

FLEUR DESIGNER'S PAINT

LIME PAINT

Revisión N. 7 Fecha de revisión 06/04/2020 Imprimida el 28/10/2020 Pag. N. 1/15 Sustituye la revisión6 (Fecha de revisión: 30/03/2020)

Ficha de Datos de Seguridad En conformidad con Anexo II del REACH - Reglamento 2015/830

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SECCIÓN 1. Identificación de la sust	tancia o la mezcla y d	e la sociedad o la	empresa
1.1. Hontificador dol producto			
1.1. Identificador del producto Código:	Varios		
Denominación	Fleur Lime Paint		
1.2. Usos pertinentes identificados de la sustancia Descripción/Uso: Pintura a base de ag		consejados	
Usos Identificados pinturas de construcción	Industriales	Profesionales	Consumidores
Usos Desaconsejados		×	✓
Usos distintos a los identificados como relevantes en el punto anterior.			
1.3. Datos del proveedor de la ficha de datos de s Razón social: Dirección: Localidad y Estado:	eguridad COLORIFICIO CENTRALE S Via Industria, 12/14/16 25030 Torbole Casaglia (BS)		
dirección electrónica de la persona competente, responsable de la ficha de datos de seguridad Responsable de la emisión en el mercado:	info@fleurpaint.com		
1.4. Teléfono de emergencia Para informaciones urgentes dirigirse a	Spain: Servicio de Informa Spain: Instituto Nacional de Echegaray 4, 28032 Las Ro -	e Toxicología y Ciencias	Forenses (INTCF) Calle José
	ITALY MILANO: CAV Ospec	dale Niguarda Ca' Gran	da +39 0266101029
SECCIÓN 2. Identificación de los pe	liaros		
	iigi oo		
2.1. Clasificación de la sustancia o de la mezcla			
El producto está clasificado como peligroso según las o adaptaciones). Por lo tanto, el producto requiere una fi 2015/830.	cha de datos de seguridad con	forme a las disposiciones	del Reglamento (UE)
Eventual información adicional sobre los riesgos para l ficha.	a salud y/o el ambiente están d	lisponibles en las seccione	es 11 y 12 de la presente
Clasificación e indicación de peligro: Lesiones oculares graves, categoría 1 Irritación cutáneas, categoría 2	H318 H315	Provoca lesiones ocula Provoca irritación cutár	



2.2. Elementos de la etiqueta

Etiquetas de peligro en conformidad con el Reglamento (CE) 1272/2008 (CLP) y sucesivas modificaciones y adaptaciones.

Pictogramas de peligro:



Palabras de advertencia Peligro

Indicaciones de peligro:

H318	Provoca lesiones oculares graves.
H315	Provoca irritación cutánea.

Consejos de prudencia:

P101	Si se necesita consejo médico, tener a mano el envase o la etiqueta.
P102	Mantener fuera del alcance de los niños.
P280	Llevar guantes / prendas / gafas / máscara de protección.
P302+P352	EN CASO DE CONTACTO CON LA PIEL: Lavar con abundante agua
P305+P351+P338	EN CASO DE CONTACTO CON LOS OJOS: Enjuagar con agua cuidadosamente durante varios minutos. Quitar las lentes de contacto cuando estén presentes y pueda hacerse con facilidad. Proseguir con el lavado.
P501	Deseche el producto / contenedor de acuerdo con las regulaciones locales / regionales / nacionales / internacionales.

Contiene: CAL HIDRATADA VOC (Directiva 2004/42/CE) :

Recubrimientos mate para paredes y techos interiores.

VOC expresados en g/litro de producto preparado para su empleo :	10,00
Límite máximo:	30,00

2.3. Otros peligros

Sobre la base de los datos disponibles, el producto no contiene sustancias PBT o vPvB en porcentaje superior al 0,1%.

SECCIÓN 3. Composición/información sobre los componentes

3.2. Mezclas

Contiene:

Identificación	x = Conc. %	Clasificación 1272/2008 (CLP)
CAL HIDRATADA		
CAS 1305-62-0	10 ≤ x < 11	Eye Dam. 1 H318, Skin Irrit. 2 H315, STOT SE 3 H335



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CE 215-137-3 INDEX - N° Reg. 01-2119475151-45-0041 **DIÓXIDO DE TITANIO** CAS 13463-67-7 $3 \le$ CE 236-675-5 INDEX - N° Reg. 01-2119489379-17-0021

.1 3≤x< 3,5

El texto completo de las indicaciones de peligro (H) se encuentra en la sección 16 de la ficha.

SECCIÓN 4. Primeros auxilios

4.1. Descripción de los primeros auxilios

OJOS: Quite las eventuales lentes de contacto. Lave inmediatamente con abundante agua durante al menos 30/60 minutos, abriendo bien los párpados. Consulte inmediatamente a un médico.

PIEL: Quítese la indumentaria contaminada. Dúchese inmediatamente. Consulte inmediatamente a un médico.

INGESTIÓN: Beba mayor cantidad de agua posible. Consulte inmediatamente a un médico. No provoque el vómito sin expresa autorización del médico. INHALACIÓN: Llame mediatamente a un médico. Lleve al sujeto al aire libre, lejos del lugar del accidente. Si la respiración cesa, practique respiración artificial. Se deben tomar precauciones adecuadas para el socorrista.

4.2. Principales síntomas y efectos, agudos y retardados

No hay información específica sobre síntomas y efectos provocados por el producto.

CAL HIDRATADA

El hidróxido de calcio no es extremadamente tóxico si se ingiere, inhala o entra en contacto con la piel. La sustancia se clasifica como irritante para la piel y las vías respiratorias, y conlleva el riesgo de lesiones oculares graves. No se temen efectos adversos sistémicos porque el principal peligro para la salud son los efectos locales (efecto sobre el pH)

4.3. Indicación de toda atención médica y de los tratamientos especiales que deban dispensarse inmediatamente

Información no disponible.

SECCIÓN 5. Medidas de lucha contra incendios

5.1. Medios de extinción

MEDIOS DE EXTINCIÓN IDÓNEOS Los medios de extinción son los tradicionales: anhídrido carbónico, espuma, polvos y agua nebulizada. MEDIOS DE EXTINCIÓN NO IDÓNEOS Ninguno en particular.

5.2. Peligros específicos derivados de la sustancia o la mezcla

PELIGROS DEBIDOS A LA EXPOSICIÓN EN CASO DE INCENDIO Evite respirar los productos de la combustión.

5.3. Recomendaciones para el personal de lucha contra incendios

INFORMACIÓN GENERAL

Enfríe los recipientes con chorros de agua para evitar la descomposición del producto y la formación de sustancias potencialmente peligrosas para la

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salud. Use siempre el equipo de protección antiincendio completo. Recoja las aguas usadas para la extinción, que no deben verterse en las alcantarillas. Elimine el agua contaminada usada para la extinción y los residuos del incendio siguiendo las normas vigentes. EQUIPO

Elementos normales para la lucha contra el fuego, como un respirador autónomo de aire comprimido de circuito abierto (EN 137), traje ignífugo (EN469), guantes ignífugos (EN 659) y botas de bomberos (HO A29 o A30).

SECCIÓN 6. Medidas en caso de vertido accidental

6.1. Precauciones personales, equipo de protección y procedimientos de emergencia

Bloquee la pérdida, si no hay peligro.

Utilizar adecuados dispositivos de protección (incluidos los equipos de protección individual indicados en la sección 8 de la ficha de datos de seguridad), para prevenir la contaminación de la piel, de los ojos y de las prendas personales. Estas indicaciones son válidas tanto para los encargados de las elaboraciones como para las intervenciones de emergencia.

6.2. Precauciones relativas al medio ambiente

Impida que el producto alcance el alcantarillado, las aguas superficiales y las capas freáticas.

6.3. Métodos y material de contención y de limpieza

Aspire el producto derramado en un recipiente idóneo. Evalúe la compatibilidad del producto con el recipiente a utilizar, consultando la sección 10. Absorba el producto restante con material absorbente inerte. Proceda a una suficiente ventilación del lugar afectado por la pérdida. La eliminación del material contaminado se debe realizar según las disposiciones del punto 13.

6.4. Referencia a otras secciones

Eventual información sobre la protección individual y la eliminación está disponible en las secciones 8 y 13.

SECCIÓN 7. Manipulación y almacenamiento

7.1. Precauciones para una manipulación segura

Manipule el producto después de consultar todas las demás secciones de esta ficha de seguridad. Evite la dispersión del producto en el ambiente. No coma, beba ni fume durante el uso. Quítese las prendas contaminadas y los dispositivos de protección antes de acceder a la zona destinada a comer.

7.2. Condiciones de almacenamiento seguro, incluidas posibles incompatibilidades

Conserve el producto solamente en el envase original. Conserve los recipientes cerrados, en un lugar bien ventilado, protegidos de la acción directa de los rayos del sol. Conserve los recipientes alejados de eventuales materiales incompatibles, verificando la sección 10.

7.3. Usos específicos finales

Información no disponible.

SECCIÓN 8. Controles de exposición/protección individual

8.1. Parámetros de control

България

Referencias Normativas:

BGR

МИНИСТЕРСТВО НА ТРУДА И СОЦИАЛНАТА ПОЛИТИКА МИНИСТЕРСТВО НА

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CZE	Česká Republika	ЗДРАВЕОПАЗВАНЕТО НАРЕДБА No 13 от 30 декември 2003 г (4 Септември 2018г) Nařízení vlády č. 246/2018 Sb. Nařízení vlády, kterým se mění nařízení vlády č. 361/2007 Sb., kterým se stanoví podmínky ochrany zdraví při práci, ve znění pozdějších předpisů
DEU	Deutschland	TRGS 900 - Seite 1 von 69 (Fassung 29.03.2019)- Liste der Arbeitsplatzgrenzwerte und Kurzzeitwerte
ESP	España	LÍMITES DE EXPOSICIÓN PROFESIONAL PARA AGENTES QUÍMICOS EN ESPAÑA 2019 (INSST)
FRA	France	Valeurs limites d'exposition professionnelle aux agents chimiques en France. ED 984 - INRS
GBR	United Kingdom	EH40/2005 Workplace exposure limits (Third edition,published 2018)
GRC	Ελλάδα	ΕΦΗΜΕΡΙΔΑ ΤΗΣ ΚΥΒΕΡΝΗΣΕΩΣ - ΤΕΥΧΟΣ ΠΡΩΤΟ Αρ. Φύλλου 152 - 21 Αυγούστου 2018
ITA	Italia	DIRETTIVA (UE) 2017/164 DELLA COMMISSIONE del 31 gennaio 2017
NLD	Nederland	Regeling van de Staatssecretaris van Sociale Zaken en Werkgelegenheid van 13 juli 2018, 2018-
		0000118517 tot wijziging van de Arbeidsomstandighedenregeling in verband met de implementatie van Richtlijn 2017/164 in Bijlage XIII
POL	Polska	ROZPORZĄDZENIE MINISTRA RODZINY, PRACY I POLITYKI SPOŁECZNEJ z dnia 12 czerwca 2018 r
PRT	Portugal	Ministério da Economia e do Emprego Consolida as prescrições mínimas em matéria de protecção dos
		trabalhadores contra os riscos para a segurança e a saúde devido à exposição a agentes químicos no trabalho - Diário da República, 1.ª série - N.º 111 - 11 de junho de 2018
SVK	Slovensko	Nariadenie vlády č. 33/2018 Z. z. Nariadenie vlády Slovenskej republiky, ktorým sa mení a dopĺňa nariadenie vlády Slovenskej republiky č. 355/2006 Z. z. o ochrane zamestnancov pred rizikami súvisiacimi
E 11		s expozíciou chemickým faktorom pri práci v znení neskorších predpisov Directive (UD) 2017/2020, Directive (UD) 2017/2014 Directive 2020/201/2014 Directive 2020/2014 Directive 2020/20
EU	OEL EU	Directiva (UE) 2017/2398; Directiva (UE) 2017/164; Directiva 2009/161/UE; Directiva 2006/15/CE; Directiva 2004/37/CE; Directiva 2000/39/CE; Directiva 91/322/CEE.
	TLV-ACGIH	ACGIH 2019

CAL HIDRATADA

Valor límite de u							
Tipo	Estado	TWA/8h		STEL/15min		Notas / Observaciones	
		mg/m3	ppm	mg/m3	ppm		
TLV	BGR	1		4		RESPIR	
TLV	CZE	1		4		RESPIR	
AGW	DEU	1		2 (C)		INHAL	
MAK	DEU	1		2		INHAL	
VLA	ESP	1		4			
VLEP	FRA	5					
WEL	GBR	5					
WEL	GBR	1		4		RESPIR	
TLV	GRC	1		4			Αναπνεύσιμο κλάσμα
VLEP	ITA	1	0	4	0	RESPIR	
TGG	NLD	1		4			
NDS/NDSCh	POL	1		4		RESPIR	
NDS/NDSCh	POL	2		6		INHAL	
VLE	PRT	1		4		RESPIR	
NPEL	SVK	1		4		RESPIR	
OEL	EU	1		4		RESPIR	
TLV-ACGIH		5					
Concentración prev	rista sin efectos so	bre el ambiente - P	NEC				
Valor de referencia	en agua dulce			0,49	mg/l		
Valor de referencia	en agua marina			32	mg/l		
Valor de referencia	para sedimentos e	en agua dulce		VND			
Valor de referencia para sedimentos en agua marina		VND					
Valor de referencia	para los microorga	anismos STP		3	mg/l		
Valor de referencia	para la cadena ali	mentaria (envenen	amiento secundario)	NPI			
Valor de referencia	para el medio terro	estre		1080	mg/k	g	



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Salud - Nivel sin	efecto derivado -	DNEL/DMEL						
	Efectos sobre los consumidores				Efectos sobre los trabajadores			
Vía de exposición	Locales agudos	Sistém agudos	Locales crónicos	Sistém crónicos	Locales agudos	Sistém agudos	Locales crónicos	Sistém crónicos
Oral	NEA	NPI	NEA	NPI				
Inhalación	4 mg/m3	NPI	1 mg/m3	NPI	4 mg/m3	NPI	1 mg/m3	NPI
Dérmica	VND	NPI	VND	NPI	VND	NPI	VND	NPI
DIÓXIDO DE TITA								
Valor límite de ur	nbral Estado	TWA/8h		STEL/15min		Notas /		
Тіро	Estado	I WA/ON		STEL/TSHIII		Observaci	ones	
		mg/m3	ppm	mg/m3	ppm			
TLV	BGR	10				RESPIR		
VLA	ESP	10						
VLEP	FRA	10						
WEL	GBR	4				RESPIR		
WEL	GBR	10				INHAL		
TLV	GRC		10					
NDS/NDSCh	POL	10				INHAL		
NPEL	SVK	5						
TLV-ACGIH		10						
Concentración previs	ta sin efectos sobre e	el ambiente - PNE	С					
Valor de referencia e	n agua dulce			0,184	mg/	I		
Valor de referencia e	n agua marina			0,018	mg/			
Valor de referencia p	ara sedimentos en aç	jua dulce		1000	mg/	kg/d		
Valor de referencia p	ara sedimentos en ag	jua marina		100	mg/	kg/d		
Valor de referencia p	ara el agua, liberació	n intermitente		0,193	mg/			
Valor de referencia p	ara los microorganisr	nos STP		100	mg/	l		
Valor de referencia p	ara el medio terrestre)		100	mg/	kg/d		
Salud - Nivel sin	efecto derivado -	DNEL/DMEL						
	Efectos sobre los				Efectos sobre los			
	consumidores				trabajadores			
Vía de exposición	Locales agudos	Sistém agudos	Locales crónicos	Sistém crónicos	Locales agudos	Sistém agudos	Locales crónicos	Sistém crónicos
Oral			0.011000	700 mg/kg bw/d	uguuos	uguuos	010111003	010111003

Leyenda:

(C) = CEILING ; INHAL = Fracción inhalable ; RESPIR = Fracción respirable ; TORAC = Fracción torácica.

VND = peligro identificado pero ningún DNEL/PNEC disponible ; NEA = ninguna exposición prevista ; NPI = ningún peligro identificado.

8.2. Controles de la exposición

Considerando que el uso de medidas técnicas adecuadas debería tener prioridad respecto a los equipos de protección personales, asegurar una buena

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ventilación en el lugar de trabajo a través de una eficaz aspiración local. Durante la elección de los equipos protectores personales pedir consejo a los proveedores de sustancias químicas. Los dispositivos de protección individual deben ser conformes a las normativas vigentes y deberán llevar el marcado CE.

Prever un sistema para el lavado ocular y una ducha de emergencia.

PROTECCIÓN DE LAS MANOS

Proteger las manos con guantes de trabajo de categoría III (ref. norma EN 374).

Para la elección definitiva del material de los guantes de trabajo se deben considerar: compatibilidad, degradación, tiempo de ruptura y permeabilidad. En el caso de preparados para la resistencia de los guantes de trabajo, ésta debe ser verificada antes del uso dado que no es previsible. Los guantes tienen un tiempo de uso que depende de la duración de la exposición.

PROTECCIÓN DE LA PIEL

Usar indumentos de trabajo con mangas largas y calzado de protección para uso profesional de categoría II (ref. Reglamento 2016/425 y norma EN ISO 20344). Lavarse con agua y jabón después de haber extraído los indumentos de protección.

PROTECCIÓN DE LOS OJOS

Usar gafas de protección herméticas (ref. norma EN 166).

PROTECCIÓN RESPIRATORIA

En caso de superación del valor umbral (ej. TLV-TWA) de una o varias sustancias presentes en el preparado, Usar una mascarilla con filtro de tipo A.Elegid la clase de la misma (1, 2 o 3) según la concentración límite de utilización. (ref. norma EN 14387). En presencia de gases o vapores de naturaleza distinta y/o gases o vapores con partículas (aerosoles, humos, nieblas, etc.) es necesario prever filtros de tipo combinado.

La utilización de medios de protección de las vías respiratorias es necesaria en ausencia de medidas técnicas para limitar la exposición del trabajador. La protección ofrecida por las mascarillas es, en todo caso, limitada.

En caso de que la sustancia considerada sea inodora o su umbral olfativo sea superior al correspondiente TLV-TWA y en caso de emergencia, usar un autorrespirador de aire comprimido de circuito abierto (ref. norma EN 137) o bien un respirador con toma de aire exterior (ref. norma EN 138). Para elegir una protección idónea para las vías respiratorias, hacer referencia a la norma EN 529.

CONTROLES DE LA EXPOSICIÓN AMBIENTAL

Las emisiones de los procesos productivos, incluidas las de los dispositivos de ventilación, deberían ser controladas para garantizar el respeto de la normativa de protección ambiental.

SECCIÓN 9. Propiedades físicas y químicas

9.1. Información sobre propiedades físicas y químicas básicas

Estado físico	líquido viscoso	
Color	Varios (ver sección 16)	
Olor	Ligero olor a pintura a base de agua.	
Umbral olfativo	No disponible	Motivo para falta de dato:Olor suave No hay umbral olfativo disponible para las sustancias contenidas en la mezcla.
рН	12	
Punto de fusión / punto de congelación	0°0	
Punto inicial de ebullición	100 °C	Motivo para falta de dato:Mezcla, técnicamente no es posible. 100 ° C el componente con el punto de ebullición más bajo.
Intervalo de ebullición	No determinado	Notivo para falta de dato:Mezcla, técnicamente no es posible.
Punto de inflamación	> 61 °C	
Velocidad de evaporación	No determinado	
Inflamabilidad de sólidos y gases Límites inferior de inflamabilidad Límites superior de inflamabilidad Límites inferior de explosividad	no aplicable No aplicable No aplicable No aplicable	Motivo para falta de dato:la mezcla es liquida Motivo para falta de dato:no inflamable Motivo para falta de dato:no inflamable Motivo para falta de dato:no explosivo



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Límites superior de explosividad Presión de vapor Densidad de vapor Densidad relativa	No aplicable 17,5 mmHg 1 1,28 ± 0,05 kg/l kg/l	Motivo para fa Sustancia:AG Sustancia:AG
Solubilidad	Parcialmente miscible en agua	
Coeficiente de repartición: n-octanol/agua	No aplicable	Motivo para fa técnicamente
Temperatura de auto-inflamación	No aplicable	Motivo para fa inflamable
Temperatura de descomposición Viscosidad Propiedades explosivas	580 °C 20.000 cP Non esplosivo	Sustancia:CA Método:Visco
Propiedades comburentes	Non ossidante	
9.2. Otros datos		

Sólidos totales (250°C / 482°F)	47,91 %			
VOC (Directiva 2004/42/CE) :	< 0.01 %	-	0,03	gr/litro
VOC (carbono volátil) :	< 0.01 %	-	0,01	gr/litro

Motivo para falta de dato:no explosivo Sustancia:AGUA Sustancia:AGUA

Motivo para falta de dato:Mezcla, técnicamente no es posible. Motivo para falta de dato:producto no inflamable Sustancia:CAL HIDRATADA Método:Viscosidad dinámica

SECCIÓN 10. Estabilidad y reactividad

10.1. Reactividad

En condiciones de uso normales, no hay particulares peligros de reacción con otras sustancias.

CAL HIDRATADA

En contacto con: agua.

En agua se disocia con la consiguiente formación de cationes de calcio y aniones hidroxilo (cuando es inferior al límite de solubilidad en

agua).

10.2. Estabilidad química

El producto es estable en las condiciones normales de uso y almacenamiento.

10.3. Posibilidad de reacciones peligrosas

En condiciones de uso y almacenamiento normales, no se prevén reacciones peligrosas.

CAL HIDRATADA

Reacciona violentamente liberando calor en contacto con: ácidos.

El hidróxido de cal reacciona esotéricamente al contacto con ácidos. Cuando se calienta por encima de 580 ° C, el hidróxido de cal se descompone para producir óxido de calcio (CaO) y agua H2O. El óxido de calcio reacciona con el agua y genera calor.

