

Scheda dei dati di sicurezza secondo 1907/2006/CE - 2020/878

Nome commerciale: Trichloressigsre (TCA) techn, Schuppen
Articolo-No: 105368
Data di revisione: 07.03.2023
Versione: 7.2/it



Versione sostitutiva di: 20.01.2023
Data della stampa: 09.05.2023

SEZIONE 1: Identificazione della sostanza/miscela e della società/im-presa

1.1 Identificatore del prodotto

Nome commerciale	Acido Tricloroacetico (TCA) tec,scaglie Cod. 13100051
Nome conf. 67/548/CEE / 1272/2008/CE	acido tricloroacetico
No. CAS	76-03-9
No. INDICE	607-004-00-7
No. CE	200-927-2
Numero di registrazione REACH	01-2119485186-30-0000

1.2 Usi identificati pertinenti della sostanza o della miscela e usi sconsigliati

Usi rilevanti individuati	Usò come reagenti per laboratorio
Notano	SU 3, 22, 24; ERC 2, 9a; PROC 5, 8b, 9, 10; PC 21 Prodotti per il trattamento di superfici metalliche
Notano	SU 3; ERC 2, 7; PROC 5, 13; PC 14 Prodotti per il trattamento delle superfici non metalliche
Notano	SU 3; ERC 2, 7; PROC 5, 13; PC 15 Revistimenti e colori, riempitivi, stucchi, diluenti
Notano	SU 3; ERC 2; PROC 5; PC 9a Prodotti per la pulizia e il lavaggio
Notano	SU 3; ERC 2; PROC 5; PC 35 Fabbricazione di prodotti di chimica fine
Notano	SU 3, 9; ERC 7; PROC 4; PC 21

1.3 Informazioni sul fornitore della scheda di dati di sicurezza

Indirizzo	CABB GmbH Ludwig-Hermann-Str. 100 DE-86368 Gersthofen
Dipartimento responsabile	Telefono: +49 6196 9674 0 Telefax: +49 6196 9674 199 info@cabb-chemicals.com
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1.4 Numero telefonico di emergenza

Numero telefonico d'emergenza +49 (0)821-491714

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SEZIONE 2: Identificazione dei pericoli

2.1 Classificazione della sostanza o della miscela

Classificazione secondo la normativa (CE) n. 1272/2008 Skin Corr. 1A; H314 Aquatic Acute 1; H400 Aquatic Chronic 1; H410 STOT SE 3; H335

2.2 Elementi dell'etichetta

Pittogramma di pericolo



GHS05



GHS07



GHS09

Avvertenza

Pericolo

Frasi H

H314: Provoca gravi ustioni cutanee e gravi lesioni oculari.
H335: Può irritare le vie respiratorie.
H410: Molto tossico per gli organismi acquatici con effetti di lunga durata.

Frasi P

P273: Non disperdere nell'ambiente.
P280: Indossare guanti/indumenti protettivi/proteggere gli occhi/proteggere il viso/proteggere l'udito.
P301+P330+P331: IN CASO DI INGESTIONE: sciacquare la bocca. NON provocare il vomito.
P303+P361+P353: IN CASO DI CONTATTO CON LA PELLE (o con i capelli): togliersi di dosso immediatamente tutti gli indumenti contaminati. Sciacquare la pelle (o fare una doccia).
P305+P351+P338: IN CASO DI CONTATTO CON GLI OCCHI: sciacquare accuratamente per parecchi minuti. Togliere le eventuali lenti a contatto se è agevole farlo. Continuare a sciacquare.
P310: Contattare immediatamente un CENTRO ANTIVELENI/un medico.

2.3 Altri pericoli

Indicazioni sui pericoli

Questa sostanza/miscela non contiene componenti a livelli dello 0,1% o superiori, classificati come persistenti, bioaccumulabili e tossici (PBT) o molto persistenti e molto bioaccumulabili (vPvB).
La sostanza/miscela non contiene componenti a livelli pari o superiori allo 0,1% inclusi nell'elenco stabilito in conformità all'articolo 59, paragrafo 1, per le proprietà di interferenza endocrina.
Questa sostanza/miscela non contiene componenti a livelli pari o superiori allo 0,1% identificati come interferenti endocrini in base ai criteri del regolamento delegato (UE) 2017/2100 della Commissione o del regolamento (UE) 2018/605 della Commissione.

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SEZIONE 3: Composizione/informazioni sugli ingredienti

Altri informazioni Stato di notificazione: AICS, DSL, ECL, EINECS, ENCS, IECSC, NZIoC, PICCS, REACH, SWISS, TSCA.

Ingredienti pericolosi

Sostanza contenuta	Numeri	Classificazione 1272/2008/CE	Concentrazione
TCA (ISO); acido tricloroacetico	No. CAS: 76-03-9 No. CE: 200-927-2 No. INDICE: 607-004-00-7	Skin Corr. 1A; H314 Aquatic Acute 1; H400 Aquatic Chronic 1; H410	>= 98.0 peso%
acido dicloroacetico	No. CAS: 79-43-6 No. CE: 201-207-0 No. INDICE: 607-066-00-5	Skin Corr. 1A; H314 Aquatic Acute 1; H400	<= 1.2 peso%

altre informazioni sulle sostanze

Sostanza contenuta	Numeri	Fattore M - SCL - ATE	altro
TCA (ISO); acido tricloroacetico	No. CAS: 76-03-9 No. CE: 200-927-2 No. INDICE: 607-004-00-7	STOT SE 3 H335: C >= 1 %	
acido dicloroacetico	No. CAS: 79-43-6 No. CE: 201-207-0 No. INDICE: 607-066-00-5		

SEZIONE 4: Misure di primo soccorso

4.1 Descrizione delle misure di primo soccorso

Informazione generale	In caso di incidente o di malessere consultare immediatamente il medico (se possibile, mostrargli l'etichetta). Mostrare questa scheda di sicurezza al medico curante. Il soccorritore deve munirsi di protezione individuale. Togliere gli indumenti contaminati e lavarli prima del loro riutilizzo.
Se inalato	SE INALATO : Allontanarsi per respirare aria fresca e restare a riposo in una posizione che facilita la respirazione. Chiamare immediatamente un medico. Mostrare questa scheda di sicurezza al medico curante.
In caso di contatto con la pelle	Lavare immediatamente con molta acqua e sentire il parere di un medico. Trattamento medico immediato si rende necessario in quanto gli effetti corrosivi sulla pelle mostrano una lenta e cattiva guarigione della piaga.
In caso di contatto con gli occhi	Sciacquare immediatamente con molta acqua anche sotto le palpebre, per almeno 15 minuti. Chiamare subito un medico.
Se ingerito	Far bere immediatamente grandi quantità d'acqua. Chiamare immediatamente un medico. Mostrare questa scheda di sicurezza al medico curante. NON indurre il vomito.

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Smaltire come rifiuto speciale secondo le normative locali e nazionali.
Pulire accuratamente i suoli e altri oggetti contaminati osservando le regolamentazioni sull'ambiente.

6.4 Riferimento ad altre sezioni

Riferimento ad altre sezioni Manipolazione in sicurezza: vedi sezione 7
Protezione individuale: vedi sezione 8
Smaltimento: vedi sezione 13

SEZIONE 7: Manipolazione e immagazzinamento

7.1 Precauzioni per la manipolazione sicura

Avvertenze per un impiego sicuro Assicurare un sufficiente ricambio d'aria e/o un'aspirazione negli ambienti di lavoro.
Aprire e maneggiare il recipiente con cura.

7.2 Condizioni per lo stoccaggio sicuro, comprese eventuali incompatibilità

Requisiti per i locali e i contenitori di stoccaggio Immagazzinare a temperatura ambiente nel contenitore originale. I contenitori devono essere rivestiti internamente.

Indicazioni per il magazzinaggio vario Conservare lontano da alimenti o mangimi e da bevande.

Indicazioni sullo stoccaggio Tenere i contenitori ben chiusi in un luogo secco, fresco e ben ventilato.

TRGS 510 Classe di deposito 8 A

Temperatura di stoccaggio consigliata: < 30 °C

Indicazioni contro incendi ed esplosioni Normali misure di prevenzione antincendio.

7.3 Usi finali particolari

Impieghi particolari vedere la sezione 1.2

SEZIONE 8: Controllo dell'esposizione/protezione individuale

8.1 Parametri di controllo

TCA (ISO); acido tricloroacetico

DNEL	Gruppo	Via di esposizione	Osservazioni	Fonte
1,4 mg/kg/d	DNEL lavoratore	DNEL A lungo termine dermico (sistemico); DNEL acuta dermico, a breve termine (sistemico)		dati aziendali
124 mg/m ³	DNEL lavoratore	DNEL A lungo termine per inalazione (sistemico); DNEL acuta per inalazione (sistemico)		dati aziendali

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5% in mixture	DNEL lavoratore	DNEL acuta dermico, a breve termine (locale)		dati aziendali
0,7 mg/kg/d	DNEL Consumatore	DNEL A lungo termine dermico (sistemico); DNEL A lungo termine per via orale (ripetuto); DNEL acuta dermico, a breve termine (sistemico)		dati aziendali
61 mg/m ³	DNEL Consumatore	DNEL A lungo termine per inalazione (sistemico); DNEL acuta per inalazione (sistemico)		dati aziendali
5% in mixture	DNEL Consumatore	DNEL A lungo termine dermico (locale); DNEL acuta dermico, a breve termine (locale)	corrosive substance	dati aziendali

PNEC	Gruppo	Fonte
0,17 µg/l	PNEC acquatico, acqua dolce	dati aziendali
0,017 µg/l	PNEC acquatico, acqua marina	dati aziendali
0,00014 mg/kg peso a secco	PNEC sedimento, acqua dolce	dati aziendali
0,000014 mg/kg peso a secco	PNEC sedimento, acqua marina	dati aziendali
0,0046 mg/kg peso a secco	PNEC Terreno	dati aziendali
100 mg/l	PNEC impianto di depurazione (STP)	dati aziendali
2,4 mg/kg alimenti	PNEC Avvelenamento secondario	dati aziendali

8.2 Controlli dell'esposizione

Protezione respiratoria	In caso di areazione insufficiente indossare una protezione respiratoria.
Protezione delle mani	Guanti resistenti al solvente (gomma butilica)
Spessore materiale	0,7 mm
Tempo di penetrazione	> 480 min
suggerimento	Tenere presenti le informazioni date dal produttore relative alla permeabilità, ai tempi di penetrazione, ed alle condizioni al posto di lavoro, (stress meccanico, durata del contatto).
Protezione degli occhi	Occhiali di sicurezza ben aderenti
Protezione della pelle e del corpo	Indossare adeguati indumenti di protezione.
Norme generali protettive e di igiene del lavoro	Manipolare rispettando le buone pratiche di igiene industriale e di sicurezza adeguate. Durante l'utilizzo, non mangiare, bere o fumare. Evitare il contatto con la pelle, con gli occhi e con gli indumenti. Tener lontano da cibi, bevande e alimenti per animali. Lavarsi le mani prima delle pause ed alla fine della giornata lavorativa.
Dati di progetto	Assicurare un'adeguata areazione, specialmente in zone chiuse.

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SEZIONE 9: Proprietà fisiche e chimiche

9.1 Informazioni sulle proprietà fisiche e chimiche fondamentali

Colore	biancastro - giallo chiaro
Odore	di aceto
Punto di fusione [°C] / Punto di congelamento [°C]	56
Punto di ebollizione [°C]	197
Tipo di misurazione	DIN 53171
Infiammabilità	Non infiammabile.
Tipo di misurazione	EU A.10
Punto di infiammabilità [°C]	110°C
Pressione	1013 hPa
pH	< 1
Temperatura [°C]	20 °C
Osservazioni	900 g/l
Viscosità dinamica [kg/(m s)]	non applicabile
Idrosolubilità [g/l]	1300
Pressione	20 °C
Coefficiente di distribuzione (n-oc- tanolo/acqua) (log P O/W)	1,44
Tensione di vapore [kPa]	1,2
Temperatura [°C]	50 °C 0,08
Temperatura [°C]	25 °C
Densità [g/cm ³]	1,62
Temperatura [°C]	65 °C

9.2 Altre informazioni

9.2.2 Altri parametri relativi alla sicurezza

Tasso di evaporazione [kg/(s m ²)]	Nessun dato disponibile
Forma fisica	solido: cristallino

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SEZIONE 10: Stabilità e reattività

10.1 Reattività

Decomposizione termica L'acido tricloroacetico si decompone al di sopra dei 200 °C con formazione di HCl, CO, Fosgene.

10.2 Stabilità chimica

Stabilità chimica Questo prodotto è stabile se immagazzinato a delle temperature ambiente normali.

10.3 Possibilità di reazioni pericolose

Reazioni pericolose Incompatibile con le basi.

10.4 Condizioni da evitare

Condizioni da evitare L'acido tricloroacetico si decompone al di sopra dei 200 °C con formazione di HCl, CO, Fosgene.

10.5 Materiali incompatibili

Materiali da evitare Metalli

10.6 Prodotti di decomposizione pericolosi

Prodotti di decomposizione pericolosi Fosgene, Chloroidrogeno (HCl)

SEZIONE 11: Informazioni tossicologiche

11.1 Informazioni sulle classi di pericolo ai sensi del regolamento (UE) n. 1272/2008

Tossicità orale [mg/kg]	3320 mg/kg
Criterio di test	DL50
Saggio sulla specie	ratto 4970 mg/kg
Criterio di test	DL50
Saggio sulla specie	topo
Tossicità cutanea [mg/kg]	Nessun dato disponibile
LC50 Inalazione 4h per vapori [mg/l]	Nessun dato disponibile
Tossicità subacuta, subcronica, cronica	NOEL = 26 mg/kg/d
Saggio sulla specie	cane

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Durata dell'esposizione [h]	90 giorni
Modalità di assunzione	Orale NOEL = 70,5 mg/kg/d
Saggio sulla specie	ratto
Durata dell'esposizione [h]	730 giorni
Modalità di assunzione	Orale
Irritazione della pelle	fortemente corrosivo.
Irritazione degli occhi	fortemente corrosivo.
Irritazione delle vie respiratorie	irritante
Sensibilizzazione	Nessuna reazione di sensibilizzazione è stata osservata.
Tipo di misurazione	OECD TG 406
Mutagenicità'	Non ci sono indicazioni sperimentali circa la mutagenicità in vitro. Non ci sono indicazioni sperimentali circa la mutagenicità in vivo.
Effetti cancerogeni .	Non classificabile come cancerogeno per l'uomo..
Tossicità di riproduzione	Gli esperimenti condotti su animali in laboratorio hanno mostrato effetti tossici sulla riproduzione. Esperimenti su animali hanno evidenziato un rischio a danno della fertilità soltanto a seguito di una somministrazione di dosi elevate di questa sostanza.
Tossicità specifica per l'organo (esposizione singola) [mg/kg]	
Osservazioni	Nessun dato disponibile
Tossicità specifica per l'organo (esposizione ripetuta) [mg/kg]	
Modalità di assunzione	Nessun dato disponibile
Pericolo in caso di aspirazione	
Valutazione	non applicabile

11.2 Informazioni su altri pericoli

Proprietà di interferente endocrino
Nessun dato disponibile

SEZIONE 12: Informazioni ecologiche

12.1 Tossicità

Tossicità per i pesci [mg/l]	> 277
Criterio di test	LC50
Saggio sulla specie	colore naturale - colori vari

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Durata dell'esposizione [h]	48 h
Tossicità per Daphnia [mg/l]	110 mg/l
Criterio di test	EC50/LC50
Saggio sulla specie	Daphnia magna (grande pulce d'acqua)
Durata dell'esposizione [h]	24 h
Tossicità per le alghe [mg/l]	0,27 mg/l
Criterio di test	EC50
Saggio sulla specie	Chlorella pyrenoidosa
Durata dell'esposizione [h]	14 d 0,4 mg/l
Criterio di test	EC50
Saggio sulla specie	Chlorella mucosa
Durata dell'esposizione [h]	14 d
NOEC (Pesce) [mg/l]	< 7 mg/l
Saggio sulla specie	Cyprinus caprio
Durata dell'esposizione [h]	63 d
NOEC (Daphnia) [mg/l]	nessun dato disponibile.
NOEC (Alga) [mg/l]	0,008 mg/l
Saggio sulla specie	colore naturale - colori vari

12.2 Persistenza e degradabilità

Biodegradabilità	Non immediatamente biodegradabile.
Tipo di misurazione	colore naturale - colori vari

12.3 Potenziale di bioaccumulo

Bioaccumulazione	sottile
Fattore di bioconcentrazione (BCF)	0,4 - 1,7 (Cyprinus caprio) 3,162 (BCFWIN v2.17)

12.4 Mobilità nel suolo

Distribuzione nell'ambiente	Nessun dato disponibile
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12.5 Risultati della valutazione PBT e vPvB

Il risultato del rilevamento delle proprietà PBT	Questa sostanza non soddisfa i criteri PBT/vPvB della normativa REACH, allegato XIII.
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12.6 Proprietà di interferente endocrino

Effetti nocivi per l'ambiente Nessun dato disponibile

12.7 Altri effetti nocivi

Ecotossicologia 4,6 mg/kg
 Criterio di test EC50
 Saggio sulla specie Avena sativa
 Osservazioni NOEC = 1 mg/kg
 Durata dell'esposizione [h] 14 d
Tossicità per i batteri [mg/l] > 880 mg/l
 Criterio di test EC10
 Saggio sulla specie Pseudomonas putida
 Durata dell'esposizione [h] 24 h







SEZIONE 13: Considerazioni sullo smaltimento

13.1 Metodi di trattamento dei rifiuti

Osservazioni sullo smaltimento Eliminare rispettando le Direttive Europee che riguardano i rifiuti o i rifiuti pericolosi. I codici dei rifiuti devono essere assegnati dall'utilizzatore, di preferenza dopo discussione con le autorità responsabili per lo smaltimento dei rifiuti.

