nt. As the associated nption for the exposure
determinant of the process Frequency and duration PROC PROC 22 All other applicable PROCs Human factors not influ The shift breathing volum Other given operational Operational conditions lik assessment of the condu exposure assessment in temperatures are expect estimation. Thus all proce Technical conditions ar Risk management meass required in the processes	n of use/exposure uenced by risk managem ne during all process steps Il conditions affecting wo ke process temperature an ucted processes. In process MEASE is however based ed to vary within the indus ess temperatures are auto nd measures at process sures at the process level s.	tial. Duration o ≤ 240 n 480 minutes (ent reflected in the PROCs is prkers exposure d process pressure are no s steps with considerably h on the ratio of process ter try the highest ratio was tal matically covered in this ex- level (source) to prevent (e.g. containment or segu	f exposure ninutes not restricted) assumed to be 10 m³/shift t considered relevant for o nigh temperatures (i.e. PR0 mperature and melting poir ken as a worst case assun cposure scenario for PR00 release regation of the emission s	t (8 hours). ccupational exposure DC 22, 23, 25), the nt. As the associated nption for the exposure C 22, 23 and PROC 25.
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determinant of the process Frequency and duration PROC PROC 22 All other applicable PROCs Human factors not influ The shift breathing volum Other given operational Operational conditions lik assessment of the condu exposure assessment in temperatures are expect estimation. Thus all proce Technical conditions an Risk management meass required in the processes	n of use/exposure uenced by risk managem ne during all process steps Il conditions affecting wo ke process temperature an ucted processes. In process MEASE is however based ed to vary within the indus ess temperatures are auto nd measures at process sures at the process level s.	tial. Duration o ≤ 240 n 480 minutes (ent reflected in the PROCs is prkers exposure d process pressure are no s steps with considerably h on the ratio of process ter try the highest ratio was tal matically covered in this ex- level (source) to prevent (e.g. containment or segu	f exposure ninutes not restricted) assumed to be 10 m³/shift t considered relevant for o nigh temperatures (i.e. PR0 mperature and melting poir ken as a worst case assun cposure scenario for PR00 release regation of the emission s	t (8 hours). ccupational exposure DC 22, 23, 25), the nt. As the associated nption for the exposure C 22, 23 and PROC 25.
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determinant of the process Frequency and duration PROC PROC 22 All other applicable PROCs Human factors not influ The shift breathing volum Other given operationa Operational conditions like assessment of the conduction sets assessment of the conduct	ss intrinsic emission poten n of use/exposure uenced by risk managem ne during all process steps al conditions affecting wo ke process temperature an ucted processes. In process MEASE is however based ed to vary within the indus ess temperatures are auto nd measures at process sures at the process level s. nd measures to control of Level of separation Any potentially required	tial. Duration o ≤ 240 m 480 minutes (ent reflected in the PROCs is orkers exposure of process pressure are no s steps with considerably f on the ratio of process ter try the highest ratio was tal matically covered in this ex- level (source) to prevent (e.g. containment or seguing lispersion from source to Localised controls (LC)	f exposure ninutes not restricted) assumed to be 10 m³/shift t considered relevant for o nigh temperatures (i.e. PRO nperature and melting poir ken as a worst case assun cosure scenario for PROO release regation of the emission s wards the worker Efficiency of LC (according to MEASE)	: (8 hours). ccupational exposure DC 22, 23, 25), the nt. As the associated nption for the exposure C 22, 23 and PROC 25. source) are generally not



All other applicable PROCs	A reduction of exposure duration can be achieved, for example, by the installation of ventilated (positive pressure) control rooms or by removing the worker from workplaces	not required	na	-
	involved with relevant exposure.			

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid inhalation or ingestion. General occupational hygiene measures are required to ensure a safe handling of the substance. These measures involve good personal and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating and smoking at the workplace, the wearing of standard working clothes and shoes unless otherwise stated below. Shower and change clothes at end of work shift. Do not wear contaminated clothing at home. Do not blow dust off with compressed air.

Conditions and measures related to personal protection, hygiene and health evaluation

PROC	Specification of respiratory protective equipment (RPE)	RPE efficiency (assigned protection factor, APF)	Specification of gloves	Further personal protective equipment (PPE)
PROC 22, 24, 27a	FFP1 mask	APF=4		Eye protection equipment (e.g. goggles or visors) must be worn,
All other applicable PROCs	not required	na	Since calcium magnesium carbonate oxide is considered as irritating to skin, the use of protective gloves is mandatory for all process steps.	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.

Any RPE as defined above shall only be worn if the following principles are implemented in parallel: The duration of work (compare with "duration of exposure" above) should reflect the additional physiological stress for the worker due to the breathing resistance and mass of the RPE itself, due to the increased thermal stress by enclosing the head. In addition, it shall be considered that the worker's capability of using tools and of communicating are reduced during the wearing of RPE. For reasons as given above, the worker should therefore be (i) healthy (especially in view of medical problems that may affect the use of RPE), (ii) have suitable facial characteristics reducing leakages between face and mask (in view of scars and facial hair). The recommended devices above which rely on a tight face seal will not provide the required protection unless they fit the

contours of the face properly and securely. The employer and self-employed persons have legal responsibilities for the maintenance and issue of respiratory protective devices and the management of their correct use in the workplace. Therefore, they should define and document a suitable policy for a respiratory protective device programme including training of the workers.

An overview of the APFs of different RPE (according to BS EN 529:2005) can be found in the glossary of MEASE.

2.2 Control of environmental exposure

Amounts used

The daily and annual amount per site (for point sources) is not considered to be the main determinant for environmental

exposure. Frequency and duration of use

Intermittent (< 12 time per year) or continuous use/release

Environment factors not influenced by risk management

Flow rate of receiving surface water: 18000 m³/day

Other given operational conditions affecting environmental exposure

Effluent discharge rate: 2000 m³/day

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil



Risk management measures related to the environment aim to avoid discharging lime solutions into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes. Regular control of the pH value during introduction into open waters is required. In general discharges should be carried out such that pH changes in receiving surface waters are minimised (e.g. through neutralisation). In general most aquatic organisms can tolerate pH values in the range of 6-9. This is also reflected in the description of standard OECD tests with aquatic organisms. The justification for this risk management measure can be found in the introduction.

Conditions and measures related to waste

Solid industrial waste of lime should be reused or discharged to the industrial wastewater and further neutralized if needed.

3. Exposure estimation and reference to its source

Occupational exposure

The exposure estimation tool MEASE was used for the assessment of inhalation exposure. The risk characterisation ratio (RCR) is the quotient of the refined exposure estimate and the respective DNEL (derived no-effect level) and has to be below 1 to demonstrate a safe use. For inhalation exposure, the RCR is based on the DNEL for calcium magnesium carbonate oxide of 1 mg/m³ (as respirable dust) and the respective inhalation exposure estimate derived using MEASE (as inhalable dust). Thus, the RCR includes an additional safety margin since the respirable fraction being a sub-fraction of the inhalable fraction according to EN 481.

PROC	Method used for inhalation exposure assessment	Inhalation exposure estimate (RCR)	Method used for dermal exposure assessment	Dermal exposure estimate (RCR)
PROC 1, 2, 3, 4, 5, 6, 7, 8a, 8b, 9, 10, 13, 14, 15, 16, 17, 18, 19, 21, 22, 23, 24, 25, 26, 27a, 27b	MEASE	<1 mg/m³ (0.01 – 0.83)	Since calcium magnesium carbonate oxide i considered as irritating to skin, dermal exposu has to be minimised as far as technically feasi A DNEL for dermal effects has not been deriv Thus, dermal exposure is not assessed in th exposure scenario.	

Environmental emissions

The environmental exposure assessment is only relevant for the aquatic environment, when applicable including STPs/WWTPs, as emissions of calcium magnesium carbonate oxide in the different life-cycle stages (production and use) mainly apply to (waste) water. The aquatic effect and risk assessment only deal with the effect on organisms/ecosystems due to possible pH changes related to OH- discharges, being the toxicity of Ca2+ and Mg2+ is expected to be negligible compared to the (potential) pH effect. Only the local scale is being addressed, including municipal sewage treatment plants (STPs) or industrial waste water treatment plants (WWTPs) when applicable, both for production and industrial use as any effects that might occur would be expected to take place on a local scale. The high water solubility and very low vapour pressure indicate that calcium magnesium carbonate oxide. Significant emissions or exposure to air are not expected due to the low vapour pressure of calcium magnesium carbonate oxide. Significant emissions or exposure to the terrestrial environment are not expected either for this exposure scenario. The exposure assessment for the aquatic environment will therefore only deal with the epfect on the Orl- discharges at the local scale. The exposure assessment is approached by assessing the resulting pH impact: the surface water pH should not increase above 9.

decession in the approached by decessing the resulting printiplet. The surface water principlet hereited by decessing the resulting printiplet.				
Environmental emissions	The production of calcium magnesium carbonate oxide can potentially result in an aquatic emission and locally increase the calcium and magnesium concentrations and affect the pH in the aquatic environment. When the pH is not neutralised, the discharge of effluent from calcium magnesium carbonate oxide production sites may impact the pH in the receiving water. The pH of effluents is normally measured very frequently and can be neutralised easily as often required by national laws.			
Exposure concentration in waste water treatment plant (WWTP)	Waste water from calcium magnesium carbonate oxide production is an inorganic wastewater stream and therefore there is no biological treatment. Therefore, wastewater streams from calcium magnesium carbonate oxide production sites will normally not be treated in biological waste water treatment plants (WWTPs), but can be used for pH control of acid wastewater streams that are treated in biological WWTPs.			
Exposure concentration in aquatic pelagic compartment	When calcium magnesium carbonate oxide is emitted to surface water, sorption to particulate matter and sediment will be negligible. When lime is rejected to surface water, the pH may increase, depending on the buffer capacity of the water. The higher the buffer capacity of the water, the lower the effect on pH will be. In general the buffer capacity preventing shifts in acidity or alkalinity in natural waters is regulated by the equilibrium between carbon dioxide (CO2), the bicarbonate ion (HCO3-) and the carbonate ion (CO32-).			
Exposure concentration in sediments	The sediment compartment is not included in this ES, because it is not considered relevant for calcium magnesium carbonate oxide: when calcium magnesium carbonate oxide is emitted to the aquatic compartment, sorption to sediment particles is negligible.			
Exposure concentrations in soil and groundwater	The terrestrial compartment is not included in this exposure scenario, because it is not considered to be relevant.			



Exposure concentration in atmospheric compartment	The air compartment is not included in this CSA because it is considered not relevant for calcium magnesium carbonate oxide: when emitted to air as an aerosol in water, calcium magnesium carbonate oxide is neutralised as a result of its reaction with CO2 (or other acids), into HCO3- and Ca2+. Subsequently, the salts (e.g. calcium(bi)carbonate) are washed out from the air and thus the atmospheric emissions of neutralised calcium magnesium carbonate oxidelargely end up in soil and water.
Exposure concentration relevant for the food chain (secondary poisoning)	Bioaccumulation in organisms is not relevant for calcium magnesium carbonate oxide: a risk assessment for secondary poisoning is therefore not required.

4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Occupational exposure

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below. If measured data are not available, the DU may make use of an appropriate scaling tool such as MEASE (<u>www.ebrc.de/mease.html</u>) to estimate the associated exposure. The dustiness of the substance used can be determined according to the MEASE glossary. For example, substances with a dustiness less than 2.5 % according to the Rotating Drum Method (RDM) are defined as "low dusty", substances with a dustiness less than 10 % (RDM) are defined as "medium dusty" and substances with a dustiness with a dustiness less than 10 % (RDM) are defined as "medium dusty".

DNEL_{inhalation}: 1 mg/m³ (as respirable dust)

Important note: The DU has to be aware of the fact that apart from the long-term DNEL given above, a DNEL for acute effects exists at a level of 4 mg/m³. By demonstrating a safe use when comparing exposure estimates with the long-term DNEL, the acute DNEL is therefore also covered (according to R.14 guidance, acute exposure levels can be derived by multiplying longterm exposure estimates by a factor of 2). When using MEASE for the derivation of exposure estimates, it is noted that the exposure duration should only be reduced to half-shift as a risk management measure (leading to an exposure reduction of 40 %).

Environmental exposure

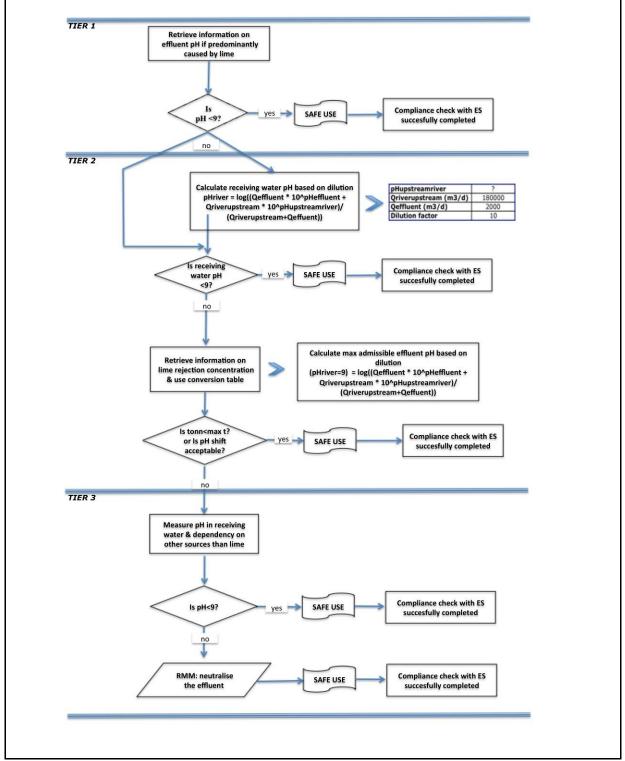


If a site does not comply with the conditions stipulated in the safe use ES, it is recommended to apply a tiered approach to perform a more site-specific assessment. For that assessment, the following stepwise approach is recommended.
Tier 1 : retrieve information on effluent pH and the contribution of the calcium magnesium carbonate oxide on the resulting pH. Should the pH be above 9 and be predominantly attributable to lime, then further actions are required to demonstrate safe use.
Tier 2a : retrieve information on receiving water pH after the discharge point. The pH of the receiving water shall not exceed the value of 9. If the measures are not available, the pH in the river can be calculated as follows:
$\Box Qeffluent^*10_{pHeffluent} + Qriverupstream^*10_{pHupstream} \Box pHriver = Log \Box - \Box$
$\Box \qquad Qriverupstream + Qeffluent \qquad \Box$
(Eq 1)
Where:
Q effluent refers to the effluent flow (in m³/day)
Q river upstream refers to the upstream river flow (in m³/day) pH
effluent refers to the pH of the effluent
pH upstream river refers to the pH of the river upstream of the discharge point Please
note that initially, default values can be used:
 Q river upstream flows: use the 10th of existing measurements distribution or use default value of 18000 m³/day
Q effluent: use default value of 2000 m ³ /day
 The upstream pH is preferably a measured value. If not available, one can assume a neutral pH of 7 if this can be justified.
Such equation has to be seen as a worst case scenario, where water conditions are standard and not case specific.
Tier 2b : Equation 1 can be used to identify which effluent pH causes an acceptable pH level in the receiving body. In order to do so, pH of the river is set at value 9 and pH of the effluent is calculated accordingly (using default values as reported previously, if necessary). As temperature influences lime solubility, pH effluent might require to be adjusted on a case-by-case basis. Once the maximum admissible pH value in the effluent is established, it is assumed that the OH- concentrations are all dependent on lime discharge and that there is no buffer capacity conditions to consider (this is a unrealistic worst case scenario, which can be

modified where information is available). Maximum load of lime that can be annually rejected without negatively affecting the pH of the receiving water is calculated assuming chemical equilibrium. OH- expressed as moles/litre are multiplied by average flow of the effluent and then divided by the molar mass of the calcium magnesium carbonate oxide.

Tier 3: measure the pH in the receiving water after the discharge point. If pH is below 9, safe use is reasonably demonstrated and the ES ends here. If pH is found to be above 9, risk management measures have to be implemented: the effluent has to undergo neutralisation, thus ensuring safe use of lime during production or use phase.





ES number 9.3: Manufacture and industrial uses of medium dusty solids/powders of lime substances

Exposure Scenario Format (1) addressing uses carried out by workers			
1. Title			
Free short title	Manufacture and industrial uses of medium dusty solids/powders of lime substances		



Systematic title based on use descriptor	SU3, SU1, SU2a, SU2b, SU4, SU5, SU6a, SU6b, SU7, SU8, SU9, SU10, SU11, SU12, SU13, SU14, SU15, SU16, SU17, SU18, SU19, SU20, SU23, SU24 PC1, PC2, PC3, PC7, PC8, PC9a, PC9b, PC11, PC12, PC13, PC14, PC15, PC16, PC17, PC18, PC19, PC20, PC21, PC23, PC24, PC25, PC26, PC27, PC28, PC29, PC30, PC31, PC32, PC33, PC34, PC35, PC36, PC37, PC38, PC39, PC40 AC1, AC2, AC3, AC4, AC5, AC6, AC7, AC8, AC10, AC11, AC13 (appropriate PROCs and ERCs are given in Section 2 below)					
Processes, tasks and/or activities covered	Processes, tasks and/or activities covered are described in Section 2 below.					
Assessment Method	Sessment Method The assessment of inhalation exposure is based on the exposure estimation tool MEASE.					
2. Operational con	ditions and risk management measures	;				
PROC/ERC	REACH definition	Involved tasks				
PROC 1	Use in closed process, no likelihood of exposure					
PROC 2	Use in closed, continuous process with occasional controlled exposure					
PROC 3	Use in closed batch process (synthesis or formulation)					
PROC 4	Use in batch and other process (synthesis) where opportunity for exposure arises					
PROC 5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)					
PROC 7	Industrial spraying					
PROC 8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities					
PROC 8b	Transfer of substance or preparation (charging/ discharging) from/to vessels/large containers at dedicated facilities					
PROC 9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)					
PROC 10	Roller application or brushing	Further information is provided in the ECHA				
PROC 13	Treatment of articles by dipping and pouring	Guidance on information requirements and chemical safety assessment, Chapter R.12: Use				
PROC 14	Production of preparations or articles by tabletting, compression, extrusion, pelletisation	descriptor system (ECHA-2010-G-05-EN).				
PROC 15	Use as laboratory reagent					
PROC 16	Using material as fuel sources, limited exposure to unburned product to be expected					
PROC 17	Lubrication at high energy conditions and in partly open process					
PROC 18	Greasing at high energy conditions					
PROC 19	Hand-mixing with intimate contact and only PPE available					
PROC 22	Potentially closed processing operations with minerals/metals at elevated temperature Industrial setting					
PROC 23	Open processing and transfer operations with minerals/metals at elevated temperature					
PROC 24	High (mechanical) energy work-up of substances bound in materials and/or articles					
PROC 25	Other hot work operations with metals					
PROC 26	Handling of solid inorganic substances at ambient temperature					

PROC 27a Production of metal powders (hot processes)	
ROC 27b Production of metal powders (wet processes)	



ERC 1-7, 12	Manufacture, formulation and all types of industrial uses						
ERC 10, 11		and indoor use of longlife d materials					
2.1 Control of wor	kers exposure		-				
Product characteristic							
reflected by an assignme ambient temperature the temperature based, takir	approach, the substance- ent of a so-called fugacity c fugacity is based on the d g into account the process d on the level of abrasion ir	lass in the MEASE tool. Found that substance temperature and the melt	or operations conducted w . Whereas in hot metal ope ting point of the substance.	ith solid substances at erations, fugacity is			
PROC	Use in preparation	Content in preparation	Physical form	Emission potential			
PROC 22, 23, 25, 27a	not res		solid/powder, molten	high			
PROC 24	not res	stricted	solid/powder	high			
All other applicable PROCs	not res	stricted	solid/powder	medium			
Amounts used			<u>.</u>				
of the scale of operation determinant of the proce	led per shift is not considere (industrial vs. professional ss intrinsic emission poten) and level of containment					
Frequency and duratio	n of use/exposure						
PROC		Duration o	f exposure				
PROC 7, 17, 18, 19, 22		≤ 240 r	minutes				
All other applicable PROCs		480 minutes (not restricted)					
Human factors not influ	uenced by risk managem	ent					
The shift breathing volun	ne during all process steps	reflected in the PROCs is	assumed to be 10 m ³ /shift	t (8 hours).			
Other given operationa	I conditions affecting wo	rkers exposure					
assessment of the condu exposure assessment in temperatures are expect estimation. Thus all proc	ke process temperature an ucted processes. In process MEASE is however based ed to vary within the indust ess temperatures are autor nd measures at process I	s steps with considerably l on the ratio of process ter ry the highest ratio was ta matically covered in this e	high temperatures (i.e. PR mperature and melting poir ken as a worst case assun xposure scenario for PROC	OC 22, 23, 25), the nt. As the associated nption for the exposure			
	ures at the process level (e	e.g. containment or segreg	ation of the emission source	ce) are generally not			
required in the processe Technical conditions a	s. nd measures to control d	ispersion from source to	owards the worker				
PROC	Level of separation	Localised controls (LC)	Efficiency of LC (according to MEASE)	Further information			
PROC 1, 2, 15, 27b	Any potentially required	not required	na	-			
PROC 3, 13, 14	separation of workers from the emission	general ventilation	17 %	-			
PROC 19	source is indicated above under	source is indicated not applicable na -					
All other applicable PROCs	not applicable na						

exposure.



Organisational measures to prevent /limit releases, dispersion and exposure

Avoid inhalation or ingestion. General occupational hygiene measures are required to ensure a safe handling of the substance. These measures involve good personal and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating and smoking at the workplace, the wearing of standard working clothes and shoes unless otherwise stated below. Shower and change clothes at end of work shift. Do not wear contaminated clothing at home. Do not blow dust off with compressed air.

Conditions and measures related to personal protection, hygiene and health evaluation

PROC	Specification of respiratory protective equipment (RPE)	RPE efficiency (assigned protection factor, APF)	Specification of gloves	Further personal protective equipment (PPE)		
PROC 4, 5, 7, 8a, 8b, 9, 10, 16, 17, 18, 19, 22, 24, 27a	FFP1 mask	APF=4		Eye protection equipment (e.g. goggles or visors) must be worn,		
All other applicable PROCs	not required	na	Since calcium magnesium carbonate oxide is considered as irritating to skin, the use of protective gloves is mandatory for all process steps.	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.		
Any RPE as defined above shall only be worn if the following principles are implemented in parallel: The duration of work						
(compare with "duration of exposure" above) should reflect the additional physiological stress for the worker due to the breathing						
resistance and mass of the RPE itself, due to the increased thermal stress by enclosing the head. In addition, it shall be						

resistance and mass of the RPE itself, due to the increased thermal stress by enclosing the head. In addition, it shall be considered that the worker's capability of using tools and of communicating are reduced during the wearing of RPE. For reasons as given above, the worker should therefore be (i) healthy (especially in view of medical problems that may affect the use of RPE), (ii) have suitable facial characteristics reducing leakages between face and mask (in view of scars and facial hair). The recommended devices above which rely on a tight face seal will not provide the required protection unless they fit the

contours of the face properly and securely. The employer and self-employed persons have legal responsibilities for the maintenance and issue of respiratory protective devices and the management of their correct use in the workplace. Therefore, they should define and document a suitable policy for a respiratory protective device programme including training of the workers.

An overview of the APFs of different RPE (according to BS EN 529:2005) can be found in the glossary of MEASE.

2.2 Control of environmental exposure

Amounts used

The daily and annual amount per site (for point sources) is not considered to be the main determinant for environmental exposure.

Frequency and duration of use

Intermittent (< 12 time per year) or continuous use/release

Environment factors not influenced by risk management

Flow rate of receiving surface water: 18000 m³/day

Other given operational conditions affecting environmental exposure

Effluent discharge rate: 2000 m³/day

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

Risk management measures related to the environment aim to avoid discharging lime solutions into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes. Regular control of the pH value during introduction into open waters is required. In general discharges should be carried out such that pH changes in receiving surface waters are minimised (e.g. through neutralisation). In general most aquatic organisms can tolerate pH values in the range of 6-9. This is also reflected in the description of standard OECD tests with aquatic organisms. The justification for this risk management measure can be found in the introduction.