10.4. Condiciones que deben evitarse

Ninguna en particular. De todos modos, aténgase a las precauciones usuales para los productos químicos.



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10.5. Materiales incompatibles

CAL HIDRATADA

Mantener alejado de: ácidos, aluminio, latón.

El hidróxido de cal reacciona esotéricamente al contacto con ácidos para formar sales. En presencia de humedad, el hidróxido de cal reacciona con aluminio y latón para formar hidrógeno.

10.6. Productos de descomposición peligrosos

Información no disponible.

SECCIÓN 11. Información toxicológica

11.1. Información sobre los efectos toxicológicos

CAL HIDRATADA

El producto causa daños oculares graves y puede causar opacidad corneal, lesión del iris, coloración irreversible de los ojos.

Efectos agudos: en contacto con la piel hay irritación con eritema, edema, sequedad y grietas.

La inhalación de vapores puede causar irritación moderada del tracto respiratorio superior.

La inhalación de polvo causa irritación del tracto respiratorio inferior y superior con tos y dificultades respiratorias; a concentraciones más altas también puede causar edema pulmonar.

La ingestión puede causar problemas de salud, que incluyen dolor abdominal con ardor, náuseas y vómitos.

Metabolismo, cinética, mecanismo de acción y otras informaciones

Información no disponible.

Información sobre posibles vías de exposición

Información no disponible.

Efectos retardados e inmediatos, así como efectos crónicos producidos por una exposición a corto y largo plazo

Información no disponible.

Efectos interactivos

Información no disponible.

TOXICIDAD AGUDA

LC50 (Inhalación) de la mezcla: No clasificado (ningún componente relevante) LD50 (Oral) de la mezcla: No clasificado (ningún componente relevante) LD50 (Cutánea) de la mezcla: No clasificado (ningún componente relevante)



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DIÓXIDO DE TITANIO

LD50 (Oral) > 5000 mg/kg Rat

LD50 (Cutánea) 2000 mg/kg Metodo di calcolo

LC50 (Inhalación) 3,43 mg/l/4h Ratto

CAL HIDRATADA

LD50 (Oral) > 2000 mg/kg OECD 425 Ratto

LD50 (Cutánea) > 2500 mg/kg OECD 402 Coniglio

Carbonato de calcio natural

LD50 (Oral) > 5000 mg/kg ratto

CORROSIÓN O IRRITACIÓN CUTÁNEAS

Provoca irritación cutánea

LESIONES OCULARES GRAVES O IRRITACIÓN OCULAR

Provoca lesiones oculares graves

SENSIBILIZACIÓN RESPIRATORIA O CUTÁNEA

No responde a los criterios de clasificación para esta clase de peligro

MUTAGENICIDAD EN CÉLULAS GERMINALES

No responde a los criterios de clasificación para esta clase de peligro

CARCINOGENICIDAD

No responde a los criterios de clasificación para esta clase de peligro

TOXICIDAD PARA LA REPRODUCCIÓN

No responde a los criterios de clasificación para esta clase de peligro

TOXICIDAD ESPECÍFICA EN DETERMINADOS ÓRGANOS (STOT) - EXPOSICIÓN ÚNICA

No responde a los criterios de clasificación para esta clase de peligro

TOXICIDAD ESPECÍFICA EN DETERMINADOS ÓRGANOS (STOT) - EXPOSICIÓN REPETIDA

No responde a los criterios de clasificación para esta clase de peligro



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PELIGRO POR ASPIRACIÓN

No responde a los criterios de clasificación para esta clase de peligro

SECCIÓN 12. Información ecológica

Utilizar según las buenas prácticas de trabajo, evitando la dispersión del producto en el ambiente. Advertir a las autoridades competentes si el producto ha entrado en contacto con cursos de agua o si ha contaminado el suelo o la vegetación.

> 200 mg/l/72h alga verde

1844,9 mg/l Risultato da studio, metodo EU A.6

12.1. Toxicidad

CAL HIDRATADA

-	
LC50 - Peces	50,6 mg/l/96h Pesci di acqua dolce
EC50 - Crustáceos	49,1 mg/l/48h Invertebrati di acqua dolce
EC50 - Algas / Plantas Acuáticas	184,57 mg/l/72h Alghe d'acqua dolce
NOEC crónica crustáceos	32 mg/l Invertebrati del mare
NOEC crónica algas / plantas acuáticas	48 mg/l Alghe d'acqua dolce
Carbonato de calcio natural	
LC50 - Peces	> 10000 mg/l/96h Trota Iridea
EC50 - Crustáceos	> 1000 mg/l/48h Daphnia magna

12.2. Persistencia y degradabilidad

EC50 - Algas / Plantas Acuáticas

DIÓXIDO DE TITANIO	
Solubilidad en agua	< 0,001 mg/l
Degradabilidad: dato no disponible	

CAL HIDRATADA Solubilidad en agua

Carbonato de calcio natural Degradabilidad: dato no disponible

Non Applicabile 12.3. Potencial de bioacumulación

Carbonato de calcio natural Coeficiente de distribución: n-octanol/agua

12.4. Movilidad en el suelo

< 1 stimato

Información no disponible.



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12.5. Resultados de la valoración PBT y mPmB

Sobre la base de los datos disponibles, el producto no contiene sustancias PBT o vPvB en porcentaje superior al 0,1%.

12.6. Otros efectos adversos

Información no disponible.

SECCIÓN 13. Consideraciones relativas a la eliminación

13.1. Métodos para el tratamiento de residuos

Reutilizar si es posible. Los deshechos del producto tienen que considerarse especialmente peligrosos. La peligrosidad de los residuos que contiene en parte este producto debe valorarse en función de las disposiciones legislativas vigentes. La eliminación debe encargarse a una sociedad autorizada para la gestión de basuras, según cuanto dispuesto por la normativa nacional y eventualmente local. EMBALAJES CONTAMINADOS Los embalajes contaminados deben enviarse a la recuperación o eliminación según las normas nacionales sobre la gestión de residuos.

SECCIÓN 14. Información relativa al transporte

El producto no debe ser considerada peligrosa según las disposiciones vigentes en lo que concierne al transporte de mercancías peligrosas por carretera (A.D.R.), ferrocarril (RID), mar (IMDG Code) y vía aérea (IATA).

14.1. Número ONU

No aplicable

14.2. Designación oficial de transporte de las Naciones Unidas

No aplicable

14.3. Clase(s) de peligro para el transporte

No aplicable

14.4. Grupo de embalaje

No aplicable



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14.5. Peligros para el medio ambiente

No aplicable

14.6. Precauciones particulares para los usuarios

No aplicable

14.7. Transporte a granel con arreglo al anexo II del Convenio MARPOL y el Código IBC

Información no pertinente.

SECCIÓN 15. Información reglamentaria

15.1. Reglamentación y legislación en materia de seguridad, salud y medio ambiente específicas para la sustancia o la mezcla

Categoría Seveso - Directivo 2012/18/CE: Ninguna

Restricciones relativas al producto o a las sustancias contenidas según el anexo XVII Reglamento (CE) 1907/2006

Producto Punto

3

Sustancias en Candidate List (Art. 59 REACH)

Sobre la base de los datos disponibles, el producto no contiene sustancias SVHC en porcentaje superior al 0,1%.

Sustancias sujetas a autorización (Anexo XIV REACH)

Ninguna

Sustancias sujetas a obligación de notificación de exportación Reg. (CE) 649/2012:

Ninguna

Sustancias sujetas a la Convención de Rotterdam:

Ninguna

Sustancias sujetas a la Convención de Estocolmo:

Ninguna

Controles sanitarios

Los trabajadores expuestos a este agente químico no deben ser sometidos a la vigilancia sanitaria, siempre y cuando los resultados de la

evaluación de



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los riesgos demuestren que existe sólo un moderado riesgo para la seguridad y la salud de los trabajadores y que las medidas previstas por la directiva 98/24/CE estén siendo respetadas y sean suficientes para reducir el riesgo.

VOC (Directiva 2004/42/CE) :

Recubrimientos mate para paredes y techos interiores.

15.2. Evaluación de la seguridad química

Ha sido realizada una evaluación de seguridad química para las siguientes sustancias contenidas:

CAL HIDRATADA

SECCIÓN 16. Otra información

Texto de las indicaciones de peligro (H) citadas en la secciones 2-3 de la ficha:

Eye Dam. 1	Lesiones oculares graves, categoría 1
Skin Irrit. 2	Irritación cutáneas, categoría 2
STOT SE 3	Toxicidad específica en determinados órganos - exposiciones única, categoría 3
H318	Provoca lesiones oculares graves.
H315	Provoca irritación cutánea.
H335	Puede irritar las vías respiratorias.

LEYENDA:

- ADR: Acuerdo europeo para el transporte de las mercancías peligrosas por carretera
- CAS NUMBER: Número del Chemical Abstract Service
- CE50: Concentración que tiene efecto sobre el 50 % de la población sometida a prueba
- CE NUMBER: Número identificativo en ESIS (archivo europeo de las sustancias existentes)
- CLP: Reglamento CE 1272/2008
- DNEL: Nivel derivado sin efecto
- EmS: Emergency Schedule
- GHS: Sistema armonizado global para la clasificación y el etiquetado de los productos químicos
- IATA DGR: Reglamento para el transporte de mercancías peligrosas de la Asociación internacional de transporte aéreo
- IC50: Concentración de inmovilización del 50 % de la población sometida a prueba
- IMDG: Código marítimo internacional para el transporte de mercancías peligrosas
- IMO: International Maritime Organization
- INDEX NUMBER: Número identificativo en el anexo VI del CLP
- LC50: Concentración letal 50 %
- LD50: Dosis letal 50 %
- OEL: Nivel de exposición ocupacional
- PBT: Persistente, bioacumulable y tóxico según el REACH
- PEC: Concentración ambiental previsible
- PEL: Nivel previsible de exposición
- PNEC: Concentración previsible sin efectos
- REACH: Reglamento CE 1907/2006
- RID: Reglamento para el transporte internacional de mercancías peligrosas por ferrocarril
- TLV: Valor límite de umbral
- TLV VALOR MÁXIMO: Concentración que no se debe superar en ningún momento de la exposición laboral.
- TWA STEL: Límite de exposición a corto plazo
- TWA: Límite de exposición media ponderada
- VOC: Compuesto orgánico volátil
- vPvB: Muy persistente y muy bioacumulable según el REACH
- WGK: Wassergefährdungsklassen (Deutschland).

BIBLIOGRAFÍA GENERAL:



Revisión N. 7 Fecha de revisión 06/04/2020 Imprimida el 28/10/2020 Pag. N. 15/15 Sustituye la revisión6 (Fecha de revisión: 30/03/2020)

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- Handling Chemical Safety
- INRS Fiche Toxicologique (toxicological sheet)
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- N.I. Sax Dangerous properties of Industrial Materials-7, 1989 Edition
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- Banco de datos de modelos de SDS de sustancias químicas - Ministerio de Salud e Instituto Superior de Sanidad

Nota para el usuario:

La información contenida en esta ficha se basa en los conocimientos disponibles hasta la fecha de la última versión. El usuario debe cerciorarse de la idoneidad y completeza de la información en lo que se refiere al específico uso del producto.

Este documento no debe ser interpretado como garantía de alguna propiedad específica del producto.

Visto que la utilización del producto no puede ser controlada directamente por nosotros, será obligación del usuario respetar, bajo su responsabilidad, las leyes y las disposiciones vigentes en lo que se refiere a higiene y seguridad. No se asumen responsabilidades por usos inadecuados.

Ofrezca una adecuada formación al personal encargado del uso de productos químicos.

La clasificación del producto se basa en los métodos de cálculo previstos en el Anexo I de la CLP, a menos que se especifique lo contrario en las secciones 11 y 12.

Los métodos de evaluación de las propiedades químico-físicas se indican en la sección 9.

REGOLAMENTO (UE) n. 528/2012 DEL PARLAMENTO EUROPEO (BPR) La seguente scheda è valida per i colori realizzati con le formulazioni presenti nel sistema tintometrico in base allo studio eseguito a supporto.

Modificaciones con respecto a la revisión precedente: Han sido realizadas variaciones en las siguientes secciones:

08 / 11

APPENDIX: EXPOSURE SCENARIOS

The current document includes all relevant occupational and environmental exposure scenarios (ES) for the production and use of calcium dihydroxide 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-G-06-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 dihydroxide 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. 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.

2) Professional uses (local scale)

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.

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, human exposure is assessed with the aid of a modelling tool. At the first tier screening level, the MEASE tool (http://www.ebrc.de/mease.html) is used to assess inhalation exposure according to the ECHA

guidance (R.14).

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 Contam Toxicol. 126: 1-85.), 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 dihydroxide professional 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.

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

ES number Exposure scenario title			Identified uses		ed	Resultin g life cycle stage	Identified Use			Process	Article	Environmental
	Manufacture	Formulation	End use	Consumer	Service life (for articles)	Linked to Iden			category (PROC)	categor y (AC)	release category (ERC)	
9.1	Manufacture and industrial uses of aqueous solutions of lime substances	х	x	x		х	1	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, 12, 13, 14, 15, 16, 17, 18, 19	5, 6, 7, 8,	1, 2, 3, 4, 5, 6a, 6b, 6c, 6d, 7, 12a, 12b, 10a, 10b, 11a, 11b
9.2	Manufacture and industrial uses of low dusty solids/powders of lime substances	x	x	x		х	2	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, 6, 7, 8a, 8b, 9, 10, 13, 14, 15, 16, 17, 18, 19, 21, 22, 23, 24, 25, 26, 27a, 27b	5, 6, 7, 8,	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	x		х	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	5, 6, 7, 8,	1, 2, 3, 4, 5, 6a, 6b, 6c, 6d, 7, 12a, 12b, 10a, 10b, 11a, 11b

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		Identified uses		ed	Resultin g life cycle stage	tified Use			Process	Article	Environmental	
ES number	S number Exposure scenario title Scenario title	Formulation	End use	Consumer	Service life (for articles)	Linked to Identified	Sector of use category (SU)	Chemical Product Category (PC)	category (PROC)	categor y (AC)	release category (ERC)	
9.4	Manufacture and industrial uses of high dusty solids/powders of lime substances	x	x	x		х	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	1, 2, 3, 4, 5, 6a, 6b, 6c, 6d, 7, 12a, 12b, 10a, 11a
9.5	Manufacture and industrial uses of massive objects containing lime substances	х	x	x		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	5, 6, 7, 8,	1, 2, 3, 4, 5, 6a, 6b, 6c, 6d, 7, 12a, 12b, 10a, 10b, 11a, 11b
9.6	Professional uses of aqueous solutions of lime substances		x	x		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

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ES number Exposure scenario title			Identified uses		ed	Resultin g life cycle stage	tified Use			Process	Article	Environmental
	Manufacture	Formulation	End use	Consumer	Service life (for articles)	Linked to Identified Use		Chemical Product Category (PC)	category (PROC)	categor y (AC)	release category (ERC)	
9.7	Professional uses of low dusty solids/powders of lime substances		x	x		x	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
9.8	Professional uses of medium dusty solids/powders of lime substances		x	x		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	x		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

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			ldentified uses		Resultin g life cycle stage				Process	Article	Environmental	
ES number	Exposure scenario title	Manufacture	Formulation	End use	Consumer	Service life (for articles)	Linked to Identified Use		Chemical Product Category (PC)	category (PROC)	categor y (AC)	release category (ERC)
9.10	Professional use of lime substances in soil treatment		x	x			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			x		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
9.12	Consumer use of building and construction material (DIY)				х		12	21	9b, 9a			8
9.13	Consumer use of CO_2 absorbent in breathing apparatuses				x		13	21	2			8

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		Identified uses			Resultin g life cycle stage				Process	Article	Environmental	
ES number	Exposure scenario title	Manufacture	Formulation	End use	Consumer	Service life (for articles)	ed to		Chemical Product Category (PC)	category (PROC)	categor	release category (ERC)
9.14	Consumer use of garden lime/fertilizer				х		14	21	20, 12			8e
9.15	Consumer use of lime substances as water treatment chemicals in aquaria				х		15	21	20, 37			8
9.16	Consumer use of cosmetics containing lime substances				х		16	21	39			8

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

Exposure Scenario	Format (1) addressing uses carried out b	y workers	
1. Title			
Free short title	Manufacture and industrial uses of aque	ous solutions 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	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)	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-	
PROC 12	Use of blowing agents in manufacture of foam	EN).	
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 long-life 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 restricted		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

PROC	Level of separation	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 "Frequency and	local exhaust ventilation	78 %	-
PROC 19	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.	not applicable	na	-
All other applicable PROCs		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.

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Conditions and measures related to personal protection, hygiene and health evaluation **RPE efficiency** Further personal Specification of respiratory Specification of (assigned PROC protective equipment protective equipment (RPE) protection gloves (PPE) factor, APF) Eye protection equipment (e.g. goggles or visors) must PROC 7 FFP1 mask APF=4 be worn, unless Since calcium potential contact with dihydroxide is the eye can be classified as irritating excluded by the nature to skin, the use of and type of application protective gloves is (i.e. closed process). mandatory for all Additionally, face All other applicable process steps. protection, protective not required na PROCs 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 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 dihydroxide 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, 12, 13, 14, 15, 16, 17, 18, 19	MEASE	< 1 mg/m³ (0.001 – 0.66)	irritating to skin, derr minimised as far as DNEL for dermal derived. Thus, de	roxide are classified as nal exposure has to be technically feasible. A effects has not been rmal exposure is not exposure scenario.

Environmental exposure

The environmental exposure assessment is only relevant for the aquatic environment, when applicable including STPs/WWTPs, as emissions of lime substance 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+ 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 lime substance will be found predominantly in water. Significant emissions or exposure to air are not expected due to the low vapour pressure of lime substance. 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 lime substance can potentially result in an aquatic emission and locally increase the lime substance concentration and affect the pH in the aquatic environment. When the pH is not neutralised, the discharge of effluent from lime substance 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	Waste water from lime substance production is an inorganic wastewater stream and therefore there is
concentration in	no biological treatment. Therefore, wastewater streams from lime substance production sites will
waste water treatment	normally not be treated in biological waste water treatment plants (WWTPs), but can be used for pH
plant (WWTP)	control of acid wastewater streams that are treated in biological WWTPs.
Exposure concentration in aquatic pelagic compartment	When lime substance 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	The sediment compartment is not included in this ES, because it is not considered relevant for lime
concentration in	substance: when lime substance is emitted to the aquatic compartment, sorption of to sediment
sediments	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 lime substance: when emitted to air as an aerosol in water, lime substance 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 lime substance largely end up in soil and water.
Exposure concentration relevant for the food chain (secondary poisoning)	Bioaccumulation in organisms is not relevant for lime substance: 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 (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 site as the 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 long-term 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 lime substance 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:

$$pHriver = Log \left[\frac{Qeffluent * 10^{pHeffluent} + Qriverupstream * 10^{pHupstream}}{Qriverupstream + Qeffluent} \right]$$
(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:

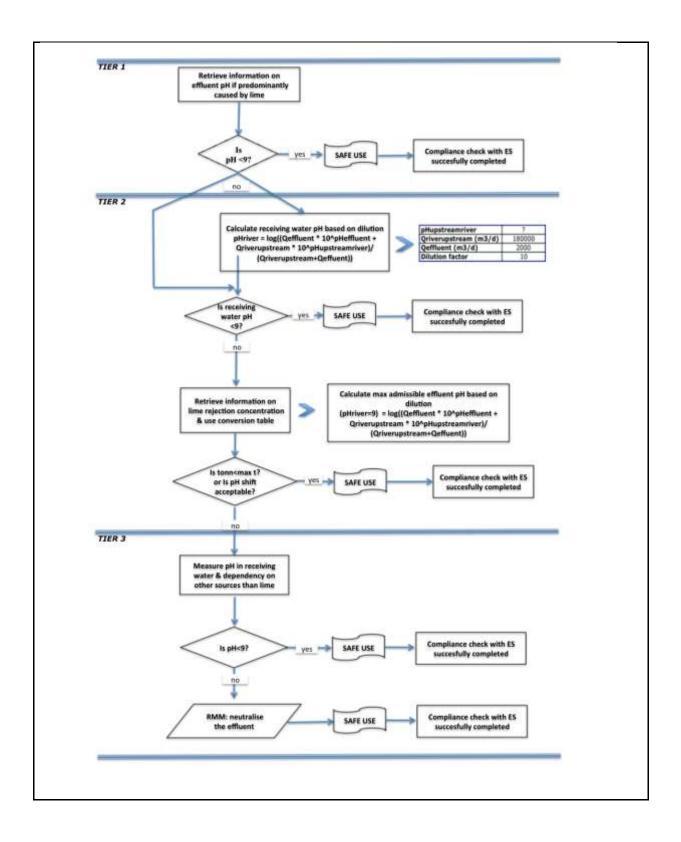
- Q river upstream flows: use the 10th of existing measurements distribution or use default value of 18000 m³/day
- Q effluent: use default value of 2000 m3/day
- The upstream pH is preferably a measured value. If not available, one can assume a neutral pH of 7 if this can be justified.

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 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.