Imballaggi vuoti sporchi. Smaltire come prodotto inutilizzato.

SEZIONE 14: Informazioni sul trasporto

	Trasporto su strada ADR/RID	Trasporto marittimo IMDG	Trasporto aereo ICAO/IATA
14.1 No UN	1839	1839	1839
14.3 Classi di pericolo connesso al trasporto	8	8	8
14.4 Gruppo d'imballaggio	II	II	II
14.2 Descrizione delle merci	ACIDO TRICLOROACETICO	TRICHLORESSIGSÄURE, FEST	Trichloressigsäure
Etichetta	8  	8  	8 - Corrosivo  
Rischio N°	80		
Categoria	2		
Codice di classificazione	C4		
Codice di limitazione tunnel	E		
14.5 Pericoli per l'ambiente	U - Pericoloso per l'ambiente	U - inquinante marino	U - pericolosa per l'ambiente
Nome di spedizione dell'ONU	UN 1839 ACIDO TRICLOROACETICO	UN 1839 TRICHLOROACETIC ACID, SOLID	UN 1839 Trichloroacetic acid
EMS no		F-A;S-B	

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	Trasporto su strada ADR/RID	Trasporto marittimo IMDG	Trasporto aereo ICAO/IATA
Categoria di stivamento		A	

CFR 49 - Code of Federal Regulations (US)

No UN	1839
Classi di pericolo connesso al trasporto	8
Gruppo d'imballaggio	II
Descrizione delle merci	Trichloroacetic acid
Etichetta	8
Pericoli per l'ambiente	U - pericolosa per l'ambiente

TDG - Transport Dangerous Goods (Canada)

No UN	1839
Classi di pericolo connesso al trasporto	8
Gruppo d'imballaggio	II
Descrizione delle merci	TRICHLOROACETIC ACID
Etichetta	8
Pericoli per l'ambiente	U - pericolosa per l'ambiente

SEZIONE 15: Informazioni sulla regolamentazione

15.1 Disposizioni legislative e regolamentari su salute, sicurezza e ambiente specifiche per la sostanza o la miscela

Regolamenti supplementari	Prendere nota della direttiva 94/33/CE sulla protezione dei giovani al posto di lavoro. Prendere nota della direttiva 92/33/CEE sulla sicurezza e la salute delle donne incinta al posto di lavoro.
Lista TA Luft (Germania).	5.2.5 I
Classe pericolosità acque	2
Nr. caratteristico	197

15.2 Valutazione della sicurezza chimica

Valutazione della sicurezza	Per la sostanza è stata effettuata una della sicurezza chimica.
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SEZIONE 16: Altre informazioni

Modifica rispetto all'ultima stesura	Le variazioni rispetto all'ultima versione sono contrassegnate con *. Sezioni revisionate dell' (M)SDS: 4, 6, 7, 10, 12
Testo delle H - frasi	H314: Provoca gravi ustioni cutanee e gravi lesioni oculari. H335: Può irritare le vie respiratorie. H400: Molto tossico per gli organismi acquatici. H410: Molto tossico per gli organismi acquatici con effetti di lunga durata.
Testo delle classi di pericolo	Aquatic Acute: Pericoloso per l'ambiente acquatico Aquatic Chronic: Pericoloso per l'ambiente acquatico STOT SE: Tossicità specifica per organi bersaglio - esposizione singola
Scheda rilasciata da	Dr. Hubert Reif / HSEQ (+49 821 479 2555)

I dati si poggiano sul livello odierno delle nostre conoscenze ed esperienze. Il foglio di istruzioni per la sicurezza descrive prodotti riguardo a quello che concerne le esigenze di sicurezza. I dati non hanno il significato di assicurazione di determinate caratteristiche.

1. Overview of exposure scenarios (ES)

ES number	Exposure scenario name	Manufacture / Use / Subsequent service life	Stage No.*)
1	Blank as it is confidential		
2	Manufacture of pharmaceuticals	Manufacture of pharmaceuticals - Manufacture	IW-1
3	Formulation of laboratory chemicals	Formulation of laboratory chemicals - Mixing in closed batch process - Transfer - Transfer small quantities	F-1
4	Manufacture of fine chemicals	Manufacture - Use in batch process	IW-2
5	Laboratory reagent. Professional use	Laboratory reagent - laboratory reagent	PW-1
6	Textile. Formulation of surface treatment	Formulation - Mixing	F-2
7	Textile. surface treatment	surface treatment - Dipping	IW-3
8	Metals. Surface treatment	surface treatment - Dipping	IW-4
9	Coatings and Inks. Formulation stage	Formulation stage - Mix	F-3
10	Cleaning products. Formulation	Formulation - Mix	F-4
11	Lubricants. Formulation	Closed batch process - Industrial use	IW-5
12	Dermatologist. Professional use	Dermatologist - Peelings	PW-2

2. Conditions of use affecting exposure

2.1. blank as it is confidential

2.2. Manufacture of pharmaceuticals

Trichloroacetic acid is used in the pharmaceutical industry as an intermediate for the manufacture of fine chemicals. This scenario covers these manufacturing processes, according to the descriptors facilitated by customers PROC3.

2.2.1. Exposure scenario

Manufacture of pharmaceuticals
Market sector: PC 29 - Pharmaceuticals Sector of use: SU 9 - Manufacture of fine chemicals

Environment:	ERC 7
Worker	
Manufacture	PROC 3
Operational conditions and risk management measures	
Control of environmental exposure: Manufacture of pharmaceuticals	
Product characteristics	
Amounts used	
Daily use at a site	<= 7.65 tonnes/day
Annual use at a site	<= 153 tonnes/year
Percentage of tonnage used at regional scale	= 100 %
Frequency and duration of use	
ESVOC1 duration of use	= 300
Environment factors not influenced by risk management	
Receiving surface water flow rate	>= 1.8E4 m3/d
Other given operational conditions affecting environmental exposure	
Technical conditions and measures at process level (source) to prevent release	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
No releases	no releases [Water: 100%; Air: 100%; Soil: 100%]
no releases. Wastes are incinered.	
Organizational measures to prevent/limit release from site	
Conditions and measures related to municipal sewage treatment plant	
Municipal STP	Yes [Water: 100%]
Discharge rate of STP	>= 2E3 m3/d
Application of the STP sludge on agricultural soil	No
Conditions and measures related to external treatment of waste for disposal	
Conditions and measures related to external recovery of waste	
Additional good practice advice beyond the REACH CSA	

Control of workers exposure for "Manufacture" [PROC 3]				
		Inhal*)		Derm*)
		Loc	Sys	Loc Sys
Product characteristics				
Substance in preparation	No			L
Dustiness	High			L
Amounts used				
Frequency and duration of use/exposure				
Duration of activity	>4 hours			L
Human factors not influenced by risk management				
Other given operational conditions affecting workers exposure				
Place of use	Indoors			L

Surface of skin exposed	One hand face only (240 cm2)			L
Technical conditions and measures at process level (source) to prevent release				
Level of containment	Use in closed batch process (synthesis or formulation)		L	
Technical conditions and measures to control dispersion from source towards the worker				
LEV	LEV [Inhalation: 90%]		A	
LEV				
Local Exhaust Ventilation	Yes		L	L
Organisational measures to prevent /limit releases, dispersion and exposure				
Conditions and measures related to personal protection, hygiene and health evaluation				
gloves	chemically resistant gloves with specific activity training [Dermal: 95%]			A
wear chemically resistant gloves (tested to EN374) in combination with specific activity training (PPE17)				
Corrosive	100 [Dermal: 100%]			AL
Dermal and eyes exposure should be avoided from corrosive substance.				
respirator masks	half mask respirator [Inhalation: 90%]		A	
wear a respirator conforming to EN140 with type A filter or better				
Respiratory protection	Respiratory protection is not used		L	
Additional good practice advice beyond the REACH CSA				
Corrosive	Corrosive		A	AL A
As the substance is corrosive, the following Personal Protective Equipment is recommended as good industrial practice advice beyond those considered in the exposure scenario: Avoid contact with contaminated tools and objects Train staff on good standard of personal hygiene. Wash skin after contact with substance/product containing the substance. Immediate removal/dry cleaning and disposal of spills.				

*) The route of exposure (**Inhalation**, **Dermal**) and type of effect (**Local**, **Systemic** and **Acute** or **Long term**) for which the determinant has been used for exposure estimation are reported.

2.2.2. Exposure estimation for Manufacture of pharmaceuticals

2.2.2.1. Exposure estimation for the environment (Manufacture of pharmaceuticals)

ERC7 defined as Industrial use of substances in closed systems was used. Taking into account the RMM implemented in pharmaceutical industry, releases of 5% to the different compartments (water, soil and air) is non realistic frame. Same "no release" determinant was used in this scenario too.

2.2.2.1.1. Environmental releases

Compartment	Release factor estimation method	Explanation / Justification
Water	ERC (ERC 7)	Initial release factor (%): 5 Release factor after on site risk management (%): 0

Compartment	Release factor estimation method	Explanation / Justification
		Local release rate (kg/day): 0
Air	ERC (ERC 7)	Initial release factor (%): 5 Release factor after on site risk management (%): 0 Local release rate (kg/day): 0
Soil	ERC (ERC 7)	Initial release factor (%): 5 Release factor after on site risk management (%): 0

2.2.2.1.2. Environmental exposure

Protection target	Exposure concentration
Water: Fresh Water (Pelagic)	Local PEC: 1.85E-7 mg/L Local concentration: 0 mg/L
Water: Fresh Water (Sediment)	Local PEC: 7.15E-7 mg/kg dw
Water: Marine Water (Pelagic)	Local PEC: 1.84E-8 mg/L Local concentration: 0 mg/L
Water: Marine Water (Sediment)	Local PEC: 7.14E-8 mg/kg dw
Water: Fresh Water Food Chain (Predators)	Local PEC: 6.17E-7 mg/kg ww
Water: Marine Water Food Chain (Predators)	Local PEC: 6.16E-8 mg/kg ww
Water: Marine Water Food Chain (Top Predators)	Local PEC: 6.16E-8 mg/kg ww
Water: Sewage Treatment Plant (Effluent)	Local PEC: 0 mg/L
Air	Local PEC: 3.39E-10 mg/m ³
Soil: Agricultural Soil	Local PEC: 4.45E-9 mg/kg dw Local concentration: 0 mg/kg dw
Soil: Terrestrial Food Chain (Predators)	Local PEC: 2.54E-8 mg/kg ww

2.2.2.1.3. Indirect exposure of humans via the environment

Exposure via inhalation

The exposure concentrations in air are reported in the Table "Summary of exposure concentrations" of the preceding section 2. 2.2.1.2 "Environmental exposure".

Exposure via food consumption: Total daily intake for humans

Type of food	Daily human dose through intake	
	Total estimated daily intake for humans: 6.568E-9 mg/kg bw/day	
	Estimated daily dose through intake from local exposure	Concentration in food from local exposure
Drinking	5.28E-9 mg/kg bw/day	1.85E-7 mg/L

Type of food	Daily human dose through intake	
water		
Fish	1.01E-9 mg/kg bw/day	6.17E-7 mg/kg
Leaf crops	1.13E-10 mg/kg bw/day	6.58E-9 mg/kg
Root crops	1.64E-10 mg/kg bw/day	2.99E-8 mg/kg
Meat	3.64E-14 mg/kg bw/day	8.46E-12 mg/kg
Milk	6.78E-13 mg/kg bw/day	8.46E-11 mg/kg

2.2.2.2. Exposure estimation for Worker for Manufacture

Since there is currently no tool available for estimating acute inhalation exposures, REACH guidance (R14) recommends multiplying chronic exposure estimates by a factor of 2 or 4 depending on whether exposure estimates are based on 90th or 75th percentile. For inhalation exposures estimated using ECETOC TRA, a factor of 2 is appropriate because the tool provides 90th percentile exposure estimates. This factor of 2 is applied to full-shift exposure estimates.

For dermal acute systemic exposures same figure than chronic exposure estimate was used as recommended in the above described guidance.

Route of exposure and type of effects	Exposure concentration	Method / name of exposure assessment	Explanation / Justification
Inhalation: Acute, Systemic	0.02 mg/m ³	Method: External exposure estimation tool Name: Acute inhalation	Representativity and reliability: Exposure obtained for long term exposure x 2. ECETOC TRA exposure estimate is based on 90% percentile; therefore as recommended in REACH guidance R14, a factor of 2 is to be applied to long exposure estimation. Remark on exposure value: Calculated as recommends in guidance R14.
Inhalation: Long term, Systemic	0.1 mg/m ³	Method: TRA workers Name: long term systemic	
Dermal: Acute, Local		Method: Conditions of use (OC/RMM) Name: Acute local	
Dermal: Acute,	0.034 mg/kg bw/day	Method: External exposure estimation tool	Representativity and reliability: Same figure that long term exposure

Route of exposure and type of effects	Exposure concentration	Method / name of exposure assessment	Explanation / Justification
Systemic		Name: Acute systemic	calculated with TRA module within CHESAR 1.1.1 Remark on exposure value: Calculated as recommended in guidance R14.
Dermal: Long term, Local		Method: Conditions of use (OC/RMM) Name: Acute local	
Dermal: Long term, Systemic	0.034 mg/kg bw/day	Method: TRA workers Name: long term systemic	

2.3. Formulation of laboratory chemicals

Trichloroacetic acid is used in the fine chemicals market sector for laboratory chemicals formulation. Information provided by customers for different processes were collected using REACH terminology (i.e., use descriptors). Furthermore, the following activities are covered in this scenario:

PROC5: Manufacture or formulation of chemical products or articles using technologies related to mixing and blending of solid or liquid materials, and where the process is in stages and provides the opportunity for significant contact at any stage

PROC 8b: Sampling, loading, filling, transfer, dumping, bagging in dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected.