Conditions and measures related to waste

Solid industrial waste of lime should be reused or discharged to the industrial wastewater and further neutralized if needed.



3. Exposure estimation and reference to its source

Occupational exposure

The exposure estimation tool MEASE was used for the assessment of inhalation exposure. The risk characterisation ratio (RCR) is the quotient of the refined exposure estimate and the respective DNEL (derived no-effect level) and has to be below 1 to demonstrate a safe use. For inhalation exposure, the RCR is based on the DNEL for calcium magnesium carbonate oxide of 1 mg/m³ (as respirable dust) and the respective inhalation exposure estimate derived using MEASE (as inhalable dust). Thus, the RCR includes an additional safety margin since the respirable fraction being a sub-fraction of the inhalable fraction according to EN 481.

PROC	Method used for inhalation exposure assessment	Inhalation exposure estimate (RCR)	Method used for dermal exposure assessment	Dermal exposure estimate (RCR)	
PROC 1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 14, 15, 16, 17, 18, 19, 22, 23, 24, 25, 26, 27a, 27b	H_{2} MEASE< 1 mg/m³ (0.01 - 0.88)				
Environmental emissio	ns	•			
as emissions of calcium r (waste) water. The aquat changes related to OH- of pH effect. Only the local treatment plants (WWTP expected to take place of carbonate oxide will be for vapour pressure of calciu expected either for this e the possible pH changes	environment. When the pH is not neutralised, the discharge of effluent from calcium magnesium				
Exposure concentration in waste water treatment plant (WWTP)	normally measured very frequently and can be neutralised easily as often required by national laws. Waste water from calcium magnesium carbonate oxide production is an inorganic wastewater stream and therefore there is no biological treatment. Therefore, wastewater streams from calcium magnesium carbonate oxide production sites will normally not be treated in biological waste water treatment plants (WWTPs), but can be used for pH control of acid wastewater streams that are treated in biological WWTPs.				
Exposure concentration in aquatic pelagic compartment	When calcium magnesium carbonate oxide is emitted to surface water, sorption to particulate matter and sediment will be negligible. When lime is rejected to surface water, the pH may increase, depending on the buffer capacity of the water. The higher the buffer capacity of the water, the lower the effect on pH will be. In general the buffer capacity preventing shifts in acidity or alkalinity in natural waters is regulated by the equilibrium between carbon dioxide (CO2), the bicarbonate ion (HCO3-) and the carbonate ion (CO32–).				
Exposure concentration in sediments	The sediment compartment is not included in this ES, because it is not considered relevant for calcium magnesium carbonate oxide: when calcium magnesium carbonate oxide is emitted to the aquatic compartment, sorption of to sediment particles is negligible.				
Exposure concentrations in soil and groundwater	The terrestrial compartment is not included in this exposure scenario, because it is not considered to				
Exposure concentration in atmospheric compartment	The air compartment is not included in this CSA because it is considered not relevant for calcium magnesium carbonate oxide: when emitted to air as an aerosol in water, calcium magnesium carbonate oxide is neutralised as a result of its reaction with CO2 (or other acids), into HCO3- and Ca2+. Subsequently, the salts (e.g. calcium(bi)carbonate) are washed out from the air and thus the atmospheric emissions of neutralised calcium magnesium carbonate oxidelargely end up in soil and water.				
Exposure concentration relevant for the food chain (secondary poisoning)	Bioaccumulation in organisms is not relevant for calcium magnesium carbonate oxide: a risk assessment for secondary poisoning is therefore not required.				
4. Guidance to DU	4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES				



Occupational exposure

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the

respective DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below. If measured data are not available, the DU may make use of an appropriate scaling tool such as MEASE (<u>www.ebrc.de/mease.html</u>) to estimate the associated exposure. The dustiness of the substance used can be determined according to the MEASE glossary. For example, substances with a dustiness less than 2.5 % according to the Rotating Drum Method (RDM) are defined as "low dusty", substances with a dustiness less than 10 % (RDM) are defined as "medium dusty" and substances with a dustiness site a dustiness with a dustances w

DNEL_{inhalation}: 1 mg/m³ (as respirable dust)

<u>Important note</u>: The DU has to be aware of the fact that apart from the long-term DNEL given above, a DNEL for acute effects exists at a level of 4 mg/m³. By demonstrating a safe use when comparing exposure estimates with the long-term DNEL, the acute DNEL is therefore also covered (according to R.14 guidance, acute exposure levels can be derived by multiplying longterm exposure estimates by a factor of 2). When using MEASE for the derivation of exposure estimates, it is noted that the exposure duration should only be reduced to half-shift as a risk management measure (leading to an exposure reduction of 40 %).

Environmental exposure

If a site does not comply with the conditions stipulated in the safe use ES, it is recommended to apply a tiered approach to perform a more site-specific assessment. For that assessment, the following stepwise approach is recommended.

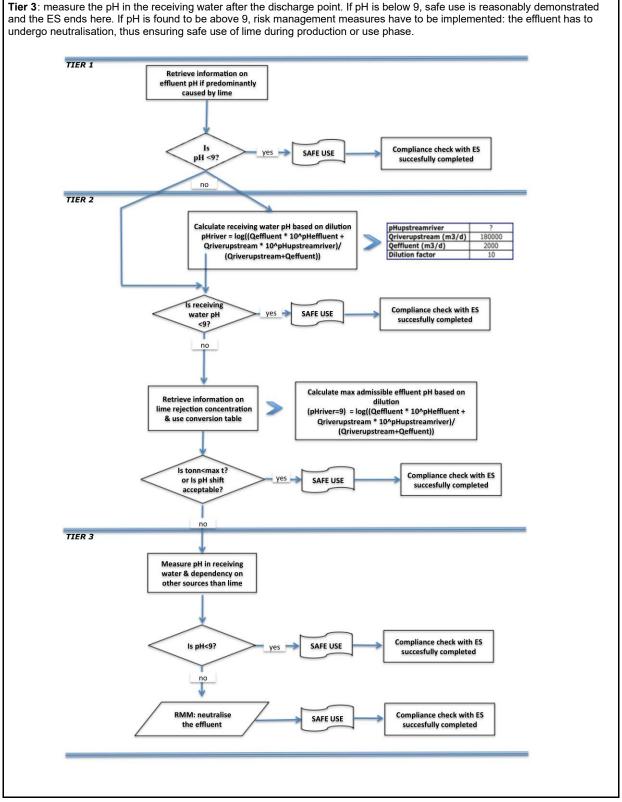
Tier 1: retrieve information on effluent pH and the contribution of the calcium magnesium carbonate oxide on the resulting pH. Should the pH be above 9 and be predominantly attributable to lime, then further actions are required to demonstrate safe use.

Tier 2a: retrieve information on receiving water pH after the discharge point. The pH of the receiving water shall not exceed the value of 9. If the measures are not available, the pH in the river can be calculated as follows:

	□ Qeff	$\square Qeffluent*10_{pHeffluent} + Qriverupstream*10_{pHupstream} \square pHriver =$					
Log □ —□		Qriverupstream+ Qeffluent					
Where	9:		Eq 1)				
Q efflu	uent refers to	the effluent flow (in m³/day)					
		efers to the upstream river flow (in m³/day) pH					
	•	e pH of the effluent					
		refers to the pH of the river upstream of the discharge	e point Please				
		efault values can be used:					
•		pstream flows: use the 10th of existing measurement	s distribution or use default value of 18000				
•	Q effluer	nt: use default value of 2000 m³/day					
•		ream pH is preferably a measured value. If not availa	able, one can assume a neutral pH of 7 if this				
Such equation h	as to be see	n as a worst case scenario, where water conditions a	re standard and not case specific.				
so, pH of the rive necessary). As t	er is set at va emperature i	sed to identify which effluent pH causes an acceptab lue 9 and pH of the effluent is calculated accordingly nfluences lime solubility, pH effluent might require to le in the effluent is established, it is assumed that the	(using default values as reported previously, if be adjusted on a case-by-case basis. Once the				

maximum admissible pH value in the effluent is established, it is assumed that the OH- concentrations are all dependent on lime discharge and that there is no buffer capacity conditions to consider (this is a unrealistic worst case scenario, which can be modified where information is available). Maximum load of lime that can be annually rejected without negatively affecting the pH of the receiving water is calculated assuming chemical equilibrium. OH- expressed as moles/litre are multiplied by average flow of the effluent and then divided by the molar mass of the calcium magnesium carbonate oxide.





ES number 9.4: Manufacture and industrial uses of high dusty solids/powders of lime substances

Exposure Scenario Format (1) addressing uses carried out by workers
1. Title



Free short title	Manufacture and industrial uses of high	dusty solids/powders of lime substances			
Systematic title based on use descriptor	SU3, SU1, SU2a, SU2b, SU4, SU5, SU6a, SU6b, SU7, SU8, SU9, SU10, SU11, SU12, SU13, SU14, SU15, SU16, SU17, SU18, SU19, SU20, SU23, SU24 PC1, PC2, PC3, PC7, PC8, PC9a, PC9b, PC11, PC12, PC13, PC14, PC15, PC16, PC17, PC18, PC19, PC20, PC21, PC23, PC24, PC25, PC26, PC27, PC28, PC29, PC30, PC31, PC32, PC33, PC34, PC35, PC36, PC37, PC38, PC39, PC40 AC1, AC2, AC3, AC4, AC5, AC6, AC7, AC8, AC10, AC11, AC13 (appropriate PROCs and ERCs are given in Section 2 below)				
Processes, tasks and/or activities covered	Processes, tasks and/or activities cove	ered are described in Section 2 below.			
Assessment Method	The assessment of inhalation exposure is ba	sed on the exposure estimation tool MEASE.			
2. Operational con	ditions and risk management measures	\$			
PROC/ERC	REACH definition	Involved tasks			
PROC 1	Use in closed process, no likelihood of exposure				
PROC 2	Use in closed, continuous process with occasional controlled exposure				
PROC 3	Use in closed batch process (synthesis or formulation)				
PROC 4	Use in batch and other process (synthesis) where opportunity for exposure arises				
PROC 5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)				
PROC 7	Industrial spraying				
PROC 8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities				
PROC 8b	Transfer of substance or preparation (charging/ discharging) from/to vessels/large containers at dedicated facilities				
PROC 9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)				
PROC 10	Roller application or brushing	Further information is provided in the ECHA			
PROC 13	Treatment of articles by dipping and pouring	Guidance on information requirements and chemical safety assessment, Chapter R.12: Use			
PROC 14	Production of preparations or articles by tabletting, compression, extrusion, pelletisation	descriptor system (ECHA-2010-G-05-EN).			
PROC 15	Use as laboratory reagent				
PROC 16	Using material as fuel sources, limited exposure to unburned product to be expected				
PROC 17	Lubrication at high energy conditions and in partly open process				
PROC 18	Greasing at high energy conditions				
PROC 19	Hand-mixing with intimate contact and only PPE available				
PROC 22	Potentially closed processing operations with minerals/metals at elevated temperature Industrial setting				
PROC 23	Open processing and transfer operations with minerals/metals at elevated temperature				
PROC 24	High (mechanical) energy work-up of substances bound in materials and/or articles				
PROC 25	Other hot work operations with metals				
PROC 26	Handling of solid inorganic substances at ambient temperature				

PROC 27a Production of metal powders (hot processes)	
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PROC 27b	Production of metal po	wders (wet processes)				
ERC 1-7, 12		and all types of industrial				
ERC 10, 11	Wide-dispersive outdoor	and indoor use of longlife				
2.1 Control of work		d materials				
Product characteristic						
According to the MEASE	approach, the substance-	intrinsic emission potential	Lis one of the main exposu	re determinants. This is		
reflected by an assignme ambient temperature the temperature based, takin	ent of a so-called fugacity c fugacity is based on the di g into account the process I on the level of abrasion in	lass in the MEASE tool. For ustiness of that substance temperature and the melt	or operations conducted w . Whereas in hot metal ope ing point of the substance.	ith solid substances at erations, fugacity is		
PROC	Use in preparation	Content in preparation	Physical form	Emission potential		
PROC 22, 23, 25, 27a	not res		solid/powder, molten	high		
All other applicable PROCs	not res	stricted	solid/powder	high		
Amounts used						
combination of the scale PROC) is the main deter	lled per shift is not conside of operation (industrial vs. minant of the process intrir	professional) and level of				
Frequency and duration	n of use/exposure					
PROC		Duration o	f exposure			
PROC 7, 8a, 17, 18, 19, 22		≤ 240 r	ninutes			
All other applicable PROCs		480 minutes (not restricted)			
Human factors not influenced by risk management						
The shift breathing volum	ne during all process steps	reflected in the PROCs is	assumed to be 10 m ³ /shift	(8 hours).		
Other given operationa	I conditions affecting wo	rkers exposure				
assessment of the condu exposure assessment in temperatures are expect estimation. Thus all proc	te process temperature an icted processes. In process MEASE is however based ed to vary within the indust ess temperatures are autor	s steps with considerably I on the ratio of process ter ry the highest ratio was ta matically covered in this e	high temperatures (i.e. PR0 mperature and melting poir ken as a worst case assun xposure scenario for PRO0	DC 22, 23, 25), the nt. As the associated nption for the exposure		
	nd measures at process I					
Risk management measurequired in the processes	ures at the process level (e s.	e.g. containment or segreg	ation of the emission sourc	ce) are generally not		
	nd measures to control d	ispersion from source to	owards the worker			
PROC	Level of separation	Localised controls (LC)	Efficiency of LC (according to MEASE)	Further information		
PROC 1	Any potentially required separation of workers	not required	na	-		
PROC 2, 3	from the emission source is indicated above under	general ventilation	17 %	-		
PROC 7	"Frequency and duration of exposure". A reduction of exposure	integrated local exhaust ventilation	84 %	-		
PROC 19	duration can be achieved, for example,	not applicable	na	-		
All other applicable PROCs	by the installation of ventilated (positive pressure) control rooms or by removing the worker from workplaces involved with relevant exposure.	local exhaust ventilation	78 %	-		



Organisational measures to prevent /limit releases, dispersion and exposure

Avoid inhalation or ingestion. General occupational hygiene measures are required to ensure a safe handling of the substance. These measures involve good personal and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating and smoking at the workplace, the wearing of standard working clothes and shoes unless otherwise stated below. Shower and change clothes at end of work shift. Do not wear contaminated clothing at home. Do not blow dust off with compressed air.

Conditions and measures related to personal protection, hygiene and health evaluation

	Specification of	RPE efficiency	Specification of gloves	Eurthor porconal		
PROC	respiratory protective equipment (RPE)	(assigned protection factor, APF)	Specification of gloves	Further personal protective equipment (PPE)		
PROC 1, 2, 3, 23, 25, 27b	not required	na	Since calcium magnesium carbonate oxide is considered as irritating to skin, the use of protective gloves is mandatory for all process steps.	Eye protection equipment (e.g. goggles		
PROC 4, 5, 7, 8a, 8b, 9, 17, 18,	FFP2 mask	APF=10		or visors) must be worn, unless		
PROC 10, 13, 14, 15, 16, 22, 24, 26, 27a	FFP1 mask	APF=4		potential contact with the eye can be excluded by the nature		
PROC 19	FFP3 mask	APF=20		and type of application (i.e. closed process). Additionally, face protection, protective clothing and safety shoes are required to be worn as appropriate.		
Any RPE as defined above shall only be worn if the following principles are implemented in parallel: The duration of work (compare with "duration of exposure" above) should reflect the additional physiological stress for the worker due to the breathing resistance and mass of the RPE itself, due to the increased thermal stress by enclosing the head. In addition, it shall be considered that the worker's capability of using tools and of communicating are reduced during the wearing of RPE. For reasons as given above, the worker should therefore be (i) healthy (especially in view of medical problems that may affect the use of RPE), (ii) have suitable facial characteristics reducing leakages between face and mask (in view of scars and facial hair). The recommended devices above which rely on a tight face seal will not provide the required protection unless they fit the contours of the face properly and securely. The employer and self-employed persons have legal responsibilities for the maintenance and issue of respiratory protective devices programme including training of the workers. An overview of the APFs of different RPE (according to BS EN 529:2005) can be found in the glossary of MEASE.						
Amounts used The daily and annual amo	ount per site (for point sou	rces) is not considered to	be the main determinant fo	or environmental		
exposure. Frequency and duration						
	r year) or continuous use/	release				
Environment factors no	t influenced by risk man	agement				
Flow rate of receiving sur	face water: 18000 m³/day					
Other given operational	conditions affecting en	vironmental exposure				
Effluent discharge rate: 2	000 m³/day					
Technical onsite condit	ions and measures to re	duce or limit discharges	, air emissions and relea	ses to soil		
Risk management measures related to the environment aim to avoid discharging lime solutions into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes. Regular control of the pH value during introduction into open waters is required. In general discharges should be carried out such that pH changes in receiving surface waters are minimised (e.g. through neutralisation). In general most aquatic organisms can tolerate pH values in the range of 6-9. This is also reflected in the description of standard OECD tests with aquatic organisms. The justification for this risk management measure can be found in the introduction section.						

measure can be found in the introduction section. Conditions and measures related to waste

Solid industrial waste of lime should be reused or discharged to the industrial wastewater and further neutralized if needed.



3. Exposure estimation and reference to its source

Occupational exposure

The exposure estimation tool MEASE was used for the assessment of inhalation exposure. The risk characterisation ratio (RCR) is the quotient of the refined exposure estimate and the respective DNEL (derived no-effect level) and has to be below 1 to demonstrate a safe use. For inhalation exposure, the RCR is based on the DNEL for calcium magnesium carbonate oxide of 1 mg/m³ (as respirable dust) and the respective inhalation exposure estimate derived using MEASE (as inhalable dust). Thus, the RCR includes an additional safety margin since the respirable fraction being a sub-fraction of the inhalable fraction according to EN 481.

PROC	Method used for inhalation exposure assessment	Inhalation exposure estimate (RCR)	Method used for dermal exposure assessment	Dermal exposure estimate (RCR)	
PROC 1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 14, 15, 16, 17, 18, 19, 22, 23, 24, 25, 26, 27a, 27b	MEASE Since calcium magnesium carbonate oxide is considered as irritating to skin, dermal exposure has to be minimised as far as technically feasible. A DNEL for dermal effects has not been derived. Thus, dermal exposure is not assessed in this exposure scenario.				
Environmental emissio	ns				
as emissions of calcium r (waste) water. The aquat changes related to OH- o pH effect. Only the local treatment plants (WWTP expected to take place of carbonate oxide will be for vapour pressure of calciu expected either for this e the possible pH changes	sure assessment is only re magnesium carbonate oxic ic effect and risk assessme lischarges, being the toxic scale is being addressed, i s) when applicable, both for n a local scale. The high w bound predominantly in wate im magnesium carbonate of xposure scenario. The exp in STP effluent and surface ed by assessing the resulti	le in the different life-cycle ent only deal with the effec- ty of Ca2+ and Mg2+ is ex- ncluding municipal sewag- or production and industria ater solubility and very low er. Significant emissions or oxide. Significant emission osure assessment for the e water related to the OH-	stages (production and us to on organisms/ecosystem spected to be negligible co e treatment plants (STPs) I use as any effects that m vapour pressure indicate r exposure to air are not ex s or exposure to the terres aquatic environment will the discharges at the local so	se) mainly apply to as due to possible pH mpared to the (potential) or industrial waste water ight occur would be that calcium magnesium kpected due to the low strial environment are not merefore only deal with rale. The exposure	
Environmental emissions	ad by assessing the resulting pH impact: the surface water pH should not increase above 9. The production of calcium magnesium carbonate oxide can potentially result in an aquatic emission and locally increase the calcium and magnesium concentrations and affect the pH in the aquatic environment. When the pH is not neutralised, the discharge of effluent from calcium magnesium carbonate oxide production sites may impact the pH in the receiving water. The pH of effluents is normally measured very frequently and can be neutralised easily as often required by national laws.				
Exposure concentration in waste water treatment plant (WWTP)	Waste water from calcium magnesium carbonate oxide production is an inorganic wastewater stream and therefore there is no biological treatment. Therefore, wastewater streams from calcium magnesium carbonate oxide production sites will normally not be treated in biological waste water treatment plants (WWTPs), but can be used for pH control of acid wastewater streams that are treated in biological WWTPs.				
Exposure concentration in aquatic pelagic compartment	When calcium magnesium carbonate oxide is emitted to surface water, sorption to particulate matter and sediment will be negligible. When lime is rejected to surface water, the pH may increase, depending on the buffer capacity of the water. The higher the buffer capacity of the water, the lower the effect on pH will be. In general the buffer capacity preventing shifts in acidity or alkalinity in natural waters is regulated by the equilibrium between carbon dioxide (CO2), the bicarbonate ion (HCO3-) and the carbonate ion (CO32-).				
Exposure concentration in sediments	magnesium carbonate ox	ent is not included in this E tide: when calcium magnet to sediment particles is ne	sium carbonate oxide is er		
Exposure concentrations in soil and groundwater	be relevant.	ent is not included in this e	· · ·		
Exposure concentration in atmospheric compartment	magnesium carbonate ox carbonate oxide is neutra Ca2+. Subsequently, the	ot included in this CSA bea ide: when emitted to air as lised as a result of its read salts (e.g. calcium(bi)carb f neutralised calcium magr	s an aerosol in water, calci tion with CO2 (or other ac onate) are washed out fro	um magnesium ids), into HCO3- and m the air and thus the	
Exposure concentration relevant for the food chain (secondary poisoning)		isms is not relevant for ca y poisoning is therefore no		te oxide: a risk	
4. Guidance to DU	to evaluate whether	he works inside the	e boundaries set by	the ES	
Occupational exposure	Occupational exposure				



The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below. If

measured data are not available, the DU may make use of an appropriate scaling tool such as MEASE (<u>www.ebrc.de/mease.html</u>) to estimate the associated exposure. The dustiness of the substance used can be determined according to the MEASE glossary. For example, substances with a dustiness less than 2.5 % according to the Rotating Drum Method (RDM) are defined as "low dusty", substances with a dustiness less than 10 % (RDM) are defined as "medium dusty" and substances with a dustiness with a dustines with a dustines with a dustiness less than 10 % (RDM) are defined as "medium dusty" and substances with a dustiness ≥10 % are defined as "high dusty".

DNEL_{inhalation}: 1 mg/m³ (as respirable dust)

Important note: The DU has to be aware of the fact that apart from the long-term DNEL given above, a DNEL for acute effects exists at a level of 4 mg/m³. By demonstrating a safe use when comparing exposure estimates with the long-term DNEL, the acute DNEL is therefore also covered (according to R.14 guidance, acute exposure levels can be derived by multiplying longterm exposure estimates by a factor of 2). When using MEASE for the derivation of exposure estimates, it is noted that the exposure duration should only be reduced to half-shift as a risk management measure (leading to an exposure reduction of 40 %).

Environmental exposure

If a site does not comply with the conditions stipulated in the safe use ES, it is recommended to apply a tiered approach to perform a more site-specific assessment. For that assessment, the following stepwise approach is recommended.