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

Exposure Scenario	Format (1) addressing uses carried out b	y workers	
1. Title			
Free short title	Manufacture and industrial uses of low dust	ty 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	d are described in Section 2 below.	
Assessment Method	The assessment of inhalation exposure is based	I on the exposure estimation tool MEASE.	
2. Operational conc	litions 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 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	Further information is provided in the ECHA Guidance on information requirements and	
PROC 9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	chemical safety assessment, Chapter R.12: Use descriptor system (ECHA-2010-G-05-	
PROC 10	Roller application or brushing	EN).	
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		
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 of minerals/metals at elevated t	•				
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 substa temperature	inces at ambient				
PROC 27a	Production of metal powders (h	ot processes)				
PROC 27b	Production of metal powders (w	vet processes)				
ERC 1-7, 12	Manufacture, formulation and all trues	ypes of industrial				
ERC 10, 11	Wide-dispersive outdoor and indoo articles and materia					
2.1 Control of work	ers exposure					
Product characteristic						
reflected by an assignmer ambient temperature the f temperature based, taking	approach, the substance-intrinsic en t of a so-called fugacity class in the ugacity is based on the dustiness of i into account the process temperatu on the level of abrasion instead of th	MEASE tool. For o that substance. Wi re and the melting e substance intrins	perations conducted wi hereas in hot metal ope point of the substance.	th solid substances at rations, fugacity is		
PROC	Use in preparation	Use in preparation Content in preparation Physical form Emission poter				
PROC 22, 23, 25, 27a	not restricted		solid/powder, molten	high		
PROC 24	not restricted		solid/powder	high		
All other applicable PROCs	not restricted		solid/powder	low		
Amounts used						
combination of the scale	dled per shift is not considered to of operation (industrial vs. profess ninant of the process intrinsic emission	sional) and level c				
Frequency and duration	of use/exposure					
PROC		Duration of ex	kposure			
PROC 22	≤ 240 minutes					
All other applicable PROCs	480 minutes (not restricted)					
Human factors not influe	enced by risk management					
The shift breathing volume	e during all process steps reflected ir	n the PROCs is ass	sumed to be 10 m ³ /shift	(8 hours).		
Other given operational	conditions affecting workers expo	osure				
assessment of the conduct exposure assessment in M temperatures are expecte	e process temperature and process p ted processes. In process steps with /IEASE is however based on the ration d to vary within the industry the high ss temperatures are automatically co	n considerably high o of process tempe est ratio was taken	temperatures (i.e. PRO erature and melting poin as a worst case assum	DC 22, 23, 25), the t. As the associated aption for the exposure		

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.

PROCSpecification of respiratory protective equipment (RPE)(assigned protection factor, APF)Specification of glovesprotective equip (PPE)PROC 22, 24, 27aFFP1 maskAPF=4Eye protection equipment (e. goggles or visc must be worn, un potential contact the eye can be classified as irritating to skin, the use of protective gloves is mandatory for all process steps.Since calcium dihydroxide is classified as irritating to skin, the use of protective gloves is mandatory for all process steps.Eye protection equipment (e. goggles or visc must be worn, un potential contact the eye can be excluded by the r and type of applic othing and sa shoes are requin be worn as	PROC	Level of separation	Localised controls (LC)	Efficiency of LC (according to MEASE)	Further information
PROC 19 above under "Frequency and duration of exposure". An eduction of exposure duration of exposure control rooms or by removing the worker from workplaces involved with relevant In a interquired na - Organisational measures to prevent limit releases, dispersion and exposure Avoid inhaliation or ingestion. General occupational hygiene measures are required to ensure a safe handling of the subst these measures involve good personal and housekeeping practices (i.e. regular cleaning with suble cleaning device are contaminated clothing at home. Do not blow dust of compressed air. Conditions and measures rolated to personal protection, hygiene and health evaluation Further person protection factor, APF) Specification of figures (i.e. regular cleaning with subst cleaning device equipment (RPE) PROC Specification of respiratory protection factor, APF) Specification of gloves immation of exposure alove and the subst cleaning device and the cleaning device and the subst cleaning device and th	PROC 7, 17, 18	separation of workers from the		17 %	-
PROC 22, 23, 24, 25, 26, 27a reduction of exposure duration on the achieved (for example, by) the installation of vertilitated or by removing the worker from workplaces involved with relevant exposure. interquired na - Organisational measures to prevent limit releases, dispersion and exposure Avoid inhibition or ingestion. General occupational hygiene measures are required to ensure a safe handling of the subst These measures involve good personal and housekeeping practices (i.e. regular cleaning with subst cleaning device eating and smoking at the workplace, the wearing of standard working (othes and shoes unless otherwise stated t Shower and change clothes at end of work shift. Do not wear contaminated clothing at home. Do not blow dust of compressed air. PROC Specification of respiratory protective equipment (RPE) RPE efficiency factor, APF) Specification of gloves Further perso protective equipment (e goggles or visc intrating to skin, the use of protective gloves is mandatory for all process steps Eve protection evoluted by the use of protection and type of applic (i.e. closed proc Additionally, risk and type of applic (i.e. closed proc Additionally risk and type of applic (i.e. clos	PROC 19	above under "Frequency and	not applicable	na	-
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(compare with "duration of exposure" above) should reflect the additional physiological stress for the worker due to the breat 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 aff the use of RPE), (ii) have suitable facial characteristics reducing leakages between face and mask (in view of scars and face hair). The recommended devices above which rely on a tight face seal will not provide the required protection unless they for 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. 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		not required	na	dihydroxide is classified as irritating to skin, the use of protective gloves is mandatory	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.
Amounts used The daily and annual amount per site (for point sources) is not considered to be the main determinant for environn exposure. Frequency and duration of use	(compare with "duration o 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 prope The employer and self-en devices and the managen policy for a respiratory pro An overview of the APFs	f exposure [*] above) should reflect the re RPE itself, due to the increased the r's capability of using tools and of co ve, the worker should therefore be (i suitable facial characteristics reduci devices above which rely on a tight f erly and securely. nployed persons have legal responsi- nent of their correct use in the workp otective device programme including of different RPE (according to BS Efford)	e additional physiol hermal stress by en- ommunicating are n i) healthy (especial ng leakages betwee face seal will not pr ibilities for the main place. Therefore, the training of the worl	ogical stress for the wor closing the head. In add educed during the wear y in view of medical pro- en face and mask (in vi ovide the required prote- tenance and issue of re ey should define and do kers.	ker due to the breathing lition, it shall be ing of RPE. blems that may affect ew of scars and facial ection unless they fit the espiratory protective ocument a suitable
The daily and annual amount per site (for point sources) is not considered to be the main determinant for environmexposure. Frequency and duration of use	2.2 Control of envir	onmental exposure			
Frequency and duration of use	The daily and annual an	nount per site (for point sources)	is not considered	to be the main determ	inant for environmenta
Intermittent (< 12 time per year) or continuous use/release	•	of use			
	Intermittent (< 12 time per	r year) or continuous use/release			
Environment factors not influenced by risk management	Environment factors no	t influenced by risk management			

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 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 dihydroxide 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 dihydroxide is classified as irritating to skin, dermal exposure has to b 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 emission	S			

The environmental exposure assessment is only relevant for the aquatic environment, when applicable including STPs/WWTPs, as emissions of calcium dihydroxide 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+ 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 dihydroxide will be found predominantly in water. Significant emissions or exposure to air are not expected due to the low vapour pressure of calcium dihydroxide will be found and ydroxide. 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 dihydroxide can potentially result in an aquatic emission and locally increase the calcium dihydroxide concentration and affect the pH in the aquatic environment. When the pH is not neutralised, the discharge of effluent from calcium dihydroxide 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 dihydroxide production is an inorganic wastewater stream and therefore there is no biological treatment. Therefore, wastewater streams from calcium dihydroxide 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 dihydroxide 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 dihydroxide: when calcium dihydroxide 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 dihydroxide: when emitted to air as an aerosol in water, calcium dihydroxide 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 dihydroxide largely end up in soil and water.
Exposure concentration relevant for the food chain (secondary poisoning)	Bioaccumulation in organisms is not relevant for calcium dihydroxide: 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

(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 site 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 long-term 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 dihydroxide 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:

$$pHriver = Log \left[\frac{Qeffluent * 10^{pHeffluent} + Qriverupstream * 10^{pHupstream}}{Qriverupstream + Qeffluent} \right]$$
(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.

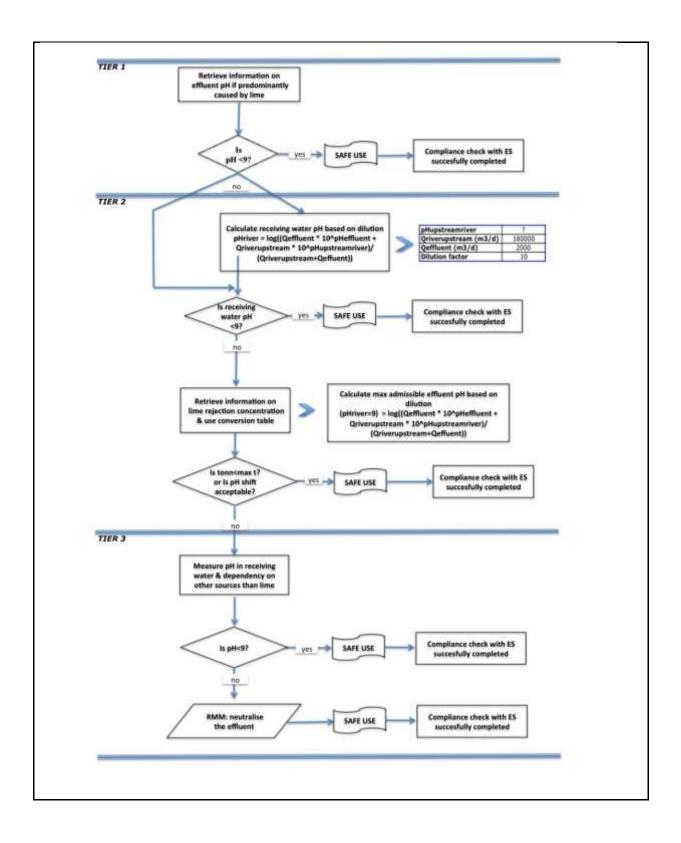
Such equation has to be seen as a worst case scenario, where water conditions are standard and not case specific.

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 dihydroxide.

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.

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CAS 1305-62-0	Page n. 20/90



• 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	The assessment of inhalation exposure is based on the exposure estimation tool MEASE.			
2. Operational cond	litions 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)	Further information is provided in the ECHA Guidance on information requirements and chemical safety assessment, Chapter R.12:		
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	Use descriptor system (ECHA-2010-G-05-		
PROC 13	Treatment of articles by dipping and pouring	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 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-u bound in materials and/or			
PROC 25	Other hot work operations v	vith metals		
PROC 26	Handling of solid inorganic substa temperature	ances at ambient		
PROC 27a	Production of metal powders (h	not processes)		
PROC 27b	Production of metal powders (w	vet processes)		
ERC 1-7, 12	Manufacture, formulation and all types of industrial uses			
ERC 10, 11	Wide-dispersive outdoor and indo articles and materia			
2.1 Control of work	ers exposure			
Product characteristic				
reflected by an assignmen ambient temperature the temperature based, taking	approach, the substance-intrinsic en nt of a so-called fugacity class in the fugacity is based on the dustiness of g into account the process temperatu on the level of abrasion instead of th	MEASE tool. For o that substance. Wi ure and the melting the substance intrins	perations conducted wi hereas in hot metal ope point of the substance.	th solid substances at rations, fugacity is
PROC	Use in preparation	Content in preparation	Physical form	Emission potential
PROC 22, 23, 25, 27a	not restricted		solid/powder, molten	high
PROC 24	not restricted	not restricted		high
All other applicable PROCs	not restricted		solid/powder	medium
Amounts used				
combination of the scale	dled per shift is not considered to of operation (industrial vs. profes ninant of the process intrinsic emissi	sional) and level c		
PROC	Duration of exposure			
PROC 7, 17, 18, 19, 22	≤ 240 minutes			
All other applicable	480 minutes (not restricted)			
PROCs				
Human factors not influ	enced by risk management			
The shift has athing a set				
The shift breathing volum	e during all process steps reflected in	n the PROCs is ass	sumed to be 10 m³/shift	(8 hours).
Other given operational	conditions affecting workers expe	osure		
Other given operational Operational conditions like assessment of the conduc exposure assessment in I temperatures are expected	. .	osure pressure are not co h considerably high o of process tempe est ratio was taken	nsidered relevant for or temperatures (i.e. PRC erature and melting poir as a worst case assum	ccupational exposure DC 22, 23, 25), the tt. As the associated aption for the exposure
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Other given operational Operational conditions like assessment of the conduc exposure assessment in I temperatures are expecte estimation. Thus all process Technical conditions an Risk management measu required in the processes	conditions affecting workers experiences temperature and process temperature and process ted processes. In process steps with MEASE is however based on the rational to vary within the industry the high ess temperatures are automatically conditioned measures at process level (sour trees at the process level (e.g. contain	pressure are not co h considerably high o of process tempe est ratio was taken overed in this expose rce) to prevent rela- ment or segregatio	nsidered relevant for or temperatures (i.e. PRC erature and melting poir as a worst case assum sure scenario for PROC ease n of the emission sourc	ccupational exposure DC 22, 23, 25), the it. As the associated pition for the exposure 22, 23 and PROC 25.
Other given operational Operational conditions like assessment of the conduce exposure assessment in N temperatures are expected estimation. Thus all process Technical conditions and Risk management measure required in the processes Technical conditions and	conditions affecting workers experiences temperature and process temperature and process ted processes. In process steps with MEASE is however based on the rational to vary within the industry the high ess temperatures are automatically conditioned measures at process level (sources at the process level (e.g. contained measures to control dispersion Level of separation Any potentially required	pressure are not co h considerably high o of process tempe est ratio was taken overed in this expose rce) to prevent rele- ment or segregation from source towa Localised	nsidered relevant for or temperatures (i.e. PRO erature and melting poir as a worst case assum sure scenario for PROC ease n of the emission sourc rds the worker Efficiency of LC (according to	ccupational exposure DC 22, 23, 25), the it. As the associated uption for the exposure 22, 23 and PROC 25.
Other given operational Operational conditions like assessment of the conduce exposure assessment in N temperatures are expected estimation. Thus all process Technical conditions an Risk management measure required in the processes Technical conditions an PROC	conditions affecting workers experies process temperature and process temperature and process steps with MEASE is however based on the rational to vary within the industry the high ess temperatures are automatically contract at the process level (sour ares at the process level (e.g. contained measures to control dispersion Level of separation Any potentially required separation of workers from the emission source is indicated	pressure are not co h considerably high io of process tempe est ratio was taken overed in this expose rce) to prevent rele iment or segregatio from source towa Localised controls (LC)	nsidered relevant for or temperatures (i.e. PRC erature and melting poir as a worst case assum sure scenario for PROC ease n of the emission source rds the worker Efficiency of LC (according to MEASE)	ccupational exposure DC 22, 23, 25), the it. As the associated uption for the exposure 22, 23 and PROC 25.
Other given operational Operational conditions like assessment of the conduce exposure assessment in N temperatures are expected estimation. Thus all process Technical conditions an Risk management measurequired in the processes Technical conditions an PROC PROC 1, 2, 15, 27b	conditions affecting workers experiences temperature and process temperature and process ted processes. In process steps with MEASE is however based on the rational to vary within the industry the high ess temperatures are automatically control dispersional terms at the process level (e.g. contained measures to control dispersion Level of separation Any potentially required separation of workers from the	pressure are not co h considerably high o of process tempe est ratio was taken overed in this expose rce) to prevent rele ment or segregatio from source towa Localised controls (LC) not required general	nsidered relevant for or temperatures (i.e. PRC erature and melting poir as a worst case assum sure scenario for PROC ease n of the emission source rds the worker Efficiency of LC (according to MEASE) na	ccupational exposure DC 22, 23, 25), the tt. As the associated uption for the exposure 2 22, 23 and PROC 25.

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	the installation of ventilated (positive pressure) control rooms or by removing the worker from workplaces involved with relevant exposure.			
Organisational measure	s to prevent /limit releases, dispe	rsion and exposu	е	
These measures involve eating and smoking at the Shower and change clot compressed air.	ion. General occupational hygiene r good personal and housekeeping ne workplace, the wearing of stan hes at end of work shift. Do not	practices (i.e. regul dard working cloth wear contaminated	ar cleaning with suitab es and shoes unless clothing at home. Do	le cleaning devices), no otherwise stated below.
Conditions and measure	es related to personal protection,		h 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)
All other applicable PROCs	not required	na	Since calcium dihydroxide is classified as irritating to skin, the use of protective gloves is mandatory for all process steps.	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.
For reasons as given abor the use of RPE), (ii) have hair). The recommended contours of the face prope The employer and self-em devices and the managen policy for a respiratory pro-	r's capability of using tools and of ca ve, the worker should therefore be (suitable facial characteristics reduci devices above which rely on a tight erly and securely. nployed persons have legal respons nent of their correct use in the workp tective device programme including of different RPE (according to BS EI	 i) healthy (especiall ing leakages betwee face seal will not pre- ibilities for the main place. Therefore, the g training of the worl 	y in view of medical pro en face and mask (in vie ovide the required prote tenance and issue of re ey should define and do kers.	blems that may affect ew of scars and facial action unless they fit the spiratory protective acument a suitable
2.2 Control of environmental exposure				
Amounts used				
The daily and annual an exposure.	nount per site (for point sources)	is not considered	to be the main determ	inant for environmental
Frequency and duration	of use			
Intermittent (< 12 time per	year) or continuous use/release			
Environment factors not	t influenced by risk management			
Flow rate of receiving surf	ace water: 18000 m³/day			
Other given operational	conditions affecting environment	tal exposure		
Effluent discharge rate: 20	000 m³/day			
Technical onsite conditi	ons and measures to reduce or li	mit discharges, ai	r emissions and releas	ses to soil
surface water, in case suc introduction into open wat waters are minimised (e.g This is also reflected in the	res related to the environment aim t ch discharges are expected to cause ers is required. In general discharge through neutralisation). In general e description of standard OECD tes n be found in the introduction sectio	e significant pH chai es should be carried most aquatic organ ts with aquatic orga	nges. Regular control of out such that pH chang isms can tolerate pH va	f the pH value during ges in receiving surface alues in the range of 6-9.
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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 dihydroxide 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.

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	< 1 mg/m³ (0.01 – 0.88)	irritating to skin, derr minimised as far as DNEL for dermal derived. Thus, de	iroxide is classified as nal exposure has to be technically feasible. A effects has not been rmal exposure is not exposure scenario.
Environmental emission	IS			
as emissions of calcium d aquatic effect and risk ass OH- discharges, being the scale is being addressed, (WWTPs) when applicable place on a local scale. Th predominantly in water. S dihydroxide. Significant er The exposure assessmen surface water related to th	ure assessment is only relevant for t ihydroxide in the different life-cycle s sessment only deal with the effect or e toxicity of Ca2+ is expected to be r including municipal sewage treatme e, both for production and industrial e high water solubility and very low ignificant emissions or exposure to a missions or exposure to the terrestria t for the aquatic environment will the ne OH- discharges at the local scale. urface water pH should not increase	stages (production a n organisms/ecosyst negligible compared ent plants (STPs) or use as any effects t vapour pressure ind air are not expected al environment are r erefore only deal wit . The exposure asse	and use) mainly apply to tems due to possible pl to the (potential) pH ef industrial waste water hat might occur would icate that calcium dihyo due to the low vapour not expected either for h the possible pH chan	o (waste) water. The H changes related to ffect. Only the local treatment plants be expected to take droxide will be found pressure of calcium this exposure scenario. tiges in STP effluent and
Environmental emissions	The production of calcium dihydroxide can potentially result in an aquatic emission and locally increase the calcium dihydroxide concentration and affect the pH in the aquatic environment. When the pH is not neutralised, the discharge of effluent from calcium dihydroxide 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 dihydroxide production is an inorganic wastewater stream and therefore there is no biological treatment. Therefore, wastewater streams from calcium dihydroxide 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 dihydroxide is emitted be negligible. When lime is rejected capacity of the water. The higher the general the buffer capacity prevent equilibrium between carbon dioxide (CO32–).	d to surface water, the buffer capacity of ing shifts in acidity of	he pH may increase, do the water, the lower th or alkalinity in natural w	epending on the buffer e effect on pH will be. In aters is regulated by the
Exposure concentration in sediments	The sediment compartment is not i calcium dihydroxide: when calcium sediment particles is negligible.	,		
Exposure concentrations in soil and groundwater	The terrestrial compartment is not i be relevant.	•	-	
Exposure concentration in atmospheric compartment	The air compartment is not included dihydroxide: when emitted to air as of its reaction with CO2 (or other ac calcium(bi)carbonate) are washed calcium dihydroxide largely end up	an aerosol in water cids), into HCO3- ar out from the air and	r, calcium dihydroxide in nd Ca2+. Subsequently	s neutralised as a result , the salts (e.g.
Exposure concentration relevant for the food chain (secondary poisoning)	Bioaccumulation in organisms is no secondary poisoning is therefore no		m dihydroxide: a risk a	ssessment for

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 ≥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 long-term 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 dihydroxide 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:

$$pHriver = Log \left[\frac{Qeffluent*10^{pHeffluent} + Qriverupstream*10^{pHupstream}}{Qriverupstream + Qeffluent} \right]$$

$$Eq 1)$$

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

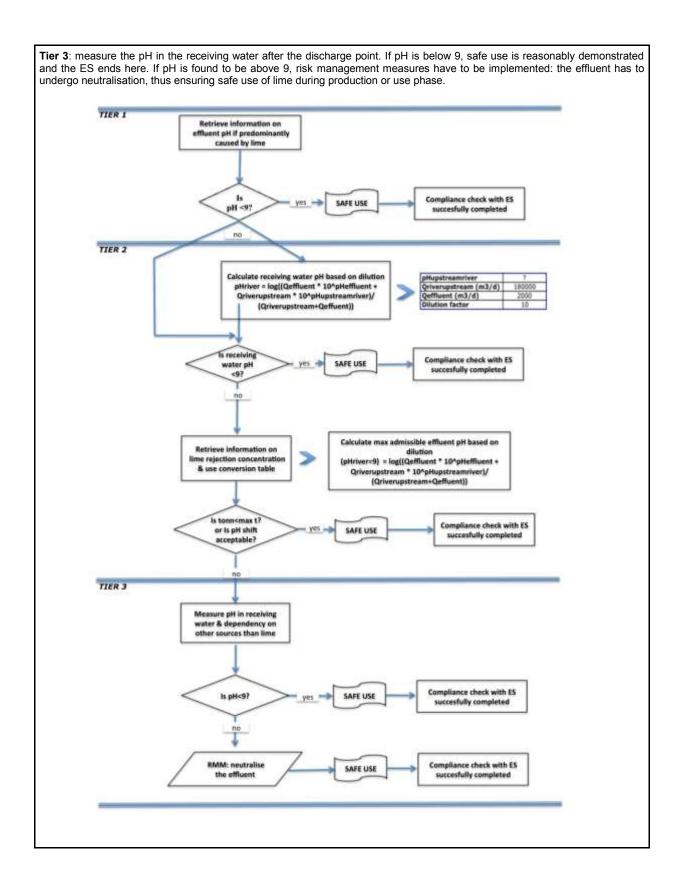
Please note that initially, default values can be used:

- 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 dihydroxide.