PROC9: Filling lines specifically designed to both capture vapour and aerosol emissions and minimise spillage

For environmental exposure ERC2 was the starting point. However more refined release factors for formulation processes were described by AISE. Therefore Environmental release factors based on AISE spERC 2.1.h.v1 (AISE 8) was used:

- Air: Release fraction 0
- Waste water: Release fraction 0.001
- Soil: Release fraction: 0

RMM determinants were also applied.

2.3.1. Exposure scenario

Formulation of laboratory chemicals
Market sector: PC 21 - Laboratory Chemicals

Environment:	ERC 2
Worker	
Mixing in closed batch process	PROC 5
Transfer	PROC 8b
Transfer small quantities	PROC 9
Operational conditions and risk management measures	

Control of environmental exposure: Formulation of laboratory chemicals	
Product characteristics	
Amounts used	
Daily use at a site	<= 0.14 tonnes/day
Annual use at a site	<= 1.4 tonnes/year
Percentage of tonnage used at regional scale	= 100 %
Frequency and duration of use	
AISE general duration	= 220 days
Environment factors not influenced by risk management	
Receiving surface water flow rate	>= 1.8E4 m3/d
Other given operational conditions affecting environmental exposure	
Technical conditions and measures at process level (source) to prevent release	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
AISE 8. Formulations	Formulation AISE
Formulation release rates from AISE8	
Organizational measures to prevent/limit release from site	
Conditions and measures related to municipal sewage treatment plant	
Municipal STP	Yes [Water: 0.4%]
Discharge rate of STP	>= 2E3 m3/d
Application of the STP sludge on agricultural soil	No
Conditions and measures related to external treatment of waste for disposal	
Conditions and measures related to external recovery of waste	
Additional good practice advice beyond the REACH CSA	

Control of workers exposure for "Mixing in closed batch process" [PROC 5]				
Product characteristics				
Substance in preparation				
	No		Inhal*)	Derm*)
			Loc	Sys
Dustiness	High		L	L
Amounts used				
Frequency and duration of use/exposure				
Duration of activity	>4 hours		L	

Human factors not influenced by risk management				
Other given operational conditions affecting workers exposure				
Place of use	Indoors		L	
Surface of skin exposed	Two hands face (480 cm2)		L	L
Technical conditions and measures at process level (source) to prevent release				
Technical conditions and measures to control dispersion from source towards the worker				
LEV	LEV [Inhalation: 90%]		A	
LEV				
Local Exhaust Ventilation	Yes		L	L L
Organisational measures to prevent /limit releases, dispersion and exposure				
Conditions and measures related to personal protection, hygiene and health evaluation				
gloves	chemically resistant gloves with specific activity training [Dermal: 95%]			A
wear chemically resistant gloves (tested to EN374) in combination with specific activity training (PPE17)				
Corrosive	100 [Dermal: 100%]			A
Dermal and eyes exposure should be avoided from corrosive substance.				
respirator masks	half mask respirator [Inhalation: 90%]		A	
wear a respirator conforming to EN140 with type A filter or better				
Respiratory protection	Respiratory protection capable offering a 90% reduction in inhaled concentrations of the substance		L	
Additional good practice advice beyond the REACH CSA				
Corrosive	Corrosive		A	A A
As the substance is corrosive, the following Personal Protective Equipment is recommended as good industrial practice advice beyond those considered in the exposure scenario:				
<ul style="list-style-type: none"> • Avoid contact with contaminated tools and objects • Train staff on good standard of personal hygiene. • Wash skin after contact with substance/product containing the substance. • Immediate removal/dry cleaning and disposal of spills. 				

*) The route of exposure (**Inhalation, Dermal**) and type of effect (**Local, Systemic and Acute or Long term**) for which the determinant has been used for exposure estimation are reported.

Control of workers exposure for "Transfer" [PROC 8b]					
		Inhal*)		Derm*)	
		Loc	Sys	Loc	Sys
Product characteristics					
Substance in preparation	No		L		
Dustiness	High		L		
Amounts used					
Frequency and duration of use/exposure					
Duration of activity	>4 hours		L		
Human factors not influenced by risk management					
Other given operational conditions affecting workers exposure					

Place of use	Indoors	L		
Surface of skin exposed	Two hands face (480 cm2)		L	L
Technical conditions and measures at process level (source) to prevent release				
Technical conditions and measures to control dispersion from source towards the worker				
LEV	LEV [Inhalation: 90%]	A		
LEV				
Local Exhaust Ventilation	Yes	L	L	L
Organisational measures to prevent /limit releases, dispersion and exposure				
Conditions and measures related to personal protection, hygiene and health evaluation				
gloves	chemically resistant gloves with specific activity training [Dermal: 95%]			A
wear chemically resistant gloves (tested to EN374) in combination with specific activity training (PPE17)				
Corrosive	100 [Dermal: 100%]			A
Dermal and eyes exposure should be avoided from corrosive substance.				
respirator masks	half mask respirator [Inhalation: 90%]	A		
wear a respirator conforming to EN140 with type A filter or better				
Respiratory protection	Respiratory protection capable offering a 90% reduction in inhaled concentrations of the substance	L		
Additional good practice advice beyond the REACH CSA				
Corrosive	Corrosive	A	A	A
As the substance is corrosive, the following Personal Protective Equipment is recommended as good industrial practice advice beyond those considered in the exposure scenario:				
<ul style="list-style-type: none"> • Avoid contact with contaminated tools and objects • Train staff on good standard of personal hygiene. • Wash skin after contact with substance/product containing the substance. • Immediate removal/dry cleaning and disposal of spills. 				

*) The route of exposure (**Inhalation**, **Dermal**) and type of effect (**Local**, **Systemic** and **Acute** or **Long term**) for which the determinant has been used for exposure estimation are reported.

Control of workers exposure for "Transfer small quantities" [PROC 9]					
		Inhal*)		Derm*)	
		Loc	Sys	Loc	Sys
Product characteristics					
Substance in preparation	No		L		
Dustiness	High		L		
Amounts used					
Frequency and duration of use/exposure					
Duration of activity	>4 hours		L		
Human factors not influenced by risk management					
Other given operational conditions affecting workers exposure					
Place of use	Indoors		L		
Surface of skin exposed	Two hands face (480 cm2)			L	L

Technical conditions and measures at process level (source) to prevent release			
Technical conditions and measures to control dispersion from source towards the worker			
LEV	LEV [Inhalation: 90%]	A	
LEV			
Local Exhaust Ventilation	Yes	L	L L
Organisational measures to prevent /limit releases, dispersion and exposure			
Conditions and measures related to personal protection, hygiene and health evaluation			
respirator masks	half mask respirator [Inhalation: 90%]	A	
wear a respirator conforming to EN140 with type A filter or better			
gloves	chemically resistant gloves with specific activity training [Dermal: 95%]		A
wear chemically resistant gloves (tested to EN374) in combination with specific activity training (PPE17)			
Corrosive	100 [Dermal: 100%]		A
Dermal and eyes exposure should be avoided from corrosive substance.			
Respiratory protection	Respiratory protection capable offering a 90% reduction in inhaled concentrations of the substance	L	
Additional good practice advice beyond the REACH CSA			
Corrosive	Corrosive	A	A A
As the substance is corrosive, the following Personal Protective Equipment is recommended as good industrial practice advice beyond those considered in the exposure scenario: Avoid contact with contaminated tools and objects Train staff on good standard of personal hygiene. Wash skin after contact with substance/product containing the substance. Immediate removal/dry cleaning and disposal of spills.			

*) The route of exposure (**Inhalation, Dermal**) and type of effect (**Local, Systemic and Acute or Long term**) for which the determinant has been used for exposure estimation are reported.

2.3.2. Exposure estimation for Formulation of laboratory chemicals

2.3.2.1. Exposure estimation for the environment (Formulation of laboratory chemicals chemicals)

2.3.2.1.1. Environmental releases

For environmental release figures, AISE 8 was used instead ERC 2.

Compartment	Release factor estimation method	Explanation / Justification
Water	ERC (ERC 2)	Initial release factor (%): 2 Release factor after on site risk management (%): 2E-5 Local release rate (kg/day): 2.8E-5
Air	ERC (ERC 2)	Initial release factor (%): 2.5 Release factor after on site risk management (%): 0 Local release rate (kg/day): 0

Compartment	Release factor estimation method	Explanation / Justification
Soil	ERC (ERC 2)	Initial release factor (%): 0.01 Release factor after on site risk management (%): 0

2.3.2.1.2. Environmental exposure

Protection target	Exposure concentration
Water: Fresh Water (Pelagic)	Local PEC: 1.58E-6 mg/L Local concentration: 1.39E-6 mg/L
Water: Fresh Water (Sediment)	Local PEC: 6.12E-6 mg/kg dw
Water: Marine Water (Pelagic)	Local PEC: 1.58E-7 mg/L Local concentration: 1.39E-7 mg/L
Water: Marine Water (Sediment)	Local PEC: 6.12E-7 mg/kg dw
Water: Fresh Water Food Chain (Predators)	Local PEC: 6.81E-7 mg/kg ww
Water: Marine Water Food Chain (Predators)	Local PEC: 6.8E-8 mg/kg ww
Water: Marine Water Food Chain (Top Predators)	Local PEC: 6.29E-8 mg/kg ww
Water: Sewage Treatment Plant (Effluent)	Local PEC: 1.39E-5 mg/L
Air	Local PEC: 3.4E-10 mg/m ³
Soil: Agricultural Soil	Local PEC: 4.45E-9 mg/kg dw Local concentration: 2.14E-13 mg/kg dw
Soil: Terrestrial Food Chain (Predators)	Local PEC: 2.54E-8 mg/kg ww

229.3.2.1.3. Indirect exposure of humans via the environment

Exposure via inhalation

The exposure concentrations in air are reported in the Table "Summary of exposure concentrations" of the preceding section 2. 3.2.1.2 "Environmental exposure".

Exposure via food consumption: Total daily intake for humans

Type of food	Daily human dose through intake	
	Total estimated daily intake for humans: 6.568E-9 mg/kg bw/day	
	Estimated daily dose through intake from local exposure	Concentration in food from local exposure
Drinking water	5.28E-9 mg/kg bw/day	1.85E-7 mg/L
Fish	1.01E-9 mg/kg bw/day	6.17E-7 mg/kg
Leaf crops	1.13E-10 mg/kg bw/day	6.58E-9 mg/kg
Root crops	1.64E-10 mg/kg	2.99E-8 mg/kg

Type of food	Daily human dose through intake	
	bw/day	
Meat	3.64E-14 mg/kg bw/day	8.46E-12 mg/kg
Milk	6.78E-13 mg/kg bw/day	8.46E-11 mg/kg
	Dose from regional exposure: see section 9.0.3.3	

2.3.2.2. Exposure estimation for Worker for Mixing in closed batch process

Since there is currently no tool available for estimating acute inhalation exposures, REACH guidance (R14) recommends multiplying chronic exposure estimates by a factor of 2 or 4 depending on whether exposure estimates are based on 90th or 75th percentile. For inhalation exposures estimated using ECETOC TRA, a factor of 2 is appropriate because the tool provides 90th percentile exposure estimates. This factor of 2 is applied to full-shift exposure estimates.

For dermal acute systemic exposures same figure than chronic exposure estimate was used as recommended in the above described guidance.

Route of exposure and type of effects	Exposure concentration	Method / name of exposure assessment	Explanation / Justification
Inhalation: Acute, Systemic	0.5 mg/m ³	Method: External exposure estimation tool Name: Acute inhalation	Representativity and reliability: Exposure estimate for long-term x 2. ECETOC TRA exposure estimate is based on 90% percentile; therefore as recommended in REACH Guidance R14, a factor of 2 is to be applied. Remark on exposure value: Calculated as recommends in guidance R14.
Inhalation: Long term, Systemic	0.25 mg/m ³	Method: TRA workers Name: TRA workers	
Dermal: Acute, Local		Method: Conditions of use (OC/RMM) Name: corrosive	
Dermal: Acute, Systemic	0.069 mg/kg bw/day	Method: External exposure estimation tool Name: Acute systemic	Representativity and reliability: Same figure that long term exposure calculated with TRA module within CHESAR 1.1.1 Remark on exposure value: Calculated as recommends in guidance R14.

Route of exposure and type of effects	Exposure concentration	Method / name of exposure assessment	Explanation / Justification
Dermal: Long term, Local	0.01 mg/cm ²	Method: TRA workers Name: TRA workers	
Dermal: Long term, Systemic	0.069 mg/kg bw/day	Method: TRA workers Name: TRA workers	

2.3.2.2. Exposure estimation for Worker for Transfer

Since there is currently no tool available for estimating acute inhalation exposures, REACH guidance (R14) recommends multiplying chronic exposure estimates by a factor of 2 or 4 depending on whether exposure estimates are based on 90th or 75th percentile. For inhalation exposures estimated using ECETOC TRA, a factor of 2 is appropriate because the tool provides 90th percentile exposure estimates. This factor of 2 is applied to full-shift exposure estimates.

For dermal acute systemic exposures same figure than chronic exposure estimate was used as recommended in the above described guidance.

Route of exposure and type of effects	Exposure concentration	Method / name of exposure assessment	Explanation / Justification
Inhalation: Acute, Systemic	0.25 mg/m ³	Method: External exposure estimation tool Name: Acute inhalation	Representativity and reliability: Exposure estimate for long term exposure x 2. (according to REACH guidance R14). ECETOC TRA exposure estimatios are based on 90% percentile. Therefore a factor of 2 is to be applied. Remark on exposure value: According to REACH Guidance R14.
Inhalation: Long term, Systemic	0.125 mg/m ³	Method: TRA workers Name: TRA workers	
Dermal: Acute, Local		Method: Conditions of use (OC/RMM) Name: Corrosive	
Dermal: Acute, Systemic	0.686 mg/kg bw/day	Method: External exposure estimation tool Name: Acute systemic	Representativity and reliability: Same figure that long term exposure calculated with TRA module within CHESAR 1.1.1 Remark on exposure value: Calculated as recommendes in guidance R14.

Route of exposure and type of effects	Exposure concentration	Method / name of exposure assessment	Explanation / Justification
Dermal: Long term, Local	0.1 mg/cm ²	Method: TRA workers Name: TRA workers	
Dermal: Long term, Systemic	0.686 mg/kg bw/day	Method: TRA workers Name: TRA workers	

2.3.2.2. Exposure estimation for Worker for Transfer small quantities

Since there is currently no tool available for estimating acute inhalation exposures, REACH guidance (R14) recommends multiplying chronic exposure estimates by a factor of 2 or 4 depending on whether exposure estimates are based on 90th or 75th percentile. For inhalation exposures estimated using ECETOC TRA, a factor of 2 is appropriate because the tool provides 90th percentile exposure estimates. This factor of 2 is applied to full-shift exposure estimates.

For dermal acute systemic exposures same figure than chronic exposure estimate was used as recommended in the above described guidance.

Route of exposure and type of effects	Exposure concentration	Method / name of exposure assessment	Explanation / Justification
Inhalation: Acute, Systemic	0.4 mg/m ³	Method: External exposure estimation tool Name: Acute inhalation	Representativity and reliability: Exposure obtained for long term exposure x 2. ECETOC TRA exposure estimate is based on 90% percentile; therefore as recommended in REACH guidance R14, a factor of 2 is to be applied to long exposure estimation. Remark on exposure value: Calculated as recommends in guidance R14.
Inhalation: Long term, Systemic	0.2 mg/m ³	Method: TRA workers Name: TRA workers	
Dermal: Acute, Local		Method: Conditions of use (OC/RMM) Name: Corrosive	
Dermal: Acute, Systemic	0.686 mg/kg bw/day	Method: External exposure estimation tool Name: acute systemic	Representativity and reliability: Same figure that long term exposure calculated with TRA module within CHESAR 1.1.1 Remark on exposure value: Calculated as recommends in guidance R14.