Tier 1: retrieve information on effluent pH and the contribution of the calcium magnesium carbonate oxide on the resulting pH. Should the pH be above 9 and be predominantly attributable to lime, then further actions are required to demonstrate safe use. **Tier 2a**: retrieve information on receiving water pH after the discharge point. The pH of the receiving water shall not exceed the value of 9. If the measures are not available, the pH in the river can be calculated as follows:

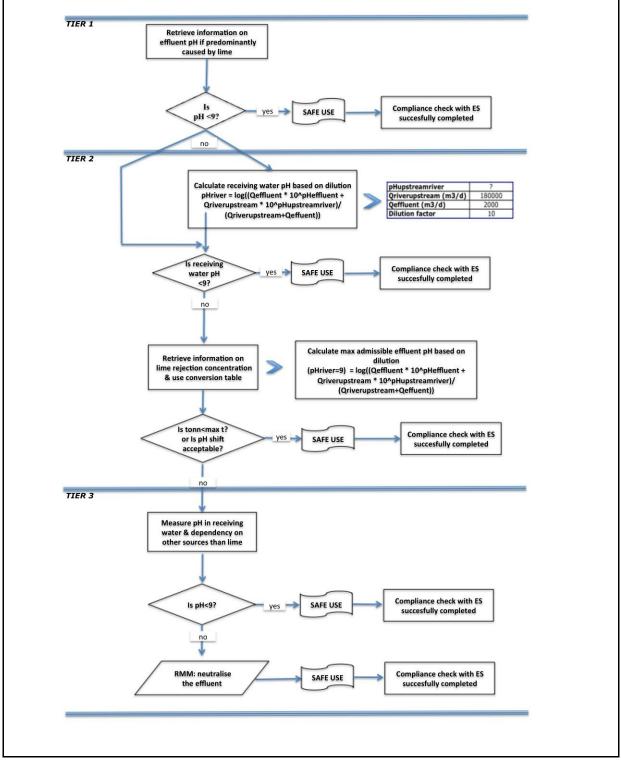
 $\Box Qeffluent^*10_{pHeffluent} + Qriverupstream^*10_{pHupstream} \Box pHriver =$ $Log \square - \square$ **Qriverupstream+ Qeffluent** (Eq 1)Where. Q effluent refers to the effluent flow (in m³/day) Q river upstream refers to the upstream river flow (in m³/day) pH effluent refers to the pH of the effluent pH upstream river refers to the pH of the river upstream of the discharge point Please note that initially, default values can be used: Q river upstream flows: use the 10th of existing measurements distribution or use default value of 18000 m³/day Q effluent: use default value of 2000 m3/day The upstream pH is preferably a measured value. If not available, one can assume a neutral pH of 7 if this can be justified.

Such equation has to be seen as a worst case scenario, where water conditions are standard and not case specific.

Tier 2b: Equation 1 can be used to identify which effluent pH causes an acceptable pH level in the receiving body. In order to do so, pH of the river is set at value 9 and pH of the effluent is calculated accordingly (using default values as reported previously, if necessary). As temperature influences lime solubility, pH effluent might require to be adjusted on a case-by-case basis. Once the maximum admissible pH value in the effluent is established, it is assumed that the OH- concentrations are all dependent on lime discharge and that there is no buffer capacity conditions to consider (this is a unrealistic worst case scenario, which can be modified where information is available). Maximum load of lime that can be annually rejected without negatively affecting the pH of the receiving water is calculated assuming chemical equilibrium. OH- expressed as moles/litre are multiplied by average flow of the effluent and then divided by the molar mass of the calcium magnesium carbonate oxide.

Tier 3: measure the pH in the receiving water after the discharge point. If pH is below 9, safe use is reasonably demonstrated and the ES ends here. If pH is found to be above 9, risk management measures have to be implemented: the effluent has to undergo neutralisation, thus ensuring safe use of lime during production or use phase.





ES number 9.5: Manufacture and industrial uses of massive objects containing lime substances

Exposure Scenario Format (1) addressing uses carried out by workers					
1. Title	1. Title				
Free short title Manufacture and industrial uses of massive objects containing lime substances					



Systematic title based on use descriptor	SU3, SU1, SU2a, SU2b, SU4, SU5, SU6a, SU6b, SU7, SU8, SU9, SU10, SU11, SU12, SU13, SU14, SU15, SU16, SU17, SU18, SU19, SU20, SU23, SU24 PC1, PC2, PC3, PC7, PC8, PC9a, PC9b, PC11, PC12, PC13, PC14, PC15, PC16, PC17, PC18, PC19, PC20, PC21, PC23, PC24, PC25, PC26, PC27, PC28, PC29, PC30, PC31, PC32, PC33, PC34, PC35, PC36, PC37, PC38, PC39, PC40 AC1, AC2, AC3, AC4, AC5, AC6, AC7, AC8, AC10, AC11, AC13 (appropriate PROCs and ERCs are given in Section 2 below)					
Processes, tasks and/or activities covered	Processes, tasks and/or activities covered are described in Section 2 below.					
Assessment Method	The assessment of	inhalation exposure is ba	sed on the exposure estimation	ation tool MEASE.		
2. Operational con	ditions and risk mar	agement measures	5			
PROC/ERC	REACH d	lefinition	Involve	d tasks		
PROC 6	Calendering	operations				
PROC 14	Production of prepart tabletting, compression					
PROC 21	Low energy manipulatior materials an					
PROC 22	Potentially closed proc minerals/metals at e Industria	levated temperature	- Further information is provided in the ECHA			
PROC 23	Open processing and to minerals/metals at e		Guidance on information requirements and chemical safety assessment, Chapter R.12: Us			
PROC 24	High (mechanical) energ bound in materia	y work-up of substances	descriptor system (ECHA-2010-G-05-EN).			
PROC 25	Other hot work operations with metals					
ERC 1-7, 12	Manufacture, formula industri	ation and all types of al uses	-			
ERC 10, 11	Wide-dispersive outdoor a articles and		2			
2.1 Control of work	(ers exposure					
Product characteristic						
reflected by an assignme ambient temperature the temperature based, takin abrasive tasks are based	ent of a so-called fugacity c fugacity is based on the du g into account the process I on the level of abrasion in	lass in the MEASE tool. Four substance temperature and the melt stead of the substance interest		ith solid substances at erations, fugacity is As a third group, high		
PROC	Use in preparation	Content in preparation	Physical form	Emission potential		
PROC 22, 23,25	not restricted		massive objects, molten	high		
PROC 24	not restricted		massive objects	high		
All other applicable PROCs	not restricted		massive objects	very low		
Amounts used			· · · · · · · · · · · · · · · · · · ·			
combination of the scale		professional) and level of	ure as such for this scenari containment/automation (a			

Frequency and duration of use/exposure					
PROC	Duration of exposure				
PROC 22	≤ 240 minutes				
All other applicable PROCs	480 minutes (not restricted)				
Human factors not influenced by risk management					



The shift breathing volume during all process steps reflected in the PROCs is assumed to be 10 m³/shift (8 hours).

Other given operational conditions affecting workers exposure

Operational conditions like process temperature and process pressure are not considered relevant for occupational exposure assessment of the conducted processes. In process steps with considerably high temperatures (i.e. PROC 22, 23, 25), the exposure assessment in MEASE is however based on the ratio of process temperature and melting point. As the associated temperatures are expected to vary within the industry the highest ratio was taken as a worst case assumption for the exposure estimation. Thus all process temperatures are automatically covered in this exposure scenario for PROC 22, 23 and PROC 25.

Technical conditions and measures at process level (source) to prevent release

Risk management measures at the process level (e.g. containment or segregation of the emission source) are generally not required in the processes.

Technical conditions and measures to control dispersion from source towards the worker

PROC	Level of separation	Localised controls (LC)	Efficiency of LC (according to MEASE)	Further information
PROC 6, 14, 21	Any potentially required separation of workers	not required	na	-
PROC 22, 23, 24, 25	from the emission source is indicated above under "Frequency and duration of exposure". A reduction of exposure duration can be achieved, for example, by the installation of ventilated (positive pressure) control rooms or by removing the worker from workplaces involved with relevant exposure.	local exhaust ventilation	78 %	-

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid inhalation or ingestion. General occupational hygiene measures are required to ensure a safe handling of the substance. These measures involve good personal and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating and smoking at the workplace, the wearing of standard working clothes and shoes unless otherwise stated below. Shower and change clothes at end of work shift. Do not wear contaminated clothing at home. Do not blow dust off with compressed air.

Conditions and measures related to personal protection, hygiene and health evaluation

PROC	Specification of respiratory protective equipment (RPE)	RPE efficiency (assigned protection factor, APF)	Specification of gloves	Further personal protective equipment (PPE)
PROC 22	FFP1 mask	APF=4	Since calcium magnesium carbonate oxide is considered as	Eye protection equipment (e.g. goggles or visors) must be worn, unless potential contact with the eye can be
All other applicable PROCs	not required	na	irritating to skin, the use of protective gloves is mandatory for all process steps.	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.

Any RPE as defined above shall only be worn if the following principles are implemented in parallel: The duration of work (compare with "duration of exposure" above) should reflect the additional physiological stress for the worker due to the breathing resistance and mass of the RPE itself, due to the increased thermal stress by enclosing the head. In addition, it shall be considered that the worker's capability of using tools and of communicating are reduced during the wearing of RPE. For reasons as given above, the worker should therefore be (i) healthy (especially in view of medical problems that may affect the use of RPE), (ii) have suitable facial characteristics reducing leakages between face and mask (in view of scars and facial



hair). The recommended devices above which rely on a tight face seal will not provide the required protection unless they fit the contours of the face properly and securely.

The employer and self-employed persons have legal responsibilities for the maintenance and issue of respiratory protective devices and the management of their correct use in the workplace. Therefore, they should define and document a suitable policy for a respiratory protective device programme including training of the workers.

An overview of the APFs of different RPE (according to BS EN 529:2005) can be found in the glossary of MEASE.

2.2 Control of environmental exposure

Amounts used

The daily and annual amount per site (for point sources) is not considered to be the main determinant for environmental exposure.

Frequency and duration of use

Intermittent (< 12 time per year) or continuous use/release

Environment factors not influenced by risk management

Flow rate of receiving surface water: 18000 m³/day

Other given operational conditions affecting environmental exposure

Effluent discharge rate: 2000 m³/day

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

Risk management measures related to the environment aim to avoid discharging lime solutions into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes. Regular control of the pH value during introduction into open waters is required. In general discharges should be carried out such that pH changes in receiving surface waters are minimised (e.g. through neutralisation). In general most aquatic organisms can tolerate pH values in the range of 6-9. This is also reflected in the description of standard OECD tests with aquatic organisms. The justification for this risk management measure can be found in the introduction.

Conditions and measures related to waste

Solid industrial waste of lime should be reused or discharged to the industrial wastewater and further neutralized if needed.

3. Exposure estimation and reference to its source

Occupational exposure

The exposure estimation tool MEASE was used for the assessment of inhalation exposure. The risk characterisation ratio (RCR) is the quotient of the refined exposure estimate and the respective DNEL (derived no-effect level) and has to be below 1 to demonstrate a safe use. For inhalation exposure, the RCR is based on the DNEL for calcium magnesium carbonate oxide of 1 mg/m³ (as respirable dust) and the respective inhalation exposure estimate derived using MEASE (as inhalable dust). Thus, the RCR includes an additional safety margin since the respirable fraction being a sub-fraction of the inhalable fraction according to EN 481.

PROC	Method used for inhalation exposure assessment	Inhalation exposure estimate (RCR)	Method used for dermal exposure assessment	Dermal exposure estimate (RCR)	
PROC 6, 14, 21, 22, 23, 24, 25	MEASE	< 1 mg/m³ (0.01 – 0.44)	Since calcium magnesium carbonate oxide considered as irritating to skin, dermal expos has to be minimised as far as technically feas A DNEL for dermal effects has not been deriv Thus, dermal exposure is not assessed in th exposure scenario.		
Environmental emissions					

Environmental emissions

The environmental exposure assessment is only relevant for the aquatic environment, when applicable including STPs/WWTPs, as emissions of calcium magnesium carbonate oxide in the different life-cycle stages (production and use) mainly apply to (waste) water. The aquatic effect and risk assessment only deal with the effect on organisms/ecosystems due to possible pH changes related to OH- discharges, being the toxicity of Ca2+ and Mg2+ is expected to be negligible compared to the (potential) pH effect. Only the local scale is being addressed, including municipal sewage treatment plants (STPs) or industrial waste water treatment plants (WWTPs) when applicable, both for production and industrial use as any effects that might occur would be expected to take place on a local scale. The high water slipility and very low vapour pressure indicate that calcium magnesium carbonate oxide. Significant emissions or exposure to air are not expected due to the low vapour pressure of calcium magnesium carbonate oxide. Significant emissions or exposure to the terrestrial environment are not expected either for this exposure scenario. The exposure assessment for the aquatic environment will therefore only deal with the possible pH changes in STP effluent and surface water related to the OH- discharges at the local scale. The exposure assessment is approached by assessing the resulting pH impact: the surface water pH should not increase above 9.



Environmental emissions	The production of calcium magnesium carbonate oxide can potentially result in an aquatic emission and locally increase the calcium and magnesium concentrations and affect the pH in the aquatic environment. When the pH is not neutralised, the discharge of effluent from calcium magnesium carbonate oxide production sites may impact the pH in the receiving water. The pH of effluents is normally measured very frequently and can be neutralised easily as often required by national laws.			
Exposure concentration in waste water treatment plant (WWTP)	Waste water from calcium magnesium carbonate oxide production is an inorganic wastewater stream and therefore there is no biological treatment. Therefore, wastewater streams from calcium magnesium carbonate oxide production sites will normally not be treated in biological waste water treatment plants (WWTPs), but can be used for pH control of acid wastewater streams that are treated in biological WWTPs.			
Exposure concentration in aquatic pelagic compartment	When calcium magnesium carbonate oxide is emitted to surface water, sorption to particulate matter and sediment will be negligible. When lime is rejected to surface water, the pH may increase, depending on the buffer capacity of the water. The higher the buffer capacity of the water, the lower the effect on pH will be. In general the buffer capacity preventing shifts in acidity or alkalinity in natural waters is regulated by the equilibrium between carbon dioxide (CO2), the bicarbonate ion (HCO3-) and the carbonate ion (CO32-).			
Exposure concentration in sediments	The sediment compartment is not included in this ES, because it is not considered relevant for calcium magnesium carbonate oxide: when calcium magnesium carbonate oxide is emitted to the aquatic compartment, sorption of to sediment particles is negligible.			
Exposure concentrations in soil and groundwater	The terrestrial compartment is not included in this exposure scenario, because it is not considered to be relevant.			
Exposure concentration in atmospheric compartment	The air compartment is not included in this CSA because it is considered not relevant for calcium magnesium carbonate oxide: when emitted to air as an aerosol in water, calcium magnesium carbonate oxide is neutralised as a result of its reaction with CO2 (or other acids), into HCO3- and Ca2+. Subsequently, the salts (e.g. calcium(bi)carbonate) are washed out from the air and thus the atmospheric emissions of neutralised calcium magnesium carbonate oxidelargely end up in soil and water.			
Exposure concentration relevant for the food chain (secondary poisoning)	Bioaccumulation in organisms is not relevant for calcium magnesium carbonate oxide: a risk assessment for secondary poisoning is therefore not required.			
4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES				
Occupational exposure				
met or the downstream u measures are adequate. respective DNEL (given t measured data are not a	boundaries set by the ES if either the proposed risk management measures as described above are iser can demonstrate on his own that his operational conditions and implemented risk management This has to be done by showing that they limit the inhalation and dermal exposure to a level below the that the processes and activities in question are covered by the PROCs listed above) as given below. If vailable, the DU may make use of an appropriate scaling tool such as MEASE by the estimate the associated exposure. The dustinees of the substance used can be determined			

(<u>www.ebrc.de/mease.html</u>) to estimate the associated exposure. The dustiness of the substance used can be determined according to the MEASE glossary. For example, substances with a dustiness less than 2.5 % according to the Rotating Drum Method (RDM) are defined as "low dusty", substances with a dustiness less than 10 % (RDM) are defined as "medium dusty" and substances with a dustiness ≥10 % are defined as "high dusty".

DNEL_{inhalation}: 1 mg/m³ (as respirable dust)

Important note: The DU has to be aware of the fact that apart from the long-term DNEL given above, a DNEL for acute effects exists at a level of 4 mg/m³. By demonstrating a safe use when comparing exposure estimates with the long-term DNEL, the acute DNEL is therefore also covered (according to R.14 guidance, acute exposure levels can be derived by multiplying longterm exposure estimates by a factor of 2). When using MEASE for the derivation of exposure estimates, it is noted that the exposure duration should only be reduced to half-shift as a risk management measure (leading to an exposure reduction of 40 %).

Environmental exposure



If a site does not comply with the conditions stipulated in the safe use ES, it is recommended to apply a tiered approach to perform a more site-specific assessment. For that assessment, the following stepwise approach is recommended. Tier 1: retrieve information on effluent pH and the contribution of the calcium magnesium carbonate oxide on the resulting pH. Should the pH be above 9 and be predominantly attributable to lime, then further actions are required to demonstrate safe use. Tier 2a: retrieve information on receiving water pH after the discharge point. The pH of the receiving water shall not exceed the value of 9. If the measures are not available, the pH in the river can be calculated as follows: $\Box Qeffluent*10_{pHeffluent} + Qriverupstream*10_{pHupstream} \Box pHriver =$ $Log \Box = \Box$ **Qriverupstream+ Qeffluent** Π (Eq 1)Where: Q effluent refers to the effluent flow (in m³/day) Q river upstream refers to the upstream river flow (in m³/day) pH effluent refers to the pH of the effluent pH upstream river refers to the pH of the river upstream of the discharge point Please note that initially, default values can be used: Q river upstream flows: use the 10th of existing measurements distribution or use default value of 18000

m³/day

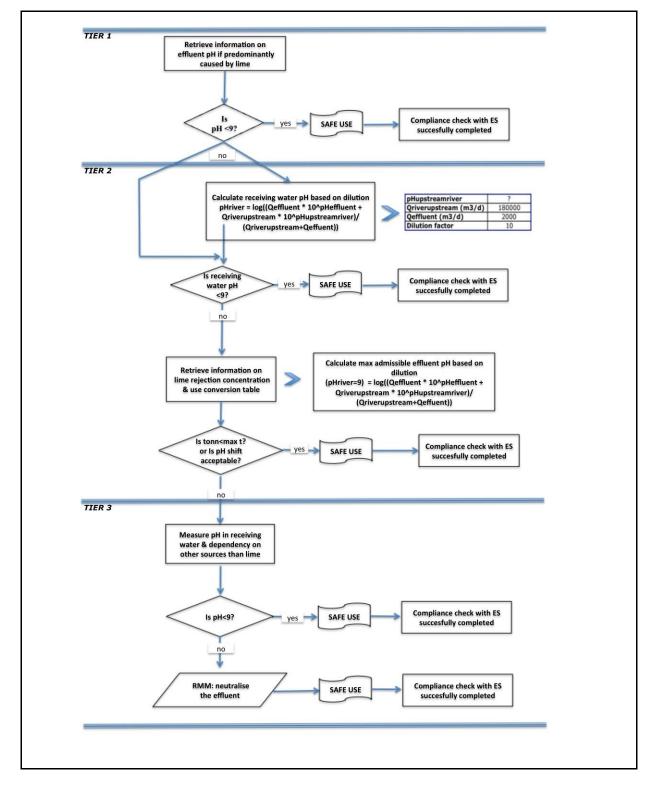
- Q effluent: use default value of 2000 m³/day
- The upstream pH is preferably a measured value. If not available, one can assume a neutral pH of 7 if this can be justified.

Such equation has to be seen as a worst case scenario, where water conditions are standard and not case specific.

Tier 2b: Equation 1 can be used to identify which effluent pH causes an acceptable pH level in the receiving body. In order to do so, pH of the river is set at value 9 and pH of the effluent is calculated accordingly (using default values as reported previously, if necessary). As temperature influences lime solubility, pH effluent might require to be adjusted on a case-by-case basis. Once the maximum admissible pH value in the effluent is established, it is assumed that the OH- concentrations are all dependent on lime discharge and that there is no buffer capacity conditions to consider (this is a unrealistic worst case scenario, which can be modified where information is available). Maximum load of lime that can be annually rejected without negatively affecting the pH of the receiving water is calculated assuming chemical equilibrium. OH- expressed as moles/litre are multiplied by average flow of the effluent and then divided by the molar mass of the calcium magnesium carbonate oxide.

Tier 3: measure the pH in the receiving water after the discharge point. If pH is below 9, safe use is reasonably demonstrated and the ES ends here. If pH is found to be above 9, risk management measures have to be implemented: the effluent has to undergo neutralisation, thus ensuring safe use of lime during production or use phase.





ES number 9.6: Professional uses of aqueous solutions of lime substances

Exposure Scenario Format (1) addressing uses carried out by workers				
1. Title				
Free short title	Professional uses of aqueous solutions of lime substances			



Systematic title based on use descriptor Processes, tasks and/or activities covered Assessment Method 2. Operational con	SU22, SU1, SU5, SU6a, SU6b, SU7, SU10, SU11, SU12, SU13, SU16, SU17, SU18, SU19, SU20, SU23, SU24 PC1, PC2, PC3, PC7, PC8, PC9a, PC9b, PC11, PC12, PC13, PC14, PC15, PC16, PC17, PC18, PC19, PC20, PC21, PC23, PC24, PC25, PC26, PC27, PC28, PC29, PC30, PC31, PC32, PC33, PC34, PC35, PC36, PC37, PC39, PC40 AC1, AC2, AC3, AC4, AC5, AC6, AC7, AC8, AC10, AC11, AC13 (appropriate PROCs and ERCs are given in Section 2 below) Processes, tasks and/or activities covered are described in Section 2 below. The assessment of inhalation exposure is based on the exposure estimation tool MEASE. The environmental assessment is based on FOCUS-Exposit.			
PROC/ERC	REACH definition	Involved tasks		
PROC 2	Use in closed, continuous process with occasional controlled exposure			
PROC 3	Use in closed batch process (synthesis or formulation)			
PROC 4	Use in batch and other process (synthesis) where opportunity for exposure arises			
PROC 5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)			
PROC 8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities			
PROC 8b	Transfer of substance or preparation (charging/ discharging) from/to vessels/large containers at dedicated facilities			
PROC 9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Further information is provided in the ECHA Guidance on information requirements and chemical safety assessment, Chapter R.12: Use		
PROC 10	Roller application or brushing	descriptor system (ECHA-2010-G-05-EN).		
PROC 11	Non industrial spraying			
PROC 12	Use of blowing agents in manufacture of foam			
PROC 13	Treatment of articles by dipping and pouring			
PROC 15	Use as laboratory reagent			
PROC 16	Using material as fuel sources, limited exposure to unburned product to be expected			
PROC 17	Lubrication at high energy conditions and in partly open process			
PROC 18	Greasing at high energy conditions			
PROC 19	Hand-mixing with intimate contact and only PPE available			
ERC2, ERC8a, ERC8b, ERC8c, ERC8d, ERC8e, ERC8f	Wide dispersive indoor and outdoor use of reactive substances or processing aids in open systems	Calcium magnesium carbonate oxide is applied in numerous cases of wide dispersive uses: agricultural, forestry, fish and shrimps farming, soil treatment and environmental protection.		

2.1 Control of workers exposure

Product characteristic

According to the MEASE approach, the substance-intrinsic emission potential is one of the main exposure determinants. This is reflected by an assignment of a so-called fugacity class in the MEASE tool. For operations conducted with solid substances at ambient temperature the fugacity is based on the dustiness of that substance. Whereas in hot metal operations, fugacity is temperature based, taking into account the process temperature and the melting point of the substance. As a third group, high abrasive tasks are based on the level of abrasion instead of the substance intrinsic emission potential. The spraying of aqueous solutions (PROC7 and 11) is assumed to be involved with a medium emission.