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

Exposure Scenario	Format (1) addressing uses carried out b	y workers	
1. Title			
Free short title	Manufacture and industrial uses of high dus	ty 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	The assessment of inhalation exposure is based	on the exposure estimation tool MEASE.	
2. Operational cond	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	Further information is provided in the ECHA	
PROC 9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Guidance on information requirements and chemical safety assessment, Chapter R.12:	
PROC 10	Roller application or brushing	Use descriptor system (ECHA-2010-G-05- EN).	
PROC 13	Treatment of articles by dipping and pouring	Liv).	
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 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-u bound in materials and/o			
PROC 25	Other hot work operations w	with metals		
PROC 26	Handling of solid inorganic substated temperature	ances at ambient		
PROC 27a	Production of metal powders (h	not processes)		
PROC 27b	Production of metal powders (v	vet processes)		
ERC 1-7, 12	Manufacture, formulation and all t uses	ypes of industrial		
ERC 10, 11	Wide-dispersive outdoor and indo articles and materia			
2.1 Control of work	ers exposure			
Product characteristic				
reflected by an assignmer ambient temperature the t temperature based, taking	approach, the substance-intrinsic en ht of a so-called fugacity class in the fugacity is based on the dustiness of g into account the process temperatu on the level of abrasion instead of th	MEASE tool. For o that substance. When the melting	perations conducted wi hereas in hot metal ope point of the substance.	th solid substances at arations, fugacity is
PROC	Use in preparation	Content in preparation	Physical form	Emission potential
PROC 22, 23, 25, 27a	not restricted		solid/powder, molten	high
All other applicable PROCs	not restricted		solid/powder	high
Amounts used				
combination of the scale of	ed per shift is not considered to influ of operation (industrial vs. professior ninant of the process intrinsic emissi	al) and level of con		
Frequency and duration	of use/exposure			
PROC		Duration of ex	cposure	
PROC 7, 8a, 17, 18, 19, 22		≤ 240 mini	utes	
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 m ³ /shift (8 hours).				
Other given operational	conditions affecting workers exp	osure		
assessment of the conduct exposure assessment in N temperatures are expected	e process temperature and process cted processes. In process steps wit MEASE is however based on the rati d to vary within the industry the high ss temperatures are automatically c	h considerably high io of process tempe lest ratio was taken	temperatures (i.e. PRO erature and melting poin as a worst case assum	DC 22, 23, 25), the nt. As the associated nption for the exposure
Technical conditions an	d measures at process level (sou	rce) to prevent rel	ease	
Risk management measu	res at the process level (e.g. contain	ment or segregation	n of the emission source	e) are generally not

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

PROC 1 PROC 2, 3 PROC 7	Level of separation Any potentially required	Localised controls (LC)	(according to	Further information
PROC 2, 3			MEASE)	
	separation of workers from the	not required	na	-
	emission source is indicated above under "Frequency and duration of exposure". A	general ventilation	17 %	-
	reduction of exposure . A reduction of exposure duration can be achieved, for example, by the installation of ventilated	integrated local exhaust ventilation	84 %	-
PROC 19	(positive pressure) control rooms or by removing the worker from	not applicable	na	-
All other applicable PROCs	workplaces involved with relevant exposure.	local exhaust ventilation	78 %	-
Drganisational measure	es to prevent /limit releases, dispe	rsion and exposu	re	
Shower and change cloth compressed air.	e workplace, the wearing of standard tes at end of work shift. Do not wear es related to personal protection,	contaminated cloth hygiene and healt	ing at home. Do not blo	se stated below. w dust off with
PROC	Specification of respiratory protective equipment (RPE)	RPE efficiency (assigned protection factor, APF)	Specification of gloves	Further personal protective equipmen (PPE)
PROC 1, 2, 3, 23, 25, 27b	not required	na		Eye protection equipment (e.g. goggles or visors) must be worn, unless potential contact with the eye can be excluded by the nature
PROC 4, 5, 7, 8a, 8b, 9, 7, 18,	FFP2 mask	APF=10		
PROC 10, 13, 14, 15, 6, 22, 24, 26, 27a	FFP1 mask	APF=4	Since calcium dihydroxide is classified as irritating	
PROC 19	FFP3 mask	APF=20	to skin, the use of protective gloves is mandatory for all process steps.	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.				

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 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 dihydroxide 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	<1 mg/m³ (0.01 – 0.96)	irritating to skin, derr minimised as far as DNEL for dermal derived. Thus, de	droxide is classified as nal exposure has to be technically feasible. A effects has not been rmal exposure is not exposure scenario.

Environmental emissions

The environmental exposure assessment is only relevant for the aquatic environment, when applicable including STPs/WWTPs, as emissions of calcium dihydroxide 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+ 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 dihydroxide will be found predominantly in water. Significant emissions or exposure to air are not expected due to the low vapour pressure of calcium dihydroxide will be found and ydroxide. 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 dihydroxide can potentially result in an aquatic emission and locally increase the calcium dihydroxide concentration and affect the pH in the aquatic environment. When the pH is not neutralised, the discharge of effluent from calcium dihydroxide 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	Waste water from calcium dihydroxide production is an inorganic wastewater stream and therefore
concentration in waste	
water treatment plant	sites will normally not be treated in biological waste water treatment plants (WWTPs), but can be
(WWTP)	used for pH control of acid wastewater streams that are treated in biological WWTPs.
Exposure concentration in aquatic pelagic compartment	When calcium dihydroxide 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-).

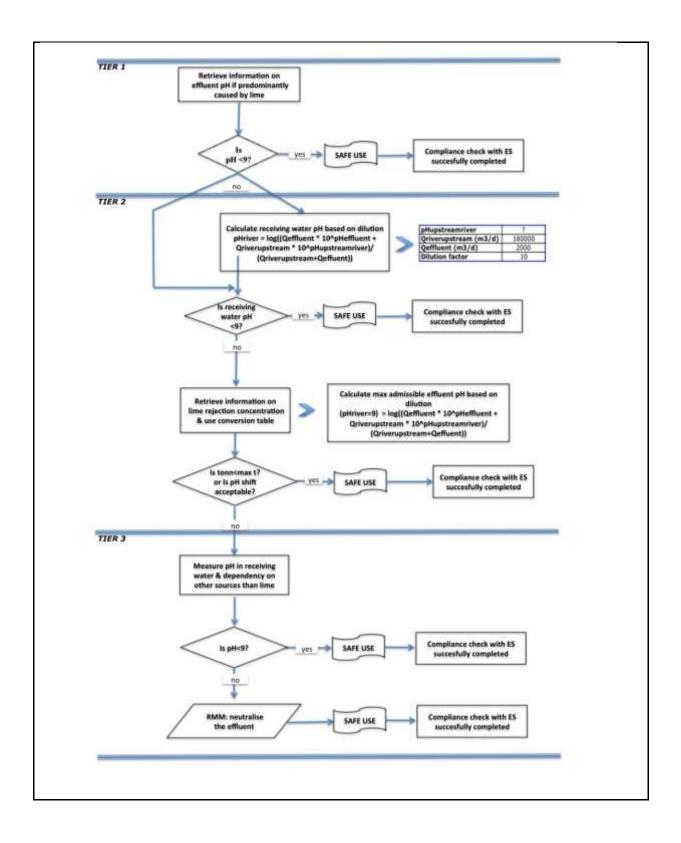
Exposure	The sodiment compartment is not included in this ES, because it is not considered relevant for
Exposure concentration in	The sediment compartment is not included in this ES, because it is not considered relevant for calcium dihydroxide: when calcium dihydroxide is emitted to the aquatic compartment, sorption of to
sediments	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 dihydroxide: when emitted to air as an aerosol in water, calcium dihydroxide 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 dihydroxide largely end up in soil and water.
Exposure concentration relevant for the food chain (secondary poisoning)	Bioaccumulation in organisms is not relevant for calcium dihydroxide: 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	
measures are adequate. respective DNEL (given t measured data are not av (www.ebrc.de/mease.htm according to the MEASE Method (RDM) are define	ser 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 hat 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 <u>al</u>) to estimate the associated exposure. The dustiness of the substance used can be determined glossary. For example, substances with a dustiness less than 2.5 % according to the Rotating Drum ed as "low dusty", substances with a dustiness less than 10 % (RDM) are defined as "medium dusty" ustiness ≥10 % are defined as "high dusty".
DNEL _{inhalation} : 1 mg	g/m³ (as respirable dust)
exists at a level of 4 mg/n acute DNEL is therefore a term exposure estimates	has to be aware of the fact that apart from the long-term DNEL given above, a DNEL for acute effects n ³ . By demonstrating a safe use when comparing exposure estimates with the long-term DNEL, the also covered (according to R.14 guidance, acute exposure levels can be derived by multiplying long- by a factor of 2). When using MEASE for the derivation of exposure estimates, it is noted that the long be reduced to half-shift as a risk management measure (leading to an exposure reduction of
Environmental exposur	e
perform a more site-spec	with the conditions stipulated in the safe use ES, it is recommended to apply a tiered approach to ific assessment. For that assessment, the following stepwise approach is recommended.
	on on effluent pH and the contribution of the calcium dihydroxide on the resulting pH. Should the pH be nantly attributable to lime, then further actions are required to demonstrate safe use.
	ion on receiving water pH after the discharge point. The pH of the receiving water shall not exceed the
value of 9. If the measure	es are not available, the pH in the river can be calculated as follows:
0e	
	es are not available, the pH in the river can be calculated as follows:
0e	as are not available, the pH in the river can be calculated as follows: $effluent * 10^{pHeffluent} + Qriverup stream * 10^{pHupstream}$
0e	as are not available, the pH in the river can be calculated as follows: $\frac{effluent * 10^{pHeffluent} + Qriverupstream * 10^{pHupstream}}{Qriverupstream + Qeffluent}$
$pHriver = Log \underbrace{Qe}_{Where:}$	as are not available, the pH in the river can be calculated as follows: $\frac{effluent * 10^{pHeffluent} + Qriverupstream * 10^{pHupstream}}{Qriverupstream + Qeffluent}$
$pHriver = Log \underbrace{Qe}_{Where:}$ Q effluent refer	as are not available, the pH in the river can be calculated as follows: $\frac{effluent*10^{pHeffluent} + Qriverupstream*10^{pHupstream}}{Qriverupstream+Qeffluent}$ (Eq 1)
$pHriver = Log \underbrace{Qe}_{Qe}$ Where: Q effluent refer Q river upstrea	The set of the effluent set of the effluent is the river can be calculated as follows: $\begin{array}{c} effluent * 10^{pHeffluent} + Qriverupstream * 10^{pHupstream} \\ \hline \\ Qriverupstream + Qeffluent \\ \hline \\ $
$pHriver = Log \underbrace{Qe}_{Qe}$ Where: Q effluent refer Q river upstrea pH effluent refer	The set of the effluent flow (in m ³ /day) $est are not available, the pH in the river can be calculated as follows: effluent * 10^{pHeffluent} + Qriverupstream * 10^{pHupstream}}Qriverupstream + Qeffluent(Eq 1)(Eq 1)$
$pHriver = Log \underbrace{Qe}_{q}$ Where: Q effluent refer Q river upstrea pH effluent refer pH upstream river	The set of the pH in the river can be calculated as follows: $\begin{array}{c} \hline effluent * 10^{pHeffluent} + Qriverupstream * 10^{pHupstream} \\ \hline Qriverupstream + Qeffluent \\ \hline \end{array} \\ \hline \end{array} \\ \hline \begin{array}{c} (Eq \ 1) \\ \hline \end{array} \\ \hline \end{array}$ The set of the effluent flow (in m³/day) m refers to the upstream river flow (in m³/day) ers to the pH of the effluent
$pHriver = Log \underbrace{Qe}_{q}$ Where: Q effluent refer Q river upstrea pH effluent refer PH upstream riv Please note that	The set of the pH in the river can be calculated as follows: $\begin{array}{c} effluent * 10^{pHeffluent} + Qriverupstream * 10^{pHupstream} \\ \hline Qriverupstream + Qeffluent \\ \hline \\ $
$pHriver = Log \qquad \underbrace{Qe}_{d}$ Where: Q effluent refer Q river upstrea pH effluent refer pH upstream riv Please note that • Q riv m ³ /dt	The set of the pH in the river can be calculated as follows: $\begin{array}{c} effluent * 10^{pHeffluent} + Qriverupstream * 10^{pHupstream} \\ \hline Qriverupstream + Qeffluent \\ \hline \end{array} \\ \hline \end{array} \\ \hline \end{array} \\ \hline \end{array} \\ \hline \begin{array}{c} (Eq \ 1) \\ \hline \end{array} \\ \hline \bigg $ \\ \hline \bigg \\ \\ \hline \bigg \\ \hline \bigg \\ \\ \\ \hline \bigg \\ \\ \hline \bigg \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\
$pHriver = Log \underbrace{Qe}_{q}$ Where: Q effluent refer Q river upstread pH effluent refer pH upstream rid Please note that • Q river m ³ /da • Q effluent refer Please note that • Q river m ³ /da • The	The set of the pH in the river can be calculated as follows: $\begin{array}{c} \hline effluent * 10^{pHeffluent} + Qriverupstream * 10^{pHupstream}} \\ \hline Qriverupstream + Qeffluent \\ \hline \end{array} \\ \hline \begin{array}{c} (Eq \ 1) \\ \hline \end{array} \\ \hline \bigg $ \\ \hline \bigg \\ \hline \end{array} \\ \hline \bigg \\ \\ \hline \bigg \\ \hline \bigg \\ \\ \hline \bigg \\ \\ \\ \hline \bigg \\ \\ \\ \hline \bigg \\ \\ \hline \bigg \\ \\ \\ \end{aligned} \\ \end{aligned} \\ \hline \bigg \\ \\ \hline \bigg \\ \end{aligned} \\ \end{aligned} \\ \end{aligned} \\ \end{aligned} \\ \\ \end{aligned} \\ \\ \end{aligned} \\ \\ \\ \end{aligned} \\ \end{aligned} \\ \\ \\ \end{aligned} \\ \\
$pHriver = Log \underbrace{Qe}_{i}$ Where: Q effluent refer Q river upstrea pH effluent refer pH upstream ri Please note tha • Q riv m ³ /d: • Q eff • The can the Such equation has to be	The set of the pH in the river can be calculated as follows: $\begin{array}{c} effluent * 10^{pHeffluent} + Qriverupstream * 10^{pHupstream} \\ Qriverupstream + Qeffluent \\ \hline \\ $

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 dihydroxide.

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.

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

	Format (1) addressing use	s carried out i	Jy workers			
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/o	or activities covered	d are described in Secti	on 2 below.		
Assessment Method	The assessment of inhalation	exposure is based	I on the exposure estim	ation tool MEASE.		
2. Operational con	ditions and risk managemer	nt measures				
PROC/ERC	REACH definition	l	Involv	ed tasks		
PROC 6	Calendering operation	ins				
PROC 14	Production of preparations or artic compression, extrusion, pe	letisation				
PROC 21	Low energy manipulation of subst materials and/or artic	les				
PROC 22	Potentially closed processing operations with minerals/metals at elevated temperature Industrial setting		Further information is provided in the ECF Guidance on information requirements ar			
PROC 23	Open processing and transfer o minerals/metals at elevated to	chemical safety assessment, Chapter R.12: Use descriptor system (ECHA-2010-G-05- EN).				
PROC 24	High (mechanical) energy work-u bound in materials and/or					
PROC 25	Other hot work operations w					
ERC 1-7, 12	Manufacture, formulation and all ty uses					
ERC 10, 11	Wide-dispersive outdoor and indoor use of long-life articles and materials					
2.1 Control of work	ers exposure					
Product characteristic						
reflected by an assignme ambient temperature the temperature based, takin	approach, the substance-intrinsic en nt of a so-called fugacity class in the fugacity is based on the dustiness of g into account the process temperatu on the level of abrasion instead of th	MEASE tool. For c that substance. W re and the melting e substance intrins	pperations conducted with hereas in hot metal operations 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	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	led per shift is not considered to influ of operation (industrial vs. profession ninant of the process intrinsic emission	al) and level of cor				

Frequency and duration	n of use/exposure					
PROC	Duration of exposure					
PROC 22	≤ 240 minutes					
All other applicable PROCs		480 minutes (not	restricted)			
Human factors not influ	enced by risk management					
The shift breathing volum	e during all process steps reflected i	n the PROCs is ass	sumed to be 10 m³/shift	(8 hours).		
Other given operational	conditions affecting workers exp	osure				
assessment of the condu exposure assessment in temperatures are expected	e process temperature and process cted processes. In process steps wit MEASE is however based on the rat ed to vary within the industry the high ess temperatures are automatically c	h considerably high io of process tempe nest ratio was taken	e temperatures (i.e. PRO erature and melting poir as a worst case assum	DC 22, 23, 25), the nt. As the associated nption for the exposure		
Technical conditions ar	nd measures at process level (sou	rce) to prevent rel	ease			
Risk management measurequired in the processes	ures at the process level (e.g. conta	ainment or segrega	ation of the emission s	ource) are generally not		
Technical conditions ar	nd measures to control dispersion	from source towa	irds 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 from the	not required	na	-		
PROC 22, 23, 24, 25	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 measure	es to prevent /limit releases, dispe	rsion and exposur	.e			
These measures involve eating and smoking at the	ion. General occupational hygiene m good personal and housekeeping pra e workplace, the wearing of standard les at end of work shift. Do not wear	actices (i.e. regular working clothes an	cleaning with suitable of ad shoes unless otherwi	cleaning devices), no ise stated below.		
Conditions and measur	es related to personal protection,	hygiene and healt	h 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 dihydroxide is	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 principles are imple	classified as irritating to skin, the use of protective gloves is mandatory for all process steps. mented in parallel: The	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. duration of work		
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						

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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 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 dihydroxide 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.

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 A state of the second s					
Environmental emission	ns					
as emissions of calcium of aquatic effect and risk as OH- discharges, being th scale is being addressed (WWTPs) when applicabl place on a local scale. Th predominantly in water. S dihydroxide. Significant e The exposure assessmer surface water related to th	sure assessment is only relevant for the different life-cycle is the different life-cycle is essment only deal with the effect or e toxicity of Ca2+ is expected to be reacted in the different life-cycle is expected to be reacted to be react	stages (production a n organisms/ecosys negligible compared ent plants (STPs) or use as any effects t vapour pressure ind air are not expected al environment are u erefore only deal wit . The exposure asso above 9. ide can potentially r oncentration and aff arge of effluent from r. The pH of effluen	and use) mainly apply t tems due to possible pl to the (potential) pH ef industrial waste water hat might occur would licate that calcium dihy due to the low vapour not expected either for the possible pH chan essment is approached esult in an aquatic emis ect the pH in the aquati calcium dihydroxide pi ts is normally measured	o (waste) water. The H changes related to ffect. Only the local treatment plants be expected to take droxide will be found pressure of calcium this exposure scenario. iges in STP effluent and by assessing the ssion and locally ic environment. When roduction sites may		
-	can be neutralised easily as often re					
Exposure concentration in waste water treatment plant (WWTP)	Waste water from calcium dihydroxide production is an inorganic wastewater stream and therefore there is no biological treatment. Therefore, wastewater streams from calcium dihydroxide 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 dihydroxide 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 dihydroxide: when calcium dihydroxide 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 dihydroxide: when emitted to air as an aerosol in water, calcium dihydroxide 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 dihydroxide largely end up in soil and water.					
Exposure concentration relevant for the food chain (secondary poisoning)	Bioaccumulation in organisms is no secondary poisoning is therefore no		m dihydroxide: a risk as	ssessment for		

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

(www.ebrc.de/mease.ntm) 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 long-term 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 dihydroxide 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:

$$pHriver = Log \left[\frac{Qeffluent*10^{pHeffluent} + Qriverupstream*10^{pHupstream}}{Qriverupstream + Qeffluent} \right]$$
(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:

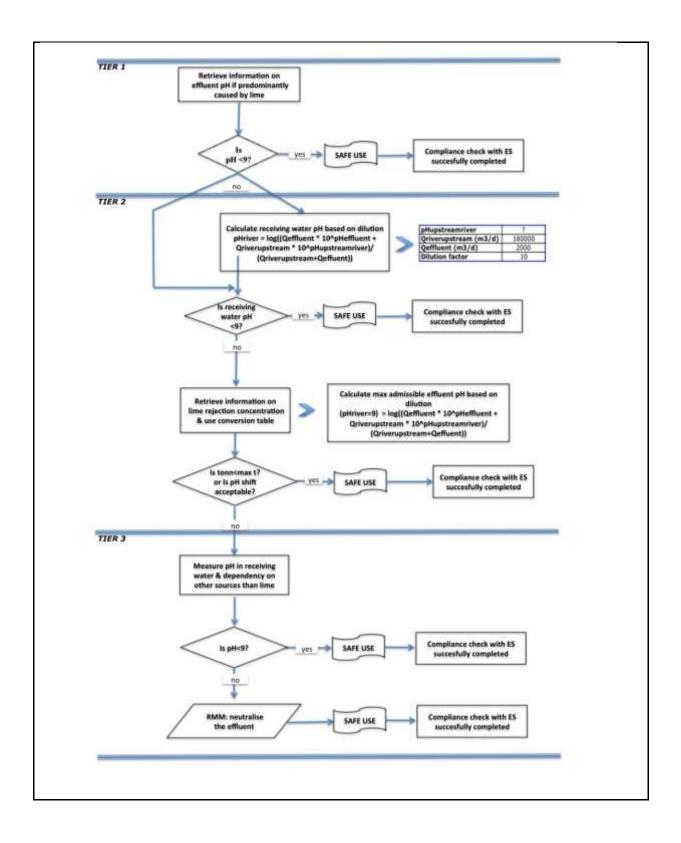
- Q river upstream flows: use the 10th of existing measurements distribution or use default value of 18000 $m^{3}\!/day$
- Q effluent: use default value of 2000 m³/day
- The upstream pH is preferably a measured value. If not available, one can assume a neutral pH of 7 if this can be justified.