Route of exposure and type of effects	Exposure concentration	Method / name of exposure assessment	Explanation / Justification
Dermal: Long term, Local	0.1 mg/cm ²	Method: TRA workers Name: TRA workers	
Dermal: Long term, Systemic	0.686 mg/kg bw/day	Method: TRA workers Name: TRA workers	

2.4. Manufacture of fine chemicals

Trichloroacetic acid is used in the fine chemicals market sector for obtention of trichloroacetic acid-ethylesters. Information provided by customers for different processes were collected using REACH terminology (i.e., use descriptors). Furthermore, the following activities are covered in this scenario:

PROC4: Use in batch manufacture of a chemical where significant opportunity for exposure arises, e.g. during charging, sampling or discharge of material, and when the nature of the design is likely to result in exposure.

For environmental exposure ERC7 (Industrial use of substances in closed systems) was the starting point. As stated in the previous scenario, “no releases” determinant was used.

2.4.1. Exposure scenario

Manufacture of fine chemicals	
Market sector:	
PC 21 - Laboratory Chemicals	
Sector of use:	
SU 9 - Manufacture of fine chemicals	
Environment:	ERC 7
Worker	
Use in batch process	PROC 4
Operational conditions and risk management measures	

Control of environmental exposure: Manufacture	
Product characteristics	
Amounts used	
Daily use at a site	<= 0.05 tonnes/day
Annual use at a site	<= 1 tonnes/year
Percentage of tonnage used at regional scale	= 100 %
Frequency and duration of use	
Environment factors not influenced by risk management	

Receiving surface water flow rate	>= 1.8E4 m3/d
Other given operational conditions affecting environmental exposure	
Technical conditions and measures at process level (source) to prevent release	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
No releases	no releases [Water: 100%; Air: 100%; Soil: 100%]
no releases. Wastes are incinered.	
Organizational measures to prevent/limit release from site	
Conditions and measures related to municipal sewage treatment plant	
Municipal STP	Yes [Water: 100%]
Discharge rate of STP	>= 2E3 m3/d
Application of the STP sludge on agricultural soil	No
Conditions and measures related to external treatment of waste for disposal	
Conditions and measures related to external recovery of waste	
Additional good practice advice beyond the REACH CSA	

Control of workers exposure for "Use in batch process" [PROC 4]					
		Inhal*)		Derm*)	
		Loc	Sys	Loc	Sys
Product characteristics					
Substance in preparation	No		L		
Dustiness	High		L		
Amounts used					
Frequency and duration of use/exposure					
Duration of activity	>4 hours		L		
Human factors not influenced by risk management					
Other given operational conditions affecting workers exposure					
Place of use	Indoors		L		
Surface of skin exposed	Two hands face (480 cm2)			L	L
Technical conditions and measures at process level (source) to prevent release					
Level of containment	Use in closed batch process (synthesis or formulation)		L		
Technical conditions and measures to control dispersion from source towards the worker					
Local Exhaust Ventilation	Yes		L	L	L
Organisational measures to prevent /limit releases, dispersion and exposure					
Conditions and measures related to personal protection, hygiene and health evaluation					
gloves	chemically resistant gloves with specific activity training [Dermal: 95%]				A
wear chemically resistant gloves (tested to EN374) in combination with specific activity training (PPE17)					
Corrosive	100 [Dermal: 100%]				A
Dermal and eyes exposure should be avoided from corrosive substance.					
Respiratory protection	Respiratory protection capable offering a 95% reduction in inhaled concentrations of		L		

the substance		
Additional good practice advice beyond the REACH CSA		
Corrosive	Corrosive	A A A
As the substance is corrosive, the following Personal Protective Equipment is recommended as good industrial practice advice beyond those considered in the exposure scenario: Avoid contact with contaminated tools and objects Train staff on good standard of personal hygiene. Wash skin after contact with substance/product containing the substance. Immediate removal/dry cleaning and disposal of spills.		

*) The route of exposure (**Inhalation, Dermal**) and type of effect (**Local, Systemic and Acute or Long term**) for which the determinant has been used for exposure estimation are reported.

2.4.2. Exposure estimation for Manufacture of fine chemicals

2.4.2.1. Exposure estimation for the environment (Manufacture)

2.4.2.1.1. Environmental releases

Compartment	Release factor estimation method	Explanation / Justification
Water	ERC (ERC 7)	Initial release factor (%): 5 Release factor after on site risk management (%): 0 Local release rate (kg/day): 0
Air	ERC (ERC 7)	Initial release factor (%): 5 Release factor after on site risk management (%): 0 Local release rate (kg/day): 0
Soil	ERC (ERC 7)	Initial release factor (%): 5 Release factor after on site risk management (%): 0

2.4.2.1.2. Environmental exposure

Protection target	Exposure concentration
Water: Fresh Water (Pelagic)	Local PEC: 1.85E-7 mg/L Local concentration: 0 mg/L
Water: Fresh Water (Sediment)	Local PEC: 7.15E-7 mg/kg dw
Water: Marine Water (Pelagic)	Local PEC: 1.84E-8 mg/L Local concentration: 0 mg/L
Water: Marine Water (Sediment)	Local PEC: 7.14E-8 mg/kg dw
Water: Fresh Water Food Chain (Predators)	Local PEC: 6.17E-7 mg/kg ww
Water: Marine Water Food Chain (Predators)	Local PEC: 6.16E-8 mg/kg ww
Water: Marine Water Food Chain (Top Predators)	Local PEC: 6.16E-8 mg/kg ww
Water: Sewage Treatment Plant (Effluent)	Local PEC: 0 mg/L
Air	Local PEC: 3.39E-10 mg/m ³

Protection target	Exposure concentration
Soil: Agricultural Soil	Local PEC: 4.45E-9 mg/kg dw Local concentration: 0 mg/kg dw
Soil: Terrestrial Food Chain (Predators)	Local PEC: 2.54E-8 mg/kg ww

2.4.2.1.3. Indirect exposure of humans via the environment

Exposure via inhalation

The exposure concentrations in air are reported in the Table "Summary of exposure concentrations" of the preceding section 2. 4.2.1.2 "Environmental exposure".

Exposure via food consumption: Total daily intake for humans

Type of food	Daily human dose through intake	
	Total estimated daily intake for humans: 6.568E-9 mg/kg bw/day	
	Estimated daily dose through intake from local exposure	Concentration in food from local exposure
Drinking water	5.28E-9 mg/kg bw/day	1.85E-7 mg/L
Fish	1.01E-9 mg/kg bw/day	6.17E-7 mg/kg
Leaf crops	1.13E-10 mg/kg bw/day	6.58E-9 mg/kg
Root crops	1.64E-10 mg/kg bw/day	2.99E-8 mg/kg
Meat	3.64E-14 mg/kg bw/day	8.46E-12 mg/kg
Milk	6.78E-13 mg/kg bw/day	8.46E-11 mg/kg
	Dose from regional exposure: see section 9.0.3.3	

2.4.2.2. Exposure estimation for Worker for Use in batch process

Since there is currently no tool available for estimating acute inhalation exposures, REACH guidance (R14) recommends multiplying chronic exposure estimates by a factor of 2 or 4 depending on whether exposure estimates are based on 90th or 75th percentile. For inhalation exposures estimated using ECETOC TRA, a factor of 2 is appropriate because the tool provides 90th percentile exposure estimates. This factor of 2 is applied to full-shift exposure estimates.

For dermal acute systemic exposures same figure than chronic exposure estimate was used as recommended in the above described guidance.

Route of exposure and type of effects	Exposure concentration	Method / name of exposure assessment	Explanation / Justification

Route of exposure and type of effects	Exposure concentration	Method / name of exposure assessment	Explanation / Justification
Inhalation: Acute, Systemic	0.25 mg/m ³	Method: External exposure estimation tool Name: Acute inhalation	Representativity and reliability: Exposure obtained for long term exposure x 2. ECETOC TRA exposure estimate is based on 90% percentile; therefore as recommended in REACH guidance R14, a factor of 2 is to be applied to long exposure estimation. Remark on exposure value: Calculated as recommends in guidance R14.
Inhalation: Long term, Systemic	0.125 mg/m ³	Method: TRA workers Name: TRA workers	
Dermal: Acute, Local		Method: Conditions of use (OC/RMM) Name: Corrosive	
Dermal: Acute, Systemic	0.686 mg/kg bw/day	Method: External exposure estimation tool Name: Acute systemic	Representativity and reliability: Same figure that long term exposure calculated with TRA module within CHESAR 1.1.1 Remark on exposure value: Calculated as recommends in guidance R14.
Dermal: Long term, Local	0.1 mg/cm ²	Method: TRA workers Name: TRA workers	
Dermal: Long term, Systemic	0.686 mg/kg bw/day	Method: TRA workers Name: TRA workers	

2.5. Laboratory reagent. Professional use

Trichloroacetic acid is used as laboratory reagent itself. Information provided by customers for different processes were collected using REACH terminology (i.e., use descriptors). Furthermore, the following activities are covered in this scenario:

PROC15: Use of substances at small scale laboratory (< 1 l or 1 kg present at workplace). Larger laboratories and R+D in-stallations should be treated as industrial processes.

For environmental exposure ERC9a (Wide dispersive indoor use of substances in closed systems) was the starting point. However more refined release factors for this use were described by Solvents industry. Therefore Environmental release factors based on ESVOC39 was used:

- Air: Release fraction 0.5
- Waste water: Release fraction 0.5
- Soil: Release fraction: 0

2.5.1. Exposure scenario

Laboratory reagent. Professional use	
Market sector:	
PC 21 - Laboratory Chemicals	
Sector of use:	
SU 24 - Scientific research and development	
Environment:	ERC 9a
Worker	
laboratory reagent	PROC 15
Operational conditions and risk management measures	

Control of environmental exposure: Laboratory reagent	
Product characteristics	
Amounts used	
Daily wide dispersive use	= 1.1E-6 tonnes/day
Frequency and duration of use	
ESVOC 39 duration	= 365 days
Environment factors not influenced by risk management	
Receiving surface water flow rate	>= 1.8E4 m3/d
Other given operational conditions affecting environmental exposure	
Technical conditions and measures at process level (source) to prevent release	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
ESVOC39	Lab reagent [Water: 50%; Air: 50%; Soil: 100%]
laboratory reagent	
Organizational measures to prevent/limit release from site	
Conditions and measures related to municipal sewage treatment plant	
Municipal STP	Yes [Water: 0.4%]
Discharge rate of STP	>= 2E3 m3/d
Application of the STP sludge on agricultural soil	Yes
Conditions and measures related to external treatment of waste for disposal	
Conditions and measures related to external recovery of waste	
Additional good practice advice beyond the REACH CSA	

Control of workers exposure for "laboratory reagent" [PROC 15]	

		Inhal*)		Derm*)	
		Loc	Sys	Loc	Sys
Product characteristics					
Substance in preparation	No		L		
Dustiness	High		L		
Amounts used					
Frequency and duration of use/exposure					
Duration of activity	>4 hours		L		
Human factors not influenced by risk management					
Other given operational conditions affecting workers exposure					
Place of use	Indoors		L		
Surface of skin exposed	One hand face only (240 cm ²)				L
Technical conditions and measures at process level (source) to prevent release					
Technical conditions and measures to control dispersion from source towards the worker					
Local Exhaust Ventilation	Yes		L		L
Organisational measures to prevent /limit releases, dispersion and exposure					
Conditions and measures related to personal protection, hygiene and health evaluation					
gloves	chemically resistant gloves with specific activity training [Dermal: 95%]				A
wear chemically resistant gloves (tested to EN374) in combination with specific activity training (PPE17)					
Corrosive	100 [Dermal: 100%]				L
Dermal and eyes exposure should be avoided from corrosive substance.					
Respiratory protection	Respiratory protection capable offering a 95% reduction in inhaled concentrations of the substance		L		
Additional good practice advice beyond the REACH CSA					
Corrosive	Corrosive		A	L	A
As the substance is corrosive, the following Personal Protective Equipment is recommended as good industrial practice advice beyond those considered in the exposure scenario: Avoid contact with contaminated tools and objects Train staff on good standard of personal hygiene. Wash skin after contact with substance/product containing the substance. Immediate removal/dry cleaning and disposal of spills.					

*) The route of exposure (**Inhalation**, **Dermal**) and type of effect (**Local**, **Systemic** and **Acute** or **Long term**) for which the determinant has been used for exposure estimation are reported.

2.5.2. Exposure estimation for Laboratory reagent. Professional use

2.5.2.1. Exposure estimation for the environment (Laboratory reagent)

2.5.2.1.1. Environmental releases

Compartment	Release factor estimation method	Explanation / Justification

Compartment	Release factor estimation method	Explanation / Justification
Water	ERC (ERC 9a)	Initial release factor (%): 5 Release factor after on site risk management (%): 2.5 Local release rate (kg/day): 2.75E-5
Air	ERC (ERC 9a)	Initial release factor (%): 5 Release factor after on site risk management (%): 2.5 Local release rate (kg/day): 0
Soil	ERC (ERC 9a)	Initial release factor (%): 0 Release factor after on site risk management (%): 0

2.5.2.1.2. Environmental exposure

Protection target	Exposure concentration
Water: Fresh Water (Pelagic)	Local PEC: 1.55E-6 mg/L Local concentration: 1.37E-6 mg/L
Water: Fresh Water (Sediment)	Local PEC: 6.02E-6 mg/kg dw
Water: Marine Water (Pelagic)	Local PEC: 1.55E-7 mg/L Local concentration: 1.37E-7 mg/L
Water: Marine Water (Sediment)	Local PEC: 6.02E-7 mg/kg dw
Water: Fresh Water Food Chain (Predators)	Local PEC: 2.91E-6 mg/kg ww
Water: Marine Water Food Chain (Predators)	Local PEC: 2.91E-7 mg/kg ww
Water: Marine Water Food Chain (Top Predators)	Local PEC: 1.07E-7 mg/kg ww
Water: Sewage Treatment Plant (Effluent)	Local PEC: 1.37E-5 mg/L
Air	Local PEC: 3.65E-10 mg/m ³
Soil: Agricultural Soil	Local PEC: 2.01E-8 mg/kg dw Local concentration: 1.57E-8 mg/kg dw
Soil: Terrestrial Food Chain (Predators)	Local PEC: 4.35E-8 mg/kg ww

2.5.2.1.3. Indirect exposure of humans via the environment

Exposure via inhalation

The exposure concentrations in air are reported in the Table "Summary of exposure concentrations" of the preceding section 2. 5.2.1.2 "Environmental exposure".

Exposure via food consumption: Total daily intake for humans

Type of food	Daily human dose through intake

Type of food	Daily human dose through intake	
	Total estimated daily intake for humans: 6.568E-9 mg/kg bw/day	
	Estimated daily dose through intake from local exposure	Concentration in food from local exposure
Drinking water	5.28E-9 mg/kg bw/day	1.85E-7 mg/L
Fish	1.01E-9 mg/kg bw/day	6.17E-7 mg/kg
Leaf crops	1.13E-10 mg/kg bw/day	6.58E-9 mg/kg
Root crops	1.64E-10 mg/kg bw/day	2.99E-8 mg/kg
Meat	3.64E-14 mg/kg bw/day	8.46E-12 mg/kg
Milk	6.78E-13 mg/kg bw/day	8.46E-11 mg/kg
	Dose from regional exposure: see section 9.0.3.3	

2.5.2.2. Exposure estimation for Worker for laboratory reagent

Since there is currently no tool available for estimating acute inhalation exposures, REACH guidance (R14) recommends multiplying chronic exposure estimates by a factor of 2 or 4 depending on whether exposure estimates are based on 90th or 75th percentile. For inhalation exposures estimated using ECETOC TRA, a factor of 2 is appropriate because the tool provides 90th percentile exposure estimates. This factor of 2 is applied to full-shift exposure estimates.

For dermal acute systemic exposures same figure than chronic exposure estimate was used as recommended in the above described guidance.