PROC	Use in preparation	Content in preparation	Physical form	Emission potential



All applicable PROCs	not res	tricted	aqueous solution	very low		
Amounts used						
The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation (industrial vs. professional) and level of containment/automation (as reflected in the PROC) is the main determinant of the process intrinsic emission potential.						
Frequency and duration	n of use/exposure					
PROC		Duration o	f exposure			
PROC 11		≤ 240 r	ninutes			
All other applicable PROCs		480 minutes (not restricted)			
Human factors not influ	enced by risk managem	ent				
The shift breathing volum	ne during all process steps	reflected in the PROCs is	assumed to be 10 m³/shift	t (8 hours).		
Other given operationa	I conditions affecting wo	rkers exposure				
	are not used in hot-metallu ered relevant for occupatio					
Technical conditions ar	nd measures at process I	evel (source) to prevent	release			
Risk management meas required in the processes	ures at the process level	(e.g. containment or seg	regation of the emission s	source) are generally not		
Technical conditions ar	nd measures to control d	ispersion from source to	owards the worker			
PROC	Level of separation	Localised controls (LC)	Efficiency of LC (according to MEASE)	Further information		
PROC 19	Separation of workers from the emission source is generally not	not applicable	na	-		
All other applicable required in the conducted processes. not required na -						
Organisational measures to prevent /limit releases, dispersion and exposure						
These measures involve eating and smoking at the	tion. General occupational good personal and housel e workplace, the wearing o id of work shift. Do not wea	eeping practices (i.e. regu f standard working clothes	lar cleaning with suitable of and shoes unless otherw	cleaning devices), no ise stated below. Shower		

Conditions and measures related to personal protection, hygiene and health evaluation					
PROC	Specification of respiratory protective equipment (RPE)	RPE efficiency (assigned protection factor, APF)	Specification of gloves	Further personal protective equipment (PPE)	
PROC 11	FFP3 mask	APF=20	Since calcium magnesium carbonate oxide is classified as irritating to skin, the use of protective gloves is mandatory for all process steps.	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.	
PROC 17	FFP1 mask	APF=4			
All other applicable PROCs	not required	na			



Any RPE as defined above shall only be worn if the following principles are implemented in parallel: The duration of work (compare with "duration of exposure" above) should reflect the additional physiological stress for the worker due to the breathing resistance and mass of the RPE itself, due to the increased thermal stress by enclosing the head. In addition, it shall be considered that the worker's capability of using tools and of communicating are reduced during the wearing of RPE. For reasons as given above, the worker should therefore be (i) healthy (especially in view of medical problems that may affect the use of RPE), (ii) have suitable facial characteristics reducing leakages between face and mask (in view of scars and facial hair). The recommended devices above which rely on a tight face seal will not provide the required protection unless they fit the contours of the face properly and securely.

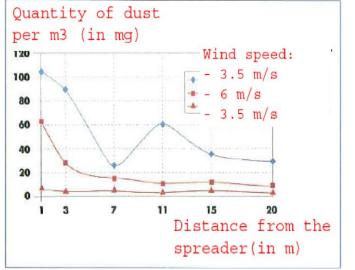
The employer and self-employed persons have legal responsibilities for the maintenance and issue of respiratory protective devices and the management of their correct use in the workplace. Therefore, they should define and document a suitable policy for a respiratory protective device programme including training of the workers.

An overview of the APFs of different RPE (according to BS EN 529:2005) can be found in the glossary of MEASE.

2.2 Control of environmental exposure – only relevant for agricultural soil protection

Product characteristics

Drift: 1% (very worst-case estimate based on data from dust measurements in air as a function of the distance from application)



2,149 kg/ha

(Figure taken from: Laudet, A. et al., 1999)

Amounts used

CaCO3.MgO

Frequency and duration of use

1 day/year (one application per year). Multiple applications during the year are allowed, provided the total yearly amount of 2,149 kg/ha is not exceeded (CaCO3.MgO)

Environment factors not influenced by risk management

Volume of surface water: 300 L/m² Field surface area: 1 ha

Other given operational conditions affecting environmental exposure

Outdoor use of products Soil

mixing depth: 20 cm

Technical conditions and measures at process level (source) to prevent release

There are no direct releases to adjacent surface waters.

Technical conditions and measures to reduce or limit discharges, air emissions and releases to soil

Drift should be minimised.

Organizational measures to prevent/limit release from site



In line with the requirements for good agricultural practice, agricultural soil should be analysed prior to application of lime and the application rate should be adjusted according to the results of the analysis. 2.2 Control of environmental exposure – only relevant for urban soil treatment **Product characteristics** Drift: 1% (very worst-case estimate based or data from dust measurements in air as a function of Quantity of dust the distance from application) per m3 (in mg) 120 Wind speed: 👕 - 3.5 m/s 100 • - 6 m/s 80 - 3.5 m/s 60 40 20 7 11 15 3 20 Distance from the spreader(in m) (Figure taken from: Laudet, A. et al., 1999) Amounts used CaCO3.MgO 228,115 kg/ha Frequency and duration of use 1 day/year and only once in a lifetime. Multiple applications during the year are allowed, provided the total yearly amount of 228,115 kg/ha is not exceeded (CaCO3.MgO) Environment factors not influenced by risk management Field surface area: 1 ha Other given operational conditions affecting environmental exposure Outdoor use of products Soil mixing depth: 20 cm Technical conditions and measures at process level (source) to prevent release Lime is only applied onto the soil in the technosphere zone before road construction. There are no direct releases to adjacent surface waters. Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Drift should be minimised.

3. Exposure estimation and reference to its source

Occupational exposure

The exposure estimation tool MEASE was used for the assessment of inhalation exposure. The risk characterisation ratio (RCR) is the quotient of the refined exposure estimate and the respective DNEL (derived no-effect level) and has to be below 1 to demonstrate a safe use. For inhalation exposure, the RCR is based on the DNEL for calcium magnesium carbonate oxide of 1 mg/m³ (as respirable dust) and the respective inhalation exposure estimate derived using MEASE (as inhalable dust). Thus, the RCR includes an additional safety margin since the respirable fraction being a sub-fraction of the inhalable fraction according to EN 481.



PROC	Method used for inhalation exposure assessment	Inhalation exposure estimate (RCR)	Method used for dermal exposure assessment	Dermal exposure estimate (RCR)	
PROC 2, 3, 4, 5, 8a, 8b, 9, 10, 11, 12, 13, 15, 16, 17, 18, 19	MEASE <pre> Since calcium magnesium carbonate oxide is classified as irritating to skin, dermal exposure has to be minimised as far as technically feasible. A DNEL for dermal effects has not been derived. Thus, dermal exposure is not assessed in this exposure scenario. </pre>				
Environmental exposu	re for agricultural soil pro	otection			
on the calculation of prec surface water and sedim more appropriate for agri modelling.FOCUS is a m German EXPOSIT 1.0 m soil, calcium magnesium	soil and surface water was dicted environmental conce ent (Kloskowksi et al., 199 icultural-like application as odel typically developed fo odel, where parameters su carbonate oxide can inder	entration values (PEC) of p 9). The FOCUS/EXPOSIT in this case where parame or biocidal applications and uch as drifts can be improv	lant protection products for modelling tool is preferred eter as the drift needs to be I was further elaborated or red according to collected	r soil, ground water, I to the EUSES as it is e included in the n the basis of the	
Environmental emissions	See amounts used				
Exposure concentration in waste water treatment plant (WWTP)	Not relevant for agricultu	ral soil protection			
Exposure concentration in	Substance	PEC (ug/L)	PNEC (ug/L)	RCR	
aquatic pelagic compartment	CaCO3.MgO	7.16	470	0.015	
Exposure concentration in sediments	waters the hydroxide ions reacting with Ca2+. The	exposure of surface water is react with HCO3– to form calcium carbonate precipita ility and a constituent of na	n water and CO32 CO32- ates and deposits on the s	forms CaCO3 by	
Exposure concentrations in soil	Substance CaCO3.MgO	PEC (mg/L) 632	PNEC (mg/L) 1034	RCR 0.61	
and groundwater	Cacco.inge	002	1004	0.01	
Exposure concentration in atmospheric compartment	This point is not relevant. below 10 ⁻⁵ Pa.	Calcium magnesium carb	onate oxide is not volatile.	The vapour pressures is	
Exposure concentration relevant for the food chain (secondary poisoning)	omnipresent and essentia	because calcium magnesi al in the environment. The uents (Ca ²⁺ and OH ⁻) in the	uses covered do not signi		
Environmental exposu	re for urban soil treatmer	nt			
The urban soil treatment scenario is based on a road border scenario. At the special road border technical meeting (Ispra, September 5, 2003), EU Member States and industry agreed on a definition for a "road technosphere". The road technosphere can be defined as "the engineered environment that carries the geotechnical functions of the road in connection with its structure, operation and maintenance including the installations to ensure road safety and manage run off. This technosphere, which includes the hard and soft shoulder at the edge of the carriageway, is vertically dictated by the groundwater watertable. The road authority has responsibility for this road technosphere including road safety, road support, prevention of pollution and water management". The road technosphere was therefore excluded as assessment endpoint for risk assessment for the purpose of the existing/new substances regulations. The target zone is the zone beyond the technosphere, to which the environmental risk assessment applies.The PEC calculation for soil was based on the FOCUS soil group (FOCUS, 1996) and on the "draft guidance on the calculation of predicted environmental concentration values (PEC) of plant protection products for soil, ground water, surface water and sediment (Kloskowksi et al., 1999). The FOCUS/EXPOSIT modelling tool is preferred to the EUSES as it is more appropriate for agricultural-like application as in this case where parameter as the drift needs to be included in the modelling.FOCUS is a model typically developed for biocidal applications and was further elaborated on the basis of the German EXPOSIT 1.0 model, where parameters such as drifts can be improved according to collected data.EnvironmentalSee amounts used					
L					
emissions					



Exposure concentration in waste water treatment plant (WWTP)	Not relevant for road borc	ler scenario			
Exposure concentration in aquatic pelagic compartment	Not relevant for road border scenario				
Exposure concentration in sediments	Not relevant for road borc	ler scenario			
Exposure	Substance	PEC (mg/L)	PNEC (mg/L)	RCR	
concentrations in soil and groundwater	CaCO3.MgO	671	1034	0.65	
Exposure concentration in atmospheric compartment	This point is not relevant. below 10 ⁻⁵ Pa.	Calcium magnesium carb	onate oxide is not volatile.	The vapour pressures is	
Exposure concentration relevant for the food chain (secondary poisoning)		overed do not significantly	onsidered to be omniprese influence the distribution of		
Environmental exposur	e for other uses				
 The operational protection or un clime is an ingravity soil, wastewate Lime is specific the air compart 	 For all other uses, no quantitative environmental exposure assessment is carried because The operational conditions and risk management measures are less stringent than those outlined for agricultural soil protection or urban soil treatment Lime is an ingredient and chemically bound into a matrix. Releases are negligible and insufficient to cause a pH-shift in soil, wastewater or surface water Lime is specifically used to release CO2-free breathable air, upon reaction with CO2. Such applications only relates to the air compartment, where the lime properties are exploited Neutralisation/pH-shift is the intended use and there are no additional impacts beyond those desired. 				
4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES					
met or the downstream u measures are adequate. respective DNEL (given t measured data are not av (www.ebrc.de/mease.htm according to the MEASE	The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below. If measured data are not available, the DU may make use of an appropriate scaling tool such as MEASE (www.ebrc.de/mease.html) to estimate the associated exposure. The dustiness of the substance used can be determined according to the MEASE glossary. For example, substances with a dustiness less than 2.5 % according to the Rotating Drum Method (RDM) are defined as "low dusty", substances with a dustiness less than 10 % (RDM) are defined as "medium dusty"				
DNEL _{inhalation} : 1 mg/m ³ (as respirable dust) <u>Important note</u> : The DU has to be aware of the fact that apart from the long-term DNEL given above, a DNEL for acute effects exists at a level of 4 mg/m ³ . By demonstrating a safe use when comparing exposure estimates with the long-term DNEL, the acute DNEL is therefore also covered (according to R.14 guidance, acute exposure levels can be derived by multiplying longterm exposure estimates by a factor of 2). When using MEASE for the derivation of exposure estimates, it is noted that the exposure duration should only be reduced to half-shift as a risk management measure (leading to an exposure reduction of 40 %).					
		I uses of low	dusty solids/p	owders of	
lime substand		ten un en en en tent	A law waard a wa		
Exposure Scenario	Format (1) address	ing uses carried ou	t by workers		
	De f		lide/second and of the second of		
Free short title	Profess	sional uses of low dusty so	blids/powders of lime substa	ances	
Systematic title based on use descriptor	SU22, SU1, SU5, SU6a, SU6b, SU7, SU10, SU11, SU12, SU13, SU16, SU17, SU18, SU19, SU20, SU23, SU24 PC1, PC2, PC3, PC7, PC8, PC9a, PC9b, PC11, PC12, PC13, PC14, PC15, PC16, PC17, PC18, PC19, PC20, PC21, PC23, PC24, PC25, PC26, PC27, PC28, PC29, PC30, PC31, PC32, PC33, PC34, PC35, PC36, PC37, PC39, PC40 AC1, AC2, AC3, AC4, AC5, AC6, AC7, AC8, AC10, AC11, AC13 (appropriate PROCs and ERCs are given in Section 2 below)				



Processes, tasks and/or activities covered	Processes, tasks and/or activities covered are described in Section 2 below.					
Assessment Method	The assessment of inhalation exposure is based on the exposure estimation tool MEASE. The environmental assessment is based on FOCUS-Exposit.					
2. Operational con	ditions and risk management measures	3				
PROC/ERC	REACH definition	Involved tasks				
PROC 2	Use in closed, continuous process with occasional controlled exposure					
PROC 3	Use in closed batch process (synthesis or formulation)					
PROC 4	Use in batch and other process (synthesis) where opportunity for exposure arises					
PROC 5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)					
PROC 8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities					
PROC 8b	Transfer of substance or preparation (charging/ discharging) from/to vessels/large containers at dedicated facilities					
PROC 9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)					
PROC 10	Roller application or brushing	Further information is provided in the ECHA				
PROC 11	Non industrial spraying	Guidance on information requirements and chemical safety assessment, Chapter R.12: Use				
PROC 13	Treatment of articles by dipping and pouring	descriptor system (ECHA-2010-G-05-EN).				
PROC 15	Use as laboratory reagent					
PROC 16	Using material as fuel sources, limited exposure to unburned product to be expected					
PROC 17	Lubrication at high energy conditions and in partly open process					
PROC 18	Greasing at high energy conditions					
PROC 19	Hand-mixing with intimate contact and only PPE available					
PROC 21	Low energy manipulation of substances bound in materials and/or articles					
PROC 25	Other hot work operations with metals					
PROC 26	Handling of solid inorganic substances at ambient temperature					
ERC2, ERC8a, ERC8b, ERC8c, ERC8d, ERC8e, ERC8f	Wide dispersive indoor and outdoor use of reactive substances or processing aids in open systems					

2.1 Control of workers exposure

Product characteristic

According to the MEASE approach, the substance-intrinsic emission potential is one of the main exposure determinants. This is reflected by an assignment of a so-called fugacity class in the MEASE tool. For operations conducted with solid substances at ambient temperature the fugacity is based on the dustiness of that substance. Whereas in hot metal operations, fugacity is temperature based, taking into account the process temperature and the melting point of the substance. As a third group, high abrasive tasks are based on the level of abrasion instead of the substance intrinsic emission potential.

PROC	Use in preparation	Content in preparation	Physical form	Emission potential
PROC 25	not restricted		solid/powder, molten	high
All other applicable PROCs	not restricted		solid/powder	low
Amounts used				



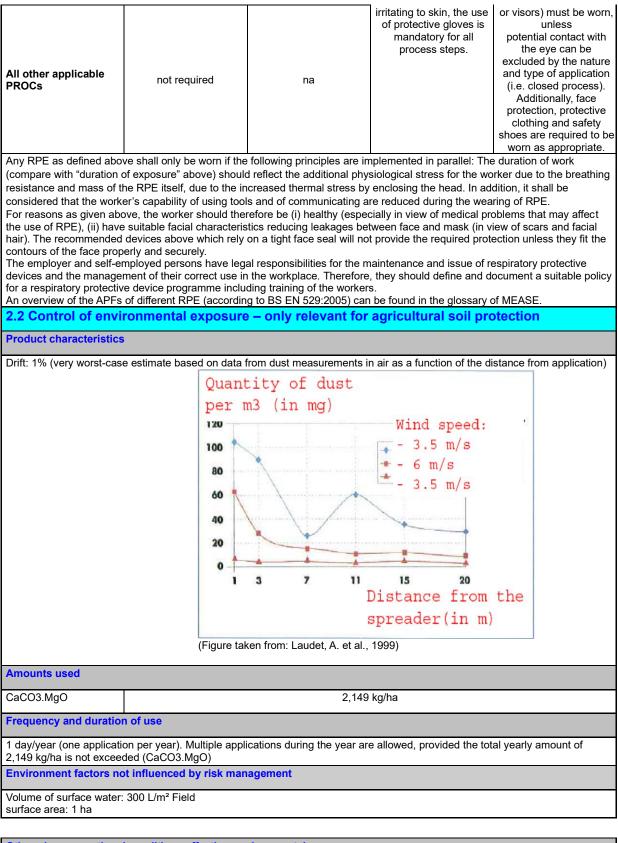
The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation (industrial vs. professional) and level of containment/automation (as reflected in the PROC) is the main determinant of the process intrinsic emission potential.

Frequency and duration of use/exposure				
PROC		Duration o	of exposure	
PROC 17		≤ 240 r	minutes	
All other applicable PROCs		480 minutes ((not restricted)	
Human factors not influ	uenced by risk managem	ent		
The shift breathing volun	ne during all process steps	reflected in the PROCs is	assumed to be 10 m³/shift	t (8 hours).
Other given operationa	I conditions affecting wo	rkers exposure		
assessment of the conduction exposure assessment in temperatures are expect	ve process temperature an- ucted processes. In process MEASE is however based ed to vary within the indust ess temperatures are autor	s steps with considerably on the ratio of process ter ry the highest ratio was ta	high temperatures (i.e. PR(mperature and melting poir ken as a worst case assun	OC 22, 23, 25), the nt. As the associated nption for the exposure
Technical conditions and	nd measures at process I	evel (source) to prevent	release	
Risk management measurequired in the processes	ures at the process level (e s.	e.g. containment or segreg	ation of the emission source	ce) are generally not
Technical conditions a	nd measures to control d	ispersion from source to	owards the worker	
PROC	Level of separation	Localised controls (LC)	Efficiency of LC (according to MEASE)	Further information
PROC 19	Any potentially required separation of workers from the emission source is indicated above under "Frequency and duration of exposure".	not applicable	na	-
All other applicable PROCs	A reduction of exposure duration can be achieved, for example, by the installation of ventilated (positive pressure) control rooms or by removing the worker from workplaces involved with relevant exposure.	not required	na	-
Organisational measur	es to prevent /limit releas	es, dispersion and expo	osure	
Avoid inhalation or indes	tion General occupational	hydiene measures are red	nuired to ensure a safe har	dling of the substance

Avoid inhalation or ingestion. General occupational hygiene measures are required to ensure a safe handling of the substance. These measures involve good personal and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating and smoking at the workplace, the wearing of standard working clothes and shoes unless otherwise stated below. Shower and change clothes at end of work shift. Do not wear contaminated clothing at home. Do not blow dust off with compressed air.

Conditions and measures related to personal protection, hygiene and health evaluation					
PROC	Specification of respiratory protective equipment (RPE)	RPE efficiency (assigned protection factor, APF)	Specification of gloves	Further personal protective equipment (PPE)	
PROC 4, 5, 11, 26	FFP1 mask	APF=4	Since calcium	Eye protection equipment (e.g. goggles	
PROC 16, 17, 18, 25	FFP2 mask	APF=10	magnesium carbonate oxide is classified as	oquipmont (o.g. goggioo	





Other given operational conditions affecting environmental exposure

Outdoor use of products Soil mixing depth: 20 cm



Technical conditions and measures at process level (source) to prevent release

There are no direct releases to adjacent surface waters.

Technical conditions and measures to reduce or limit discharges, air emissions and releases to soil

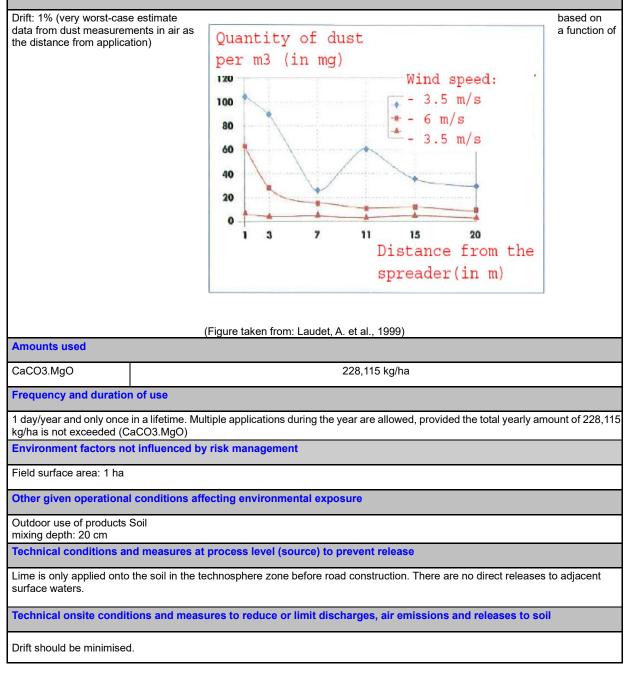
Drift should be minimised.

Organizational measures to prevent/limit release from site

In line with the requirements for good agricultural practice, agricultural soil should be analysed prior to application of lime and the application rate should be adjusted according to the results of the analysis.

2.2 Control of environmental exposure – only relevant for urban soil treatment

Product characteristics





3. Exposure estimation and reference to its source

Occupational exposure

The exposure estimation tool MEASE was used for the assessment of inhalation exposure. The risk characterisation ratio (RCR) is the quotient of the refined exposure estimate and the respective DNEL (derived no-effect level) and has to be below 1 to demonstrate a safe use. For inhalation exposure, the RCR is based on the DNEL for calcium magnesium carbonate oxide of 1 mg/m³ (as respirable dust) and the respective inhalation exposure estimate derived using MEASE (as inhalable dust). Thus, the RCR includes an additional safety margin since the respirable fraction being a sub-fraction of the inhalable fraction according to EN 481.

PROC	Method used for inhalation exposure assessment	Inhalation exposure estimate (RCR)	Method used for dermal exposure assessment	Dermal exposure estimate (RCR)
PROC 2, 3, 4, 5, 8a, 8b, 9, 10, 11, 13, 15, 16, 17, 18, 19, 21, 25, 26	MEASE	< 1 mg/m³ (0.01 – 0.75)	Since calcium magnesium carbonate oxide is classified as irritating to skin, dermal exposure has to be minimised as far as technically feasible. A DNEL for dermal effects has not been derived. Thus, dermal exposure is not assessed in this exposure scenario.	
Environmental exposur	e for agricultural soil pro	otection	-	

The PEC calculation for soil and surface water was based on the FOCUS soil group (FOCUS, 1996) and on the "draft guidance on the calculation of predicted environmental concentration values (PEC) of plant protection products for soil, ground water, surface water and sediment (Kloskowksi et al., 1999). The FOCUS/EXPOSIT modelling tool is preferred to the EUSES as it is more appropriate for agricultural-like application as in this case where parameter as the drift needs to be included in the modelling.FOCUS is a model typically developed for biocidal applications and was further elaborated on the basis of the German EXPOSIT 1.0 model, where parameters such as drifts can be improved according to collected data: once applied on the soil, calcium magnesium carbonate oxide can indeed migrate then towards surface waters, via drift.

v					
Environmental emissions	See amounts used				
Exposure concentration in waste water treatment plant (WWTP)	Not relevant for agricultural soil protection				
Exposure	Substance	PEC (ug/L)	PNEC (ug/L)	RCR	
concentration in aquatic pelagic compartment	CaCO3.MgO	7.16	470	0.015	
Exposure concentration in sediments	As described above, no exposure of surface water nor sediment to lime is expected. Further, in natural waters the hydroxide ions react with HCO3- to form water and CO32 CO32- forms CaCO3 by reacting with Ca2+. The calcium carbonate precipitates and deposits on the sediment. Calcium carbonate is of low solubility and a constituent of natural soils.				
Exposure	Substance	PEC (mg/L)	PNEC (mg/L)	RCR	
concentrations in soil and groundwater	CaCO3.MgO	632	1034	0.61	
Exposure concentration in atmospheric compartment	This point is not relevant. Calcium magnesium carbonate oxide is not volatile. The vapour pressures is below 10 ⁻⁵ Pa.				
Exposure concentration relevant for the food chain	This point is not relevant because calcium can be considered to be omnipresent and essential in the environment. The uses covered do not significantly influence the distribution of the constituents (Ca ²⁺ and OH ⁻) in the environment.				
(secondary poisoning)		ent.			