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 dihydroxide.

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.

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

Exposure Scenario	Format (1) addressing uses carrie	d out by workers		
1. Title				
Free short title	Professional uses of aq	ueous solutions 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 activitie	s covered are described in Section 2 below.		
Assessment Method		based on the exposure estimation tool MEASE. The ment is based on FOCUS-Exposit.		
2. Operational cond	itions and risk management meas	ures		
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 descriptor system		
PROC 10	Roller application or brushing	(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 dihydroxide is applied in numerous cases of wide dispersive uses: agricultural, forestry, fish and shrimps farming, soil treatment and environmental protection.		

2.1 Control of worke	ers 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 restric	cted	aqueous solution	very low			
Amounts used							
The actual tonnage handle combination of the scale o PROC) is the main determ	of operation (industrial vs.	professional) and lev	el of containment/automa				
Frequency and duration	of use/exposure						
PROC		Durat	ion of exposure				
PROC 11		≤	240 minutes				
All other applicable PROCs		480 min	utes (not restricted)				
Human factors not influe	enced by risk manageme	ent					
The shift breathing volume	e during all process steps	reflected in the PRO	Cs is assumed to be 10 m	³/shift (8 hours).			
Other given operational	conditions affecting wor	kers exposure					
Since aqueous solutions process pressure) are not				e.g. process temperature and icted processes.			
Technical conditions and	d measures at process l	evel (source) to pre	event release				
Risk management measu required in the processes.	res at the process level ((e.g. containment or	segregation of the emiss	sion source) are generally not			
Technical conditions and	d measures to control di	spersion from sou	rce towards 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	not applicable	na	-			
All other applicable PROCs	source is generally not required in the conducted processes.						
Organisational measures		· · ·	· ·				
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.							

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.

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Conditions and measures related to personal protection, hygiene and health evaluation RPE efficiency Specification of Specification of Further personal protective (assigned PROC respiratory protective equipment (PPE) protection gloves equipment (RPE) factor, APF) Eye protection equipment PROC 11 FFP3 mask APF=20 (e.g. goggles or visors) must Since calcium be worn, unless potential dihydroxide is contact with the eye can be classified as irritating to excluded by the nature and PROC 17 FFP1 mask skin, the use of type of application (i.e. APF=4 protective gloves is closed process). Additionally, mandatory for all face protection, protective process steps. clothing and safety shoes are required to be worn as All other applicable not required na PROCs 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 mg) 120 Wind speed: - 3.5 m/s 100 - 6 m/s 80 3.5 m/s 60 40 20 7 11 15 20 Distance from the spreader(in m)

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

Amounts used

Ca(OH)2

2,244 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 2,244 kg/ha is not exceeded (CaOH2)

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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

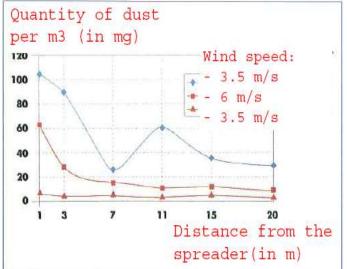
Drift should be minimised.

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 soil treatment in civil engineering Product characteristics

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



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

Amounts used

Ca(OH)2

238,208 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 238,208 kg/ha is not exceeded (CaOH2)

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

(secondary poisoning)

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 dihydroxide 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	< 1 mg/m³ (<0.001 – 0.6)	 Since calcium dihydroxide is classified as irritating skin, dermal exposure has to be minimised as far a technically feasible. A DNEL for dermal effects has been derived. Thus, dermal exposure is not assess in this exposure scenario. 			
Environmental exposure	e for agricultural soil pro	tection				
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 dihydroxide can indeed migrate then towards surface waters, via drift. Environmental emissions See amounts used Exposure concentration in waste water treatment plant Not relevant for agricultural soil protection						
(WWTP) Exposure	Substance	PEC (ug/L)	PNEC (ug/L)	RCR		
concentration in aquatic pelagic compartment	Ca(OH)2	7.48	490	0.015		
Exposure concentration in sediments	natural waters the hydrox by reacting with Ca2+. T	I I I I I I I I I I I I I I I I I I I				

	carbonate is or low solubility and a constituent of natural solis.				
Exposure	Substance	PEC (mg/L)	PNEC (mg/L)	RCR	
concentrations in soil and groundwater	Ca(OH)2	660	1080	0.61	
Exposure concentration in atmospheric compartment	This point is not relevant. Calcium dihydroxide is not volatile. The vapour pressures is below 10 ⁻⁵ Pa				
Exposure concentration relevant for the food chain (secondary poisoning)		nent. The uses cover	red do not significantly infl	ered to be omnipresent and uence the distribution of the	

Environmental exposure for soil treatment in civil engineering

The soil treatment in civil engineering 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.

where parameters such as	s units can be improved a	containing to contected	uala.		
Environmental emissions	See amounts used				
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	Ca(OH)2	701	1080	0.65	
Exposure concentration in atmospheric compartment	This point is not relevant. Calcium dihydroxide 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 (Ca2+ and OH-) in the environment.				
Environmental exposure	Environmental exposure 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 					

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

• 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

(<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 dustiness 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 long-term 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 9.7: Professional uses of low dusty solids/powders of lime substances

Exposure Scenari	o Format (1) addressing uses carried out	by workers			
1. Title					
Free short title	Professional uses of low 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 covere	d are described in Section 2 below.			
Assessment Method	The assessment of inhalation exposure is based o environmental assessment is b				
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				
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				
PROC 11	Non industrial spraying	Further information is provided in the ECHA Guidance on information requirements and			
PROC 13	Treatment of articles by dipping and pouring	chemical safety assessment, Chapter R.12: Use 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 wor	kers 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 Emiss					
PROC 25	not restricted		solid/powder, molten	high		
All other applicable PROCs	not restricted		solid/powder	low		
Amounts used						
combination of the scale	dled per shift is not considered to infl of operation (industrial vs. professio minant of the process intrinsic emiss	nal) and level of co				
Frequency and duratio	n of use/exposure					
PROC		Duration of e	xposure			
PROC 17		≤ 240 min	utes			
All other applicable PROCs		480 minutes (not	restricted)			
Human factors not infl	uenced by risk management					
The shift breathing volur	ne during all process steps reflected	in the PROCs is as	ssumed to be 10 m³/shif	t (8 hours).		
	al conditions affecting workers exp					
assessment of the condi- exposure assessment in temperatures are expect	ke process temperature and process ucted processes. In process steps wi MEASE is however based on the ra ted to vary within the industry the hig cess temperatures are automatically of	th considerably hig tio of process temp hest ratio was take	h temperatures (i.e. PR erature and melting poi n as a worst case assur	OC 22, 23, 25), the nt. As the associated nption for the exposure		
Technical conditions a	nd measures at process level (sou	urce) to prevent re	lease			
Risk management meas required in the processe	ures at the process level (e.g. contai s.	nment or segregati	on of the emission sour	ce) are generally not		
Technical conditions a	nd measures to control dispersior	n from source tow	ards 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					
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 measur	res to prevent /limit releases, dispe	ersion and exposu	ire			
These measures involve eating and smoking at th	tion. General occupational hygiene r good personal and housekeeping p e workplace, the wearing of standard hes at end of work shift. Do not wear	ractices (i.e. regula d working clothes a	r cleaning with suitable nd shoes unless otherw	cleaning devices), no vise stated below.		

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Conditions and measures related to personal protection, hygiene and health evaluation **RPE efficiency** Further personal Specification of respiratory Specification of (assigned PROC protective equipment protective equipment (RPE) protection gloves (PPE) factor, APF) Eye protection PROC 4, 5, 11, 26 FFP1 mask APF=4 equipment (e.g. goggles PROC 16, 17, 18, 25 APF=10 FFP2 mask or visors) must be worn, Since calcium unless potential contact dihydroxide is with the eye can be classified as irritating excluded by the nature to skin, the use of and type of application protective gloves is (i.e. closed process). All other applicable not required na PROCs mandatory for all Additionally, face process steps. 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/s80 3.5 m/s 60 40 20 15 7 11 Distance from the spreader(in m) (Figure taken from: Laudet, A. et al., 1999) Amounts used Ca(OH)2 2,244 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 2,244 kg/ha is not exceeded (CaOH2)

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EXPOSURE SCENARIOS	Dated 26/06/2018
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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

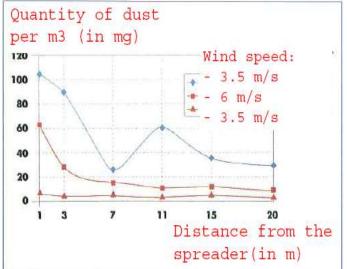
Drift should be minimised.

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 soil treatment in civil engineering Product characteristics

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



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

Amounts used

Ca(OH)2

238,208 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 238,208 kg/ha is not exceeded (CaOH2)

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 dihydroxide 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)	irritating to skin, den minimised as far as DNEL for dermal effe Thus, dermal exposu	droxide is classified as mal exposure has to be technically feasible. A cts has not been derived. re is not assessed in this e scenario.
Environmental exposu	re 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 dihydroxide can indeed migrate then towards surface waters, via drift.				
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	Ca(OH)2	7.48	490	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	Ca(OH)2	660	1080	0.61
Exposure concentration in atmospheric compartment	This point is not relevant. Calcium dihydroxide 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 of environment. The uses covered do and OH-) in the environment.			

Environmental exposure for soil treatment in civil engineering

The soil treatment in civil engineering 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.

where parameters such				
Environmental emissions	See amounts used			
Exposure concentration in waste water treatment plant (WWTP)	Not relevant for road border scenari	0		
Exposure concentration in aquatic pelagic compartment	Not relevant for road border scenari	0		
Exposure concentration in sediments	Not relevant for road border scenario			
Exposure	Substance	PEC (mg/L)	PNEC (mg/L)	RCR
concentrations in soil and groundwater	Ca(OH)2	701	1080	0.65
-	This point is not relevant. Calcium dihydroxide is not volatile. The vapour pressures is below 10 ⁻⁵ Pa.			
Exposure concentration in atmospheric compartment	This point is not relevant. Calcium d	ihydroxide is not vo	blatile. The vapour pres	ssures is below 10 ⁻⁵ Pa.
concentration in atmospheric	This point is not relevant. Calcium d This point is not relevant because ca environment. The uses covered do a and OH-) in the environment.	alcium can be cons	sidered to be omniprese	ent and essential in the
concentration in atmospheric compartment Exposure concentration relevant for the food chain (secondary	This point is not relevant because car environment. The uses covered do and OH-) in the environment.	alcium can be cons	sidered to be omniprese	ent and essential in the

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 soil treatment in civil engineering

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

(<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 dustiness 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 long-term 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 %).

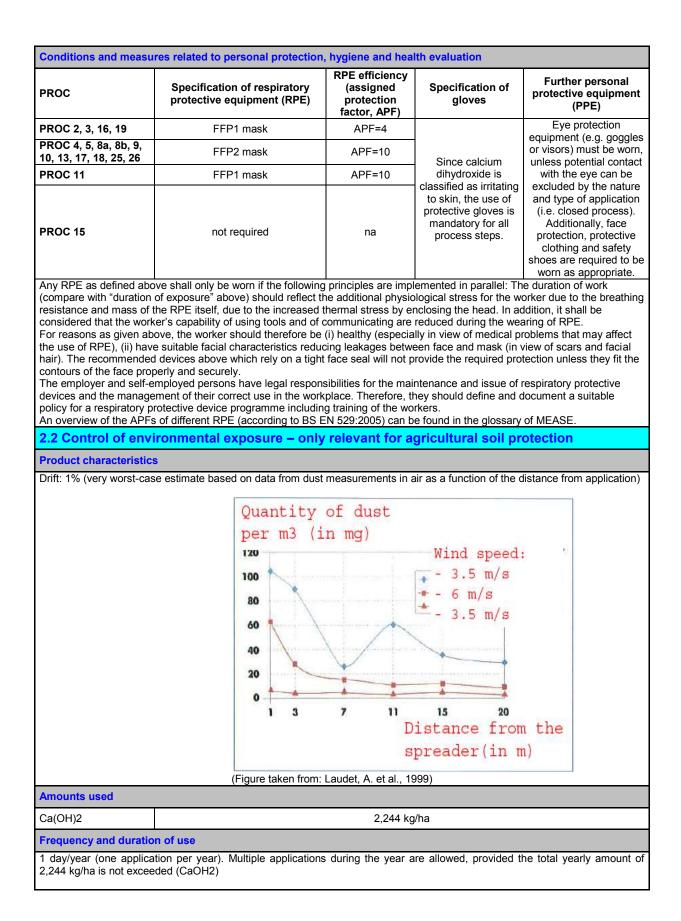
ES number 9.8: Professional uses of medium dusty solids/powders of lime substances

Exposure Scenari	o Format (1) addressing uses carried out	by workers	
1. Title			
Free short title	Professional uses of medium dusty solids/powders of lime substances		
	SU22, SU1, SU5, SU6a, SU6b, SU7, SU10, SU11, SU12, SU13, SU16, SU17, SU18, SU19, SU20,		
Systematic title based on use descriptor	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		
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:	
PROC 13	Treatment of articles by dipping and pouring	Use 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 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		

Product characteristic				
reflected by an assignm ambient temperature the temperature based, taki	E approach, the substance-intrinsic e ent of a so-called fugacity class in the e fugacity is based on the dustiness o ng into account the process temperat d on the level of abrasion instead of t	e MEASE tool. For of that substance. W ture and the melting	operations conducted v /hereas in hot metal op g point of the substance	with solid substances at perations, fugacity is
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				
combination of the scale	dled per shift is not considered to influe of operation (industrial vs. professio rminant of the process intrinsic emiss	nal) and level of co		
Frequency and duration	on of use/exposure			
PROC		Duration of e	xposure	
PROC 11, 16, 17, 18, 19		≤ 240 minutes		
All other applicable PROCs		480 minutes (not restricted)		
Human factors not infl	uenced by risk management			
The shift breathing volu	me during all process steps reflected	in the PROCs is as	sumed to be 10 m³/sh	ift (8 hours).
Other given operation	al conditions affecting workers exp	osure		
exposure assessment ir temperatures are expec estimation. Thus all proo Technical conditions a Risk management mea	ucted processes. In process steps wi MEASE is however based on the ra- ted to vary within the industry the hig cess temperatures are automatically of ind measures at process level (sou sures at the process level (e.g. cont	tio of process temp hest ratio was take covered in this expo arce) to prevent re	erature and melting po n as a worst case assu osure scenario for PRC lease	int. As the associated imption for the exposure OC 22, 23 and PROC 25
required in the processe Technical conditions a	s. Ind measures to control dispersior	n from source tow	ards 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 source is indicated	generic local exhaust ventilation	72 %	-
PROC 17, 18	above under "Frequency and duration of exposure". A reduction of exposure duration can be	integrated local exhaust ventilation	87 %	-
PROC 19	achieved, for example, by the installation of ventilated (positive	not applicable	na	-
All other applicable	pressure) control rooms or by removing the worker from workplaces involved with relevant	not required	na	-
PROCs	exposure.			
PROCs Organisational measu	res to prevent /limit releases, dispe	ersion and exposu	ire	

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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

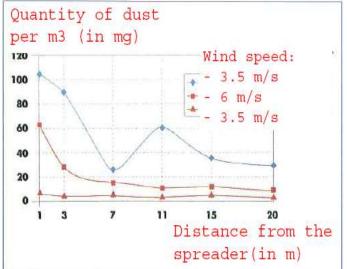
Drift should be minimised.

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 soil treatment in civil engineering Product characteristics

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



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

Amounts used

Ca(OH)2

238,208 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 238,208 kg/ha is not exceeded (CaOH2)

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 dihydroxide 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 A Since calcium dihydroxide 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. A Since calcium dihydroxide 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 exposu	re for agricultural soil protection				
on the calculation of pre- surface water and sedim more appropriate for agr modelling. FOCUS is a r German EXPOSIT 1.0 m the soil, calcium dihydro.	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 dihydroxide can indeed migrate then towards surface waters, via drift.				
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	Ca(OH)2	7.48	490	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	Ca(OH)2	660	1080	0.61	
Exposure concentration in atmospheric compartment	This point is not relevant. Calcium dihydroxide 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 of environment. The uses covered do and OH-) in the environment.				

Environmental exposure for soil treatment in civil engineering

The soil treatment in civil engineering 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.

where parameters such as units can be improved according to collected data.				
Environmental emissions	See amounts used			
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			
	Substance PEC (mg/L) PNEC (mg/L) RCR			
Exposure	Substance	PEC (mg/L)	PNEC (mg/L)	RCR
Exposure concentrations in soil and groundwater	Substance Ca(OH)2	PEC (mg/L) 701	PNEC (mg/L) 1080	RCR 0.65
concentrations in soil and groundwater Exposure concentration in atmospheric compartment		701	1080	0.65
concentrations in soil and groundwater Exposure concentration in atmospheric	Ca(OH)2	701 ihydroxide is not v	1080 olatile. The vapour pres	0.65 soures is below 10^{-5} Pa.
concentrations in soil and groundwater Exposure concentration in atmospheric compartment Exposure concentration relevant for the food chain (secondary	Ca(OH)2 This point is not relevant. Calcium d This point is not relevant because c environment. The uses covered do and OH-) in the environment.	701 ihydroxide is not v	1080 olatile. The vapour pres	0.65 soures is below 10^{-5} Pa.

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 soil treatment in civil engineering

• 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

(<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 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 long-term 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 %).

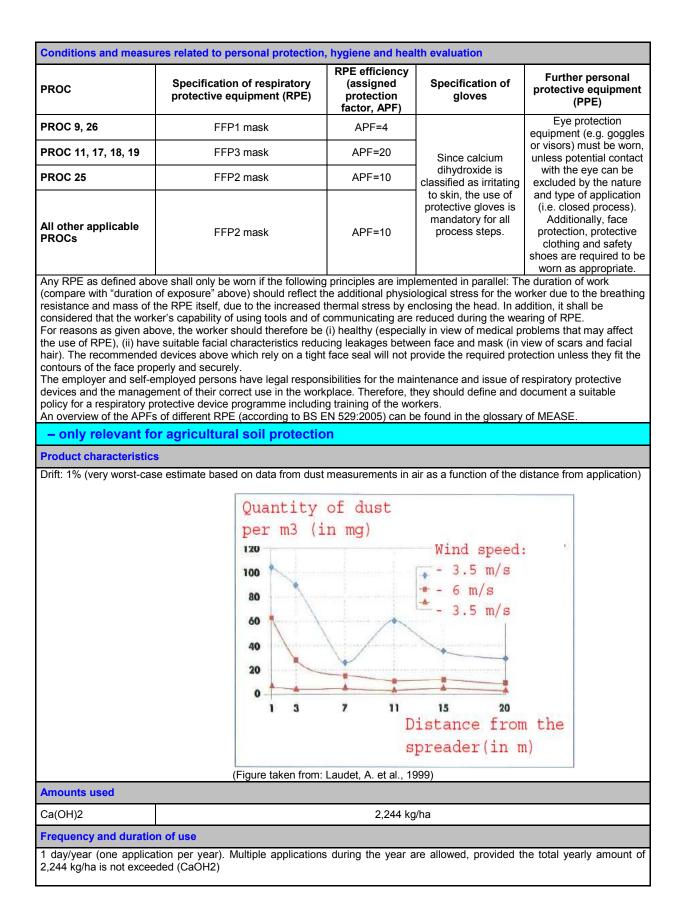
ES number 9.9: Professional uses of high dusty solids/ powders of lime substances

Exposure Scenari	o Format (1) addressing uses carried out	by workers			
1. Title					
Free short title	Professional uses of high dusty solid	ds/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 covere				
Assessment Method	The assessment of inhalation exposure is based o environmental assessment is b				
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				
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:			
PROC 13	Treatment of articles by dipping and pouring	Use 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 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 potentia					
All applicable PROCs	not restricted		solid/powder	high		
Amounts used						
combination of the scale	dled per shift is not considered to influ of operation (industrial vs. professio minant of the process intrinsic emiss	nal) and level of co				
Frequency and duratio	n of use/exposure					
PROC		Duration of e	xposure			
PROC 4, 5, 8a, 8b, 9, 10, 16, 17, 18, 19, 26		≤ 240 min	utes			
PROC 11		≤ 60 mini	utes			
All other applicable PROCs		480 minutes (no	t restricted)			
Human factors not influ	uenced by risk management					
The shift breathing volun	ne during all process steps reflected	in the PROCs is as	ssumed to be 10 m³/shi	ft (8 hours).		
Other given operationa	Il conditions affecting workers exp	osure				
assessment of the condu exposure assessment in temperatures are expect	ke process temperature and process acted processes. In process steps wi MEASE is however based on the ra- red to vary within the industry the high ress temperatures are automatically of	th considerably hig tio of process temp hest ratio was take	h temperatures (i.e. PR perature and melting poinn as a worst case assure	CC 22, 23, 25), the int. As the associated mption for the exposure		
Technical conditions a	nd measures at process level (sou	irce) to prevent re	lease			
Risk management meas required in the processe	ures at the process level (e.g. contai s.	nment or segregati	on of the emission sour	ce) are generally not		
Technical conditions a	nd measures to control dispersior	n from source tow	ards 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 source is indicated	generic local exhaust ventilation	72 %	-		
PROC 17, 18	above under "Frequency and integrated local duration of exposure". A reduction exhaust 87 % - of exposure duration can be ventilation					
PROC 19	achieved, for example, by the installation of ventilated (positive pressure) control rooms or by	not applicable	na	only in well ventilated rooms or outdoors (efficiency 50 %)		
All other applicable PROCs	vermoving the worker from workplaces involved with relevant exposure.					
Organisational measur	es to prevent /limit releases, dispe	ersion and exposu	ire			
These measures involve eating and smoking at th	tion. General occupational hygiene r good personal and housekeeping pr wwrkplace, the wearing of standard hes at end of work shift. Do not wear	ractices (i.e. regula d working clothes a	r cleaning with suitable ind shoes unless otherv	cleaning devices), no vise stated below.		