Route of exposure and type of effects	Exposure concentration	Method / name of exposure assessment	Explanation / Justification
Inhalation: Acute, Systemic	0.1 mg/m ³	Method: External exposure estimation tool Name: Acute syst.	Representativity and reliability: Exposure obtained for long term exposure x 2. ECETOC TRA exposure estimate is based on 90% percentile; therefore as recommended in REACH guidance R14, a factor of 2 is to be applied to long exposure estimation. Remark on exposure value: Calculated as recommends in guidance R14.

Route of exposure and type of effects	Exposure concentration	Method / name of exposure assessment	Explanation / Justification
Inhalation: Long term, Systemic	0.05 mg/m ³	Method: TRA workers Name: LONG TERM SYST	
Dermal: Acute, Local		Method: Conditions of use (OC/RMM) Name: Corrosive	
Dermal: Acute, Systemic	0.034 mg/kg bw/day	Method: External exposure estimation tool Name: Acute systemic	Representativity and reliability: Same figure that long term exposure calculated with TRA module within CHESAR 1.1.1 Remark on exposure value: Calculated as recommends in guidance R14.
Dermal: Long term, Local		Method: External exposure estimation tool Name: corrosive	
Dermal: Long term, Systemic	0.034 mg/kg bw/day	Method: TRA workers Name: Acute syst	

2.6. Textile. Formulation of surface treatment

9. Trichloroacetic acid is used in the textile market sector for textile finishing. It is included in dyes as an alkali-liberating auxiliary for fixing reactive dyes on fibres for printing processes. This is the most important use in terms of tonnage consumed after the pharmaceutical industry. However it could be the most important in the environmental impact if releases are not minimized.

Information provided by customers for different processes were collected using REACH terminology (i.e., use descriptors). Furthermore, the following activities are covered in this scenario:

PROC5: Manufacture or formulation of chemical products or arti-cles using technologies related to mixing and blending of solid or liquid materials, and where the process is in stages and provides the opportunity for significant contact at any stage

For environmental exposure ERC2 was the starting point. However more refined release factors for formulation processes were described by AISE.. However riks assuming the associated release rates were not acceptable. Therefore “no release” determinant is proposed for this sector.

2.6.1. Exposure scenario

Textile. Formulation of surface treatment	
Market sector: PC 15 - Non-metal-surface treatment products	
Environment:	ERC 2

Worker	
Mixing	PROC 5
Operational conditions and risk management measures	

Control of environmental exposure: Formulation	
Product characteristics	
Amounts used	
Daily use at a site	<= 7.7 tonnes/day
Annual use at a site	<= 77 tonnes/year
Percentage of tonnage used at regional scale	= 100 %
Frequency and duration of use	
AISE general duration	= 220 days
Environment factors not influenced by risk management	
Receiving surface water flow rate	>= 1.8E4 m3/d
Other given operational conditions affecting environmental exposure	
Technical conditions and measures at process level (source) to prevent release	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
No releases	no releases [Water: 100%; Air: 100%; Soil: 100%]
no releases. Wastes are incinered.	
Organizational measures to prevent/limit release from site	
Conditions and measures related to municipal sewage treatment plant	
Municipal STP	Yes [Water: 100%]
Discharge rate of STP	>= 2E3 m3/d
Application of the STP sludge on agricultural soil	No
Conditions and measures related to external treatment of waste for disposal	
Conditions and measures related to external recovery of waste	
Additional good practice advice beyond the REACH CSA	

Control of workers exposure for "Mixing" [PROC 5]					
Product characteristics					
Substance in preparation					
	No			Inhal*)	Derm*)
				Loc	Sys
Dustiness	High			L	L
Amounts used					
Frequency and duration of use/exposure					
Duration of activity	>4 hours			L	
Human factors not influenced by risk management					
Other given operational conditions affecting workers exposure					
Place of use	Indoors			L	

Surface of skin exposed	Two hands face (480 cm2)	L	L
Technical conditions and measures at process level (source) to prevent release			
Technical conditions and measures to control dispersion from source towards the worker			
LEV	LEV [Inhalation: 90%]	A	
LEV			
Local Exhaust Ventilation	Yes	L	L L
Organisational measures to prevent /limit releases, dispersion and exposure			
Conditions and measures related to personal protection, hygiene and health evaluation			
gloves	chemically resistant gloves with specific activity training [Dermal: 95%]		A
wear chemically resistant gloves (tested to EN374) in combination with specific activity training (PPE17)			
Corrosive	100 [Dermal: 100%]		A
Dermal and eyes exposure should be avoided from corrosive substance.			
respirator masks	half mask respirator [Inhalation: 90%]	A	
wear a respirator conforming to EN140 with type A filter or better			
Respiratory protection	Respiratory protection capable offering a 90% reduction in inhaled concentrations of the substance	L	
Additional good practice advice beyond the REACH CSA			
Corrosive	Corrosive	A	A A
As the substance is corrosive, the following Personal Protective Equipment is recommended as good industrial practice advice beyond those considered in the exposure scenario: Avoid contact with contaminated tools and objects Train staff on good standard of personal hygiene. Wash skin after contact with substance/product containing the substance. Immediate removal/dry cleaning and disposal of spills.			

*) The route of exposure (**Inhalation, Dermal**) and type of effect (**Local, Systemic and Acute or Long term**) for which the determinant has been used for exposure estimation are reported.

2.6.2. Exposure estimation for Textile. Formulation of surface treatment

2.6.2.1. Exposure estimation for the environment (Formulation)

2.6.2.1.1. Environmental releases

Compartment	Release factor estimation method	Explanation / Justification
Water	ERC (ERC 2)	Initial release factor (%): 2
		Release factor after on site risk management (%): 0
		Local release rate (kg/day): 0
Air	ERC (ERC 2)	Initial release factor (%): 2.5
		Release factor after on site risk management (%): 0
		Local release rate (kg/day): 0
Soil	ERC	Initial release factor (%): 0.01

Compartment	Release factor estimation method	Explanation / Justification
	(ERC 2)	Release factor after on site risk management (%): 0

2.6.2.1.2. Environmental exposure

Protection target	Exposure concentration
Water: Fresh Water (Pelagic)	Local PEC: 1.85E-7 mg/L Local concentration: 0 mg/L
Water: Fresh Water (Sediment)	Local PEC: 7.15E-7 mg/kg dw
Water: Marine Water (Pelagic)	Local PEC: 1.84E-8 mg/L Local concentration: 0 mg/L
Water: Marine Water (Sediment)	Local PEC: 7.14E-8 mg/kg dw
Water: Fresh Water Food Chain (Predators)	Local PEC: 6.17E-7 mg/kg ww
Water: Marine Water Food Chain (Predators)	Local PEC: 6.16E-8 mg/kg ww
Water: Marine Water Food Chain (Top Predators)	Local PEC: 6.16E-8 mg/kg ww
Water: Sewage Treatment Plant (Effluent)	Local PEC: 0 mg/L
Air	Local PEC: 3.39E-10 mg/m ³
Soil: Agricultural Soil	Local PEC: 4.45E-9 mg/kg dw Local concentration: 0 mg/kg dw
Soil: Terrestrial Food Chain (Predators)	Local PEC: 2.54E-8 mg/kg ww

9.6.2.1.3. Indirect exposure of humans via the environment

Exposure via inhalation

The exposure concentrations in air are reported in the Table "Summary of exposure concentrations" of the preceding section 2. 6.2.1.2 "Environmental exposure".

Exposure via food consumption: Total daily intake for humans

Type of food	Daily human dose through intake	
	Total estimated daily intake for humans: 6.568E-9 mg/kg bw/day	
	Estimated daily dose through intake from local exposure	Concentration in food from local exposure
Drinking water	5.28E-9 mg/kg bw/day	1.85E-7 mg/L
Fish	1.01E-9 mg/kg bw/day	6.17E-7 mg/kg
Leaf crops	1.13E-10 mg/kg bw/day	6.58E-9 mg/kg
Root crops	1.64E-10 mg/kg bw/day	2.99E-8 mg/kg

Type of food	Daily human dose through intake	
Meat	3.64E-14 mg/kg bw/day	8.46E-12 mg/kg
Milk	6.78E-13 mg/kg bw/day	8.46E-11 mg/kg
Dose from regional exposure: see section 9.0.3.3		

2.6.2.2. Exposure estimation for Worker for Mixing

Since there is currently no tool available for estimating acute inhalation exposures, REACH guidance (R14) recommends multiplying chronic exposure estimates by a factor of 2 or 4 depending on whether exposure estimates are based on 90th or 75th percentile. For inhalation exposures estimated using ECETOC TRA, a factor of 2 is appropriate because the tool provides 90th percentile exposure estimates. This factor of 2 is applied to full-shift exposure estimates.

For dermal acute systemic exposures same figure than chronic exposure estimate was used as recommended in the above described guidance.

Route of exposure and type of effects	Exposure concentration	Method / name of exposure assessment	Explanation / Justification
Inhalation: Acute, Systemic	0.5 mg/m ³	Method: External exposure estimation tool Name: Acute inhalation	Representativity and reliability: Exposure estimate for long-term x 2. ECETOC TRA exposure estimate is based on 90% percentile; therefore as recommended in REACH Guidance R14, a factor of 2 is to be applied. Remark on exposure value: Calculated as recommends in guidance R14.
Inhalation: Long term, Systemic	0.25 mg/m ³	Method: TRA workers Name: TRA workers	
Dermal: Acute, Local		Method: Conditions of use (OC/RMM) Name: corrosive	
Dermal: Acute, Systemic	0.069 mg/kg bw/day	Method: External exposure estimation tool Name: Acute systemic	Representativity and reliability: Same figure that long term exposure calculated with TRA module within CHESAR 1.1.1 Remark on exposure value: Calculated as recommends in guidance R14.
Dermal: Long	0.01 mg/cm ²	Method: TRA workers	

Route of exposure and type of effects	Exposure concentration	Method / name of exposure assessment	Explanation / Justification
term, Local		Name: TRA workers	
Dermal: Long term, Systemic	0.069 mg/kg bw/day	Method: TRA workers Name: TRA workers	

2.7. Textile. surfact treatment

The treatment with TCAA to fix dyes is described in this scenario. Furthermore, the following activities are covered in this scenario:

PROC13: Immersion operations. Treatment of articles by dipping, pouring, immersing, soaking, washing out or washing in substances; including cold formation or resin type matrix. Includes handling of treated objects (e.g. after dyeing, plating,).

Substance is applied to a surface by low energy techniques such as dipping the article into a bath or pouring a preparation onto a surface.

For environmental exposure ERC7 was the starting point. The releases estimated using TEGEWA5 SpERC for use of reactive processing aids in textile processing is too high: effectiveness is 98% for water releases.

Therefore, all RMM available should be used in this industry in order to get minimum/no releases. Therefore no releases determinant was assumed, as stated previously.

2.7.1. Exposure scenario

Textile. surfact treatment	
Market sector:	
PC 15 - Non-metal-surface treatment products	
Sector of use:	
SU 12 - Manufacture of plastics products, including compounding and conversion	
Environment:	ERC 7
Worker	
Dipping	PROC 13
Operational conditions and risk management measures	

Control of environmental exposure: surfact treatment	
Product characteristics	
Amounts used	
Daily use at a site	<= 3.85 tonnes/day
Annual use at a site	<= 77 tonnes/year
Percentage of tonnage used at regional scale	= 100 %
Frequency and duration of use	

Environment factors not influenced by risk management	
Receiving surface water flow rate	>= 1.8E4 m3/d
Other given operational conditions affecting environmental exposure	
Technical conditions and measures at process level (source) to prevent release	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
No releases	no releases [Water: 100%; Air: 100%; Soil: 100%]
no releases. Wastes are incinered.	
Organizational measures to prevent/limit release from site	
Conditions and measures related to municipal sewage treatment plant	
Municipal STP	Yes [Water: 100%]
Discharge rate of STP	>= 2E3 m3/d
Application of the STP sludge on agricultural soil	No
Conditions and measures related to external treatment of waste for disposal	
Conditions and measures related to external recovery of waste	
Additional good practice advice beyond the REACH CSA	

Control of workers exposure for "Dipping" [PROC 13]				
		Inhal*)		Derm*)
		Loc	Sys	Loc Sys
Product characteristics				
Substance in preparation	No		L	
Dustiness	High		L	
Amounts used				
Frequency and duration of use/exposure				
Duration of activity	>4 hours		L	
Human factors not influenced by risk management				
Other given operational conditions affecting workers exposure				
Place of use	Indoors		L	
Surface of skin exposed	Two hands face (480 cm2)			L
Technical conditions and measures at process level (source) to prevent release				
Technical conditions and measures to control dispersion from source towards the worker				
Local Exhaust Ventilation	Yes		L	L
Organisational measures to prevent /limit releases, dispersion and exposure				
Conditions and measures related to personal protection, hygiene and health evaluation				
respirator masks	half mask respirator [Inhalation: 90%]		A	
wear a respirator conforming to EN140 with type A filter or better				
gloves	chemically resistant gloves with specific activity training [Dermal: 95%]			A
wear chemically resistant gloves (tested to EN374) in combination with specific activity training (PPE17)				
Corrosive	100 [Dermal: 100%]			AL
Dermal and eyes exposure should be avoided from corrosive substance.				
Respiratory protection	Respiratory protection capable offering a		L	

95% reduction in inhaled concentrations of the substance		
Additional good practice advice beyond the REACH CSA		
Corrosive	Corrosive	A AL A
As the substance is corrosive, the following Personal Protective Equipment is recommended as good industrial practice advice beyond those considered in the exposure scenario: Avoid contact with contaminated tools and objects Train staff on good standard of personal hygiene. Wash skin after contact with substance/product containing the substance. Immediate removal/dry cleaning and disposal of spills.		

*) The route of exposure (**Inhalation, Dermal**) and type of effect (**Local, Systemic and Acute or Long term**) for which the determinant has been used for exposure estimation are reported.

2.7.2. Exposure estimation for Textile. surfact treatment

2.7.2.1. Exposure estimation for the environment (surfact treatment)

2.7.2.1.1. Environmental releases

Compartment	Release factor estimation method	Explanation / Justification
Water	ERC (ERC 7)	Initial release factor (%): 5 Release factor after on site risk management (%): 0 Local release rate (kg/day): 0
Air	ERC (ERC 7)	Initial release factor (%): 5 Release factor after on site risk management (%): 0 Local release rate (kg/day): 0
Soil	ERC (ERC 7)	Initial release factor (%): 5 Release factor after on site risk management (%): 0

2.7.2.1.2. Environmental exposure

Protection target	Exposure concentration	Explanation / Justification
Water: Fresh Water (Pelagic)	Local PEC: 1.85E-7 mg/L Local concentration: 0 mg/L	Representativity and reliability: Releases for this use are impacting all CSR results. The releases estimated using TEGEWA5 SpERC for use of reactive processing aids in textile processing are too high: effectiveness is 98% for water releases. Therefore, all RMM available should be used in this industry in order to get minimum/no releases.
Water: Fresh Water (Sediment)	Local PEC: 7.15E-7 mg/kg dw	
Water: Marine Water (Pelagic)	Local PEC: 1.84E-8 mg/L Local concentration: 0 mg/L	
Water: Marine Water (Sediment)	Local PEC: 7.14E-8 mg/kg dw	

Protection target	Exposure concentration	Explanation / Justification
Water: Fresh Water Food Chain (Predators)	Local PEC: 6.17E-7 mg/kg ww	
Water: Marine Water Food Chain (Predators)	Local PEC: 6.16E-8 mg/kg ww	
Water: Marine Water Food Chain (Top Predators)	Local PEC: 6.16E-8 mg/kg ww	
Water: Sewage Treatment Plant (Effluent)	Local PEC: 0 mg/L	
Air	Local PEC: 3.39E-10 mg/m ³	
Soil: Agricultural Soil	Local PEC: 4.45E-9 mg/kg dw Local concentration: 0 mg/kg dw	
Soil: Terrestrial Food Chain (Predators)	Local PEC: 2.54E-8 mg/kg ww	

2.7.2.1.3. Indirect exposure of humans via the environment

Exposure via inhalation

The exposure concentrations in air are reported in the Table "Summary of exposure concentrations" of the preceding section 9. x.2.1.2 "Environmental exposure".