The urban soil treatment scenario is based on a road border scenario. At the special road border technical meeting (Ispra, September 5, 2003), EU Member States and industry agreed on a definition for a "road technosphere". The road technosphere can be defined as "the engineered environment that carries the geotechnical functions of the road in connection with its structure, operation and maintenance including the installations to ensure road safety and manage run off. This technosphere, which includes the hard and soft shoulder at the edge of the carriageway, is vertically dictated by the groundwater watertable. The road authority has responsibility for this road technosphere including road safety, road support, prevention of pollution and water management". The road technosphere was therefore excluded as assessment endpoint for risk assessment for the purpose of the existing/new substances regulations. The target zone is the zone beyond the technosphere, to which the environmental risk assessment applies.

The PEC calculation for soil was based on the FOCUS soil group (FOCUS, 1996) and on the "draft guidance on the calculation of predicted environmental concentration values (PEC) of plant protection products for soil, ground water, surface water and sediment (Kloskowksi et al., 1999). The FOCUS/EXPOSIT modelling tool is preferred to the EUSES as it is more appropriate for agricultural-like application as in this case where parameter as the drift needs to be included in the modelling.FOCUS is a model typically developed for biocidal applications and was further elaborated on the basis of the German EXPOSIT 1.0 model, where parameters such as drifts can be improved according to collected data.

Environmental

I See amounts used

	Γ			
emissions				
Exposure concentration in waste water treatment plant (WWTP)	Not relevant for road border scenario			
Exposure concentration in aquatic pelagic compartment	Not relevant for road border scenario			
Exposure concentration in sediments	Not relevant for road border scenario			
Exposure concentrations in soil	Substance	PEC (mg/L)	PNEC (mg/L)	RCR
and groundwater	CaCO3.MgO	671	1034	0.65
Exposure concentration in atmospheric compartment	This point is not relevant. Calcium magnesium carbonate oxide is not volatile. The vapour pressures is below 10 ⁻⁵ Pa.			
Exposure concentration relevant for the food chain (secondary poisoning)	This point is not relevant because calcium can be considered to be omnipresent and essential in the environment. The uses covered do not significantly influence the distribution of the constituents (Ca^{2+} and OH ⁻) in the environment.			
Environmental exposur	e for other uses			
	antitative environmental ex	posure assessment is car agement measures are le		

• Neutralisation/pH-shift is the intended use and there are no additional impacts beyond those desired.

4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES



The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below. If measured data are not available, the DU may make use of an appropriate scaling tool such as MEASE

(<u>www.ebrc.de/mease.html</u>) to estimate the associated exposure. The dustiness of the substance used can be determined according to the MEASE glossary. For example, substances with a dustiness less than 2.5 % according to the Rotating Drum Method (RDM) are defined as "low dusty", substances with a dustiness less than 10 % (RDM) are defined as "medium dusty" and substances with a dustiness ≥10 % are defined as "high dusty". DNEL_{inhalation}: 1 mg/m³ (as respirable dust)

Important note: The DU has to be aware of the fact that apart from the long-term DNEL given above, a DNEL for acute effects exists at a level of 4 mg/m³. By demonstrating a safe use when comparing exposure estimates with the long-term DNEL, the acute DNEL is therefore also covered (according to R.14 guidance, acute exposure levels can be derived by multiplying longterm exposure estimates by a factor of 2). When using MEASE for the derivation of exposure estimates, it is noted that the exposure duration should only be reduced to half-shift as a risk management measure (leading to an exposure reduction of 40 %).

ES number 9.8: Professional uses of medium dusty solids/powders of lime substances

Exposure Scenario Format (1) addressing uses carried out by workers

1. Title				
Free short title	Professional uses of medium dusty solids/powders of lime substances			
Systematic title based on use descriptor	SU22, SU1, SU5, SU6a, SU6b, SU7, SU10, SU11, SU12, SU13, SU16, SU17, SU18, SU19, SU20, SU23, SU24 PC1, PC2, PC3, PC7, PC8, PC9a, PC9b, PC11, PC12, PC13, PC14, PC15, PC16, PC17, PC18, PC19, PC20, PC21, PC23, PC24, PC25, PC26, PC27, PC28, PC29, PC30, PC31, PC32, PC33, PC34, PC35, PC36, PC37, PC39, PC40 AC1, AC2, AC3, AC4, AC5, AC6, AC7, AC8, AC10, AC11, AC13 (appropriate PROCs and ERCs are given in Section 2 below)			
Processes, tasks and/or activities covered	Processes, tasks and/or activities covered are described in Section 2 below.			
Assessment Method	The assessment of inhalation exposure is based on the exposure estimation tool MEASE. The environmental assessment is based on FOCUS-Exposit.			
2. Operational con	ditions and risk management measures	;		
PROC/ERC	REACH definition	Involved tasks		
PROC 2	Use in closed, continuous process with occasional controlled exposure			
PROC 3	Use in closed batch process (synthesis or formulation)			
PROC 4	Use in batch and other process (synthesis) where opportunity for exposure arises			
PROC 5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)			
PROC 8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities	Further information is provided in the ECHA		
PROC 8b	Transfer of substance or preparation (charging/ discharging) from/to vessels/large containers at dedicated facilities	Guidance on information requirements and chemical safety assessment, Chapter R.12: Use descriptor system (ECHA-2010-G-05-EN).		
PROC 9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)			
PROC 10	Roller application or brushing	1		
PROC 11	Non industrial spraying			
PROC 13	Treatment of articles by dipping and pouring	1		
PROC 15	Use as laboratory reagent	1		
PROC 16	Using material as fuel sources, limited exposure to unburned product to be expected			



PROC 17	Lubrication at high energy conditions and in partly open process
PROC 18	Greasing at high energy conditions
PROC 19	Hand-mixing with intimate contact and only PPE available
PROC 25	Other hot work operations with metals
PROC 26	Handling of solid inorganic substances at ambient temperature
ERC2, ERC8a, ERC8b, ERC8c, ERC8d, ERC8e, ERC8f	Wide dispersive indoor and outdoor use of reactive substances or processing aids in open systems

2.1 Control of workers exposure

Product characteristic

According to the MEASE approach, the substance-intrinsic emission potential is one of the main exposure determinants. This is reflected by an assignment of a so-called fugacity class in the MEASE tool. For operations conducted with solid substances at ambient temperature the fugacity is based on the dustiness of that substance. Whereas in hot metal operations, fugacity is temperature based, taking into account the process temperature and the melting point of the substance. As a third group, high abrasive tasks are based on the level of abrasion instead of the substance intrinsic emission potential.

PROC	Use in preparation	Content in preparation	Physical form	Emission potential
PROC 25	not restricted		solid/powder, molten	high
All other applicable PROCs	not restricted		solid/powder	medium
Amounts used				

The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation (industrial vs. professional) and level of containment/automation (as reflected in the PROC) is the main determinant of the process intrinsic emission potential.

Frequency and duration of use/exposure

PROC	Duration of exposure
PROC 11, 16, 17, 18, 19	≤ 240 minutes
All other applicable PROCs	480 minutes (not restricted)

Human factors not influenced by risk management

The shift breathing volume during all process steps reflected in the PROCs is assumed to be 10 m³/shift (8 hours).

Other given operational conditions affecting workers exposure

Operational conditions like process temperature and process pressure are not considered relevant for occupational exposure assessment of the conducted processes. In process steps with considerably high temperatures (i.e. PROC 22, 23, 25), the exposure assessment in MEASE is however based on the ratio of process temperature and melting point. As the associated temperatures are expected to vary within the industry the highest ratio was taken as a worst case assumption for the exposure estimation. Thus all process temperatures are automatically covered in this exposure scenario for PROC 22, 23 and PROC 25.

Technical conditions and measures at process level (source) to prevent release

Risk management measures at the process level (e.g. containment or segregation of the emission source) are generally not required in the processes.

Technical conditions and measures to control dispersion from source towards the worker

PROC	Level of separation	Localised controls (LC)	Efficiency of LC (according to MEASE)	Further information
PROC 11, 16	Any potentially required separation of workers from the emission	generic local exhaust ventilation	72 %	-
PROC 17, 18	source is indicated above under	integrated local exhaust ventilation	87 %	-



PROC 19	"Frequency and duration of exposure". A reduction of exposure	not applicable	na	-
All other applicable PROCs	duration can be achieved, for example, by the installation of ventilated (positive pressure) control rooms or by removing the worker from workplaces involved with relevant exposure.	not required	na	-
Organisational measures to prevent /limit releases, dispersion and exposure				

Avoid inhalation or ingestion. General occupational hygiene measures are required to ensure a safe handling of the substance. These measures involve good personal and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating and smoking at the workplace, the wearing of standard working clothes and shoes unless otherwise stated below. Shower and change clothes at end of work shift. Do not wear contaminated clothing at home. Do not blow dust off with compressed air.

Conditions and measures related to personal protection, hygiene and health evaluation

PROC	Specification of respiratory protective equipment (RPE)	RPE efficiency (assigned protection factor, APF)	Specification of gloves	Further personal protective equipment (PPE)
PROC 2, 3, 16, 19	FFP1 mask	APF=4		Eye protection equipment (e.g. goggles
PROC 4, 5, 8a, 8b, 9, 10, 13, 17, 18, 25, 26	FFP2 mask	APF=10		or visors) must be worn, unless
PROC 11	FFP1 mask	APF=10	Since calcium magnesium carbonate oxide is classified as irritating to skin, the use of protective gloves is mandatory for all process steps.	potential contact with the eye can be
PROC 15	not required	na		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.

Any RPE as defined above shall only be worn if the following principles are implemented in parallel: The duration of work (compare with "duration of exposure" above) should reflect the additional physiological stress for the worker due to the breathing resistance and mass of the RPE itself, due to the increased thermal stress by enclosing the head. In addition, it shall be considered that the worker's capability of using tools and of communicating are reduced during the wearing of RPE.

For reasons as given above, the worker should therefore be (i) healthy (especially in view of medical problems that may affect the use of RPE), (ii) have suitable facial characteristics reducing leakages between face and mask (in view of scars and facial hair). The recommended devices above which rely on a tight face seal will not provide the required protection unless they fit the contours of the face properly and securely. The employer and self-employed persons have legal responsibilities for the maintenance and issue of respiratory protective

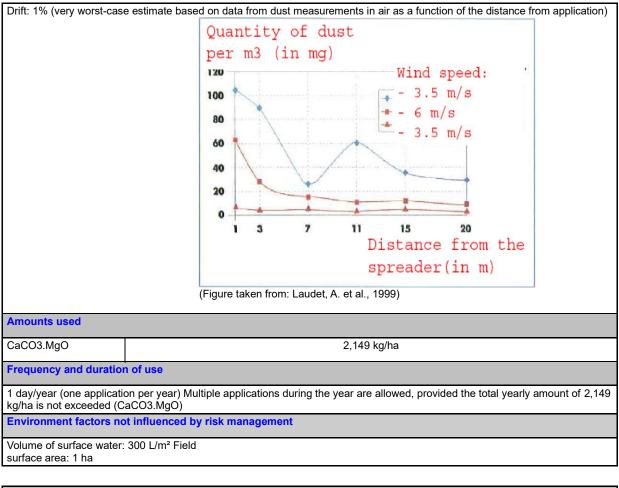
The employer and self-employed persons have legal responsibilities for the maintenance and issue of respiratory protective devices and the management of their correct use in the workplace. Therefore, they should define and document a suitable policy for a respiratory protective device programme including training of the workers.

An overview of the APFs of different RPE (according to BS EN 529:2005) can be found in the glossary of MEASE.

2.2 Control of environmental exposure – only relevant for agricultural soil protection

Product characteristics





Other given operational conditions affecting environmental exposure

Outdoor use of products Soil

mixing depth: 20 cm

Technical conditions and measures at process level (source) to prevent release

There are no direct releases to adjacent surface waters.

Technical conditions and measures to reduce or limit discharges, air emissions and releases to soil

Drift should be minimised.

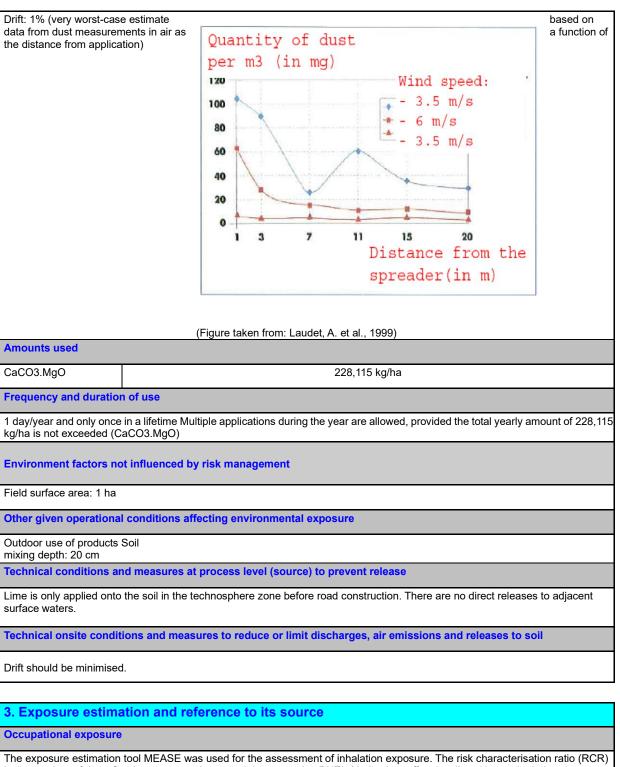
Organizational measures to prevent/limit release from site

In line with the requirements for good agricultural practice, agricultural soil should be analysed prior to application of lime and the application rate should be adjusted according to the results of the analysis.

2.2 Control of environmental exposure – only relevant for urban soil treatment

Product characteristics





is the quotient of the refined exposure estimate and the respective DNEL (derived no-effect level) and has to be below 1 to demonstrate a safe use. For inhalation exposure, the RCR is based on the DNEL for calcium magnesium carbonate oxide of 1 mg/m³ (as respirable dust) and the respective inhalation exposure estimate derived using MEASE (as inhalable dust). Thus, the RCR includes an additional safety margin since the respirable fraction being a sub-fraction of the inhalable fraction according to EN 481.

PROC	Method used for inhalation exposure assessment	Inhalation exposure estimate (RCR)	Method used for dermal exposure assessment	Dermal exposure estimate (RCR)
------	--	---------------------------------------	--	-----------------------------------



8b, 9, 10, 11, 13, 15, 16, 17, 18, 19, 25, 26	MEASE	< 1 mg/m³ (0.25 – 0.825)	Since calcium magnesiu classified as irritating to has to be minimised as far A DNEL for dermal effects Thus, dermal exposure i exposure s	skin, dermal exposure as technically feasible has not been derived. s not assessed in this
Environmental exposur	e for agricultural soil pro	otection	•	
on the calculation of pred surface water and sedime more appropriate for agric modelling. FOCUS is a m German EXPOSIT 1.0 mc	licted environmental conce ent (Kloskowksi et al., 1999 cultural-like application as nodel typically developed fo	entration values (PEC) of p 9). The FOCUS/EXPOSIT in this case where param or biocidal applications an uch as drifts can be improv	I group (FOCUS, 1996) and olant protection products for modelling tool is preferred t eter as the drift needs to be d was further elaborated on ved according to collected da urface waters, via drift	soil, ground water, o the EUSES as it is included in the the basis of the
Environmental emissions	See amounts used			
Exposure concentration in waste water treatment plant (WWTP)	Not relevant for agricultur	al soil protection		
Exposure	Substance	PEC (ug/L)	PNEC (ug/L)	RCR
concentration in aquatic pelagic compartment	CaCO3.MgO	7.16	470	0.015
Exposure concentration in sediments	waters the hydroxide ions	react with HCO3- to form alcium carbonate precipit	nor sediment to lime is expension water and CO32 CO32- for ates and deposits on the sec atural soils.	orms CaCO3 by
Exposure	Substance	PEC (mg/L)	PNEC (mg/L)	RCR
concentrations in soil and groundwater	CaCO3.MgO	632	1034	0.61
Exposure concentration in atmospheric compartment	This point is not relevant. below 10 ⁻⁵ Pa.	Calcium magnesium cart	ponate oxide is not volatile. T	he vapour pressures is
Exposure concentration relevant for the food chain		overed do not significantly	considered to be omnipreser influence the distribution of	
(secondary poisoning)				
(secondary poisoning)	e for urban soil treatmen			
(secondary poisoning) Environmental exposure The urban soil treatment September 5, 2003), EU can be defined as "the en structure, operation and r which includes the hard a The road authority has re water management". The	e for urban soil treatment scenario is based on a roa Member States and indust agineered environment that naintenance including the and soft shoulder at the edu sponsibility for this road te road technosphere was the w substances regulations	ad border scenario. At the ry agreed on a definition f t carries the geotechnical installations to ensure roa ge of the carriageway, is v chnosphere including roa herefore excluded as asse	special road border technica for a "road technosphere". The functions of the road in conr ad safety and manage run of vertically dictated by the ground d safety, road support, preven- tessment endpoint for risk assone beyond the technospher	he road technosphere nection with its f. This technosphere, undwater watertable. ention of pollution and sessment for the
(secondary poisoning) Environmental exposur The urban soil treatment September 5, 2003), EU can be defined as "the en structure, operation and r which includes the hard a The road authority has re water management". The purpose of the existing/ne environmental risk assess The PEC calculation for s of predicted environments sediment (Kloskowksi et agricultural-like applicatio model typically developed where parameters such a	e for urban soil treatment scenario is based on a roat Member States and indust ogineered environment that maintenance including the and soft shoulder at the edu- sponsibility for this road te road technosphere was the ew substances regulations sment applies. Soil was based on the FOC al concentration values (Pl al., 1999). The FOCUS/EX on as in this case where part of or biocidal applications as a drifts can be improved a	at ad border scenario. At the ry agreed on a definition t t carries the geotechnical installations to ensure roa ge of the carriageway, is v chnosphere including roa herefore excluded as asset . The target zone is the zo CUS soil group (FOCUS, 1 EC) of plant protection pro (POSIT modelling tool is p arameter as the drift needs and was further elaborated	for a "road technosphere". The functions of the road in conread safety and manage run of vertically dictated by the ground d safety, road support, prever- essment endpoint for risk assigned beyond the technospher 996) and on the "draft guida oducts for soil, ground water, preferred to the EUSES as it is to be included in the model d on the basis of the German	he road technosphere hection with its f. This technosphere, indwater watertable. ention of pollution and sessment for the e, to which the nce on the calculation surface water and is more appropriate for lling. FOCUS is a
(secondary poisoning) Environmental exposur The urban soil treatment September 5, 2003), EU can be defined as "the en structure, operation and r which includes the hard a The road authority has re water management". The purpose of the existing/ne environmental risk assess The PEC calculation for s of predicted environmenta sediment (Kloskowksi et a agricultural-like applicatio model typically developed	e for urban soil treatment scenario is based on a roat Member States and indust ogineered environment that maintenance including the and soft shoulder at the edu- sponsibility for this road te road technosphere was the we substances regulations sment applies. Soil was based on the FOC al concentration values (Pl al., 1999). The FOCUS/EX on as in this case where paid of or biocidal applications a	at ad border scenario. At the ry agreed on a definition t t carries the geotechnical installations to ensure roa ge of the carriageway, is v chnosphere including roa herefore excluded as asset . The target zone is the zo CUS soil group (FOCUS, 1 EC) of plant protection pro (POSIT modelling tool is p arameter as the drift needs and was further elaborated	for a "road technosphere". The functions of the road in conread safety and manage run of vertically dictated by the ground d safety, road support, prever- essment endpoint for risk assigned beyond the technospher 996) and on the "draft guida oducts for soil, ground water, preferred to the EUSES as it is to be included in the model d on the basis of the German	he road technosphere hection with its f. This technosphere, indwater watertable. ention of pollution and sessment for the e, to which the nce on the calculation surface water and is more appropriate fo lling. FOCUS is a

emissions	
Exposure concentration in waste water treatment plant (WWTP)	Not relevant for road border scenario



Processes, tasks and/or activities

Assessment Method

covered

Exposure concentration in aquatic pelagic compartment	Not relevant for road border scenario					
Exposure concentration in sediments	Not relevant for road border scenario					
Exposure	Substance PEC (mg/L) PNEC (mg/L) RCR					
concentrations in soil and groundwater	CaCO3.MgO	671	1034	0.65		
Exposure concentration in atmospheric compartment	This point is not relevant. Calcium magnesium carbonate oxide is not volatile. The vapour pressures is below 10 ⁻⁵ Pa.					
Exposure concentration relevant for the food chain (secondary poisoning)		overed do not significantly	onsidered to be omniprese influence the distribution o			
Environmental exposur	re for other uses					
protection or u Lime is an ingr soil, wastewate Lime is specific the air compar	rban soil treatment redient and chemically bou er or surface water cally used to release CO2- tment, where the lime prop	nd into a matrix. Releases free breathable air, upon erties are exploited	ess stringent than those ou are negligible and insuffici reaction with CO2. Such a nal impacts beyond those c	ient to cause a pH-shift in pplications only relates to		
4. Guidance to DU	to evaluate whether	he works inside th	e boundaries set by	the ES		
met or the downstream u measures are adequate. respective DNEL (given t measured data are not a (www.ebrc.de/mease.htm according to the MEASE Method (RDM) are define	ser can demonstrate on hi This has to be done by sh hat the processes and act vailable, the DU may make <u>nl</u>) to estimate the associat glossary. For example, su	s own that his operational owing that they limit the in vities in question are cove a use of an appropriate sca ed exposure. The dustines bstances with a dustiness ces with a dustiness less th	management measures as conditions and implemente halation and dermal expos ered by the PROCs listed al aling tool such as MEASE ss of the substance used ca less than 2.5 % according han 10 % (RDM) are define	ed risk management ure to a level below the bove) as given below. If an be determined to the Rotating Drum		
Important note: The DU f exists at a level of 4 mg/r acute DNEL is therefore longterm exposure estim	n ³ . By demonstrating a sat also covered (according to ates by a factor of 2). Whe	that apart from the long-te e use when comparing ex R.14 guidance, acute exp n using MEASE for the de	erm DNEL given above, a E posure estimates with the l posure levels can be derive rivation of exposure estima ent measure (leading to ar	long-term DNEL, the d by multiplying ates, it is noted that		
ES number 9. lime substand		al uses of high	dusty solids/	powders of		
	o Format (1) address	ing uses carried or	it by workers			
1. Title						
Free short title	Profess	sional uses of high dustv s	olids/powders of lime subs	tances		
Systematic title based on use descriptor	Professional uses of high dusty solids/powders of lime substances SU22, SU1, SU5, SU6a, SU6b, SU7, SU10, SU11, SU12, SU13, SU16, SU17, SU18, SU19, SU20, SU23, SU24 PC1, PC2, PC3, PC7, PC8, PC9a, PC9b, PC11, PC12, PC13, PC14, PC15, PC16, PC17, PC18, PC19, PC20, PC21, PC23, PC24, PC25, PC26, PC27, PC28, PC29, PC30, PC31, PC32, PC33, PC34, PC35, PC36, PC37, PC39, PC40 AC1, AC2, AC3, AC4, AC5, AC6, AC7, AC8, AC10, AC11, AC13 (appropriate PROCs and ERCs are given in Section 2 below)					
Duran and the star						

Processes, tasks and/or activities covered are described in Section 2 below.

The assessment of inhalation exposure is based on the exposure estimation tool MEASE. The environmental assessment is based on FOCUS-Exposit.