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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

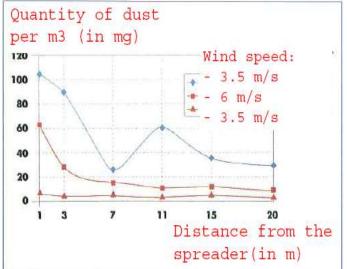
Drift should be minimised.

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 soil treatment in civil engineering Product characteristics

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



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

Amounts used

Ca(OH)2

238,208 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 238,208 kg/ha is not exceeded (CaOH2)

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 dihydroxide 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 Since calcium dihydroxide 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 exposu	re for agricultural soil protection				
on the calculation of pre- surface water and sedim more appropriate for agr modelling. FOCUS is a r German EXPOSIT 1.0 m the soil, calcium dihydro.	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 dihydroxide can indeed migrate then towards surface waters, via drift.				
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	Ca(OH)2	7.48	490	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	Ca(OH)2	660	1080	0.61	
Exposure concentration in atmospheric compartment	This point is not relevant. Calcium dihydroxide 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 of environment. The uses covered do and OH-) in the environment.				

Environmental exposure for soil treatment in civil engineering

The soil treatment in civil engineering 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.

where parameters such				
Environmental emissions	See amounts used			
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	Substance	PEC (mg/L)	PNEC (mg/L)	RCR
soil and groundwater	Ca(OH)2	701	1080	0.65
Exposure concentration in atmospheric compartment	This point is not relevant. Calcium dihydroxide is not volatile. The vapour pressures is below 10 ⁻⁵ Pa.			
Exposure	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 (Ca2+ and OH-) in the environment.			
concentration relevant for the food chain (secondary poisoning)	environment. The uses covered do i			
relevant for the food chain (secondary	environment. The uses covered do n and OH-) in the environment.			

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 soil treatment in civil engineering

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

(<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 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 long-term 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 9.10: 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 on use descriptor	SU22 (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	itions and risk management mea		00-Exp03it.	
Task/ERC	REACH definition	Invo	lved tasks	
Milling	PROC 5			
Loading of spreader	PROC 8b, PROC 26		f calcium dihydroxide for soil eatment.	
Application to soil (spreading)	PROC 11			
ERC2, ERC8a, ERC8b, ERC8c, ERC8d, ERC8e, ERC8f	Wide dispersive indoor and outdoor use o reactive substances or processing aids in open systems			
2.1 Control of work	ers exposure			
Product characteristic				
Product characteristic According to the MEASE a reflected by an assignmen ambient temperature the fi temperature based, taking	approach, the substance-intrinsic emission t of a so-called fugacity class in the MEASE ugacity is based on the dustiness of that su into account the process temperature and on the level of abrasion instead of the subst	tool. For operations conduct tostance. Whereas in hot me the melting point of the sub	icted with solid substances at etal operations, fugacity is stance. As a third group, high	
Product characteristic According to the MEASE a reflected by an assignmen ambient temperature the fi temperature based, taking	t of a so-called fugacity class in the MEASE ugacity is based on the dustiness of that su	tool. For operations conduct tostance. Whereas in hot me the melting point of the sub	icted with solid substances at etal operations, fugacity is stance. As a third group, high	
Product characteristic According to the MEASE a reflected by an assignmen ambient temperature the fi temperature based, taking abrasive tasks are based of	t of a so-called fugacity class in the MEASE ugacity is based on the dustiness of that su into account the process temperature and on the level of abrasion instead of the subst Use in preparation Content in	tool. For operations conducts ostance. Whereas in hot me the melting point of the sub ance intrinsic emission pote	icted with solid substances at etal operations, fugacity is stance. As a third group, high ential.	
Product characteristic According to the MEASE a reflected by an assignmen ambient temperature the fi temperature based, taking abrasive tasks are based of Task	t of a so-called fugacity class in the MEASE ugacity is based on the dustiness of that su into account the process temperature and on the level of abrasion instead of the subst Use in preparation Content in preparation	E tool. For operations condu- ostance. Whereas in hot me the melting point of the sub- ance intrinsic emission pote Physical form	acted with solid substances at etal operations, fugacity is stance. As a third group, high ential. Emission potential	
Product characteristic According to the MEASE a reflected by an assignmen ambient temperature the fi temperature based, taking abrasive tasks are based of Task Milling	t of a so-called fugacity class in the MEASE ugacity is based on the dustiness of that su into account the process temperature and on the level of abrasion instead of the subst Use in preparation Not restricted	tool. For operations condu- ostance. Whereas in hot me the melting point of the sub- ance intrinsic emission pote Physical form solid/powder	acted with solid substances at etal operations, fugacity is stance. As a third group, high ential. Emission potential high	
Product characteristic According to the MEASE a reflected by an assignmen ambient temperature the fi temperature based, taking abrasive tasks are based of Task Milling Loading of spreader Application to soil	t of a so-called fugacity class in the MEASE ugacity is based on the dustiness of that su into account the process temperature and on the level of abrasion instead of the subst Use in preparation Not restricted not restricted	tool. For operations condu- ostance. Whereas in hot me the melting point of the sub- ance intrinsic emission pote Physical form solid/powder solid/powder	acted with solid substances at etal operations, fugacity is stance. As a third group, high ential. Emission potential high high	
Product characteristic According to the MEASE a reflected by an assignmen ambient temperature the fi temperature based, taking abrasive tasks are based o Task Milling Loading of spreader Application to soil (spreading) Amounts used The actual tonnage handle combination of the scale o	t of a so-called fugacity class in the MEASE ugacity is based on the dustiness of that su into account the process temperature and on the level of abrasion instead of the subst Use in preparation Not restricted not restricted	tool. For operations condu- batance. Whereas in hot me the melting point of the sub- ance intrinsic emission pote Physical form solid/powder solid/powder solid/powder e exposure as such for this level of containment/autom	Interest with solid substances at least operations, fugacity is stance. As a third group, high ential. Emission potential high high high scenario. Instead, the	
Product characteristic According to the MEASE a reflected by an assignmen ambient temperature the fi temperature based, taking abrasive tasks are based o Task Milling Loading of spreader Application to soil (spreading) Amounts used The actual tonnage handle combination of the scale o	t of a so-called fugacity class in the MEASE ugacity is based on the dustiness of that su into account the process temperature and on the level of abrasion instead of the subst Use in preparation not restricted not restricted not restricted ed per shift is not considered to influence th f operation (industrial vs. professional) and inant of the process intrinsic emission pote	tool. For operations condu- batance. Whereas in hot me the melting point of the sub- ance intrinsic emission pote Physical form solid/powder solid/powder solid/powder e exposure as such for this level of containment/autom	Interest with solid substances at least operations, fugacity is stance. As a third group, high ential. Emission potential high high high scenario. Instead, the	
Product characteristic According to the MEASE a reflected by an assignmen ambient temperature the fi temperature based, taking abrasive tasks are based o Task Milling Loading of spreader Application to soil (spreading) Amounts used The actual tonnage handle combination of the scale o PROC) is the main determ	t of a so-called fugacity class in the MEASE ugacity is based on the dustiness of that su into account the process temperature and on the level of abrasion instead of the subst Use in preparation Content in preparation not restricted not restricted ad per shift is not considered to influence th f operation (industrial vs. professional) and inant of the process intrinsic emission pote of use/exposure	tool. For operations condu- batance. Whereas in hot me the melting point of the sub- ance intrinsic emission pote Physical form solid/powder solid/powder solid/powder e exposure as such for this level of containment/autom	Interest with solid substances at least operations, fugacity is stance. As a third group, high ential. Emission potential high high high scenario. Instead, the	
Product characteristic According to the MEASE a reflected by an assignmen ambient temperature the fi temperature based, taking abrasive tasks are based o Task Milling Loading of spreader Application to soil (spreading) Amounts used The actual tonnage handle combination of the scale o PROC) is the main determ Frequency and duration	t of a so-called fugacity class in the MEASE ugacity is based on the dustiness of that su into account the process temperature and on the level of abrasion instead of the subst Use in preparation Content in preparation not restricted not restricted ad per shift is not considered to influence th f operation (industrial vs. professional) and inant of the process intrinsic emission pote of use/exposure	tool. For operations condu- ostance. Whereas in hot me the melting point of the sub- ance intrinsic emission pote Physical form solid/powder solid/powder solid/powder	Interest with solid substances at least operations, fugacity is stance. As a third group, high ential. Emission potential high high high scenario. Instead, the	
Product characteristic According to the MEASE a reflected by an assignmen ambient temperature the fi temperature based, taking abrasive tasks are based o Task Milling Loading of spreader Application to soil (spreading) Amounts used The actual tonnage handle combination of the scale o PROC) is the main determ Frequency and duration Task Milling Loading of spreader	t of a so-called fugacity class in the MEASE ugacity is based on the dustiness of that su into account the process temperature and on the level of abrasion instead of the subst Use in preparation Content in preparation not restricted not restricted ad per shift is not considered to influence th f operation (industrial vs. professional) and inant of the process intrinsic emission pote of use/exposure	tool. For operations condu- batance. Whereas in hot me the melting point of the sub- ance intrinsic emission pote Physical form solid/powder solid/powder solid/powder e exposure as such for this level of containment/autom ntial.	Interest with solid substances at least operations, fugacity is stance. As a third group, high ential. Emission potential high high high scenario. Instead, the	
Product characteristic According to the MEASE a reflected by an assignmen ambient temperature the fi temperature based, taking abrasive tasks are based o Task Milling Loading of spreader Application to soil (spreading) Amounts used The actual tonnage handle combination of the scale o PROC) is the main determ Frequency and duration Task Milling	t of a so-called fugacity class in the MEASE ugacity is based on the dustiness of that su into account the process temperature and on the level of abrasion instead of the subst Use in preparation not restricted not restricted not restricted ad per shift is not considered to influence th f operation (industrial vs. professional) and inant of the process intrinsic emission pote of use/exposure Du	tool. For operations condu- batance. Whereas in hot me the melting point of the sub- ance intrinsic emission pote Physical form solid/powder solid/powder solid/powder solid/powder e exposure as such for this level of containment/autom ntial.	Interest with solid substances at least operations, fugacity is stance. As a third group, high ential. Emission potential high high high scenario. Instead, the	
Product characteristic According to the MEASE a reflected by an assignmen ambient temperature the fi temperature based, taking abrasive tasks are based of Task Milling Loading of spreader Application to soil (spreading) Amounts used The actual tonnage handle combination of the scale of PROC) is the main determ Frequency and duration Task Milling Loading of spreader Application to soil (spreading)	t of a so-called fugacity class in the MEASE ugacity is based on the dustiness of that su into account the process temperature and on the level of abrasion instead of the subst Use in preparation not restricted not restricted not restricted ad per shift is not considered to influence th f operation (industrial vs. professional) and inant of the process intrinsic emission pote of use/exposure Du	tool. For operations condu- batance. Whereas in hot me the melting point of the sub- ance intrinsic emission pote Physical form solid/powder	Interest with solid substances at least operations, fugacity is stance. As a third group, high ential. Emission potential high high high scenario. Instead, the	

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Caller given operational conductions affecting workers exposure					
Operational conditions (e.g. process temperature and process pressure) are not considered relevant for occupational exposure assessment of the conducted processes.					
Technical conditions and	Technical conditions and measures at process level (source) to prevent release				
Risk management measur required in the processes.		e.g. containment or s	segregation of the emissio	n source) are generally not	
Technical conditions and measures to control dispersion from source towards the worker					
Task	Level of separation Localised controls (LC) Efficiency of LC Further information				
Milling	Iling Separation of workers is generally not not required na -				
Loading of spreader required in the conducted processes. not required na -					
Application to soil (spreading)	During application the worker is sitting in the cabin of the spreader	Cabin with filtered air supply	99%	_	

Organisational measures to prevent /limit releases, dispersion and exposure

Other given operational conditions affecting workers 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

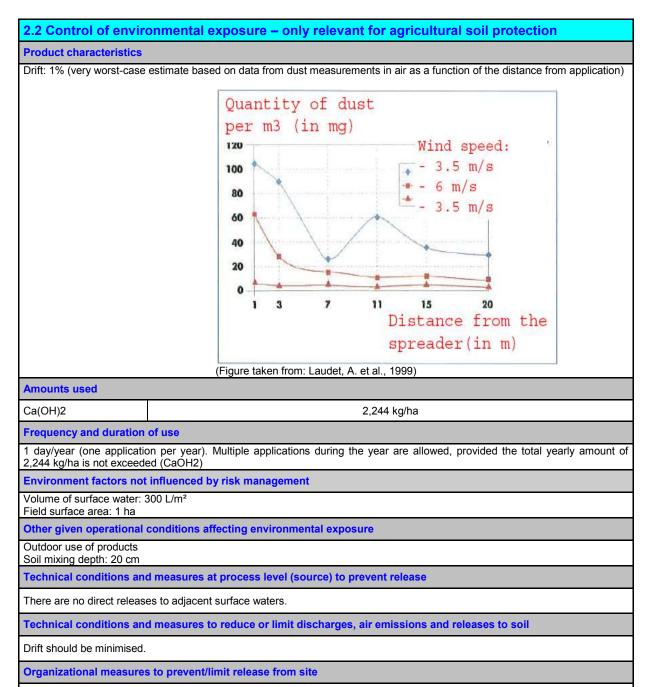
Task	Specification of respiratory protective equipment (RPE)	RPE efficiency (assigned protection factor, APF)	Specification of gloves	Further personal protective equipment (PPE)
Milling	FFP3 mask	APF=20	Since calcium dihydroxide is classified as irritating to skin, the use of protective gloves is mandatory 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
Loading of spreader	FFP3 mask	APF=20		
Application to soil (spreading)	not required	na		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.

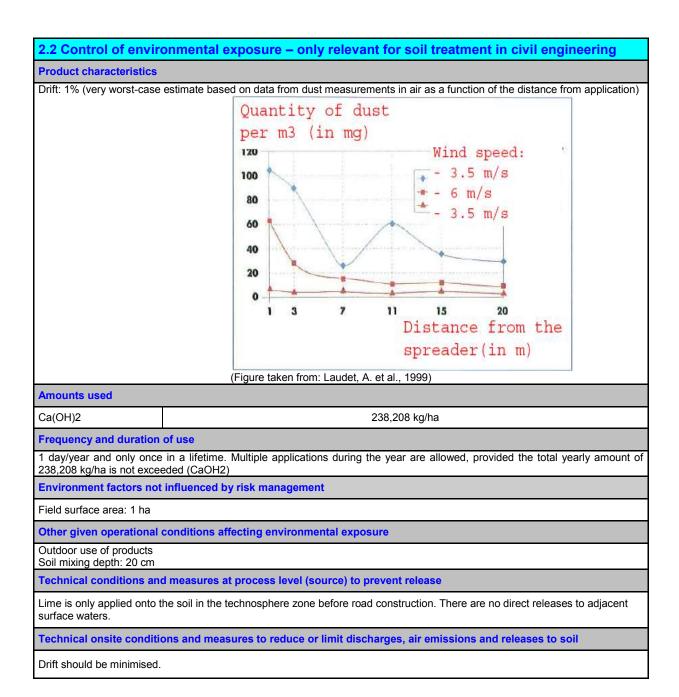
An overview of the APFs of different RPE (according to BS EN 529:2005) can be found in the glossary of MEASE.

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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.

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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 dihydroxide of 1 mg/m³ (as respirable dust).

dihydroxide of 1 mg/m ³ (as	s 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 dihydroxide is classified as irrit skin, dermal exposure has to be minimised as							
Loading of spreader	MEASE (PROC 8b)	0.488 mg/m³ (0.48)	technically feasible. A D	NEL for dermal effects has not				
Application to soil (spreading)	measured data (0.880 mg/m³ (0.88) been derived. Thus, dermal exposure is not assess this exposure scenario.							
Environmental exposure	ofor agricultural soil pr	otection						
on the calculation of predi- surface water and sedime more appropriate for agric modelling. FOCUS is a mo	cted environmental conc nt (Kloskowksi et al., 199 ultural-like application as odel typically developed del, where parameters s	entration values (PE 99). The FOCUS/EXI is in this case where p for biocidal application uch as drifts can be	C) of plant protection proc POSIT modelling tool is pro parameter as the drift need ons and was further elabor improved according to col					
emissions	See amounts used							
Exposure concentration in waste water treatment plant (WWTP)	Not relevant for agricul	tural soil protection						
Exposure concentration in	Substance	PEC (ug/L)	PNEC (ug/L)	RCR				
aquatic pelagic compartment	Ca(OH)2	7.48	490	0.015				
Exposure concentration in sediments	natural waters the hydr	oxide ions react with The calcium carbona Jbility and a constitue	HCO3- to form water and ate precipitates and depose ent of natural soils.	ne is expected. Further, in I CO32 CO32- forms CaCO3 sits on the sediment. Calcium				
Exposure	Substance	PEC (mg/L)	PNEC (mg/L)	RCR				
concentrations in soil and groundwater	Ca(OH)2	660	1080	0.61				
Exposure concentration in atmospheric compartment	This point is not releva	nt. Calcium dihydrox	ide is not volatile. The vap	oour pressures is below 10 ⁻⁵ Pa.				
Exposure concentration relevant for the food chain (secondary poisoning)		covered do not sign		mnipresent and essential in the ibution of the constituents				
Environmental exposure								
(Ispra, September 5, 2003 technosphere can be defir with its structure, operatio technosphere, which inclu groundwater watertable. T prevention of pollution and risk assessment for the pu technosphere, to which the	EU Member States an hed as "the engineered en and maintenance inclu des the hard and soft sh he road authority has read water management". The impose of the existing/new e environmental risk assorted	Id industry agreed or environment that carr ding the installations oulder at the edge of sponsibility for this ro he road technospher w substances regulat essment applies.	a definition for a "road te ies the geotechnical functi to ensure road safety and f the carriageway, is vertic bad technosphere includin e was therefore excluded tions. The target zone is th	ions of the road in connection d manage run off. This ally dictated by the g road safety, road support, as assessment endpoint for he zone beyond the				
of predicted environmenta	l concentration values (F	PEC) of plant protection	on products for soil, grour	aft guidance on the calculation nd water, surface water and ES 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.

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Environmental	See amounts used							
emissions Exposure								
concentration in waste	Not relevant for road bo	order scenario						
water treatment plant (WWTP)								
Exposure								
concentration in aguatic pelagic	Not relevant for road bo	order scenario						
compartment								
Exposure concentration in	Not relevant for road bo	order scenario						
sediments	Not relevant for road be							
Exposure	Substance	PEC (mg/L)	PNEC (mg/L)	RCR				
concentrations in soil and groundwater	Ca(OH)2	701	1080	0.65				
Exposure								
concentration in atmospheric	This point is not relevan	nt. Calcium dihydroxid	le is not volatile. The vapo	our pressures is below 10 ⁻⁵ Pa.				
compartment								
Exposure concentration relevant	•			nnipresent and essential in the				
for the food chain	environment. The uses (Ca2+ and OH-) in the		ficantly influence the distri	bution of the constituents				
(secondary poisoning)		environment.						
Environmental exposure	for other uses							
For all other uses, no quar		•						
	treatment in civil engine		are less stringent than the	ose outlined for agricultural soil				
 Lime is an ingre 	dient and chemically bo		leases are negligible and	insufficient to cause a pH-shift				
	er or surface water	free breatbable air u	inon reaction with CO2	such applications only relates to				
	nent, where the lime prop			uch applications only relates to				
 Neutralisation/pl 	H-shift is the intended us	e and there are no a	dditional impacts beyond f	hose desired.				
4. Guidance to DU to	o evaluate whethe	r he works insid	e the boundaries s	et by the ES				
				ures as described above are				
			•	emented risk management exposure to a level below the				
respective DNEL (given th	at the processes and act	tivities in question are	e covered by the PROCs I	isted above) as given below. If				
measured data are not ava (www.ebrc.de/mease.html								
according to the MEASE g	lossary. For example, su	ubstances with a dust	iness less than 2.5 % acc	ording to the Rotating Drum				
Method (RDM) are defined and substances with a dust			less than 10 % (RDM) are	e defined as "medium dusty"				
	/m ³ (as respirable d		and form DNEL sives the	wa a DNEL for cauta affacta				
		•	0 0	ove, a DNEL for acute effects the long-term DNEL, the				
acute DNEL is therefore al				derived by multiplying long-				

acute DNEL is therefore also covered (according to R.14 guidance, acute exposure levels can be derived by multiplying long term 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 %).