Exposure via food consumption: Total daily intake for humans

Type of food	Daily human dose through intake	
	Total estimated daily intake for humans: 6.568E-9 mg/kg bw/day	
	Estimated daily dose through intake from local exposure	Concentration in food from local exposure
Drinking water	5.28E-9 mg/kg bw/day	1.85E-7 mg/L
Fish	1.01E-9 mg/kg bw/day	6.17E-7 mg/kg
Leaf crops	1.13E-10 mg/kg bw/day	6.58E-9 mg/kg
Root crops	1.64E-10 mg/kg bw/day	2.99E-8 mg/kg
Meat	3.64E-14 mg/kg bw/day	8.46E-12 mg/kg
Milk	6.78E-13 mg/kg bw/day	8.46E-11 mg/kg
	Dose from regional exposure: see section 9.0.3.3	

2.7.2.2. Exposure estimation for Worker for Dipping

Since there is currently no tool available for estimating acute inhalation exposures, REACH guidance (R14) recommends multiplying chronic exposure estimates by a factor of 2 or 4 depending on whether exposure estimates are based on 90th or 75th percentile. For inhalation exposures estimated using ECETOC TRA, a factor of 2 is appropriate because the tool provides 90th percentile exposure estimates. This factor of 2 is applied to full-shift exposure estimates.

For dermal acute systemic exposures same figure than chronic exposure estimate was used as recommended in the above described guidance.

Route of exposure and type of effects	Exposure concentration	Method / name of exposure assessment	Explanation / Justification
Inhalation: Acute, Systemic	0.05 mg/m ³	Method: External exposure estimation tool Name: Acute inhalation	Representativity and reliability: Exposure obtained for long term exposure x 2. ECETOC TRA exposure estimate is based on 90% percentile; therefore as recommended in REACH guidance R14, a factor of 2 is to be applied to long exposure estimation. Remark on exposure value: Calculated as recommended in guidance R14.
Inhalation: Long term, Systemic	0.025 mg/m ³	Method: TRA workers Name: LONG TERM SYSTEM	
Dermal: Acute, Local		Method: Conditions of use (OC/RMM) Name: Corrosive	
Dermal: Acute, Systemic	0.686 mg/kg bw/day	Method: External exposure estimation tool Name: Acute systemic	Representativity and reliability: Same figure that long term exposure calculated with TRA module within CHESAR 1.1.1 Remark on exposure value: Calculated as recommended in guidance R14.
Dermal: Long term, Local		Method: Conditions of use (OC/RMM) Name: Corrosive	
Dermal: Long term, Systemic	0.686 mg/kg bw/day	Method: TRA workers Name: LONG TERM SYSTEM	

2.8. Metals. Surface treatment

Trichloroacetic acid is used in the metal market sector for surface treatment. Information provided by customers for different processes were collected using REACH terminology (i.e., use descriptors). Furthermore, the following activities are covered in this scenario:

PROC13: Immersion operations. Treatment of articles by dipping, pouring, immersing, soaking, washing out or washing in substances; including cold formation or resin type matrix. Includes handling of treated objects (e.g. after dying, plating,).

Substance is applied to a surface by low energy techniques such as dipping the article into a bath or pouring a preparation onto a surface.

For environmental exposure ERC7 was the starting point. However “no release” determinant is proposed for this use in order to get admissible risks.

2.8.1. Exposure scenario

Metals. Surface treatment	
Market sector:	
PC 14 - Metal surface treatment products, including galvanic and electroplating products	
Sector of use:	
SU 12 - Manufacture of plastics products, including compounding and conversion	
Environment:	ERC 7
Worker	
Dipping	PROC 13
Operational conditions and risk management measures	

Control of environmental exposure: surface treatment	
Product characteristics	
Amounts used	
Daily use at a site	<= 0.1 tonnes/day
Annual use at a site	<= 2 tonnes/year
Percentage of tonnage used at regional scale	= 100 %
Frequency and duration of use	
Environment factors not influenced by risk management	
Receiving surface water flow rate	>= 1.8E4 m3/d
Other given operational conditions affecting environmental exposure	
Technical conditions and measures at process level (source) to prevent release	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
No releases	no releases [Water: 100%; Air: 100%; Soil: 100%]
no releases. Wastes are incinered.	
Organizational measures to prevent/limit release from site	

Conditions and measures related to municipal sewage treatment plant	
Municipal STP	Yes [Water: 100%]
Discharge rate of STP	>= 2E3 m3/d
Application of the STP sludge on agricultural soil	No
Conditions and measures related to external treatment of waste for disposal	
Conditions and measures related to external recovery of waste	
Additional good practice advice beyond the REACH CSA	

		Inhal*)		Derm*)	
		Loc	Sys	Loc	Sys
Control of workers exposure for "Dipping" [PROC 13]					
Product characteristics					
Substance in preparation	No		L		
Dustiness	High		L		
Amounts used					
Frequency and duration of use/exposure					
Duration of activity	>4 hours		L		
Human factors not influenced by risk management					
Other given operational conditions affecting workers exposure					
Place of use	Indoors		L		
Surface of skin exposed	Two hands face (480 cm2)				L
Technical conditions and measures at process level (source) to prevent release					
Technical conditions and measures to control dispersion from source towards the worker					
Local Exhaust Ventilation	Yes		L		L
Organisational measures to prevent /limit releases, dispersion and exposure					
Conditions and measures related to personal protection, hygiene and health evaluation					
respirator masks	half mask respirator [Inhalation: 90%]		A		
wear a respirator conforming to EN140 with type A filter or better					
gloves	chemically resistant gloves with specific activity training [Dermal: 95%]				A
wear chemically resistant gloves (tested to EN374) in combination with specific activity training (PPE17)					
Corrosive	100 [Dermal: 100%]				AL
Dermal and eyes exposure should be avoided from corrosive substance.					
Respiratory protection	Respiratory protection capable offering a 95% reduction in inhaled concentrations of the substance		L		
Additional good practice advice beyond the REACH CSA					
Corrosive	Corrosive		A	AL	A
As the substance is corrosive, the following Personal Protective Equipment is recommended as good industrial practice advice beyond those considered in the exposure scenario: Avoid contact with contaminated tools and objects Train staff on good standard of personal hygiene. Wash skin after contact with substance/product containing the substance.					

Immediate removal/dry cleaning and disposal of spills.

*) The route of exposure (**Inhalation, Dermal**) and type of effect (**Local, Systemic and Acute or Long term**) for which the determinant has been used for exposure estimation are reported.

2.8.2. Exposure estimation for Metals. Surface treatment

2.8.2.1. Exposure estimation for the environment (surface treatment)

2.8.2.1.1. Environmental releases

Compartment	Release factor estimation method	Explanation / Justification
Water	ERC (ERC 7)	Initial release factor (%): 5 Release factor after on site risk management (%): 0 Local release rate (kg/day): 0
Air	ERC (ERC 7)	Initial release factor (%): 5 Release factor after on site risk management (%): 0 Local release rate (kg/day): 0
Soil	ERC (ERC 7)	Initial release factor (%): 5 Release factor after on site risk management (%): 0

2.8.2.1.2. Environmental exposure

Protection target	Exposure concentration
Water: Fresh Water (Pelagic)	Local PEC: 1.85E-7 mg/L Local concentration: 0 mg/L
Water: Fresh Water (Sediment)	Local PEC: 7.15E-7 mg/kg dw
Water: Marine Water (Pelagic)	Local PEC: 1.84E-8 mg/L Local concentration: 0 mg/L
Water: Marine Water (Sediment)	Local PEC: 7.14E-8 mg/kg dw
Water: Fresh Water Food Chain (Predators)	Local PEC: 6.17E-7 mg/kg ww
Water: Marine Water Food Chain (Predators)	Local PEC: 6.16E-8 mg/kg ww
Water: Marine Water Food Chain (Top Predators)	Local PEC: 6.16E-8 mg/kg ww
Water: Sewage Treatment Plant (Effluent)	Local PEC: 0 mg/L
Air	Local PEC: 3.39E-10 mg/m ³
Soil: Agricultural Soil	Local PEC: 4.45E-9 mg/kg dw Local concentration: 0 mg/kg dw
Soil: Terrestrial Food Chain (Predators)	Local PEC: 2.54E-8 mg/kg ww

2.8.2.1.3. Indirect exposure of humans via the environment

Exposure via inhalation

The exposure concentrations in air are reported in the Table "Summary of exposure concentrations" of the preceding section 2. 8.2.1.2 "Environmental exposure".

Exposure via food consumption: Total daily intake for humans

Type of food	Daily human dose through intake	
	Total estimated daily intake for humans: 6.568E-9 mg/kg bw/day	
	Estimated daily dose through intake from local exposure	Concentration in food from local exposure
Drinking water	5.28E-9 mg/kg bw/day	1.85E-7 mg/L
Fish	1.01E-9 mg/kg bw/day	6.17E-7 mg/kg
Leaf crops	1.13E-10 mg/kg bw/day	6.58E-9 mg/kg
Root crops	1.64E-10 mg/kg bw/day	2.99E-8 mg/kg
Meat	3.64E-14 mg/kg bw/day	8.46E-12 mg/kg
Milk	6.78E-13 mg/kg bw/day	8.46E-11 mg/kg
	Dose from regional exposure: see section 9.0.3.3	

2.8.2.2. Exposure estimation for Worker for Dipping

Since there is currently no tool available for estimating acute inhalation exposures, REACH guidance (R14) recommends multiplying chronic exposure estimates by a factor of 2 or 4 depending on whether exposure estimates are based on 90th or 75th percentile. For inhalation exposures estimated using ECETOC TRA, a factor of 2 is appropriate because the tool provides 90th percentile exposure estimates. This factor of 2 is applied to full-shift exposure estimates.

For dermal acute systemic exposures same figure than chronic exposure estimate was used as recommended in the above described guidance

Route of exposure and type of effects	Exposure concentration	Method / name of exposure assessment	Explanation / Justification
Inhalation: Acute, Systemic	0.05 mg/m ³	Method: External exposure estimation tool Name: Acute inhalation	Representativity and reliability: Exposure obtained for long term exposure x 2. ECETOC TRA exposure estimate is based on 90% percentile; therefore as recommended in REACH guidance R14, a factor of 2 is to be applied to long exposure estimation.

Route of exposure and type of effects	Exposure concentration	Method / name of exposure assessment	Explanation / Justification
			Remark on exposure value: Calculated as recommends in guidance R14.
Inhalation: Long term, Systemic	0.025 mg/m ³	Method: TRA workers Name: LONG TERM SYSTEM	
Dermal: Acute, Local		Method: Conditions of use (OC/RMM) Name: Corrosive	
Dermal: Acute, Systemic	0.686 mg/kg bw/day	Method: External exposure estimation tool Name: Acute systemic	Representativity and reliability: Same figure that long term exposure calculated with TRA module within CHESAR 1.1.1 Remark on exposure value: Calculated as recommends in guidance R14.
Dermal: Long term, Local		Method: Conditions of use (OC/RMM) Name: Corrosive	
Dermal: Long term, Systemic	0.686 mg/kg bw/day	Method: TRA workers Name: LONG TERM SYSTEM	

2.9. Coatings and Inks. Formulation stage

Trichloroacetic acid is used in the coatings and inks market sector for in formulation. Information provided by customers for different processes were collected using REACH terminology (i.e., use descriptors). Furthermore, the following activities are covered in this scenario:

PROC5: Manufacture or formulation of chemical products or arti-cles using technologies related to mixing and blending of solid or liquid materials, and where the process is in stages and provides the opportunity for significant con-tact at any stage

For environmental exposure ERC2 was the starting point. However more refined release factors for formulation processes were described by CEPE. Therefore Environmental release factors based on CEPE2(Formulation of Organic Solvent Borne Coatings and Inks - Small Scale (<100 tpa solvent use) – VOC) was used:

- Air: Release fraction 0.006
- Waste water: Release fraction 0
- Soil: Release fraction: 0

2.9.1. Exposure scenario

Coatings and Inks. Formulation stage	
Market sector: PC 9a - Coatings and Paints, Thinners, paint removers	
Environment:	ERC 2
Worker	
Mix	PROC 5
Operational conditions and risk management measures	

Control of environmental exposure: Formulation stage	
Product characteristics	
Amounts used	
Daily use at a site	<= 0.1 tonnes/day
Annual use at a site	<= 1 tonnes/year
Percentage of tonnage used at regional scale	= 100 %
Frequency and duration of use	
Environment factors not influenced by risk management	
Receiving surface water flow rate	>= 1.8E4 m3/d
Other given operational conditions affecting environmental exposure	
Technical conditions and measures at process level (source) to prevent release	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
CEPE 2 formulation	CEPE2 [Water: 100%; Air: 99.4%; Soil: 100%]
For substances with vapour pressure < 1000Pa	
Organizational measures to prevent/limit release from site	
Conditions and measures related to municipal sewage treatment plant	
Municipal STP	Yes [Water: 100%]
Discharge rate of STP	>= 2E3 m3/d
Application of the STP sludge on agricultural soil	No
Conditions and measures related to external treatment of waste for disposal	
Conditions and measures related to external recovery of waste	
Additional good practice advice beyond the REACH CSA	

Control of workers exposure for "Mix" [PROC 5]					
		Inhal*)		Derm*)	
		Loc	Sys	Loc	Sys
Product characteristics					
Substance in preparation	No			L	
Dustiness	High			L	
Amounts used					

Frequency and duration of use/exposure				
Duration of activity	>4 hours		L	
Human factors not influenced by risk management				
Other given operational conditions affecting workers exposure				
Place of use	Indoors		L	
Surface of skin exposed	Two hands face (480 cm ²)		L	L
Technical conditions and measures at process level (source) to prevent release				
Technical conditions and measures to control dispersion from source towards the worker				
LEV	LEV [Inhalation: 90%]		A	
LEV				
Local Exhaust Ventilation	Yes		L	L L
Organisational measures to prevent /limit releases, dispersion and exposure				
Conditions and measures related to personal protection, hygiene and health evaluation				
gloves	chemically resistant gloves with specific activity training [Dermal: 95%]			A
wear chemically resistant gloves (tested to EN374) in combination with specific activity training (PPE17)				
Corrosive	100 [Dermal: 100%]			A
Dermal and eyes exposure should be avoided from corrosive substance.				
respirator masks	half mask respirator [Inhalation: 90%]		A	
wear a respirator conforming to EN140 with type A filter or better				
Respiratory protection	Respiratory protection capable offering a 90% reduction in inhaled concentrations of the substance		L	
Additional good practice advice beyond the REACH CSA				
Corrosive	Corrosive		A	A A
As the substance is corrosive, the following Personal Protective Equipment is recommended as good industrial practice advice beyond those considered in the exposure scenario:				
<ul style="list-style-type: none"> • Avoid contact with contaminated tools and objects • Train staff on good standard of personal hygiene. • Wash skin after contact with substance/product containing the substance. • Immediate removal/dry cleaning and disposal of spills. 				

*) The route of exposure (**Inhalation**, **Dermal**) and type of effect (**Local**, **Systemic** and **Acute** or **Long term**) for which the determinant has been used for exposure estimation are reported.