2. Operational con	ditions and risk management measures	i	
PROC/ERC	REACH definition	Involved tasks	
PROC 2	Use in closed, continuous process with occasional controlled exposure		
PROC 3	Use in closed batch process (synthesis or formulation)		
PROC 4	Use in batch and other process (synthesis) where opportunity for exposure arises		
PROC 5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)		
PROC 8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities		
PROC 8b	Transfer of substance or preparation (charging/ discharging) from/to vessels/large containers at dedicated facilities		
PROC 9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)		
PROC 10	Roller application or brushing	Further information is provided in the ECHA Guidance on information requirements and	
PROC 11	Non industrial spraying	chemical safety assessment, Chapter R 12: U descriptor system (ECHA-2010-G-05-EN).	
PROC 13	Treatment of articles by dipping and pouring		
PROC 15	Use as laboratory reagent		
PROC 16	Using material as fuel sources, limited exposure to unburned product to be expected		
PROC 17	Lubrication at high energy conditions and in partly open process		
PROC 18	Greasing at high energy conditions		
PROC 19	Hand-mixing with intimate contact and only PPE available		
PROC 25	Other hot work operations with metals		
PROC 26	Handling of solid inorganic substances at ambient temperature		
ERC2, ERC8a, ERC8b, ERC8c, ERC8d, ERC8e, ERC8f	Wide dispersive indoor and outdoor use of reactive substances or processing aids in open systems		

2.1 Control of workers exposure

Product characteristic

According to the MEASE approach, the substance-intrinsic emission potential is one of the main exposure determinants. This is reflected by an assignment of a so-called fugacity class in the MEASE tool. For operations conducted with solid substances at ambient temperature the fugacity is based on the dustiness of that substance. Whereas in hot metal operations, fugacity is temperature based, taking into account the process temperature and the melting point of the substance. As a third group, high abrasive tasks are based on the level of abrasion instead of the substance intrinsic emission potential.

PROC	Use in preparation	Content in preparation	Physical form	Emission potential
All applicable PROCs	not res	stricted	solid/powder	high
combination of the scale	•	ered to influence the exposu professional) and level of o nsic emission potential.		,

Frequency and duration of use/exposure				
PROC	Duration of exposure			
PROC 4, 5, 8a, 8b, 9, 10, 16, 17, 18, 19, 26	≤ 240 minutes			



PROC 11		≤ 60 m	inutes				
All other applicable PROCs		480 minutes (not restricted)				
Human factors not influ	ienced by risk managem	ent					
The shift breathing volum	ne during all process steps	reflected in the PROCs is	assumed to be 10 m³/shift	t (8 hours).			
Other given operationa	I conditions affecting wo	rkers exposure					
assessment of the conductive exposure assessment in temperatures are expected.	e process temperature an icted processes. In process MEASE is however based ed to vary within the indust ess temperatures are auto	s steps with considerably h on the ratio of process ter ry the highest ratio was ta	high temperatures (i.e. PRo mperature and melting poin ken as a worst case assum	OC 22, 23, 25), the nt. As the associated nption for the exposure			
	nd measures at process I	-	-				
Risk management measurequired in the processes	ures at the process level (e s.	e.g. containment or segreg	ation of the emission sour	ce) are generally not			
Technical conditions ar	nd measures to control d	ispersion from source to	owards the worker				
PROC	Level of separation	Localised controls (LC)	Efficiency of LC (according to MEASE)	Further information			
PROC 4, 5, 8a, 8b, 9, 11, 16, 26	Any potentially required separation of workers from the emission	generic local exhaust ventilation	72 %	-			
PROC 17, 18	source is indicated above under	integrated local exhaust ventilation	87 %	-			
PROC 19	duration of exposure". A reduction of exposure duration can be	A reduction of exposure not applicable na rooms or outdoors					
All other applicable PROCs	achieved, for example, by the installation of ventilated (positive pressure) control rooms or by removing the worker from workplaces involved with relevant exposure.	not required	na	-			
Organisational measure	es to prevent /limit releas	ses, dispersion and expo	sure				
	tion Conoral accurational	hygiono mogeuros aro roc	uired to ensure a safe har	adling of the substance			

Avoid inhalation or ingestion. General occupational hygiene measures are required to ensure a safe handling of the substance. These measures involve good personal and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating and smoking at the workplace, the wearing of standard working clothes and shoes unless otherwise stated below. Shower and change clothes at end of work shift. Do not wear contaminated clothing at home. Do not blow dust off with compressed air.

Conditions and measur	Conditions and measures related to personal protection, hygiene and health evaluation					
PROC	Specification of respiratory protective equipment (RPE)	RPE efficiency (assigned protection factor, APF)	Specification of gloves	Further personal protective equipment (PPE)		
PROC 9, 26	FFP1 mask	APF=4		Eye protection equipment (e.g. goggles		
PROC 11, 17, 18, 19	FFP3 mask	APF=20	Since calcium	or visors) must be worn, unless		
PROC 25	FFP2 mask	APF=10	magnesium carbonate oxide is classified as	potential contact with the eye can be		
All other applicable PROCs	FFP2 mask	APF=10	irritating to skin, the use of protective gloves is mandatory for all process steps.	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.		



Any RPE as defined above shall only be worn if the following principles are implemented in parallel: The duration of work (compare with "duration of exposure" above) should reflect the additional physiological stress for the worker due to the breathing resistance and mass of the RPE itself, due to the increased thermal stress by enclosing the head. In addition, it shall be considered that the worker's capability of using tools and of communicating are reduced during the wearing of RPE. For reasons as given above, the worker should therefore be (i) healthy (especially in view of medical problems that may affect the use of RPE), (ii) have suitable facial characteristics reducing leakages between face and mask (in view of scars and facial hair). The recommended devices above which rely on a tight face seal will not provide the required protection unless they fit the contours of the face properly and securely. The employer and self-employed persons have legal responsibilities for the maintenance and issue of respiratory protective devices and the management of their correct use in the workplace. Therefore, they should define and document a suitable policy for a respiratory protective device programme including training of the workers. An overview of the APFs of different RPE (according to BS EN 529:2005) can be found in the glossary of MEASE. 2.2 Control of environmental exposure – only relevant for agricultural soil protection **Product characteristics** Drift: 1% (very worst-case estimate based on data from dust measurements in air as a function of the distance from application) Quantity of dust per m3 (in mq) 120 Wind speed: - 3.5 m/s 100 - 6 m/s 80 3.5 m/s 60 40 20 0 3 7 11 15 20 Distance from the spreader(in m) (Figure taken from: Laudet, A. et al., 1999) **Amounts used** CaCO3.MgO 2,149 kg/ha Frequency and duration of use 1 day/year (one application per year). Multiple applications during the year are allowed, provided the total yearly amount of 2,149 kg/ha is not exceeded (CaCO3.MgO) Environment factors not influenced by risk management Volume of surface water: 300 L/m2 Field surface area: 1 ha Other given operational conditions affecting environmental exposure Outdoor use of products Soil mixing depth: 20 cm Technical conditions and measures at process level (source) to prevent release

There are no direct releases to adjacent surface waters.

Technical conditions and measures to reduce or limit discharges, air emissions and releases to soil

Drift should be minimised.

Organizational measures to prevent/limit release from site



In line with the requirements for good agricultural practice, agricultural soil should be analysed prior to application of lime and the application rate should be adjusted according to the results of the analysis. 2.2 Control of environmental exposure – only relevant for urban soil treatment **Product characteristics** based on Drift: 1% (very worst-case estimate data from dust measurements in air as a function of Quantity of dust the distance from application) per m3 (in mg) Wind speed: 120 👕 - 3.5 m/s 100 • - 6 m/s 80 3.5 m/s 60 40 20 7 11 15 20 3 Distance from the spreader(in m) (Figure taken from: Laudet, A. et al., 1999) Amounts used CaCO3.MgO 228,115 kg/ha Frequency and duration of use 1 day/year and only once in a lifetime. Multiple applications during the year are allowed, provided the total yearly amount of 228,115 kg/ha is not exceeded (CaCO3.MgO) Environment factors not influenced by risk management Field surface area: 1 ha Other given operational conditions affecting environmental exposure Outdoor use of products Soil mixing depth: 20 cm Technical conditions and measures at process level (source) to prevent release Lime is only applied onto the soil in the technosphere zone before road construction. There are no direct releases to adjacent surface waters. Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Drift should be minimised.

3. Exposure estimation and reference to its source

Occupational exposure

The exposure estimation tool MEASE was used for the assessment of inhalation exposure. The risk characterisation ratio (RCR) is the quotient of the refined exposure estimate and the respective DNEL (derived no-effect level) and has to be below 1 to demonstrate a safe use. For inhalation exposure, the RCR is based on the DNEL for calcium magnesium carbonate oxide of 1 mg/m³ (as respirable dust) and the respective inhalation exposure estimate derived using MEASE (as inhalable dust). Thus, the RCR includes an additional safety margin since the respirable fraction being a sub-fraction of the inhalable fraction according to EN 481.



PROC	Method used for inhalation exposure assessment	Inhalation exposure estimate (RCR)	Method used for dermal exposure assessment	Dermal exposure estimate (RCR)
PROC 2, 3, 4, 5, 8a, 8b, 9, 10, 11, 13, 15, 16, 17, 18, 19, 25, 26	MEASE	<1 mg/m³ (0.5 – 0.825)	classified as irritating to has to be minimised as f A DNEL for dermal effec Thus, dermal exposure	ium carbonate oxide is o skin, dermal exposure ar as technically feasible. ts has not been derived. a is not assessed in this scenario.
Environmental exposur	e for agricultural soil pro	otection		
The PEC calculation for soil and surface water was based on the FOCUS soil group (FOCUS, 1996) and on the "draft guidane on the calculation of predicted environmental concentration values (PEC) of plant protection products for soil, ground water, surface water and sediment (Kloskowksi et al., 1999). The FOCUS/EXPOSIT modelling tool is preferred to the EUSES as it is more appropriate for agricultural-like application as in this case where parameter as the drift needs to be included in the modelling. FOCUS is a model typically developed for biocidal applications and was further elaborated on the basis of the German EXPOSIT 1.0 model, where parameters such as drifts can be improved according to collected data: once applied on soil, calcium magnesium carbonate oxide can indeed migrate then towards surface waters, via drift. Environmental See amounts used				
emissions				
Exposure concentration in waste water treatment plant (WWTP)	Not relevant for agricultur	al soil protection		
Exposure	Substance	PEC (ug/L)	PNEC (ug/L)	RCR
concentration in aquatic pelagic compartment	CaCO3.MgO	7.16	470	0.015
Exposure concentration in sediments	waters the hydroxide ions reacting with Ca2+. The c	exposure of surface water is s react with HCO3- to form calcium carbonate precipita ility and a constituent of na	water and CO32 CO32- ates and deposits on the s	forms CaCO3 by
Exposure	Substance	PEC (mg/L)	PNEC (mg/L)	RCR
concentrations in soil and groundwater	CaCO3.MgO	632	1034	0.61
Exposure concentration in atmospheric compartment Exposure	below 10 ⁻⁵ Pa.	Calcium magnesium carb		
concentration relevant for the food chain (secondary poisoning)		because calcium can be c overed do not significantly ent.		
Environmental exposur	re for urban soil treatmer	nt		
The urban soil treatment scenario is based on a road border scenario. At the special road border technical meeting (Ispra, September 5, 2003), EU Member States and industry agreed on a definition for a "road technosphere". The road technosphere can be defined as "the engineered environment that carries the geotechnical functions of the road in connection with its structure, operation and maintenance including the installations to ensure road safety and manage run off. This technosphere, which includes the hard and soft shoulder at the edge of the carriageway, is vertically dictated by the groundwater watertable. The road authority has responsibility for this road technosphere including road safety, road support, prevention of pollution and water management". The road technosphere was therefore excluded as assessment endpoint for risk assessment for the purpose of the existing/new substances regulations. The target zone is the zone beyond the technosphere, to which the environmental risk assessment applies.				
The PEC calculation for soil was based on the FOCUS soil group (FOCUS, 1996) and on the "draft guidance on the calculation of predicted environmental concentration values (PEC) of plant protection products for soil, ground water, surface water and sediment (Kloskowksi et al., 1999). The FOCUS/EXPOSIT modelling tool is preferred to the EUSES as it is more appropriate for agricultural- like application as in this case where parameter as the drift needs to be included in the modelling. FOCUS is a model typically developed for biocidal applications and was further elaborated on the basis of the German EXPOSIT 1.0 model, where parameters such as drifts can be improved according to collected data.				rface water and sediment opropriate for agricultural- ICUS is a model typically
Environmental emissions	See amounts used			
Exposure concentration in waste water treatment plant (WWTP)	Not relevant for road boro	der scenario		



concentration in aquatic pelagic compartment	Not relevant for road border scenario				
Exposure concentration in sediments	Not relevant for road boro	ler scenario			
Exposure concentrations in soil	Substance	PEC (mg/L)	PNEC (mg/L)	RCR	
and groundwater	CaCO3.MgO	671	1034	0.65	
Exposure concentration in atmospheric compartment	This point is not relevant. below 10 ⁻⁵ Pa.	Calcium magnesium carb	onate oxide is not volatile.	The vapour pressures is	
Exposure concentration relevant for the food chain (secondary poisoning)		overed do not significantly	onsidered to be omniprese influence the distribution of		
Environmental exposur	re for other uses				
soil, wastewate Lime is specific the air compart Neutralisation/ 4. Guidance to DU	er or surface water cally used to release CO2- tment, where the lime prop pH-shift is the intended use to evaluate whether	free breathable air, upon i erties are exploited a and there are no additior he works inside th	are negligible and insuffici reaction with CO2. Such an al impacts beyond those d e boundaries set by	pplications only relates to esired. the ES	
The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below. If measured data are not available, the DU may make use of an appropriate scaling tool such as MEASE (<u>www.ebrc.de/mease.html</u>) to estimate the associated exposure. The dustiness of the substance used can be determined according to the MEASE glossary. For example, substances with a dustiness less than 2.5 % according to the Rotating Drum Method (RDM) are defined as "low dusty", substances with a dustiness less than 10 % (RDM) are defined as "medium dusty" and substances with a dustiness ≥10 % are defined as "high dusty".					
Important note: The DU h	g/m ³ (as respirable dunas to be aware of the fact n ³ . By demonstrating a saf	that apart from the long-te	erm DNEL given above, a D	NEL for acute effects	

ES number 9.10: Professional use of lime substances in soil treatment

Exposure Scenario Format (1) addressing uses carried out by workers

1. Title	
Free short title	Professional use of lime substances in soil treatment
Systematic title based	SU22
on use descriptor	(appropriate PROCs and ERCs are given in Section 2 below)
Processes, tasks and/or activities covered	Processes, tasks and/or activities covered are described in Section 2 below.
Assessment Method	The assessment of inhalation exposure is based on measured data and on the exposure estimation tool MEASE. The environmental assessment is based on FOCUS-Exposit.
2. Operational cond	ditions and risk management measures



Task/ERC	REACH d	lefinition	Involve	d tasks
Milling	PRC	PROC 5		
Loading of spreader	PROC 8b,	PROC 26	Preparation and use of calcium magnesiu carbonate oxide for soil treatment.	
Application to soil (spreading)	PRO	C 11	carbonate oxide	for soil treatment.
ERC2, ERC8a, ERC8b, ERC8c, ERC8d, ERC8e, ERC8f		or and outdoor use of processing aids in open ems	numerous cases of v agricultural, forestry, fish	bonate oxide is applied ir wide dispersive uses: and shrimps farming, soi onmental protection.
2.1 Control of work	kers exposure		L	·
Product characteristic				
reflected by an assignme ambient temperature the temperature based, takin	approach, the substance- ent of a so-called fugacity c fugacity is based on the du ng into account the process d on the level of abrasion in	lass in the MEASE tool. Fo ustiness of that substance temperature and the melt	or operations conducted w . Whereas in hot metal ope ing point of the substance	ith solid substances at erations, fugacity is
Task	Use in preparation	Content in preparation	Physical form	Emission potential
Milling	not res	tricted	solid/powder	high
Loading of spreader	not res	tricted	solid/powder	high
Application to soil (spreading)	not res	tricted	solid/powder	high
Amounts used			ł	ł
combination of the scale	dled per shift is not conside of operation (industrial vs. minant of the process intrir n of use/exposure	professional) and level of		
Task		Duration o	fexposure	
Milling		240 m	-	
Loading of spreader		240 m		
Application to soil (spreading)		480 minutes (not restricted)	
U	L uenced by risk managem	ent		
The shift breathing volum	ne during all process steps	reflected in the PROCs is	assumed to be 10 m ³ /shift	t (8 hours).
Other given operationa	I conditions affecting wo	rkers exposure		
Operational conditions (e assessment of the condu	e.g. process temperature an ucted processes.	nd process pressure) are r	not considered relevant for	occupational exposure
Technical conditions a	nd measures at process I	evel (source) to prevent	release	
Risk management measured in the processes	ures at the process level (e s.	.g. containment or segreg	ation of the emission sour	ce) are generally not
	nd measures to control d	ispersion from source to	owards the worker	
Task	Level of separation	Localised controls (LC)	Efficiency of LC	Further information
	Separation of workers	not required	na	-
Milling				
Milling Loading of spreader	is generally not required in the	not required	na	-
•	is generally not	not required Cabin with filtered air supply	na 99%	-



Avoid inhalation or ingestion. General occupational hygiene measures are required to ensure a safe handling of the substance. These measures involve good personal and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating and smoking at the workplace, the wearing of standard working clothes and shoes unless otherwise stated below. Shower and change clothes at end of work shift. Do not wear contaminated clothing at home. Do not blow dust off with compressed air.

Conditions and measures related to personal protection, hygiene and health evaluation RPE efficiency Specification of Specification of gloves Further personal Task respiratory protective (assigned protection protective equipment equipment (RPE) factor, APF) (PPE) Eye protection equipment (e.g. goggles Milling FFP3 mask APF=20 or visors) must be worn, unless Since calcium potential contact with magnesium carbonate the eye can be oxide is classified as FFP3 mask APF=20 excluded by the nature Loading of spreader irritating to skin, the use and type of application of protective gloves is (i.e. closed process). mandatory for all Additionally, face process steps. protection, protective Application to soil clothing and safety not required na (spreading) shoes are required to be worn as appropriate.

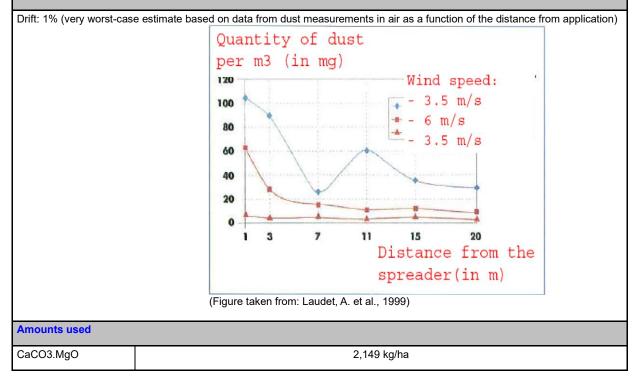
Any RPE as defined above shall only be worn if the following principles are implemented in parallel: The duration of work (compare with "duration of exposure" above) should reflect the additional physiological stress for the worker due to the breathing resistance and mass of the RPE itself, due to the increased thermal stress by enclosing the head. In addition, it shall be considered that the worker's capability of using tools and of communicating are reduced during the wearing of RPE. For reasons as given above, the worker should therefore be (i) healthy (especially in view of medical problems that may affect the use of RPE), (ii) have suitable facial characteristics reducing leakages between face and mask (in view of scars and facial hair). The recommended devices above which rely on a tight face seal will not provide the required protection unless they fit the contours of the face properly and securely.

The employer and self-employed persons have legal responsibilities for the maintenance and issue of respiratory protective devices and the management of their correct use in the workplace. Therefore, they should define and document a suitable policy for a respiratory protective device programme including training of the workers.

An overview of the APFs of different RPE (according to BS EN 529:2005) can be found in the glossary of MEASE.

2.2 Control of environmental exposure – only relevant for agricultural soil protection

Product characteristics





Frequency and duration of use

1 day/year (one application per year) Multiple applications during the year are allowed, provided the total yearly amount of 2,149 kg/ha is not exceeded (CaCO3.MgO)

Environment factors not influenced by risk management

Volume of surface water: 300 L/m² Field

surface area: 1 ha

Other given operational conditions affecting environmental exposure

Outdoor use of products Soil

mixing depth: 20 cm

Technical conditions and measures at process level (source) to prevent release

There are no direct releases to adjacent surface waters.

Technical conditions and measures to reduce or limit discharges, air emissions and releases to soil

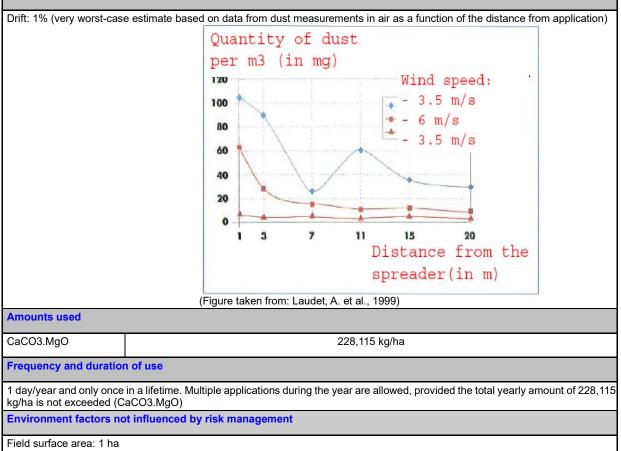
Drift should be minimised.

Organizational measures to prevent/limit release from site

In line with the requirements for good agricultural practice, agricultural soil should be analysed prior to application of lime and the application rate should be adjusted according to the results of the analysis.

2.2 Control of environmental exposure – only relevant for urban soil treatment

Product characteristics



Other given operational conditions affecting environmental exposure



Outdoor use of products Soil

mixing depth: 20 cm

Technical conditions and measures at process level (source) to prevent release

Lime is only applied onto the soil in the technosphere zone before road construction. There are no direct releases to adjacent surface waters.

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

Drift should be minimised.

3. Exposure estimation and reference to its source

Occupational exposure

Measured data and modelled exposure estimates (MEASE) were used for the assessment of inhalation exposure. The risk characterisation ratio (RCR) is the quotient of the refined exposure estimate and the respective DNEL (derived no-effect level) and has to be below 1 to demonstrate a safe use. For inhalation exposure, the RCR is based on the DNEL for calcium magnesium carbonate oxide of 1 mg/m³ (as respirable dust).

Task	Method used for inhalation exposure assessment	Inhalation exposure estimate (RCR)	Method used for dermal exposure assessment	Dermal exposure estimate (RCR)
Milling	MEASE	0.488 mg/m ³ (0.48)	Since calcium magnesium carbonate oxide i	
Loading of spreader	MEASE (PROC 8b)	0.488 mg/m³ (0.48)	has to be minimised as f	ar as technically feasible.
Application to soil (spreading)	measured data	0.880 mg/m³ (0.88)	Thus, dermal exposure	e is not assessed in this e scenario.