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

Exposure So	cenario Format (1) addressin	ig uses carrie	ed out by workers			
1. Title						
Free short title	Professional u	ses of articles/co	ntainers containing lime su	ibstances		
Systematic title based on	SU22, SU1, SU5, SU6a, SU6b, SI			7, SU18, SU19, SU20, SU23,		
use		C3, AC4, AC5, A	SU24 C6, AC7, AC8, AC10, AC1			
descriptor Processes,	(appropriate	e PROCs and ER	Cs are given in Section 2	below)		
tasks and/or activities covered	Processes, tasks a	nd/or activities co	overed are described in Se	ction 2 below.		
Assessment Method	The assessment of inhala	tion exposure is t	based on the exposure est	imation tool MEASE.		
2. Operation	al conditions and risk mana	gement meas	sures			
PROC/ERC	REACH definition		Invo	lved tasks		
PROC 0	Other process (PROC 21 (low emission potentia exposure estimation	ers containing calcium ons as CO₂ absorbents (e.g. ng apparatus)				
PROC 21	Low energy manipulation of substa materials and/or article		Handling of substances bound in materials and/or articles			
PROC 24	High (mechanical) energy work-up bound in materials and/or a		Grinding, mechanical cutting			
PROC 25	Other hot work operations with		Weldi	ng, soldering		
ERC10, ERC11, ERC 12	Wide dispersive indoor and outdoor articles and materials with low		Calcium dihydroxide 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	of workers exposure					
Product charac	teristic					
reflected by an a ambient tempera temperature bas	MEASE approach, the substance-intra assignment of a so-called fugacity class ature the fugacity is based on the dust red, taking into account the process te re based on the level of abrasion inste	ss in the MEASE tiness of that subs mperature and th ead of the substa	tool. For operations condu stance. Whereas in hot me ne melting point of the subs	cted with solid substances at etal operations, fugacity is stance. As a third group, high		
PROC	Use in preparation	Content in preparation	Physical form	Emission potential		
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	low (worst case assumption as no inhalation 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 t	age handled per shift is not considered he scale of operation (industrial vs. pro ain determinant of the process intrinsion	ofessional) and le	vel of containment/automa					
Frequency and	duration of use/exposure							
PROC		Duration	of exposure					
PROC 0	(not restricted as far as occupati duration may be restricte	onal exposure to	minutes calcium dihydroxide is cor nstructions of the actual bro	, 0				
PROC 21		480 minutes	(not restricted)					
PROC 24, 25		≤ 240	minutes					
Human factors	not influenced by risk managemen	t						
The shift breathi	ng volume during all process steps re	flected in the PR	DCs is assumed to be 10 n	n³/shift (8 hours).				
Other given op	erational conditions affecting worke	ers exposure						
assessment of the exposure assess temperatures are	ditions like process temperature and p he conducted processes. In process s sment in MEASE is however based or e expected to vary within the industry s all process temperatures are automa	teps with conside the ratio of proce the highest ratio	rably high temperatures (i. ess temperature and melti was taken as a worst case	e. PROC 22, 23, 25), the ng point. As the associated assumption for the exposure				
Technical cond	litions and measures at process lev	el (source) to pr	event release					
Risk manageme required in the p	nt measures at the process level (e.g. rocesses.	containment or s	egregation of the emission	n source) are generally not				
Technical cond	litions and measures to control disp	persion from so	irce towards the worker					
PROC	Level of separation	Localised controls (LC)	Efficiency of LC (according to MEASE)	Further information				
PROC 0, 21, 24, 25	PROC 0, 21, Any potentially required separation of workers from the emission source is indicated above under "Frequency and duration of exposure". A reduction of exposure duration can be achieved for the pot required to the pot required to							
Organisational	measures to prevent /limit releases	, dispersion and	l exposure					
These measures eating and smok	or ingestion. General occupational hy s involve good personal and housekee king at the workplace, the wearing of s nge clothes at end of work shift. Do no	eping practices (i. tandard working	e. regular cleaning with su clothes and shoes unless of	itable cleaning devices), no otherwise stated below.				

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Conditions and measures related to personal protection, hygiene and health evaluation RPE efficiency Specification of respiratory Specification of Further personal protective PROC (assigned protective equipment (RPE) gloves equipment (PPE) protection factor, APF) Eye protection equipment (e.g. goggles or visors) must **PROC 0, 21** not required na Since calcium be worn, unless potential dihydroxide is classified contact with the eye can be as irritating to skin, the excluded by the nature and type of application (i.e. closed use of protective gloves is mandatory for all process). Additionally, face PROC 24, 25 FFP1 mask APF=4 process steps. 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 Control of environmental exposure **Product characteristics** Lime is chemically bound into/onto a matrix with very low release potential 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 dihydroxide 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. Inhalation Method used for Method used for inhalation exposure Dermal exposure estimate PROC dermal exposure exposure assessment estimate (RCR) assessment (RCR) 0.5 mg/m³ PROC 0 MEASE (PROC 21) (0.5) Since calcium dihydroxide is classified as irritating to 0.05 mg/m³ PROC 21 MEASE skin, dermal exposure has to be minimised as far as (0.05)technically feasible. A DNEL for dermal effects has not 0.825 mg/m³ been derived. Thus, dermal exposure is not assessed in PROC 24 MEASE (0.825)this exposure scenario. 0.6 mg/m³ PROC 25 MEASE (0.6)Environmental exposure Lime is an ingredient and is chemically bound into a matrix: there is no intended release of lime during normal and reasonable foreseeable conditions of use. Releases are negligible and insufficient to cause a pH-shift in soil, wastewater or surface water.

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 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 long-term 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	Former	(2) and de	occina	uses corriad aut h	CODOUR	ore			
	ronnat	(\mathbf{z}) addr	essing	uses carried out by	consum	613			
1. Title									
Free short title				Consumer use of build	Consumer use of building and construction material				
Systematic title based	on use	descripto	r	SU21, PC9a, PC9b, E	RC8c, ERC	8d, ERC8e, ERC	8f		
Processes, tasks activ	vities co	vered		Handling (mixing and Application of liquid, p					
				Human health:		•			
				A qualitative assessme	ent has bee	n performed for o	ral and dermal exposure		
Assessment Method*				as well as exposure to	the eye. In	halation exposure	e to dust has been		
				assessed by the Dutch	n model (va	n Hemmen, 1992).		
				Environment:					
				A qualitative justification		ient is provided.			
2. Operational con									
RMM				ated risk management n					
PC/ERC				ctivity referring to artic	le categori	es (AC) and envi	ironmental release		
		categorie	s (ERC)						
		Mixing an	d loadin	g of powder containing I	ime substai	nces.			
PC 9a, 9b				e plaster, putty or slurry	to the walls	or ceiling.			
		Post-appl							
		Wide disp	ersive ir	ndoor use resulting in ind	clusion into	or onto a matrix			
ERC 8c, 8d, 8e, 8f		wide disp	ersive o	utdoor use of processin	g alds in op	en systems			
, , , -				utdoor use of reactive s					
0.4. Control of corr				utdoor use resulting in i	nciusion inti				
2.1 Control of con		s expos	sure						
Product characteristic									
Description of the		entration		Physical state of	Dustine	ss (if relevant)	Packaging design		
preparation		ance in th	e	the preparation					
	prepa			O all'al la surada a	L Parla and	diana and taxa	Dulla in here of on to		
Lime substance Plaster, Mortar	100 % 20-40 ^o			Solid, powder Solid, powder	Hign, me	edium and low, ng on the kind of	Bulk in bags of up to		
Plaster, Mortar	20-405	%		Solid, powder	lime sub		35 kg.		
						ve value from			
						sheet see			
					section 9				
Plaster, Mortar	20-40	%		Pasty	-		-		
Putty, filler	30-55			Pasty, highly	-		In tubes or buckets		
· ··,, ······				viscous, thick liquid					
Pre-mixed lime wash	~30%			Solid, powder	High - lo	W	Bulk in bags of up to		
paint	50,0			,		ve value from	35 kg.		
						sheet see	5		
					section 9	9.0.3)			
Lime wash paint/milk	~ 30 %	0		Milk of lime	-		-		
of lime preparation				preparation					
Amounts used									
Description of the		Amoun	t used p	per event					
preparation									
Filler, putty				wder (2:1 powder water)					
					unt is heavi	ly dependent on t	he depth and size of the		
Dianta alliana di di di			be filled						
Plaster/lime wash paint		~ 25 kg	depend	ding on the size of the room, wall to be treated. ding on the size of the room, wall to be equalized.					
Floor/wall equalizer				ing on the size of the ro	om, wall to	be equalized.			
Frequency and duratio	on of use	exposur							
Description of task				on of exposure per eve		frequency of e	ventS		
Mixing and loading of lin	ne conta	ining		in (DIY ¹ -fact sheet, RIV			4 abaa4)		
powder.		J	•	er 2.4.2 Mixing and loadi	ng or	Ziyear (DIY fac	/year (DIY ¹ fact sheet)		
			powde						
Application of lime plaster, putty or									
Application of lime plaster slurry to the walls or ceil		or	Severa	I minutes - hours		2/year (DIY ¹ fac	t sheet)		

Human factors not infl	luenced by	risk managen	nent				
Description of the task	1	on exposed	Breathing rat	e	Exposed body part		Corresponding skin area [cm²]
Handling of powder	Adult		1.25 m³/hr		Half of both hands		430 (DIY ¹ fact sheet)
Application of liquid,							
pasty lime	Adult		NR		Hands and forearms		1900 (DIY ¹ fact sheet)
preparations.							
Other given operation	al conditior			sure			
Description of the task	(Indoor/outdo	or		volume		exchange rate
Handling of powder		indoor			ersonal space, small ound the user)	0.6	hr ⁻¹ (unspecified room)
Application of liquid, pas preparations.	sty lime	indoor		NR		NR	
Conditions and measu	ires related	to informatio	n and behavior	iral advid	ce to consumers	I	
In order to avoid health workplaces: Change wet of Protect uncov	damage DI clothing, sho vered areas	Yers should co les and gloves of skin (arms, l	mply with the sa immediately. legs, face): there	me strict	protective measures w	ction	
after the work	and apply a	a care product.			, cleansing and care).	Cical	
Conditions and measured in order to avoid health						hial-	and the master stars of
 protective gog Choose work environment, 	ggles as wel gloves care cotton glove	I as face mask fully. Leather g es with plastic o	s during dusty w ploves become w covering (nitrile)	ork. /et and ca are bette	caulking and, above a an facilitate burns. Whe r. Wear gauntlet gloves nich permeates the wor	en woi s durir	ng overhead work
2.2 Control of env				multy wi	lich permeates the wor	King (Joures.
Product characteristic			<u> </u>				
Not relevant for exposur		ant				_	
Amounts used*	C 033633110	SIIL					
Not relevant for exposur		ent				_	
Frequency and duration		JII					
Not relevant for exposur		ent					
Environment factors n			nagement				
Default river flow and di			gomon				
Other given operation		ns affecting er	nvironmental ex	posure			
Indoor							
Direct discharge to the	wastewater	is avoided.					
Conditions and measu							
Default size of municipa	I sewage sy	/stem/treatmen	t plant and slude	ge treatm	ent technique		
Conditions and measu							
Not relevant for exposur							
Conditions and measu	ires related	to external r	ecovery of was	te			
Not relevant for exposur	re assessme	ent					
3. Exposure estim	ation and	d reference	to its sourc	е			
The risk characterisation effect level) and is giver substances of 4 mg/m ³ includes an additional si Since limes are classifie exposure to the eye.	n in parenthe (as respirab afety margir	eses below. Fo le dust) and th n since the resp	r inhalation expo e respective inha pirable fraction is	sure, the alation ex a sub-fra	RCR is based on the a posure estimate (as inl action of the inhalable f	acute halabl fractic	DNEL for lime le dust). Thus, the RCR on according to EN 481.

Human exposure		
Handling of powder		
Route of exposure	Exposure estimate	Method used, comments
Oral	-	Qualitative assessment
		Oral exposure does not occur as part of the intended product use.
Dermal	small task: 0.1 µg/cm ² (-)	Qualitative assessment
	large task: 1 μg/cm² (-)	If risk reduction measures are taken into account no human exposure is expected. However, dermal contact to dust from loading of lime substances 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 contac rate to dust formed while pouring powder has been taken from the DIY ¹ -fact sheet (RIVM report 320104007).
Eye	Dust	Qualitative assessment
Lyc		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)	Quantitative assessment
	Large task: 120 µg/m³ (0.03)	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).
	l, pasty lime preparations.	
Route of exposure	Exposure estimate	Method used, comments
Oral	-	Qualitative assessment
<u> </u>		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		
dioxide from the atmo	osphere.	e preparation will quickly convert to calcium carbonate with carbon
Environmental expo		
pH of the influent of a biological activity. The used beneficially for p the municipal treatme	a municipal wastewater treatment pla e influent of a municipal wastewater to bH control of acid wastewater stream	avoid discharging lime solutions directly into municipal wastewater, the ant is circum-neutral and therefore, there is no exposure to the treatment plant is often neutralized anyway and lime may even be as that are treated in biological WWTPs. Since the pH of the influent of pact is negligible on the receiving environmental compartments, such

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

Exposure Scenario	Format (2) add	ressina	uses carried out b	v consume	ers		
1. Title							
Free short title			Consumer use of CC	absorbent	in breathing appa	iratuses	
Systematic title based	on use descripto	or	SU21, PC2, ERC8b	2 0000100111			
Processes, tasks activ	vities covered		Filling of the formulat				
			Use of closed circuit		paratuses		
			Cleaning of equipme	nt			
Assessment Method*			Human health		<i>c c</i>		
			A qualitative assessed The inhalation expos	nent has bee	en performed for c	oral and dermal exposure.	
			Hemmen, 1992).	ure has beer	assessed by the	e Dutch model (van	
			Environment				
			A qualitative justificat	ion assessm	ent is provided.		
2. Operational co	onditions an	d risk	management m	neasures			
RMM	The soda	a lime is a	available in granular for	m. Furtherm	ore, a defined an	nount of water (14-18%)	
			Il further reduce the du				
00/500			de will be quickly react				
PC/ERC	categori		tivity referring to arti	cie categori	ies (AC) and env	ironmentai release	
PC 2	Use of cl	osed circ	uit breathing apparatus	s for e.g. reci	reational diving co	ontaining soda lime as	
			he breathed air will flow				
			er and sodium hydroxic an be re-breathed aga			de to form the carbonate.	
						use and refilled before	
	each dive						
ERC 8b			ndoor use resulting in inclusion into or onto a matrix				
2.1 Control of co	nsumers ex	posur	e				
Product characteristic						T .	
Description of the preparation	Concentration substance in t		Physical state of the preparation	Dustine	ss (if relevant)	Packaging design	
preparation	preparation	le	the preparation				
CO ₂ absorbent	78 - 84%		Solid, granular	Very low	dustiness	4.5, 18 kg canister	
	Depending on t			(reductio	on by 10 %		
	application the				d to powder)		
	component has different additive				nation cannot		
	A specific amou				out during the the scrubber		
	water is always			cartridge			
	(14-18%).			ou. and go	-		
"Used" CO2 absorbent	~ 20%		Solid, granular		dustiness	1-3 kg in breathing	
					on by 10 %	apparatus	
American				compare	d to powder)		
Amounts used CO ₂ -Absorbent used in b	proathing apparet		1-3 kg depending on	the kind of b	reathing opporate	10	
Frequency and duratio	n of use/exposu	re re			reating apparall		
Description of the task			on of exposure per ev	vent	frequency of e	vents	
Filling of the formulation	into the		3 min per filling, in sur			ve (up to 4 times)	
cartridge							
Use of closed circuit brea	athing	1-2 h			Up to 4 dives a	Jp to 4 dives a day	
apparatus Cleaning and emptying of	of equipment	< 15 m	in		After each dive	(up to 4 times)	
Human factors not infl					Aller each uive		
Description of the	Population exp		Breathing rate	Expose	d body part	Corresponding skin	
task	· · · · · · · · · · · · · · · · · · ·		-			area [cm²]	
Filling of the	adult		1.25 m ³ /hr (light	hands		840	
formulation into the			working activity)			(REACH guidance	
cartridge	4					R.15, men)	
Use of closed circuit breathing apparatus				-		-	
	1			1		1	

Cleaning and emptyin	ng			hands	840 (DEACH quide	200		
of equipment					(REACH guida R.15, men)	nce		
			consumers exposure		· · · /			
Description of the ta		Indoor/outd		m volume	Air exchange rate			
Filling of the formulati	on into the	NR	NR		NR			
cartridge								
Use of closed circuit b	preathing	-	-		-			
apparatus			ND		ND			
Cleaning and emptyir	ig or	NR	NR		NR			
equipment		d to informatio	on and behavioural ad					
Do not get in eyes, or				vice to consume	IS			
Keep container tightly								
Keep out of reach of o			lime to dry out.					
Wash thoroughly afte								
		immediately wi	th plenty of water and s	eek medical advid	e.			
Do not mix with acids		in the didicity in						
Carefully read the ins	tructions of th	ne breathing ap	paratus to assure a pro	per use of the bre	athing apparatus.			
			protection and hygien		0 11			
Wear suitable gloves,	goggles and	protective clot	nes during handling. Us	e a filtering half n	nask (mask type FFP2 acc. to	EN		
149).	0 00	•	0 0	Ū				
2.2 Control of	environm	ental expo	osure					
Product characteris								
Not relevant for expos		nent.						
Amounts used*								
Not relevant for expos	sure assessm	ient						
Frequency and dura		ion						
Not relevant for expos		nent						
Environment factors			nagement					
Default river flow and								
		ons affecting e	nvironmental exposur	.e				
Indoor								
Conditions and mea	sures relate	d to municipal	sewage treatment pla	int				
Default size of munici	pal sewage s	system/treatmer	nt plant and sludge trea	tment technique				
			reatment of waste for					
Not relevant for expos	sure assessm	nent						
Conditions and mea			ecovery of waste					
Not relevant for expos								
3. Exposure es	timation	and refere	nce to its sourc	e				
					he respective DNEL (derived r	10-		
substances of 4 mg/m includes an additional Since lime substance exposure and exposu Due to the very speci- taken into account to	n ³ (as respiral I safety marg s are classifie re to the eye alised kind of	ble dust) and th in since the res ed as irritating t consumers (di	e respective inhalation pirable fraction is a sub o skin, and eyes a quali	exposure estimat -fraction of the inl tative assessmer	on the acute DNEL for lime e (as inhalable dust). Thus, th halable fraction according to E thas been performed for dem be assumed that instructions	N 481. nal		
Human exposure Filling of the formula	ation into th	ocartridee						
Route of exposure	Exposure		Mathad us	ed, comments				
Oral	-	ssimale		assessment				
0.01					ir as part of the intended produ	uct use		
Dermal	-			assessment				
					e taken into account no huma	n		
					ver, dermal contact to dust fro			
			loading of g	granular soda lime	e or direct contact to the granu	les		
					tective gloves are worn during			
					onally result in mild irritation e	asily		
			avoided by	prompt rinsing wi		-		
			Qualitative	assessment				
Еуе	Dust		If rick roduv	If risk reduction measures are taken into accour				
Eye	Dust							
Eye	Dust		exposure is	s expected. Dust f	rom loading of the granular so	da lime		
Eye	Dust		exposure is is expected	s expected. Dust f I to be minimal, th	rom loading of the granular so erefore eye exposure will be r	oda lime ninimal		
Eye	Dust		exposure is is expected even without	s expected. Dust f I to be minimal, th ut protective gogg	rom loading of the granular so erefore eye exposure will be r les. Nevertheless, prompt rins	oda lime ninimal sing with		
Eye	Dust		exposure is is expected even without	s expected. Dust f I to be minimal, th ut protective gogg	rom loading of the granular so erefore eye exposure will be r	oda lime ninimal sing with		

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Inhalation	Small task: $1.2 \ \mu g/m^3 (3 \times 10^{-4})$	Quantitative assessment
	Large task: 12 µg/m³ (0.003)	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 circ	uit breathing apparatus	
Route of exposure	e 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 derma exposure to the absorbent in breathing apparatuses is non-existent.
Eye	-	Qualitative assessment
		Due to the product characteristics, it can be concluded that eye exposure to the absorbent in breathing apparatuses is non-existent.
Inhalation	negligible	Qualitative assessment
		Instructional advice is provided to remove any dust before
		finishing the assembly of the scrubber. Divers filling their own CO2
		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 emp	tying of equipment	
Route of exposure	e Exposure estimate	Method used, comments
Oral	-	Qualitative assessment
Dermont	Duct and enlack as	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
	6	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)	Quantitative assessment
	Large task: 3 µg/m³ (7.5 × 10 ⁻⁴)	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 ex	posure	
		s is expected to be negligible. The influent of a municipal wastewater
		even be used beneficially for pH control of acid wastewater streams

ES number 9.14: Consumer use of garden lime/fertilizer

					-				
Exposure Scenario	Format	t (2) add	ressin	g uses carried	d out by	consum	ers		
1. Title									
Free short title				Consumer use	e of garde	en lime/fert	ilizer		
Systematic title based	on use	descript	or	SU21, PC20, I					
Processes, tasks activ	vities co	vered		Manual applica			fertilizer		
				Post-application			, icitilizer		
Assessment Method*				Human health					
						nt has bee	n performed	l for d	oral and dermal exposure
									posure has been
				assessed by the					
				Environment		,	,		,
				A qualitative ju	ustificatio	n assessm	ent is provid	led.	
2. Operational cor	ndition	s and r	isk ma						
RMM				ated risk manag			e in place.		
PC/ERC		Descript	ion of a	ctivity referring				d env	vironmental release
PC 20		categori	es (ERC	r <u>)</u> a of the aerden l	imo hv o	havel/hand	(worst soo		d soil incorporation.
PC 20		Doct ann	lication	exposure to play	ine by S	novei/nanu	(worst case	e) and	a soil incorporation.
PC 12							1 (worst cas	e) an	d soil incorporation.
				exposure to play			a (worst cas	c) all	
ERC 8e		Wide dis	persive of	outdoor use of re	eactive su	ibstances i	n open svst	ems	
2.1 Control of con									
Product characteristic		J UNPO	Caro						
Description of the		entration	of the	Physical stat	e of	Dustines	s (if releva	nt)	Packaging design
preparation		ance in t		the preparati		Dustilles	ss (il leleva	iiii)	r ackaying design
preparation		ration							
Garden lime	100 %			Solid, powder		High dus	v		Bulk in bags or
		0 /0		cond, portaol			ingli ddoly		containers of 5, 10 and
									25 kg
Fertilizer	Up to 2	20 %		Solid, granular Low du		Low dust	y		Bulk in bags or
									containers of 5, 10 and
									25 kg
Amounts used									
Description of the pre	paration	<u> </u>							information
Garden lime				100g /m ² (up to 200g/m ²)			Information and direction of use		
Fertilizer				100g /m ² (up t	o 1kg/m²	(compost)) Inform	ation	and direction of use
Frequency and duration		e/exposu							
Description of the task	(on of exposure	e per eve	nt	frequency		
Manual application				s-hours			1 tasks pe	r yea	r
				iding on the size	of the tr	eated			
Post-application			area	ddlere plaving o	n arace /	FPΔ	Relevant f	orun	to 7 days after
				ddlers playing on grass (EPA ire factors handbook)		Relevant for up to 7 days after application		ito i uayo allei	
Human factors not infl	uenced	by risk r			2001()		apprioution		
Description of the		ation exp		Breathing rat	te	Exposed	l body part		Corresponding skin
task Manual application	Adult			1.25 m³/hr		Hondo cr	nd forcerm-		area [cm ²]
Manual application Post-application	Adult	Toddlers		NR		NR	nd forearms		1900 (DIY fact sheet) NR
Other given operation			octing of		osure				
Description of the task			or/outdo			volume		Air	exchange rate
Manual application	`	outdo				ersonal sp	ana emall	NR	
manual application		Juide				•			
Post-application outdoor				area around the u			NR		
Conditions and measu	ires rela		-	on and behavio		ce to cons	sumers		-
Do not get in eyes, on s								pe F	FP2 acc. to FN 149)
Keep container closed a								-	= 0.00. to Ent 170).
In case of contact with e					r and see	ek medical	advice.		
Wash thoroughly after h									
Do not mix with acids ar		s add lim	es to wa	ter and not wate	er to limes	6.			
Incorporation of the gard	den limé	or fertiliz	er into th	e soil with subse	equent w		facilitate the	e effe	ect.
Conditions and measu	ires rela	ited to pe	rsonal	protection and	hygiene				
VA/									

Wear suitable gloves, goggles and protection clothes.