2.9.2. Exposure estimation for Coatings and Inks. Formulation stage

2.9.2.1. Exposure estimation for the environment (Formulation stage)

2.9.2.1.1. Environmental releases

Compartment	Release factor estimation method	Explanation / Justification
Water	ERC (ERC 2)	Initial release factor (%): 2 Release factor after on site risk management (%): 0 Local release rate (kg/day): 0

Compartment	Release factor estimation method	Explanation / Justification
Air	ERC (ERC 2)	Initial release factor (%): 2.5 Release factor after on site risk management (%): 0.015 Local release rate (kg/day): 0.015
Soil	ERC (ERC 2)	Initial release factor (%): 0.01 Release factor after on site risk management (%): 0

2.9.2.1.2. Environmental exposure

Table 92. Summary of exposure concentrations

Protection target	Exposure concentration
Water: Fresh Water (Pelagic)	Local PEC: 1.85E-7 mg/L Local concentration: 0 mg/L
Water: Fresh Water (Sediment)	Local PEC: 7.15E-7 mg/kg dw
Water: Marine Water (Pelagic)	Local PEC: 1.84E-8 mg/L Local concentration: 0 mg/L
Water: Marine Water (Sediment)	Local PEC: 7.14E-8 mg/kg dw
Water: Fresh Water Food Chain (Predators)	Local PEC: 6.17E-7 mg/kg ww
Water: Marine Water Food Chain (Predators)	Local PEC: 6.16E-8 mg/kg ww
Water: Marine Water Food Chain (Top Predators)	Local PEC: 6.16E-8 mg/kg ww
Water: Sewage Treatment Plant (Effluent)	Local PEC: 0 mg/L
Air	Local PEC: 1.15E-7 mg/m ³
Soil: Agricultural Soil	Local PEC: 3.78E-8 mg/kg dw Local concentration: 3.34E-8 mg/kg dw
Soil: Terrestrial Food Chain (Predators)	Local PEC: 1.2E-7 mg/kg ww

2.9.2.1.3. Indirect exposure of humans via the environment

Exposure via inhalation

The exposure concentrations in air are reported in the Table "Summary of exposure concentrations" of the preceding section 2.9.2.1.2 "Environmental exposure".

Exposure via food consumption: Total daily intake for humans

Type of food	Daily human dose through intake
	Total estimated daily intake for humans: 6.568E-9 mg/kg bw/day

Type of food	Daily human dose through intake	
	Estimated daily dose through intake from local exposure	Concentration in food from local exposure
Drinking water	5.28E-9 mg/kg bw/day	1.85E-7 mg/L
Fish	1.01E-9 mg/kg bw/day	6.17E-7 mg/kg
Leaf crops	1.13E-10 mg/kg bw/day	6.58E-9 mg/kg
Root crops	1.64E-10 mg/kg bw/day	2.99E-8 mg/kg
Meat	3.64E-14 mg/kg bw/day	8.46E-12 mg/kg
Milk	6.78E-13 mg/kg bw/day	8.46E-11 mg/kg
	Dose from regional exposure: see section 9.0.3.3	

2.9.2.2. Exposure estimation for Worker for Mix

Since there is currently no tool available for estimating acute inhalation exposures, REACH guidance (R14) recommends multiplying chronic exposure estimates by a factor of 2 or 4 depending on whether exposure estimates are based on 90th or 75th percentile. For inhalation exposures estimated using ECETOC TRA, a factor of 2 is appropriate because the tool provides 90th percentile exposure estimates. This factor of 2 is applied to full-shift exposure estimates.

For dermal acute systemic exposures same figure than chronic exposure estimate was used as recommended in the above described guidance.

Route of exposure and type of effects	Exposure concentration	Method / name of exposure assessment	Explanation / Justification
Inhalation: Acute, Systemic	0.5 mg/m ³	Method: External exposure estimation tool Name: Acute inhalation	Representativity and reliability: Exposure estimate for long-term x 2. ECETOC TRA exposure estimate is based on 90% percentile; therefore as recommended in REACH Guidance R14, a factor of 2 is to be applied. Remark on exposure value: Calculated as recommended in guidance R14.
Inhalation: Long term, Systemic	0.25 mg/m ³	Method: TRA workers Name: TRA workers	
Dermal: Acute, Local		Method: Conditions of use (OC/RMM) Name: corrosive	

Route of exposure and type of effects	Exposure concentration	Method / name of exposure assessment	Explanation / Justification
Dermal: Acute, Systemic	0.069 mg/kg bw/day	Method: External exposure estimation tool Name: Acute systemic	Representativity and reliability: Same figure that long term exposure calculated with TRA module within CHESAR 1.1.1 Remark on exposure value: Calculated as recommended in guidance R14.
Dermal: Long term, Local	0.01 mg/cm ²	Method: TRA workers Name: TRA workers	
Dermal: Long term, Systemic	0.069 mg/kg bw/day	Method: TRA workers Name: TRA workers	

2.10. Cleaning products. Formulation

Trichloroacetic acid is used in the washing and cleaning market sector for formulations consumed in chemical cleaning unit using tetrachloroethylene. Information provided by customers for different processes were collected using REACH terminology (i.e., use descriptors). Furthermore, the following activities are covered in this scenario:

PROC5: Manufacture or formulation of chemical products or articles using technologies related to mixing and blending of solid or liquid materials, and where the process is in stages and provides the opportunity for significant contact at any stage

For environmental exposure ERC2 was the starting point. However more refined release factors for formulation processes were described by AISE. Therefore Environmental release factors based on AISE spERC 2.1.h.v1 (AISE 8) was used:

- Air: Release fraction 0
- Waste water: Release fraction 0.001
- Soil: Release fraction: 0

2.10.1. Exposure scenario

Cleaning products. Formulation	
Market sector:	
PC 35 - Washing and Cleaning Products (including solvent based products)	
Environment:	ERC 2
Worker	
Mix	PROC 5
Operational conditions and risk management measures	

Control of environmental exposure: Formulation	
Product characteristics	
Amounts used	
Daily use at a site	<= 0.1 tonnes/day
Annual use at a site	<= 1 tonnes/year
Percentage of tonnage used at regional scale	= 100 %
Frequency and duration of use	
Environment factors not influenced by risk management	
Receiving surface water flow rate	>= 1.8E4 m3/d
Other given operational conditions affecting environmental exposure	
Technical conditions and measures at process level (source) to prevent release	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
AISE 8. Formulations	Formulation AISE [Water: 100%; Air: 100%; Soil: 100%]
Formulation release rates from AISE8	
Organizational measures to prevent/limit release from site	
Conditions and measures related to municipal sewage treatment plant	
Municipal STP	Yes [Water: 0.4%]
Discharge rate of STP	>= 2E3 m3/d
Application of the STP sludge on agricultural soil	No
Conditions and measures related to external treatment of waste for disposal	
Conditions and measures related to external recovery of waste	
Additional good practice advice beyond the REACH CSA	

Control of workers exposure for "Mix" [PROC 5]					
		Inhal*)		Derm*)	
		Loc	Sys	Loc	Sys
Product characteristics					
Substance in preparation	No		L		
Dustiness	High		L		
Amounts used					
Frequency and duration of use/exposure					
Duration of activity	>4 hours		L		
Human factors not influenced by risk management					
Other given operational conditions affecting workers exposure					
Place of use	Indoors		L		
Surface of skin exposed	Two hands face (480 cm2)			L	L
Technical conditions and measures at process level (source) to prevent release					
Technical conditions and measures to control dispersion from source towards the worker					
LEV	LEV [Inhalation: 90%]		A		
LEV					

Local Exhaust Ventilation	Yes	L	L	L
Organisational measures to prevent /limit releases, dispersion and exposure				
Conditions and measures related to personal protection, hygiene and health evaluation				
gloves	chemically resistant gloves with specific activity training [Dermal: 95%]			A
wear chemically resistant gloves (tested to EN374) in combination with specific activity training (PPE17)				
Corrosive	100 [Dermal: 100%]		A	
Dermal and eyes exposure should be avoided from corrosive substance.				
respirator masks	half mask respirator [Inhalation: 90%]	A		
wear a respirator conforming to EN140 with type A filter or better				
Respiratory protection	Respiratory protection capable offering a 90% reduction in inhaled concentrations of the substance	L		
Additional good practice advice beyond the REACH CSA				
Corrosive	Corrosive	A	A	A
As the substance is corrosive, the following Personal Protective Equipment is recommended as good industrial practice advice beyond those considered in the exposure scenario:				
<ul style="list-style-type: none"> • Avoid contact with contaminated tools and objects • Train staff on good standard of personal hygiene. • Wash skin after contact with substance/product containing the substance. • Immediate removal/dry cleaning and disposal of spills. 				

*) The route of exposure (**Inhalation**, **Dermal**) and type of effect (**Local**, **Systemic** and **Acute** or **Long term**) for which the determinant has been used for exposure estimation are reported.

2.10.2. Exposure estimation for Cleaning products. Formulation

2.10.2.1. Exposure estimation for the environment (Formulation)

2.10.2.1.1. Environmental releases

Compartment	Release factor estimation method	Explanation / Justification
Water	ERC (ERC 2)	Initial release factor (%): 2
		Release factor after on site risk management (%): 2E-5
		Local release rate (kg/day): 2E-5
Air	ERC (ERC 2)	Initial release factor (%): 2.5
		Release factor after on site risk management (%): 0
		Local release rate (kg/day): 0
Soil	ERC (ERC 2)	Initial release factor (%): 0.01
		Release factor after on site risk management (%): 0

2.10.2.1.2. Environmental exposure

Protection target	Exposure concentration
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Protection target	Exposure concentration
Water: Fresh Water (Pelagic)	Local PEC: 1.18E-6 mg/L Local concentration: 9.96E-7 mg/L
Water: Fresh Water (Sediment)	Local PEC: 4.57E-6 mg/kg dw
Water: Marine Water (Pelagic)	Local PEC: 1.18E-7 mg/L Local concentration: 9.96E-8 mg/L
Water: Marine Water (Sediment)	Local PEC: 4.57E-7 mg/kg dw
Water: Fresh Water Food Chain (Predators)	Local PEC: 6.63E-7 mg/kg ww
Water: Marine Water Food Chain (Predators)	Local PEC: 6.62E-8 mg/kg ww
Water: Marine Water Food Chain (Top Predators)	Local PEC: 6.26E-8 mg/kg ww
Water: Sewage Treatment Plant (Effluent)	Local PEC: 9.96E-6 mg/L
Air	Local PEC: 3.4E-10 mg/m ³
Soil: Agricultural Soil	Local PEC: 4.45E-9 mg/kg dw Local concentration: 1.53E-13 mg/kg dw
Soil: Terrestrial Food Chain (Predators)	Local PEC: 2.54E-8 mg/kg ww

2.10.2.1.3. Indirect exposure of humans via the environment

Exposure via inhalation

The exposure concentrations in air are reported in the Table "Summary of exposure concentrations" of the preceding section 2. 10.2.1.2 "Environmental exposure".

Exposure via food consumption: Total daily intake for humans

Type of food	Daily human dose through intake	
	Total estimated daily intake for humans: 6.568E-9 mg/kg bw/day	
	Estimated daily dose through intake from local exposure	Concentration in food from local exposure
Drinking water	5.28E-9 mg/kg bw/day	1.85E-7 mg/L
Fish	1.01E-9 mg/kg bw/day	6.17E-7 mg/kg
Leaf crops	1.13E-10 mg/kg bw/day	6.58E-9 mg/kg
Root crops	1.64E-10 mg/kg bw/day	2.99E-8 mg/kg

Type of food	Daily human dose through intake	
Meat	3.64E-14 mg/kg bw/day	8.46E-12 mg/kg
Milk	6.78E-13 mg/kg bw/day	8.46E-11 mg/kg
Dose from regional exposure: see section 9.0.3.3		

2.10.2.2. Exposure estimation for Worker for Mix

Since there is currently no tool available for estimating acute inhalation exposures, REACH guidance (R14) recommends multiplying chronic exposure estimates by a factor of 2 or 4 depending on whether exposure estimates are based on 90th or 75th percentile. For inhalation exposures estimated using ECETOC TRA, a factor of 2 is appropriate because the tool provides 90th percentile exposure estimates. This factor of 2 is applied to full-shift exposure estimates.

For dermal acute systemic exposures same figure than chronic exposure estimate was used as recommended in the above described guidance

Route of exposure and type of effects	Exposure concentration	Method / name of exposure assessment	Explanation / Justification
Inhalation: Acute, Systemic	0.5 mg/m ³	Method: External exposure estimation tool Name: Acute inhalation	Representativity and reliability: Exposure estimate for long-term x 2. ECETOC TRA exposure estimate is based on 90% percentile; therefore as recommended in REACH Guidance R14, a factor of 2 is to be applied. Remark on exposure value: Calculated as recommended in guidance R14.
Inhalation: Long term, Systemic	0.25 mg/m ³	Method: TRA workers Name: TRA workers	
Dermal: Acute, Local		Method: Conditions of use (OC/RMM) Name: corrosive	
Dermal: Acute, Systemic	0.069 mg/kg bw/day	Method: External exposure estimation tool Name: Acute systemic	Representativity and reliability: Same figure that long term exposure calculated with TRA module within CHESAR 1.1.1 Remark on exposure value: Calculated as recommended in guidance R14.
Dermal: Long term, Local	0.01 mg/cm ²	Method: TRA workers	

Route of exposure and type of effects	Exposure concentration	Method / name of exposure assessment	Explanation / Justification
		Name: TRA workers	
Dermal: Long term, Systemic	0.069 mg/kg bw/day	Method: TRA workers Name: TRA workers	

2.11. Lubricants. Formulation

Trichloroacetic acid is used in the lubricants market sector as an additive to improve high-pressure properties in mineral lubricating oils. Information provided by customers for different processes were collected using REACH terminology (i.e., use descriptors). Furthermore, the following activities are covered in this scenario:

PROC3: Batch manufacture of a chemical or formulation where the predominant handling is in a contained manner, e.g. through enclosed transfers, but where some opportunity for contact with chemicals occurs, e.g. through sampling

For environmental exposure ERC7 was the starting point. However more refined release factors for formulation processes were described by AISE. Therefore Environmental release factors based on AISE spERC 2.1.h.v1 (AISE 8) was used:

- Air: Release fraction 0
- Waste water: Release fraction 0.001
- Soil: Release fraction: 0

2.11.1. Exposure scenario

Lubricants. Formulation	
Market sector:	
PC 20 - Products such as ph-regulators, flocculants, precipitants, neutralization agents	
Sector of use:	
SU 10 - Formulation [mixing] of preparations and/or re-packaging (excluding alloys)	
Environment:	ERC 7
Worker	
Industrial use	PROC 3
Operational conditions and risk management measures	

Control of environmental exposure: Closed batch process	
Product characteristics	
Amounts used	
Daily use at a site	<= 0.05 tonnes/day

Annual use at a site	<= 1 tonnes/year
Percentage of tonnage used at regional scale	= 100 %
Frequency and duration of use	
Environment factors not influenced by risk management	
Receiving surface water flow rate	>= 1.8E4 m3/d
Other given operational conditions affecting environmental exposure	
Technical conditions and measures at process level (source) to prevent release	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
AISE 8. Formulations	Formulation AISE [Water: 100%; Air: 100%; Soil: 100%]
Formulation release rates from AISE8	
Organizational measures to prevent/limit release from site	
Conditions and measures related to municipal sewage treatment plant	
Municipal STP	Yes [Water: 0.4%]
Discharge rate of STP	>= 2E3 m3/d
Application of the STP sludge on agricultural soil	No
Conditions and measures related to external treatment of waste for disposal	
Conditions and measures related to external recovery of waste	
Additional good practice advice beyond the REACH CSA	

Control of workers exposure for "Industrial use" [PROC 3]

		Inhal*)		Derm*)	
		Loc	Sys	Loc	Sys
Product characteristics					
Substance in preparation	No		L		
Dustiness	High		L		
Amounts used					
Frequency and duration of use/exposure					
Duration of activity	>4 hours		L		
Human factors not influenced by risk management					
Other given operational conditions affecting workers exposure					
Place of use	Indoors		L		
Surface of skin exposed	One hand face only (240 cm2)				L
Technical conditions and measures at process level (source) to prevent release					
Level of containment	Use in closed batch process (synthesis or formulation)		L		
Technical conditions and measures to control dispersion from source towards the worker					
LEV	LEV [Inhalation: 90%]		A		
LEV					
Local Exhaust Ventilation	Yes		L		L
Organisational measures to prevent /limit releases, dispersion and exposure					
Conditions and measures related to personal protection, hygiene and health evaluation					
gloves	chemically resistant gloves with specific				A

	activity training [Dermal: 95%]		
wear chemically resistant gloves (tested to EN374) in combination with specific activity training (PPE17)			
Corrosive	100 [Dermal: 100%]		AL
Dermal and eyes exposure should be avoided from corrosive substance.			
respirator masks	half mask respirator [Inhalation: 90%]		A
wear a respirator conforming to EN140 with type A filter or better			
Respiratory protection	Respiratory protection is not used		L
Additional good practice advice beyond the REACH CSA			
Corrosive	Corrosive		A AL A
As the substance is corrosive, the following Personal Protective Equipment is recommended as good industrial practice advice beyond those considered in the exposure scenario:			
<ul style="list-style-type: none"> • Avoid contact with contaminated tools and objects • Train staff on good standard of personal hygiene. • Wash skin after contact with substance/product containing the substance. • Immediate removal/dry cleaning and disposal of spills. 			