Environmental exposure for agricultural soil protection

The PEC calculation for soil and surface water was based on the FOCUS soil group (FOCUS, 1996) and on the "draft guidance on the calculation of predicted environmental concentration values (PEC) of plant protection products for soil, ground water, surface water and sediment (Kloskowksi et al., 1999). The FOCUS/EXPOSIT modelling tool is preferred to the EUSES as it is more appropriate for agricultural-like application as in this case where parameter as the drift needs to be included in the modelling. FOCUS is a model typically developed for biocidal applications and was further elaborated on the basis of the German EXPOSIT 1.0 model, where parameters such as drifts can be improved according to collected data: once applied on the soil, calcium magnesium carbonate oxide can indeed migrate then towards surface waters, via drift.

soil, calcium magnesium	carbonate oxide can indee	ed migrate then towards su	urface waters, via drift.		
Environmental emissions	See amounts used				
Exposure concentration in waste water treatment plant (WWTP)	Not relevant for agricultur	al soil protection			
Exposure	Substance	PEC (ug/L)	PNEC (ug/L)	RCR	
concentration in aquatic pelagic compartment	CaCO3.MgO	7.16	470	0.015	
Exposure concentration in sediments	waters the hydroxide ions reacting with Ca2+. The c	As described above, no exposure of surface water nor sediment to lime is expected. Further, in natural waters the hydroxide ions react with HCO3- to form water and CO32 CO32- forms CaCO3 by reacting with Ca2+. The calcium carbonate precipitates and deposits on the sediment. Calcium carbonate is of low solubility and a constituent of natural soils.			
Exposure	Substance	PEC (mg/L)	PNEC (mg/L)	RCR	
concentrations in soil and groundwater	CaCO3.MgO	632	1034	0.61	
Exposure concentration in atmospheric compartment	This point is not relevant. Calcium magnesium carbonate oxide is not volatile. The vapour pressures is below 10 ⁻⁵ Pa.				
Exposure concentration relevant for the food chain (secondary poisoning)	The point is not for and	overed do not significantly	onsidered to be omniprese influence the distribution of		
Environmental exposur	e for urban soil treatmer	nt			



The urban soil treatment scenario is based on a road border scenario. At the special road border technical meeting (Ispra, September 5, 2003), EU Member States and industry agreed on a definition for a "road technosphere". The road technosphere can be defined as "the engineered environment that carries the geotechnical functions of the road in connection with its structure, operation and maintenance including the installations to ensure road safety and manage run off. This technosphere, which includes the hard and soft shoulder at the edge of the carriageway, is vertically dictated by the groundwater watertable. The road authority has responsibility for this road technosphere including road safety, road support, prevention of pollution and water management". The road technosphere was therefore excluded as assessment endpoint for risk assessment for the purpose of the existing/new substances regulations. The target zone is the zone beyond the technosphere, to which the environmental risk assessment applies.

The PEC calculation for soil was based on the FOCUS soil group (FOCUS, 1996) and on the "draft guidance on the calculation of predicted environmental concentration values (PEC) of plant protection products for soil, ground water, surface water and sediment (Kloskowksi et al., 1999). The FOCUS/EXPOSIT modelling tool is preferred to the EUSES as it is more appropriate for agricultural-like application as in this case where parameter as the drift needs to be included in the modelling.FOCUS is a model typically developed for biocidal applications and was further elaborated on the basis of the German EXPOSIT 1.0 model, where parameters such as drifts can be improved according to collected data.

parameters such as units	s can be improved accordin	ly to conceted data.		
Environmental	See amounts used			
emissions				
Exposure	Not relevant for road bord	ler scenario		
concentration in waste water treatment plant (WWTP)				
Exposure concentration in aquatic pelagic compartment	Not relevant for road bord	der scenario		
Exposure concentration in sediments	Not relevant for road bord	der scenario		
Exposure concentrations in soil	Substance	PEC (mg/L)	PNEC (mg/L)	RCR
and groundwater	CaCO3.MgO	671	1034	0.65
Exposure concentration in atmospheric compartment	This point is not relevant. Calcium magnesium carbonate oxide is not volatile. The vapour pressures is below 10 ⁻⁵ Pa.			
Exposure concentration relevant for the food chain (secondary poisoning)	This point is not relevant because calcium can be considered to be omnipresent and essential in the environment. The uses covered do not significantly influence the distribution of the constituents (Ca ²⁺ and OH ⁻) in the environment.			
Environmental exposur	re for other uses			

For all other uses, no quantitative environmental exposure assessment is carried because

The operational conditions and risk management measures are less stringent than those outlined for agricultural soil protection or urban soil treatment

 Lime is an ingredient and chemically bound into a matrix. Releases are negligible and insufficient to cause a pH-shift in soil, wastewater or surface water

 Lime is specifically used to release CO2-free breathable air, upon reaction with CO2. Such applications only relates to the air compartment, where the lime properties are exploited

Neutralisation/pH-shift is the intended use and there are no additional impacts beyond those desired.

4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES



The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below. If measured data are not available, the DU may make use of an appropriate scaling tool such as MEASE (www.ebrc.de/mease.html) to estimate the associated exposure. The dustiness of the substance used can be determined

according to the MEASE glossary. For example, substances with a dustiness less than 2.5 % according to the Rotating Drum Method (RDM) are defined as "low dusty", substances with a dustiness less than 10 % (RDM) are defined as "medium dusty" and substances with a dustiness ≥10 % are defined as "high dusty".

DNEL_{inhalation}: 1 mg/m³ (as respirable dust)

Important note: The DU has to be aware of the fact that apart from the long-term DNEL given above, a DNEL for acute effects exists at a level of 4 mg/m³. By demonstrating a safe use when comparing exposure estimates with the long-term DNEL, the acute DNEL is therefore also covered (according to R.14 guidance, acute exposure levels can be derived by multiplying longterm exposure estimates by a factor of 2). When using MEASE for the derivation of exposure estimates, it is noted that the exposure duration should only be reduced to half-shift as a risk management measure (leading to an exposure reduction of 40 %).

ES number 9.11: Professional uses of articles/containers containing lime substances

Exposure Scenario Format (1) addressing uses carried out by workers

<u> </u>					
1. Title					
Free short title	Professional uses of articles/containers containing lime substances				
Systematic title based on use descriptor	SU22, SU1, SU5, SU6a, SU6b, SU7, SU10, SU11, SU12, SU13, SU16, SU17, SU18, SU19, SU20, SU23, SU24 AC1, AC2, AC3, AC4, AC5, AC6, AC7, AC8, AC10, AC11, AC13 (appropriate PROCs and ERCs are given in Section 2 below)				
Processes, tasks and/or activities covered	Processes,	tasks and/or activities cove	ered are described in Sec	tion 2 below.	
Assessment Method	The assessment of	f inhalation exposure is bas	sed on the exposure estin	nation tool MEASE.	
2. Operational con	ditions and risk mar	nagement measures	;		
PROC/ERC	REACH o	definition	Involve	ed tasks	
PROC 0	(PROC 21 (low emissio	process on potential) as proxy for estimation)	carbonate oxide/prepara	ining calcium magnesium ations as CO₂ absorbents ng apparatus)	
PROC 21		n of substances bound in nd/or articles	Handling of substances bound in materials and/ articles		
PROC 24		cal) energy work-up of substances Grinding, mechanical cutting n materials and/or articles			
PROC 25	Other hot work ope	erations with metals	Welding,	soldering	
ERC10, ERC11, ERC 12	Wide dispersive indoor and outdoor use of longlife articles and materials with low release Calcium magnesium carbonate oxide bound into or onto articles and materials such as: wooden and plastic construction and building materials (e.g. gutters, drains), flooring, furniture, toys, leather products, paper and cardboard products (magazines, books, news paper and packaging paper), electronic equipment (casing)				
2.1 Control of work	kers exposure				
Product characteristic					
reflected by an assignme ambient temperature the temperature based, takin	approach, the substance- nt of a so-called fugacity c fugacity is based on the d g into account the process l on the level of abrasion ir	lass in the MEASE tool. For ustiness of that substance. temperature and the melt	or operations conducted w . Whereas in hot metal op ing point of the substance	vith solid substances at erations, fugacity is	
			Physical form		



PROC 0	not restricted	massive objects (pellets), low potential for dust formation due to abrasion during previous filling and handling activities of pellets, not during use of breathing apparatus	exposure is assumed during the use of the breathing apparatus due to the very low abrasive potential)		
PROC 21	not restricted	massive objects	very low		
PROC 24, 25	not restricted	massive objects	high		
Amounts used					
combination of the scale	lled per shift is not considered to influence the expos of operation (industrial vs. professional) and level of minant of the process intrinsic emission potential.				

Frequency and duration of use/exposure PROC **Duration of exposure** 480 minutes (not restricted as far as occupational exposure to calcium magnesium carbonate oxide is concerned, PROC 0 the actual wearing duration may be restricted due the user instructions of the actual breathing apparatus) PROC 21 480 minutes (not restricted) PROC 24, 25 ≤ 240 minutes Human factors not influenced by risk management The shift breathing volume during all process steps reflected in the PROCs is assumed to be 10 m³/shift (8 hours). Other given operational conditions affecting workers exposure Operational conditions like process temperature and process pressure are not considered relevant for occupational exposure assessment of the conducted processes. In process steps with considerably high temperatures (i.e. PROC 22, 23, 25), the exposure assessment in MEASE is however based on the ratio of process temperature and melting point. As the associated temperatures are expected to vary within the industry the highest ratio was taken as a worst case assumption for the exposure estimation. Thus all process temperatures are automatically covered in this exposure scenario for PROC 22, 23 and PROC 25. Technical conditions and measures at process level (source) to prevent release Risk management measures at the process level (e.g. containment or segregation of the emission source) are generally not required in the processes. Technical conditions and measures to control dispersion from source towards the worker PROC Localised controls Efficiency of LC Level of separation Further information (according to MEASE) (LC) Any potentially required separation of workers PROC 0 not required na from the emission source is indicated above under PROC 21 "Frequency and not required na duration of exposure". A reduction of exposure duration can be achieved, for example, by the installation of ventilated (positive PROC 24, 25 pressure) control rooms not required na or by removing the worker from workplaces involved with relevant exposure. Organisational measures to prevent /limit releases, dispersion and exposure



Avoid inhalation or ingestion. General occupational hygiene measures are required to ensure a safe handling of the substance. These measures involve good personal and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating and smoking at the workplace, the wearing of standard working clothes and shoes unless otherwise stated below. Shower and change clothes at end of work shift. Do not wear contaminated clothing at home. Do not blow dust off with compressed air.

Conditions and measur	es related to personal p	rotection, hygiene and h	ealth evaluation								
PROC	Specification of respiratory protective equipment (RPE)RPE efficiency (assigned protection factor, APF)Specification of gloves protective of (PP)Further p protective of (PP)										
PROC 0, 21	not required	na		Eye protection equipment (e.g. goggles or visors) must be worn,							
PROC 24, 25	FFP1 mask	APF=4	Since calcium magnesium carbonate oxide is considered as irritating to skin, the use of protective gloves is mandatory for all process steps.	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.							
resistance and mass of the considered that the work For reasons as given about the use of RPE), (ii) have hair). The recommended contours of the face prop The employer and self-er devices and the manager for a respiratory protectiv	Any RPE as defined above shall only be worn if the following principles are implemented in parallel: The duration of work (compare with "duration of exposure" above) should reflect the additional physiological stress for the worker due to the breathing resistance and mass of the RPE itself, due to the increased thermal stress by enclosing the head. In addition, it shall be considered that the worker's capability of using tools and of communicating are reduced during the wearing of RPE. For reasons as given above, the worker should therefore be (i) healthy (especially in view of medical problems that may affect the use of RPE), (ii) have suitable facial characteristics reducing leakages between face and mask (in view of scars and facial hair). The recommended devices above which rely on a tight face seal will not provide the required protection unless they fit the contours of the face properly and securely. The employer and self-employed persons have legal responsibilities for the maintenance and issue of respiratory protective devices and the management of their correct use in the workplace. Therefore, they should define and document a suitable policy for a respiratory protective device programme including training of the workers.										
	of different RPE (accordin ronmental exposure		be found in the glossary o	of MEASE.							
Product characteristics	<u> </u>										
-	l into/onto a matrix with ve										
3. Exposure estima	ation and reference	to its source									
Occupational exposure	l.										
is the quotient of the refir demonstrate a safe use. mg/m ³ (as respirable dus	tool MEASE was used for ned exposure estimate and For inhalation exposure, th t) and the respective inhal nal safety margin since the	I the respective DNEL (der ne RCR is based on the Di ation exposure estimate de	ived no-effect level) and h NEL for calcium magnesiu erived using MEASE (as ir	as to be below 1 to m carbonate oxide of 1 halable dust). Thus, the							
PROC	Method used for inhalation exposure assessment	Inhalation exposure estimate (RCR)	Method used for dermal exposure assessment	Dermal exposure estimate (RCR)							
PROC 0	MEASE (PROC 21)	0.5 mg/m³ (0.5)		sium carbonate oxide is							
PROC 21	MEASE	0.05 mg/m³ (0.05)	has to be minimised as f	to skin, dermal exposure ar as technically feasible.							
PROC 24	MEASE	0.825 mg/m³ (0.825)		e is not assessed in this							
PROC 25	MEASE	0.6 mg/m³ (0.6)	exposure	e scenario.							
Environmental exposur	'e		· · · · · · · · · · · · · · · · · · ·								
	d is chemically bound into f use. Releases are negligi										
	to evaluate whether										



The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below. If measured data are not available, the DU may make use of an appropriate scaling tool such as MEASE (www.ebrc.de/mease.html) to estimate the associated exposure. The dustiness of the substance used can be determined according to the MEASE glossary. For example, substances with a dustiness less than 2.5 % according to the Rotating Drum Method (RDM) are defined as "low dusty", substances with a dustiness less than 10 % (RDM) are defined as "medium dusty" and substances with a dustiness ≥10 % are defined as "high dusty". DNELinhalation: 1 mg/m³ (as respirable dust) Important note: The DU has to be aware of the fact that apart from the long-term DNEL given above, a DNEL for acute effects exists at a level of 4 mg/m³. By demonstrating a safe use when comparing exposure estimates with the long-term DNEL, the acute DNEL is therefore also covered (according to R.14 guidance, acute exposure levels can be derived by multiplying longterm exposure estimates by a factor of 2). When using MEASE for the derivation of exposure estimates, it is noted that the exposure duration should only be reduced to half-shift as a risk management measure (leading to an exposure reduction of 40 %).

ES number 9.12: Consumer use of building and construction material (DIY – do it yourself)

Exposure Scenario F	ormat	(2) addr	ressing	uses carried out by	consume	ers		
1. Title								
Free short title				Consumer use of build				
Systematic title based of			r	SU21, PC9a, PC9b, El				
Processes, tasks activ	ities co	vered		Handling (mixing and find find the second se		wder formulations	Application	
							ral and dermal exposure	
Assessment Method*				as well as exposure to assessed by the Dutch Environment:	model (va	n Hemmen, 1992		
				A qualitative justificatio		ent is provided.		
2. Operational con								
RMM				ated risk management m				
PC/ERC				ctivity referring to articl	e categori	es (AC) and envi	ronmental release	
		categorie						
PC 9a, 9b			n of lime	g of powder containing li e plaster, putty or slurry to exposure				
				ndoor use resulting in inc	lusion into	or onto a matrix		
		Wide disp	ersive o	utdoor use of processing	aids in op	en systems		
ERC 8c, 8d, 8e, 8f		Wide disp	ersive o	utdoor use of reactive su	, ibstances i	n open systems		
				utdoor use resulting in in				
2.1 Control of cons	sumer	s expos	sure					
Product characteristic								
Description of the	Conce	entration	of the	Physical state of the	Dustine	ss (if relevant)	Packaging design	
preparation	substa prepa	ance in th ration	ie	preparation				
Lime substance	100 %			Solid, powder		edium and low,	Bulk in bags of up to 35	
Plaster, Mortar	20-40%			Solid, powder	depending on the kind of lime substance (indicative value from DIY ¹ fact sheet see section 9.0.3)		kg.	
Plaster, Mortar	20-409	%		Pasty	-		-	
Putty, filler	30-559	%		Pasty, highly viscous, thick liquid	-		In tubes or buckets	
Pre-mixed lime wash paint	~30%			Solid, powder	(indicativ DIY ¹ fact	High - low (indicative value from DIY ¹ fact sheet see section 9.0.3)		
Lime wash paint/milk	~ 30 %	, 0		Milk of lime	-		-	
of lime preparation				preparation	L			
Amounts used								
Description of the preparation			•	per event				
Filler, putty		Difficult		wder (2:1 powder water) mine, because the amount is heavily dependent on the depth and size of the d				
Plaster/lime wash paint				uning on the size of the room, wall to be treated.				
Floor/wall equalizer				ing on the size of the roo				
Frequency and duration	n of use			-				
Description of task				on of exposure per eve	nt	frequency of e	vents	
Mixing and loading of lim powder.	e conta	ining	1.33 m	in (DIY ¹ -fact sheet, RIVN er 2.4.2 Mixing and loadir	Л,	2/year (DIY ¹ fac	•	
Application of lime plaste to the walls or ceiling	er, putty	or slurry	Severa	al minutes - hours		2/year (DIY ¹ fac	t sheet)	
	ionood	by risk m	anagen	nent				
	Human factors not influenced by risk managem Description of the task Population exposed				Exposed body part Corresponding skir area [cm ²]			
Human factors not influ				Breathing rate	Expose	d body part	Corresponding skin area [cm ²] 430 (DIY ¹ fact sheet)	



Application of liquid,									
pasty lime preparations.	Adult	NR			Hands and forearms		1900 (DIY ¹ fact sheet)		
Other given operation	nal conditio	ns affecting c	onsumers expo	sure					
Description of the tas	k	Indoor/outdo	or	Room	volume	Air	exchange rate		
Handling of powder	Handling of powder indoor 1 m ³ (personal space, small 0.6 hr ⁻¹ (unspectation area around the user)								
Application of liquid, pa preparations.	Application of liquid, pasty lime indoor NR NR								
Conditions and meas	ures relate	d to informatio	n and behaviou	ral advid	ce to consumers				
In order to avoid health workplaces:	damage DI	Yers should cor	nply with the sar	ne strict	protective measures wh	hich a	pply to professional		
 Protect unco used in acco the work and 	vered areas rdance with apply a car	a skin protectio e product.	egs, face): there n plan (skin prot	ection, cl			products which should be the skin thoroughly after		
Conditions and meas									
 In order to avoid health damage DIYers should comply with the same strict protective measures which apply to professional workplaces: When preparing or mixing building materials, during demolition or caulking and, above all, during overhead work, wear protective goggles as well as face masks during dusty work. Choose work gloves carefully. Leather gloves become wet and can facilitate burns. When working in a wet environment, cotton gloves with plastic covering (nitrile) are better. Wear gauntlet gloves during overhead work because they can considerably reduce the amount of humidity which permeates the working clothes. 									
2.2 Control of env	<mark>/ironme</mark> n	tal exposur	e						
Product characteristic									
Not relevant for exposu	ire assessm	ent							
Amounts used*									
Not relevant for exposu		ent							
Frequency and durati									
Not relevant for exposu			nagoment						
Environment factors Default river flow and d		ed by risk ma	nagement						
Other given operation		ns affecting er	vironmental ex	nosure					
Indoor		ine allocally of		poouro					
Direct discharge to the	wastewater	is avoided.							
Conditions and meas									
Default size of municip	al sewage s	ystem/treatmen	t plant and sludg	je treatm	ent technique				
Conditions and meas			reatment of was	ste for di	sposal				
Not relevant for exposu									
Conditions and meas	ures relate	d to external r	ecovery of was	te					
Not relevant for exposu									
3. Exposure estin	nation an	d reference	to its sourc	e					
level) and is given in pa mg/m ³ (as respirable d additional safety margi Since limes are classifi exposure to the eye.	arentheses b ust) and the n since the r	pelow. For inhal respective inha respirable fraction	ation exposure, f lation exposure on is a sub-fracti	the RCR estimate on of the	is based on the acute I (as inhalable dust). The inhalable fraction acco	DNEL us, th ording	to EN 481.		
Human exposure									
Handling of powder Route of exposure	Exposure e	etimato	Math	od ucco	L commonte				
Oral		รรแทเลเซ			I, comments sessment				
	-					rt of th	ne intended product use.		
	small task: task: 1 μg/c	0.1 μg/cm² (-) la m² (-)	arge Qual If risk expo loadi be ex This prom The rate	itative as c reductions sure is e ng of lim coluded i may occo pt rinsing constant to dust for	sessment on measures are taken xpected. However, derr e substances or direct of f no protective gloves a asionally result in mild i g with water. Quantitativ rate model of ConsExp	into a mal co conta are wo irritati ve ass bo has wder	account no human ontact to dust from ct to the lime cannot orn during application. on easily avoided by sessment s been used. The contact has been taken from the		



Eye	Dust	Qualitative assessment If risk reduction measures are taken into account no human exposure is expected. Dust from loading of the lime substances cannot be excluded if no protective goggles are used. Prompt rinsing with water and seeking medical advice after accidental exposure is advisable.
Inhalation	Small task: 12 µg/m³ (0.003) Large task: 120 µg/m³ (0.03)	Quantitative assessment Dust formation while pouring the powder is addressed by using the dutch model (van Hemmen, 1992, as described in section 9.0.3.1 above).
Application of liquid	l, pasty lime preparations.	
Route of exposure	Exposure estimate	Method used, comments
Oral	-	Qualitative assessment Oral exposure does not occur as part of the intended product use.
Dermal	Splashes	Qualitative assessment If risk reduction measures are taken into account no human exposure is expected. However, splashes on the skin cannot be excluded if no protective gloves are worn during the application. Splashes may occasionally result in mild irritation easily avoided by immediate rinsing of the hands with water.
Eye	Splashes	Qualitative assessment If appropriate goggles are worn no exposure to the eyes needs to be expected. However, splashes into the eyes cannot be excluded if no protective goggles are worn during the application of liquid or pasty lime preparations, especially during overhead work. Prompt rinsing with water and seeking medical advice after accidental exposure is advisable.
Inhalation	-	Qualitative assessment Not expected, as the vapour pressure of limes in water is low and generation of mists or aerosols does not take place.
Post-application exp	oosure	
No relevant exposure dioxide from the atmo		preparation will quickly convert to calcium carbonate with carbon
Environmental expo	sure	
Referring to the OC/F pH of the influent of a activity. The influent of beneficially for pH con municipal treatment p	MMs related to the environment to avo municipal wastewater treatment plant f a municipal wastewater treatment pla ntrol of acid wastewater streams that a	bid discharging lime solutions directly into municipal wastewater, the is circum-neutral and therefore, there is no exposure to the biological ant is often neutralized anyway and lime may even be used re treated in biological WWTPs. Since the pH of the influent of the negligible on the receiving environmental compartments, such as



ES number 9.13: Consumer use of CO2 absorbent in breathing apparatuses

Exposure Scenario Format (2) addressing uses carried out by consumers										
	-orma	it (2) addr	essing	uses carried out by	consume	ers				
1. Title										
Free short title				Consumer use of CO ₂ a	absorbent i	in breathing appar	ratuses			
Systematic title based	on use	e descripto	r	SU21, PC2, ERC8b						
Processes, tasks activ				Filling of the formulation Use of closed circuit bre of equipment			ng			
Assessment Method*			The inhalation exposure Hemmen, 1992). Environment	e has beer	assessed by the	ral and dermal exposure. Dutch model (van				
A qualitative justification assessment is provided. 2. Operational conditions and risk management measures										
RMM The soda lime is available in granular form. Furthermore, a defined amount of water (14-18%)										
		added wh	ich will f	urther reduce the dustine	ss of the a	bsorbent. During	the breathing cycle			
PC/ERC			on of ac	tivity referring to article						
PC 2	PC 2 Use of closed circ CO ₂ absorbent. Th (catalysed by wate The CO ₂ -free air c				nrough the with the c after addi	absorbent and C alcium dihydroxid tion of oxygen.	ntaining soda lime as O ₂ will quickly react e to form the carbonate. use and refilled before			
ERC 8b		each dive Wide disr		ndoor use resulting in incl	usion into	or onto a matrix				
2.1 Control of co	nsur									
Product characteristic										
Description of the	Cond	centration	of the	Physical state of the Dustines		ss (if relevant)	Packaging design			
preparation		tance in th aration	ie	preparation						
CO ₂ absorbent	appli comp differ spec	ending on th cation the n ponent has ent additive ific amount r is always	nain es. A of	(reduction compared Dust form ruled out		dustiness n by 10 % d to powder) nation cannot be during the filling rubber cartridge.	4.5, 18 kg canister			
"Used" CO ₂ absorbent	~ 209	/		Solid, granular	Very low dustiness (reduction by 10 % compared to powder)		1-3 kg in breathing apparatus			
Amounts used			_							
CO ₂ -Absorbent used in b		0 11		1-3 kg depending on the	e kind of b	reathing apparatu	S			
Frequency and duratio		se/exposur		-		1 -				
Description of the task Filling of the formulation cartridge		9		on of exposure per even 33 min per filling, in sum <		frequency of e	vents e (up to 4 times)			
Use of closed circuit brea	athing	apparatus	1-2 h			Up to 4 dives a	day			
Cleaning and emptying o	of eauir	oment	< 15 m	in		After each dive	(up to 4 times)			
Human factors not influ							<u> </u>			
Description of the task		lation exp		Breathing rate	Exposed	d body part	Corresponding skin area [cm²]			
Filling of the formulation into the cartridge	adult			1.25 m³/hr (light working activity)	hands		840 (REACH guidance R.15, men)			
Use of closed circuit breathing apparatus					-		-			
Cleaning and emptying of equipment					hands		840 (REACH guidance R.15, men)			
Other given operationa	l cond	litions affe	cting co	onsumers exposure						



Description of the ta	ask	Indoor/outdoor	Room volume	Air exchange rate									
Filling of the formulat	ion into the	NR	NR	NR									
cartridge	carmoge												
Use of closed circuit	breathing	-	-	-									
apparatus		ND											
Cleaning and emptyir equipment	ng of	NR	NR	NR									
	Conditions and measures related to information and behavioural advice to consumers												
Do not get in eyes, on skin, or on clothing. Do not breathe dust													
Keep container tightly closed as to avoid the soda lime to dry out.													
Keep out of reach of children.													
Wash thoroughly after handling. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.													
Do not mix with acids.													
Carefully read the instructions of the breathing apparatus to assure a proper use of the breathing apparatus.													
		d to personal protection											
	, goggles and	protective clothes during	handling. Use a filtering half mas	sk (mask type FFP2 acc. to EN									
149).													
		ental exposure											
Product characteris	tics												
Not relevant for expo	sure assessm	nent											
Amounts used*													
Not relevant for expos		nent											
Frequency and dura													
Not relevant for expo													
Default river flow and		ced by risk management											
		ons affecting environmen	tal exposure										
Indoor		ins anceany environmen											
	sures relate	d to municipal sewage tr	eatment plant										
			I sludge treatment technique										
Conditions and mea	sures relate	d to external treatment of	of waste for disposal										
Not relevant for expo													
		d to external recovery o	f waste										
Not relevant for expos													
		and reference to i											
				respective DNEL (derived no-effect									
level) and is given in	parentheses l	pelow. For inhalation expo	sure, the RCR is based on the a osure estimate (as inhalable dus	cute DNEL for lime substances of 4									
			-fraction of the inhalable fraction										
			eyes a qualitative assessment h	has been performed for dermal									
exposure and exposu			hair awn CO comultar 1 thar t	o occurred that instructions will be									
taken into account to		, e	Then own OO_2 scrubber) it can be	e assumed that instructions will be									
Human exposure													
Filling of the formul	ation into the	e cartridge											
Route of exposure	Exposure		Method used, comments										
Oral	-		Qualitative assessment										
Damaal				as part of the intended product use.									
Dermal	-		Qualitative assessment If risk reduction measures are	taken into account no human									
			exposure is expected. Howeve										
			loading of granular soda lime c	r direct contact to the granules									
			cannot be excluded if no protection	0									
			avoided by prompt rinsing with	ally result in mild irritation easily water									
Eye	Dust		Qualitative assessment										
			If risk reduction measures are										
				m loading of the granular soda lime									
				efore eye exposure will be minimal s. Nevertheless, prompt rinsing with									
				vice after accidental exposure is									
			advisable.										