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2.2 Control of environmental exposure					
Product characteristics					
Drift: 1 % (very worst-case estimate based on data from dust measurements in air as a function of the distance from application)					
Amounts used					
Amount used	Ca(OH)2	2,244 kg/ha	In professional agricultural soil protection, it is		
	CaO	1,700 kg/ha	recommended not to exceed 1700 kg CaO/ha or		
	CaO.MgO	1,478 kg/ha	the corresponding amount of 2244 kg		
	Ca(OH)2.Mg(OH)2	2,030 kg/ha	Ca(OH) ₂ /ha. This rate is three times the amount		
	CaCO3.MgO	2,149 kg/ha	needed to compensate the annual losses of lime		
	Ca(OH)2.MgO	1,774 kg/ha	by leaching. For this reason, the value of 1700 kg		
	Natural hydraulic lime	2,420 kg/ha	CaO/ha or the corresponding amount of 2244 kg		
	5		Ca(OH) ₂ /ha is used in this dossier as the basis		
			for the risk assessment. The amount used for the		
			other lime variants can be calculated based on		
			their composition and the molecular weight.		
Frequency and dura					
		lications during the ye	ear are allowed, provided the total yearly amount of 2,244		
kg/ha is not exceeded					
	not influenced by risk ma	nagement			
Not relevant for expos					
	onal conditions affecting er	nvironmental exposu	Ire		
Outdoor use of produce					
Soil mixing depth: 20					
	s and measures at process		event release		
There are no direct re	leases to adjacent surface w	aters.			
Technical condition	s and measures to reduce (or limit discharges, a	air emissions and releases to soil		
Drift should be minimi	sed.				
Conditions and mea	asures related to municipal	sewage treatment p	lant		
Not relevant for expo	sure assessment				
	asures related to external t	reatment of waste for	or disposal		
Not relevant for expo					
	asures related to external r	ecovery of waste			
Not relevant for expo	sure assessment	-			
	imation and reference	to its source			
The risk characterisa	tion ratio (RCR) is the quotie	nt of the refined expo	sure estimate and the respective DNEL (derived no-		
			, the RCR is based on the long-term DNEL for lime		
substances of 1 mg/r	n^{3} (as respirable dust) and th	e respective inhalation	n exposure estimate (as inhalable dust). Thus, the RCR		
			b-fraction of the inhalable fraction according to EN 481.		
			litative assessment has been performed for dermal		
exposure and exposit		o olan ana cyco a quo			
Human exposure					
Manual application					
Route of	Exposure estimate	Method u	sed, comments		
exposure	Exposure countate	method a			
Oral	-	Qualitative	e assessment		
ora			sure does not occur as part of the intended product use.		
Dermal	Dust, powder		e 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		
			excluded if no protective gloves are worn during		
			n. Due to the relatively long application time, skin irritation		
			expected. This can easily be avoided by immediate		
			h water. It would be assumed that consumers who had		
			e of skin irritation will protect themselves. Therefore, any		
			skin irritation, which will be reversible, can be assumed		
		to be non-			
Eye	Dust		e assessment		
		If risk redu	iction measures are taken into account no human		
			is expected. Dust from surfacing with lime cannot be		
		excluded	f no protective goggles are used. Prompt rinsing with		
			seeking medical advice after accidental exposure is		
1	1	advisable.			

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Inhalation (garden lime)	Small task: 12 μg/m³ (0.0012) Large task: 120 μg/m³ (0.012)	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).		
Inhalation (fertilizer)	Small task: 0.24 μg/m³ (2.4 * 10 ⁻⁴) Large task: 2.4 μg/m³ (0.0024)	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) and applying a dust reduction factor of 10 for the granular form and a factor of 5 to account for the reduced amount of limes in fertilizer.		
Post-application				
products which are a exposure of children predicts the post-ap	applied in parks or amateur products us , who may have access to these areas	w called CRD) post-application exposure need to be addressed for sed to treat lawns and plants grown in private gardens. In this case s soon after treatment, needs to be assessed. The US EPA model private gardens (e.g. lawns) by toddlers crawling on the treated area s.		
Garden lime or fertilizer including lime is used to treat acidic soil. Therefore, after application to the soil and subsequent watering				

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.

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

Exposure Scenario Format (2) addressing uses carried out by consumers							
1. Title							
Free short title Consumer use of lime substances as water treatment chemicals						ent chemicals	
Systematic title based on use descriptor			SU21, PC20, PC37, ERC8b				
Processes, tasks activities covered			Loading, filling or re-filling of solid formulations into container/preparation of lime milk Application of lime milk to water				
Assessment Method*			Human health: 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). Environment: A qualitative justification assessment is provided.				
2. Operational co	onditi	ions and	d risk	management me	asures	5	
RMM		No furthe	r produc	t integrated risk managen	nent meas	sures are in place.	-
PC/ERC	Description of a categories (ERC		s (ERC	ctivity referring to article categories (AC) and environmental release)			
PC 20/37 Filling and re-fillin Transfer of lime s		of lime s applicat	, g (transfer of lime substances (solid)) of lime reactor for water treatment. ubstances (solid) into container for further application. tion of lime milk to water.				
ERC 8b				ndoor use of reactive subs	stances in	open systems	
2.1 Control of co	nsur	ners ex	oosur	e			
Product characteristic							
Description of the	Cond	centration	of the	Physical state of	Dustine	ss (if relevant)	Packaging design
preparation		tance in th aration	e	the preparation	,		
Water treatment chemical	Up to 100 %			Solid, fine powder			Bulk in bags or buckets/containers.
Water treatment chemical	Up to 99 %			Solid, granular of different size (D50 value 0.7 D50 value 1.75 D50 value 3.08)	low dustiness (reduction by 10% compared to powder)		Bulk-tank lorry or in "Big Bags" or in sacks
Amounts used							
Description of the prep				Amount used per event			
Water treatment chemical in lime reactor for aquaria		depending on the size of the water reactor to be filled (~ 100g /L)					
Water treatment chemical in lime reactor for drinking water		or	depending on the size of the water reactor to be filled (~up to 1.2 kg/L)				
Lime milk for further app	lication			~ 20 g / 5L			
Frequency and duratio	n of us	se/exposur				1.	
Preparation of lime milk (loading, filling and refilling) 1.33 m (DIY-fa		on of exposure per ever in ict sheet, RIVM, Chapter and loading of powders)	2.4.2 1 task/month 1 task/week		vents		
		I minutes - hours 1 tasks/ month					
Human factors not influenced by risk management							
Description of the task	Population exposed		osed	Breathing rate	Exposed body part		Corresponding skin area [cm²]
Preparation of lime milk (loading, filling and refilling)	adult			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 operational conditions affecting consumers exposure							
Description of the task Indoor/outdoor Room volume Air exchange rate							

Preparation of lime milk						
	(loading,	Indoor/outdoor	1 m ³ (personal space, small	0.6 hr ⁻¹ (unspecified room		
filling and refilling)	(l'an a sa ill a	la da an	area around the user)	indoor)		
Dropwise application of to water	i lime milk	indoor	NR	NR		
Conditions and measures related to information and behavioural advice to consumers						
		lothing. Do not breathe d				
Keep container closed						
	Use only with adequate ventilation.					
		mmediately with plenty o	f water and seek medical advice.			
Wash thoroughly after h	ind always a	dd limes to water and no	t water to limes			
		d to personal protection				
			filtering half mask (mask type FFP2 a	cc. to EN 149).		
2.2 Control of e	nvironm	ental exposure				
Product characteristic						
Not relevant for exposu		ent				
Amounts used*						
Not relevant for exposu		ent				
Frequency and duration						
Not relevant for exposu			4			
Default river flow and d	ilution	ced by risk managemen				
		ns affecting environme	ntal exposure			
Indoor		in anothing on monime				
Conditions and measu	ures related	d to municipal sewage t	reatment plant			
			d sludge treatment technique			
		d to external treatment	of waste for disposal			
Not relevant for exposu						
Conditions and measures related to external recovery of waste Not relevant for exposure assessment						
			ite e evene e			
3. Exposure est	Imation	and reference to	Its source			
			efined exposure estimate and the response			
substances of 4 mg/m ³	(as respirat	le dust) and the respecti	on exposure, the RCR is based on the a ve inhalation exposure estimate (as inl	acule DNEL IOF IIME		
			ction is a sub-fraction of the inhalable f			
			eyes a qualitative assessment has be			
exposure and exposure	to the eye.					
Human exposure		\				
Preparation of lime milk (loading)						
Bouto of experience	Evnoquro o	atimata	Method used commente			
	Exposure e	stimate	Method used, comments			
Route of exposure Oral	Exposure e	estimate	Qualitative assessment	t of the intended product use.		
Oral	Exposure e -	estimate		t of the intended product use.		
Oral Dermal (powder)	Exposure e -	estimate 0.1 μg/cm² (-)	Qualitative assessment Oral exposure does not occur as par Qualitative assessment If risk reduction measures are taken	into account no human		
Oral Dermal (powder)	Exposure e - small task: (estimate 0.1 μg/cm² (-)	Qualitative assessment Oral exposure does not occur as par Qualitative assessment If risk reduction measures are taken exposure is expected. However, den	into account no human mal contact to dust from		
Oral Dermal (powder)	Exposure e - small task: (estimate 0.1 μg/cm² (-)	Qualitative assessment Oral exposure does not occur as par Qualitative assessment If risk reduction measures are taken exposure is expected. However, den loading of limes or direct contact to t	into account no human nal contact to dust from he lime cannot be excluded if		
Oral Dermal (powder)	Exposure e - small task: (estimate 0.1 μg/cm² (-)	Qualitative assessment Oral exposure does not occur as par Qualitative assessment If risk reduction measures are taken exposure is expected. However, den loading of limes or direct contact to t no protective gloves are worn during	into account no human nal contact to dust from he lime cannot be excluded if application. This may		
Oral Dermal (powder)	Exposure e - small task: (estimate 0.1 μg/cm² (-)	Qualitative assessment Oral exposure does not occur as par Qualitative assessment If risk reduction measures are taken exposure is expected. However, den loading of limes or direct contact to t no protective gloves are worn during occasionally result in mild irritation e	into account no human nal contact to dust from he lime cannot be excluded if application. This may		
Oral Dermal (powder)	Exposure e - small task: (estimate 0.1 μg/cm² (-)	Qualitative assessment Oral exposure does not occur as par Qualitative assessment If risk reduction measures are taken exposure is expected. However, den loading of limes or direct contact to t no protective gloves are worn during occasionally result in mild irritation e rinsing with water. Quantitative assessment	into account no human mal contact to dust from he lime cannot be excluded if application. This may asily avoided by prompt		
Oral Dermal (powder)	Exposure e - small task: (estimate 0.1 μg/cm² (-)	Qualitative assessment Oral exposure does not occur as par Qualitative assessment If risk reduction measures are taken exposure is expected. However, den loading of limes or direct contact to t no protective gloves are worn during occasionally result in mild irritation e rinsing with water. Quantitative assessment The constant rate model of ConsExp	into account no human mal contact to dust from he lime cannot be excluded if application. This may asily avoided by prompt o has been used. The contact		
Oral Dermal (powder)	Exposure e - small task: (estimate 0.1 μg/cm² (-)	Qualitative assessment Oral exposure does not occur as par Qualitative assessment If risk reduction measures are taken exposure is expected. However, derr loading of limes or direct contact to t no protective gloves are worn during occasionally result in mild irritation e rinsing with water. Quantitative assessment The constant rate model of ConsExp rate to dust formed while pouring por	into account no human mal contact to dust from he lime cannot be excluded if application. This may asily avoided by prompt to has been used. The contact wder has been taken from the		
Oral Dermal (powder)	Exposure e - small task: (estimate 0.1 μg/cm² (-)	Qualitative assessment Oral exposure does not occur as par Qualitative assessment If risk reduction measures are taken exposure is expected. However, den loading of limes or direct contact to t no protective gloves are worn during occasionally result in mild irritation e rinsing with water. Quantitative assessment The constant rate model of ConsExp rate to dust formed while pouring por DIY-fact sheet (RIVM report 320104)	into account no human mal contact to dust from he lime cannot be excluded if application. This may asily avoided by prompt o has been used. The contact wder has been taken from the 007). For granules the		
Oral Dermal (powder)	Exposure e - small task: (large task: 1	estimate 0.1 μg/cm² (-)	Qualitative assessment Oral exposure does not occur as par Qualitative assessment If risk reduction measures are taken exposure is expected. However, der loading of limes or direct contact to t no protective gloves are worn during occasionally result in mild irritation e rinsing with water. Quantitative assessment The constant rate model of ConsExp rate to dust formed while pouring poi DIY-fact sheet (RIVM report 320104) exposure estimate will be even lowe	into account no human mal contact to dust from he lime cannot be excluded if application. This may asily avoided by prompt o has been used. The contact wder has been taken from the 007). For granules the		
Oral Dermal (powder)	Exposure e - small task: (estimate 0.1 μg/cm² (-)	Qualitative assessment Oral exposure does not occur as par Qualitative assessment If risk reduction measures are taken exposure is expected. However, den loading of limes or direct contact to t no protective gloves are worn during occasionally result in mild irritation e rinsing with water. Quantitative assessment The constant rate model of ConsExp rate to dust formed while pouring por DIY-fact sheet (RIVM report 320104)	into account no human mal contact to dust from he lime cannot be excluded if application. This may asily avoided by prompt o has been used. The contact wder has been taken from the 007). For granules the r.		
Oral Dermal (powder)	Exposure e - small task: (large task: 1	estimate 0.1 μg/cm² (-)	Qualitative assessment Oral exposure does not occur as par Qualitative assessment If risk reduction measures are taken exposure is expected. However, den loading of limes or direct contact to t no protective gloves are worn during occasionally result in mild irritation e rinsing with water. Quantitative assessment The constant rate model of ConsExp rate to dust formed while pouring por DIY-fact sheet (RIVM report 320104) exposure estimate will be even lowe Qualitative assessment	into account no human mal contact to dust from he lime cannot be excluded if application. This may asily avoided by prompt o has been used. The contact wder has been taken from the 207). For granules the f.		
Oral Dermal (powder)	Exposure e - small task: (large task: 1	estimate 0.1 μg/cm² (-)	Qualitative assessment Oral exposure does not occur as par Qualitative assessment If risk reduction measures are taken exposure is expected. However, den loading of limes or direct contact to t no protective gloves are worn during occasionally result in mild irritation e rinsing with water. Quantitative assessment The constant rate model of ConsExp rate to dust formed while pouring por DIY-fact sheet (RIVM report 320104/ exposure estimate will be even lowe Qualitative assessment If risk reduction measures are taken exposure is expected. Dust from load excluded if no protective goggles are	into account no human mal contact to dust from he lime cannot be excluded if application. This may asily avoided by prompt to has been used. The contact wder has been taken from the 207). For granules the r. into account no human ding of the limes cannot be a used. Prompt rinsing with		
Oral Dermal (powder)	Exposure e - small task: (large task: 1	estimate 0.1 μg/cm² (-)	Qualitative assessment Oral exposure does not occur as par Qualitative assessment If risk reduction measures are taken exposure is expected. However, den loading of limes or direct contact to t no protective gloves are worn during occasionally result in mild irritation e rinsing with water. Quantitative assessment The constant rate model of ConsExp rate to dust formed while pouring por DIY-fact sheet (RIVM report 320104/ exposure estimate will be even lowe Qualitative assessment If risk reduction measures are taken exposure is expected. Dust from loar excluded if no protective goggles are water and seeking medical advice af	into account no human mal contact to dust from he lime cannot be excluded if application. This may asily avoided by prompt to has been used. The contact wder has been taken from the 207). For granules the r. into account no human ding of the limes cannot be a used. Prompt rinsing with		
Oral Dermal (powder)	Exposure e - small task: (large task: 1 Dust	2.1 μg/cm² (-) 1 μg/cm² (-)	Qualitative assessment Oral exposure does not occur as par Qualitative assessment If risk reduction measures are taken exposure is expected. However, den loading of limes or direct contact to t no protective gloves are worn during occasionally result in mild irritation e rinsing with water. Quantitative assessment The constant rate model of ConsExp rate to dust formed while pouring por DIY-fact sheet (RIVM report 320104/ exposure estimate will be even lowe Qualitative assessment If risk reduction measures are taken exposure is expected. Dust from load excluded if no protective goggles are water and seeking medical advice af advisable.	into account no human mal contact to dust from he lime cannot be excluded if application. This may asily avoided by prompt to has been used. The contact wder has been taken from the 207). For granules the r. into account no human ding of the limes cannot be a used. Prompt rinsing with		
Oral Dermal (powder) Eye Inhalation (powder)	Exposure e - small task: (large task: 1 Dust Dust	2.1 μg/cm² (-) 1 μg/cm² (-) 12 μg/m³ (0.003)	Qualitative assessment Oral exposure does not occur as par Qualitative assessment If risk reduction measures are taken exposure is expected. However, den loading of limes or direct contact to t no protective gloves are worn during occasionally result in mild irritation e rinsing with water. Quantitative assessment The constant rate model of ConsExp rate to dust formed while pouring por DIY-fact sheet (RIVM report 320104/ exposure estimate will be even lowe Qualitative assessment If risk reduction measures are taken exposure is expected. Dust from load excluded if no protective goggles are water and seeking medical advice af advisable. Quantitative assessment	into account no human mal contact to dust from he lime cannot be excluded if application. This may asily avoided by prompt to has been used. The contact wder has been taken from the 007). For granules the r. into account no human ding of the limes cannot be a used. Prompt rinsing with ter accidental exposure is		
Oral Dermal (powder) Eye Inhalation (powder)	Exposure e - small task: (large task: 1 Dust Dust	2.1 μg/cm² (-) 1 μg/cm² (-)	Qualitative assessment Oral exposure does not occur as par Qualitative assessment If risk reduction measures are taken exposure is expected. However, den loading of limes or direct contact to t no protective gloves are worn during occasionally result in mild irritation e rinsing with water. Quantitative assessment The constant rate model of ConsExp rate to dust formed while pouring por DIY-fact sheet (RIVM report 320104/ exposure estimate will be even lowe Qualitative assessment If risk reduction measures are taken exposure is expected. Dust from load excluded if no protective goggles are water and seeking medical advice af advisable.	into account no human mal contact to dust from he lime cannot be excluded if application. This may asily avoided by prompt to has been used. The contact wder has been taken from the 007). For granules the r. into account no human ding of the limes cannot be a used. Prompt rinsing with ter accidental exposure is		

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Inhalation	Small task: 1.2 µg/m³ (0.0003)	Quantitative assessment
(granules)	Large task: 12 µg/m³ (0.003)	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.
Dropwise application	on 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
		eves 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 exp	osure	
		d 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.

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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 ma	nagement measures			
	ndoor 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 managem				
Not relevant, as the risk to human health from this				
Other given operational conditions affecting co				
Not relevant, as the risk to human health from this				
Conditions and measures related to information				
Not relevant, as the risk to human health from this				
Conditions and measures related to personal p				
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 the safety data sheet