Inhalation	Small task: 1.2 μg/m³ (3 × 10 ⁻⁴) Large task: 12 μg/m³ (0.003)	Quantitative assessment Dust formation while pouring the powder is addressed by using the
		dutch model (van Hemmen, 1992, as described in section 9.0.3.1 above) and applying a dust reduction factor of 10 for the granular form.
Use of closed circu	it breathing apparatus	
Route of exposure	Exposure estimate	Method used, comments
Oral	-	Qualitative assessment Oral exposure does not occur as part of the intended product use.
Dermal	-	Qualitative assessment Due to the product characteristics, it can be concluded that dermal exposure to the absorbent in breathing apparatuses is nonexistent.
Eye	-	Qualitative assessment Due to the product characteristics, it can be concluded that eye exposure to the absorbent in breathing apparatuses is nonexistent.
Inhalation	negligible	Qualitative assessment Instructional advice is provided to remove any dust before finishing the assembly of the scrubber. Divers filling their own CO ₂ scrubber represent a specific subpopulation within consumers. Proper use of equipment and materials is in their own interest; hence it can be assumed that instructions will be taken into account. Due to the product characteristics and the instructional advices given, it can be concluded that inhalation exposure to the absorbent during the use of the breathing apparatus is negligible.
Cleaning and empty		
Route of exposure	Exposure estimate	Method used, comments
Oral	-	Qualitative assessment Oral exposure does not occur as part of the intended product use.
Dermal	Dust and splashes	Qualitative assessment If risk reduction measures are taken into account no human exposure is expected. However, dermal contact to dust from emptying granular soda lime or direct contact to the granules cannot be excluded if no protective gloves are worn during cleaning. Furthermore, during the cleaning of the cartridge with water contact to moistened soda lime may occur. This may occasionally result in mild irritation easily avoided by immediate rinsing of with water.
Eye	Dust and splashes	Qualitative assessment If risk reduction measures are taken into account no human exposure is expected. However, contact to dust from emptying granular soda limes or during the cleaning of the cartridge with water contact to moisten soda limes may occur in very rare occasions. Prompt rinsing with water and seeking medical advice after accidental exposure is advisable.
Inhalation	Small task: 0.3 μg/m³ (7.5 × 10 ⁻⁵) Large task: 3 μg/m³ (7.5 × 10 ⁻⁴)	Quantitative assessment Dust formation while pouring the powder is addressed by using the Dutch model (van Hemmen, 1992, as described in section 9.0.3.1 above) and applying a dust reduction factor of 10 for the granular form and a factor of 4 to account for the reduced amount of lime in the "used" absorbent.
Environmental expo	osure	
The pH impact due to treatment plant is ofte that are treated in bio	o use of lime in breathing apparatuses en neutralized anyway and lime may e blogical WWTPs. Since the pH of the i	s is expected to be negligible. The influent of a municipal wastewater even be used beneficially for pH control of acid wastewater streams nfluent of the municipal treatment plant is circum neutral, the pH tments, such as surface water, sediment and terrestrial compartment.

ES number 9.14: Consumer use of garden lime/fertilizer

Exposure Scenario Format (2) addressing uses carried out by consumers								
1. Title								
Free short title	Consumer use of garden lime/fertilizer							
Systematic title based on use descriptor	SU21, PC20, PC12, ERC8e							
Processes, tasks activities covered	Manual application of garden lime, fertilizer Post-application							
	exposure							



Assessment Method*	A q as ass	well as for t	he expos le Dutch	sure to the model (va	eye. n Hei	The dua mmen, 1	st exp 1992	ral and dermal exposure posure has been). Environment		
2. Operational con	ditions	and risk	manag	gement n	neasur	es				
RMM							e in p	place.		
PC/ERC	No product integrated risk management measures are in place. Description of activity referring to article categories (AC) and environmental release categories (ERC)								ironmental release	
PC 20	ap	Surface spreading of the garden lime by shovel/hand (worst case) and soil incorporation. application exposure to playing children.							·	
PC 12	Surface spreading of the garden lime by shovel/ hand (worst case) and soil incorporation. application exposure to playing children. Wide dispersive outdoor use of reactive substances in open systems							d soil incorporation. Post-		
ERC 8e				or use of re	active su	ibstances i	n ope	en syste	ems	
2.1 Control of cons	sumers	exposur	e							
Product characteristic										
Description of the preparation		tration of th ice in the tion	-	ysical state eparation	e of the	Dustines	ss (if	relevar	nt)	Packaging design
Garden lime	100 %		So	llid, powder		High dus	ty			Bulk in bags or containers of 5, 10 and 25 kg
Fertilizer	Up to 20	%	So	olid, granular		Low dust	y			Bulk in bags or containers of 5, 10 and 25 kg
Amounts used										
Description of the prep	aration		Am	nount used	per eve	nt		Source	e of i	nformation
Garden lime			100	100g /m ² (up to 200g/m ²)			Information		ation	and direction of use
Fertilizer			100)g /m² (up to	o 1kg/m²	(compost))	Informa	ation	and direction of use
Frequency and duratio	n of use/e	exposure								
Description of the task		Du	iration o	of exposure	per eve	nt	free	quency	of e	vents
Manual application				es-hours ading on the size of the treated			1 ta	asks per	' yeai	r
Post-application		2 h ex	n (toddler posure fa	ddlers playing on grass (EPA ure factors handbook)		EPA	Rel	evant fo	or up	to 7 days after application
Human factors not influ						_				.
Description of the task	-	ion expose		Breathing rate		Exposed				Corresponding skin area [cm ²]
Manual application	Adult Child/To	ما ما ام سم	1.2 NF	25 m³/hr		Hands ar	nd to	rearms		1900 (DIY fact sheet)
Post-application				-		NR	_			NR
Other given operational Description of the task			g consi	umers expo		volumo		-	A :	ovehenge rete
Manual application		outdoor	luoor			ersonal sp		small	NR	exchange rate
Post-application		outdoor			NR	ound the user)		NR		
Conditions and measu	res relate		ation an	nd behavior		ce to cons	sume	ers		
Do not get in eyes, on sk Keep container closed a In case of contact with e Wash thoroughly after ha Do not mix with acids an Incorporation of the gard	kin, or on c nd out of r yes, rinse andling. d always a len lime or	clothing. Do reach of chil immediately add limes to r fertilizer int	not brea dren. y with ple water au to the soi	the dust. Us enty of wate nd not wate il with subse	e a filter and see to limes quent wa	ing half ma ek medical	ask (r advi	mask tyj ce.		
Conditions and measu				ection and h	nygiene					
Wear suitable gloves, go 2.2 Control of envi										
Product characteristics										
		e based on	data from	n dust meas	urement	s in air as	a fun	ction of	the c	distance from application)
Amounts used	,o coundu				arement					
Amount used	Ca(OH)2		2,2	244 kg/ha		In pro	fessi	onal agr	ricultu	ural soil protection, it is
	CaO CaO.Mg0 Ca(OH)2	O Mg(OH)2	1,4	700 kg/ha 478 kg/ha 030 kg/ha						



	CaCO3.MgO	r,149 kg/ha									
	Ca(OH)2.MgO	,774 kg/ha									
		2,420 kg/ha									
Frequency and durat											
kg/ha is not exceeded	(CaCO3.MgO)	tions during the year are allowed, provided the total yearly amount of 2,149									
	not influenced by risk manage	ement									
Not relevant for expos											
Outdoor use of produc	nal conditions affecting envir	onmental exposure									
mixing depth: 20 cm											
Technical conditions and measures at process level (source) to prevent release											
There are no direct releases to adjacent surface waters. Technical conditions and measures to reduce or limit discharges, air emissions and releases to soil											
Drift should be minimis		mit discharges, an emissions and releases to som									
Conditions and mea	sures related to municipal se	wage treatment plant									
Not relevant for expos											
Conditions and mea	sures related to external trea	tment of waste for disposal									
Not relevant for expos	sure assessment sures related to external rec	wery of waste									
Not relevant for expos		inter of music									
	mation and reference to	its source									
The risk characterisation ratio (RCR) is the quotient of the refined exposure estimate and the respective DNEL (derived no-effect level) and is given in parentheses below. For inhalation exposure, the RCR is based on the long-term DNEL for lime substances of 1 mg/m ³ (as respirable dust) and the respective inhalation exposure estimate (as inhalable dust). Thus, the RCR includes an additional safety margin since the respirable fraction is a sub-fraction of the inhalable fraction according to EN 481. Since lime substances are classified as irritating to skin and eyes a qualitative assessment has been performed for dermal exposure and exposure to the eye.											
Human exposure											
Manual application Route of exposure	Exposure estimate	Method used, comments									
Noute of exposure	Exposure estimate										
Oral	-	Qualitative assessment Oral exposure does not occur as part of the intended product use.									
Dermal	Dust, powder	Qualitative assessment If risk reduction measures are taken into account no human exposure is expected. However, dermal contact to dust from application of lime substances or by direct contact to the limes cannot be excluded if no protective gloves are worn during application. Due to the relatively long application time, skin irritation would be expected. This can easily be avoided by immediate rinsing with water. It would be assumed that consumers who had experience of skin irritation will protect themselves. Therefore, any occurring skin irritation, which will be reversible, can be assumed to be non-recurring.									
Eye	Dust	Qualitative assessment If risk reduction measures are taken into account no human exposure is expected. Dust from surfacing with lime cannot be excluded if no protective goggles are used. Prompt rinsing with water and seeking medical advice after accidental exposure is advisable.									
Inhalation (garden lime)	Large Quantitative assessment No model describing the application of powders by shovel/hand is available, therefore, read-across from the dust formation model while pouring powders has been used as a worst case. Dust formation while pouring the powder is addressed by using the dutch model (van Hemmen, 1992, as described in section 9.0.3.1 above).										



According to the PSD (UK Pesticide Safety Directorate, now called CRD) post-application exposure need to be addressed for products which are applied in parks or amateur products used to treat lawns and plants grown in private gardens. In this case exposure of children, who may have access to these areas soon after treatment, needs to be assessed. The US EPA model predicts the post-application exposure to products used in private gardens (e.g. lawns) by toddlers crawling on the treated area and also via the oral route through hand-to-mouth activities.

Garden lime or fertilizer including lime is used to treat acidic soil. Therefore, after application to the soil and subsequent watering the hazard driving effect of lime (alkalinity) will be quickly neutralized. Exposure to lime substances will be negligible within a short time after application.

Environmental exposure

No quantitative environmental exposure assessment is carried out because the operational conditions and risk management measures for consumer use are less stringent than those outlined for professional agricultural soil protection. Moreover, the neutralisation/pH-effect is the intended and desired effect in the soil compartment. Releases to wastewater are not expected.



ES number 9.15: Consumer use of lime substances as water treatment chemicals

								_		
Exposure Scenario I	Format	(2) addi	ressing	uses carried	out by c	onsume	ers			
1. Title										
Free short title				Consumer use	e of lime su	ubstances	s as water tre	atme	nt chemicals	
Systematic title based	on use	descripto	r	SU21, PC20, I	PC37, ER	C8b				
Processes, tasks activ					or re-fillin	ig of solid	formulations	into	container/preparation of	
Assessment Method*	A qualitative as as well as for a the Dutch mod Environment:	A qualitative assessment has been performed for oral and dermal exposure as well as for exposure of the eye. Dust exposure has been assessed by the Dutch model (van Hemmen, 1992).								
2. Operational co	onditi	ons an	d risk	manageme	ent mea	asures				
RMM				t integrated risk			ures are in p	lace.		
PC/ERC			ion of a	ctivity referring					ronmental release	
PC 20/37		Transfer	of lime s	g (transfer of lim ubstances (solid ion of lime milk) into cont				or water treatment.	
ERC 8b		Wide disp	persive in	ndoor use of rea	ctive subs	tances in	open system	าร		
2.1 Control of co	nsum	ers ex	posur	е						
Product characteristic										
Description of the preparation		entration ance in th ration		Physical stat the preparation		Dustine	ss (if relevar	nt)	Packaging design	
Water treatment chemical	Up to	Up to 100 %		(indicativ DIY fact		dustiness cative value from fact sheet see ion 9.0.3)		Bulk in bags or buckets/containers.		
Water treatment chemical	Up to 99 %		Solid, granula different size (value 0.7 D50 value 1.7 D50 value 3.0	D50 5		stiness (reduction % compared to er)		Bulk-tank lorry or in "Big Bags" or in sacks		
Amounts used				200 Value 0.00)						
Description of the prep	aration			Amount used	Amount used per event					
Water treatment chemica aquaria		e reactor f	or	depending on the size of the water reactor to be filled (~ 100g /L)						
Water treatment chemica drinking water	al in lime	e reactor f	or	depending on the size of the water reactor to be filled (~up to 1.2 kg/L)						
Lime milk for further app				~ 20 g / 5L						
Frequency and duratio	n of use	e/exposu		-			1.4	-		
Description of task				on of exposure	per even	t	frequency		/ents	
Preparation of lime milk and refilling)	(Ioading	, filling		in ict sheet, RIVM, and loading of p		2.4.2	1 task/month 1task/week			
Dropwise application of I water	ime milk	to	Severa	al minutes - hour	s		1 tasks/ mo	onth		
Human factors not influ							-			
Description of the task	Popul	ation exp	osed	Breathing rat	e	Expos	ed body par	t	Corresponding skin area [cm²]	
Preparation of lime milk (loading, filling and refilling)	adult	dult		1.25 m³/hr	1.25 m³/hr		Half of both hands		430 (RIVM report 320104007)	
Dropwise application of lime milk to water	adult			NR		Hands		860 (RIVM report 320104007)		
Other given operationa	I condi	tions affe	cting co	onsumers expo	sure					
Description of the task			or/outdo				exchange rate			
Preparation of lime milk filling and refilling)	(loading	, Indoo	r/outdoo							
G 0/					•		,		<i>.</i>	



Dropwise application to water	of lime milk	indoor		NR	NR					
	Conditions and measures related to information and behavioural advice to consumers									
Contaitions and med			inaviour							
Keep container close Use only with adequa In case of contact wit Wash thoroughly afte Do not mix with acids Conditions and mea Wear suitable gloves, 2.2 Control of of Product characteris Not relevant for expose Amounts used* Not relevant for expose Frequency and dura Not relevant for expose Environment factors Default river flow and	d and out of re ate ventilation. h eyes, rinse i r handling. and always a sures related goggles and environm tics sure assessm sure assessm sure assessm sure assessm and influence dilution	mmediately with plenty of dd limes to water and no I to personal protection protective clothes. Use a ental exposure ent	of water a bt water t n and hy a filtering	o limes. rgiene half mask (mask typ	vice. De FFP2 acc. to EN 149).					
	sures relator	to municipal sowage	treatme	nt nlant						
		I to municipal sewage /stem/treatment plant ar			9					
	· · ·	to external treatment	<u> </u>							
Not relevant for expos										
		I to external recovery	of waste)						
Not relevant for expos										
3. Exposure es	stimation	and reference to	its so	ource						
level) and is given in mg/m ³ (as respirable additional safety marg Since lime substance exposure and exposure	parentheses b dust) and the gin since the r is are classifie ire to the eye.	elow. For inhalation exp respective inhalation exp espirable fraction is a su d as irritating to skin and	osure, th posure e b-fractio	e RCR is based on t stimate (as inhalable n of the inhalable fra	d the respective DNEL (derived no-effect the acute DNEL for lime substances of 4 e dust). Thus, the RCR includes an ction according to EN 481. ent has been performed for dermal					
Preparation of lime										
Route of exposure	Exposure e	stimate		od used, comments	i					
Oral	-			ative assessment	cur as part of the intended product use					
Dermal (powder) small task: 0.1 µg/cm² (-) large task: 1 µg/cm² (-) Qualitative assessment If risk reduction measures are taken into account no human exposure is expected. However, dermal contact to dust from loading of limes or direct contact to the lime cannot be excluded if no protective gloves are worn during application. This may occasionally result in mild irritation easily avoided by prompt rinsing with water. Quantitative assessment The constant rate model of ConsExpo has been used. The contact rate to dust formed while pouring powder has been taken from the DIY-fact sheet (RIVM report 320104007). For granules the exposure estimate will be even lower.										
Eye Inhalation (powder)	If risk reduction measures are taken into account no human exposure is expected. Dust from loading of the limes cannot be excluded if no protective goggles are used. Prompt rinsing with water and seeking medical advice after accidental exposure is advisable.									
	task: 120 μg	//m³ (0.03)	the Du		ng the powder is addressed by using nmen, 1992, as described in section					



Inhalation (granules)	Large task: 12 µg/m³ (0.003) ´	Quantitative assessment Dust formation while pouring the powder is addressed by using the Dutch model (van Hemmen, 1992 as described in section 9.0.3.1 above) and applying a dust reduction factor of 10 for the granular form.
	n of lime milk to water	
Route of exposure	Exposure estimate	Method used, comments
Oral	-	Qualitative assessment Oral exposure does not occur as part of the intended product use.
Dermal	Droplets or splashes	Qualitative assessment If risk reduction measures are taken into account no human exposure is expected. However, splashes on the skin cannot be excluded if no protective gloves are worn during application. Splashes may occasionally result in mild irritation easily avoided by immediate rinsing of the hands in water.
Eye	Droplets or splashes	Qualitative assessment If risk reduction measures are taken into account no human exposure is expected. However, splashes into the eyes cannot be excluded if no protective goggles are worn during the application. However, it is rare for eye irritation to occur as a result of exposure to a clear solution of calcium hydroxide (lime water) and mild irritation can easily be avoided by immediate rinsing of the eyes with water.
Inhalation	-	Qualitative assessment Not expected, as the vapour pressure of limes in water is low and generation of mists or aerosols does not take place.
Environmental expo	sure	
plant is often neutraliz treated in biological V	zed anyway and lime may even be us VWTPs. Since the pH of the influent of	I to be negligible. The influent of a municipal wastewater treatment sed beneficially for pH control of acid wastewater streams that are of the municipal treatment plant is circum neutral, the pH impact is such as surface water, sediment and terrestrial compartment.

bag - Page

ES number 9.16: Consumer use of cosmetics containing lime substances

Exposure Scenario Format (2) addressing uses carried out by consumers			
1. Title			
Free short title	Consumer use of cosmetics containing limes		
Systematic title based on use descriptor	SU21, PC39, ERC8a		
Processes, tasks activities covered	-		
Human health:			
Assessment Method*	According to Article 14(5) (b) of regulation (EC) 1907/2006 risks to human health need not be considered for substances included in cosmetic products within the scope of Directive 76/768/EC. Environment A qualitative justification assessment is provided.		
2. Operational conditions and risk management measures			
ERC 8a Wide dispersive indoor use of processing aids in open systems			
2.1 Control of consumers exposure			
Product characteristic			
Not relevant, as the risk to human health from this use does not need to be considered.			
Amounts used			
Not relevant, as the risk to human health from this use does not need to be considered.			
Frequency and duration of use/exposure			
Not relevant, as the risk to human health from this use does not need to be considered.			
Human factors not influenced by risk management			
Not relevant, as the risk to human health from this use does not need to be considered.			
Other given operational conditions affecting co	onsumers exposure		
Not relevant, as the risk to human health from this use does not need to be considered.			
Conditions and measures related to information and behavioural advice to consumers			
Not relevant, as the risk to human health from this use does not need to be considered.			
Conditions and measures related to personal protection and hygiene			
Not relevant, as the risk to human health from this use does not need to be considered.			
2.2 Control of environmental exposure			
Product characteristics			
Not relevant for exposure assessment			
Amounts used*			
Not relevant for exposure assessment			
Frequency and duration of use			
Not relevant for exposure assessment			
Environment factors not influenced by risk management			
Default river flow and dilution			
Other given operational conditions affecting environmental exposure			
Indoor			
Conditions and measures related to municipal sewage treatment plant			
Default size of municipal sewage system/treatment plant and sludge treatment technique			
Conditions and measures related to external treatment of waste for disposal			
Not relevant for exposure assessment			
Conditions and measures related to external recovery of waste			
Not relevant for exposure assessment			
3. Exposure estimation and reference to its source			
Human exposure			
Human exposure to cosmetics will be addressed by other legislation and therefore need not be addressed under regulation (EC) 1907/2006 according to Article 14(5) (b) of this regulation.			
Environmental exposure			



The pH impact due to use of lime in cosmetics is expected to be negligible. The influent of a municipal wastewater treatment plant is often neutralized anyway and lime may even be used beneficially for pH control of acid wastewater streams that are treated in biological WWTPs. Since the pH of the influent of the municipal treatment plant is circum neutral, the pH impact is negligible on the receiving environmental compartments, such as surface water, sediment and terrestrial compartment.

End of Safety Data Sheet

Page