*) The route of exposure (**Inhalation, Dermal**) and type of effect (**Local, Systemic and Acute or Long term**) for which the determinant has been used for exposure estimation are reported.

2.11.2. Exposure estimation for Lubricants. Formulation

2.11.2.1. Exposure estimation for the environment (Closed batch process)

2.11.2.1.1. Environmental releases

Compartment	Release factor estimation method	Explanation / Justification
Water	ERC (ERC 7)	Initial release factor (%): 5 Release factor after on site risk management (%): 5E-5 Local release rate (kg/day): 2.5E-5
Air	ERC (ERC 7)	Initial release factor (%): 5 Release factor after on site risk management (%): 0 Local release rate (kg/day): 0
Soil	ERC (ERC 7)	Initial release factor (%): 5 Release factor after on site risk management (%): 0

9.11.2.1.2. Environmental exposure

Protection target	Exposure concentration
Water: Fresh Water (Pelagic)	Local PEC: 1.43E-6 mg/L Local concentration: 1.25E-6 mg/L
Water: Fresh Water (Sediment)	Local PEC: 5.54E-6 mg/kg dw
Water: Marine Water (Pelagic)	Local PEC: 1.43E-7 mg/L Local concentration: 1.25E-7 mg/L

Protection target	Exposure concentration
Water: Marine Water (Sediment)	Local PEC: 5.54E-7 mg/kg dw
Water: Fresh Water Food Chain (Predators)	Local PEC: 7.31E-7 mg/kg ww
Water: Marine Water Food Chain (Predators)	Local PEC: 7.3E-8 mg/kg ww
Water: Marine Water Food Chain (Top Predators)	Local PEC: 6.39E-8 mg/kg ww
Water: Sewage Treatment Plant (Effluent)	Local PEC: 1.25E-5 mg/L
Air	Local PEC: 3.4E-10 mg/m ³
Soil: Agricultural Soil	Local PEC: 4.45E-9 mg/kg dw Local concentration: 3.81E-13 mg/kg dw
Soil: Terrestrial Food Chain (Predators)	Local PEC: 2.54E-8 mg/kg ww

2.11.2.1.3. Indirect exposure of humans via the environment

Exposure via inhalation

The exposure concentrations in air are reported in the Table "Summary of exposure concentrations" of the preceding section 2. 11.2.1.2 "Environmental exposure".

Exposure via food consumption: Total daily intake for humans

Type of food	Daily human dose through intake	
	Total estimated daily intake for humans: 6.568E-9 mg/kg bw/day	
	Estimated daily dose through intake from local exposure	Concentration in food from local exposure
Drinking water	5.28E-9 mg/kg bw/day	1.85E-7 mg/L
Fish	1.01E-9 mg/kg bw/day	6.17E-7 mg/kg
Leaf crops	1.13E-10 mg/kg bw/day	6.58E-9 mg/kg
Root crops	1.64E-10 mg/kg bw/day	2.99E-8 mg/kg
Meat	3.64E-14 mg/kg bw/day	8.46E-12 mg/kg
Milk	6.78E-13 mg/kg bw/day	8.46E-11 mg/kg
	Dose from regional exposure: see section 9.0.3.3	

9.11.2.2. Exposure estimation for Worker for Industrial use

Since there is currently no tool available for estimating acute inhalation exposures, REACH guidance (R14) recommends multiplying chronic exposure estimates by a factor of 2 or 4 depending on whether exposure estimates are based on 90th or 75th percentile. For inhalation exposures estimated using ECETOC TRA, a factor of 2 is appropriate because the tool provides 90th percentile exposure estimates. This factor of 2 is applied to full-shift exposure estimates.

For dermal acute systemic exposures same figure than chronic exposure estimate was used as recommended in the above described guidance.

Route of exposure and type of effects	Exposure concentration	Method / name of exposure assessment	Explanation / Justification
Inhalation: Acute, Systemic	0.02 mg/m ³	Method: External exposure estimation tool Name: Acute inhalation	Representativity and reliability: Exposure obtained for long term exposure x 2. ECETOC TRA exposure estimate is based on 90% percentile; therefore as recommended in REACH guidance R14, a factor of 2 is to be applied to long exposure estimation. Remark on exposure value: Calculated as recommended in guidance R14.
Inhalation: Long term, Systemic	0.1 mg/m ³	Method: TRA workers Name: long term systemic	
Dermal: Acute, Local		Method: Conditions of use (OC/RMM) Name: Acute local	
Dermal: Acute, Systemic	0.034 mg/kg bw/day	Method: External exposure estimation tool Name: Acute systemic	Representativity and reliability: Same figure that long term exposure calculated with TRA module within CHESAR 1.1.1 Remark on exposure value: Calculated as recommended in guidance R14.
Dermal: Long term, Local		Method: Conditions of use (OC/RMM) Name: Acute local	
Dermal: Long term, Systemic	0.034 mg/kg bw/day	Method: TRA workers Name: long term systemic	

2.12. Dermatologist. Professional use

Trichloroacetic acid is used in the medical sector for different skin disorder treatments or as antiaging. Information provided by customers for different processes were collected using REACH terminology (i.e., use descriptors). Furthermore, the following activities are covered in this scenario:

PROC10: Roller application or brushing

For environmental exposure ERC8b (Wide dispersive indoor use of reactive substances in open systems) was the starting point. However “no release” determinant was applied since this is a minor use and the wastes are collected and treated accordingly as other medical wastes.

2.12.1. Exposure scenario

Dermatologist. Professional use	
Market sector:	
PC 29 - Pharmaceuticals	
Sector of use:	
SU 20 - Health services	
Environment:	ERC 8b
Worker	
Peelings	PROC 10
Operational conditions and risk management measures	

Control of environmental exposure: Dermatologist	
Product characteristics	
Amounts used	
Daily wide dispersive use	= 5.5E-7 tonnes/day
Frequency and duration of use	
Environment factors not influenced by risk management	
Receiving surface water flow rate	>= 1.8E4 m3/d
Other given operational conditions affecting environmental exposure	
Technical conditions and measures at process level (source) to prevent release	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
No releases	no releases [Water: 100%; Air: 100%; Soil: 100%]
no releases. Wastes are incinered.	
Organizational measures to prevent/limit release from site	
Conditions and measures related to municipal sewage treatment plant	
Municipal STP	Yes [Water: 100%]
Discharge rate of STP	>= 2E3 m3/d
Application of the STP sludge on agricultural soil	Yes
Conditions and measures related to external treatment of waste for disposal	
Waste incineration	waste incinerated [Water: 100%; Air: 100%; Soil: 100%]

Wastes are incinerated
Conditions and measures related to external recovery of waste
Additional good practice advice beyond the REACH CSA

Control of workers exposure for "Peelings" [PROC 10]			
		Inhal*)	Derm*)
		Loc	Sys
Product characteristics			
Substance in preparation	No	L	
Dustiness	High	L	
Amounts used			
Frequency and duration of use/exposure			
Duration of activity	>4 hours	L	
Duration	< 15 min	L	L L
Human factors not influenced by risk management			
Other given operational conditions affecting workers exposure			
Place of use	Indoors	L	
Surface of skin exposed	Two hands (960 cm ²)		L L
Technical conditions and measures at process level (source) to prevent release			
Technical conditions and measures to control dispersion from source towards the worker			
Local Exhaust Ventilation	No	L	L L
Organisational measures to prevent /limit releases, dispersion and exposure			
Conditions and measures related to personal protection, hygiene and health evaluation			
respirator masks	half mask respirator [Inhalation: 90%]	A	
wear a respirator conforming to EN140 with type A filter or better			
Corrosive	100 [Dermal: 100%]		A
Dermal and eyes exposure should be avoided from corrosive substance.			
gloves	chemically resistant gloves with basic training [Dermal: 90%]		A
wear chemically resistant gloves (tested to EN374) in combination with basic employee training			
Respiratory protection	Respiratory protection capable offering a 90% reduction in inhaled concentrations of the substance	L	
gloves	wear suitable gloves [Dermal: 80%]		L L
wear suitable gloves tested to EN374 (PPE15)			
Additional good practice advice beyond the REACH CSA			
Corrosive	Corrosive	AL	AL AL
As the substance is corrosive, the following Personal Protective Equipment is recommended as good industrial practice advice beyond those considered in the exposure scenario: Avoid contact with contaminated tools and objects Train staff on good standard of personal hygiene. Wash skin after contact with substance/product containing the substance. Immediate removal/dry cleaning and disposal of spills.			

*) The route of exposure (**Inhalation, Dermal**) and type of effect (**Local, Systemic and Acute or Long term**) for which the determinant has been used for exposure estimation are reported.

2.12.2. Exposure estimation for Dermatologist. Professional use

2.12.2.1. Exposure estimation for the environment (Dermatologist)

2.12.2.1.1. Environmental releases

Compartment	Release factor estimation method	Explanation / Justification
Water	ERC (ERC 8b)	Initial release factor (%): 2 Release factor after on site risk management (%): 0 Local release rate (kg/day): 0
Air	ERC (ERC 8b)	Initial release factor (%): 0.1 Release factor after on site risk management (%): 0 Local release rate (kg/day): 0
Soil	ERC (ERC 8b)	Initial release factor (%): 0 Release factor after on site risk management (%): 0

2.12.2.1.2. Environmental exposure

Protection target	Exposure concentration
Water: Fresh Water (Pelagic)	Local PEC: 1.85E-7 mg/L Local concentration: 0 mg/L
Water: Fresh Water (Sediment)	Local PEC: 7.15E-7 mg/kg dw
Water: Marine Water (Pelagic)	Local PEC: 1.84E-8 mg/L Local concentration: 0 mg/L
Water: Marine Water (Sediment)	Local PEC: 7.14E-8 mg/kg dw
Water: Fresh Water Food Chain (Predators)	Local PEC: 6.17E-7 mg/kg ww
Water: Marine Water Food Chain (Predators)	Local PEC: 6.16E-8 mg/kg ww
Water: Marine Water Food Chain (Top Predators)	Local PEC: 6.16E-8 mg/kg ww
Water: Sewage Treatment Plant (Effluent)	Local PEC: 0 mg/L
Air	Local PEC: 3.39E-10 mg/m ³
Soil: Agricultural Soil	Local PEC: 4.45E-9 mg/kg dw Local concentration: 0 mg/kg dw
Soil: Terrestrial Food Chain (Predators)	Local PEC: 2.54E-8 mg/kg ww

2.12.2.1.3. Indirect exposure of humans via the environment

Exposure via inhalation

The exposure concentrations in air are reported in the Table "Summary of exposure concentrations" of the preceding section 2. 12.2.1.2 "Environmental exposure".

Exposure via food consumption: Total daily intake for humans

Type of food	Daily human dose through intake	
	Total estimated daily intake for humans: 6.568E-9 mg/kg bw/day	
	Estimated daily dose through intake from local exposure	Concentration in food from local exposure
Drinking water	5.28E-9 mg/kg bw/day	1.85E-7 mg/L
Fish	1.01E-9 mg/kg bw/day	6.17E-7 mg/kg
Leaf crops	1.13E-10 mg/kg bw/day	6.58E-9 mg/kg
Root crops	1.64E-10 mg/kg bw/day	2.99E-8 mg/kg
Meat	3.64E-14 mg/kg bw/day	8.46E-12 mg/kg
Milk	6.78E-13 mg/kg bw/day	8.46E-11 mg/kg
	Dose from regional exposure: see section 9.0.3.3	

2.12.2.2. Exposure estimation for Worker for Peelings

Since there is currently no tool available for estimating acute inhalation exposures, REACH guidance (R14) recommends multiplying chronic exposure estimates by a factor of 2 or 4 depending on whether exposure estimates are based on 90th or 75th percentile. For inhalation exposures estimated using ECETOC TRA, a factor of 2 is appropriate because the tool provides 90th percentile exposure estimates. This factor of 2 is applied to full-shift exposure estimates.

For dermal acute systemic exposures same figure than chronic exposure estimate was used as recommended in the above described guidance.

Route of exposure and type of effects	Exposure concentration	Method / name of exposure assessment	Explanation / Justification
Inhalation: Acute, Systemic	2 mg/m ³	Method: External exposure estimation tool Name: Acute inhalation	Representativity and reliability: Exposure obtained for long term exposure x 2. ECETOC TRA exposure estimate is based on 90% percentile; therefore as recommended in REACH guidance R14, a factor of 2 is to be applied to long exposure estimation. Remark on exposure value:

Route of exposure and type of effects	Exposure concentration	Method / name of exposure assessment	Explanation / Justification
			Calculated as recommended in guidance R14.
Inhalation: Long term, Systemic	1 mg/m ³	Method: Extended TRA workers Name: TRA workers	
Dermal: Acute, Local		Method: Conditions of use (OC/RMM) Name: Corrosive	
Dermal: Acute, Systemic	5.486 mg/kg bw/day	Method: External exposure estimation tool Name: corrosive	Representativity and reliability: Same figure that long term exposure calculated with TRA module within CHESAR 1.1.1 Remark on exposure value: Calculated as recommended in guidance R14.
Dermal: Long term, Local	0.4 mg/cm ²	Method: Extended TRA workers Name: TRA workers	
Dermal: Long term, Systemic	5.486 mg/kg bw/day	Method: Extended TRA workers Name: TRA workers	

3. RISK CHARACTERISATION

3.1. blank as it is confidential

3.2. Manufacture of pharmaceuticals

3.2.1. Human health

3.2.1.1. Workers

Table below shows estimated risk characterisation ratios (RCR) for worker exposure for this use. All exposure estimates are below the pathway-specific DNELs (i.e., RCR <1).

The substance is classified as corrosive (chapter 9). Therefore no local effects DNEL can be derived for dermal exposures. PMM should be implemented to avoid direct contact (gloves and respiratory mask)

Risk characterisation: Control of workers exposure for "Manufacture" [PROC 3]

Route of exposure and type of effects	Risk characterisation ratio	Risk characterisation
Inhalation: Acute, Systemic	RCR = 0.002	Conclusion on risk characterisation: Risks adequately controlled
Inhalation: Long term, Systemic	RCR = 8.045E-4 Summed RCR including contribution of exposure via the environment (see section 2.x.1.3):	Conclusion on risk characterisation: Risks adequately controlled
Dermal: Acute, Systemic	RCR = 0.024	Conclusion on risk characterisation: Risks adequately controlled
Dermal: Long term, Local	Qualitative risk characterisation	<p>Prevention of release/exposure: Dermal exposure should be avoided for corrosive substances. Workers should wear dermal (gloves) and eyes protection.</p> <p>Expected residual exposure: No dermal exposure is expected for corrosive substances.</p> <p>Conclusion on risk characterisation: Risks are minimized with appropriate protection equipment. Exposure should be avoided due to the corrosive hazard of the substance.</p>
Dermal: Long term, Systemic	RCR = 0.024	Conclusion on risk characterisation: Risks adequately controlled
Combined routes: Long term, Systemic	RCR = 0.025 Summed RCR including contribution of exposure via the environment (see section 2.x.1.3):	

3.2.1.2. Consumers

This exposure scenario does not address consumers.

3.2.1.3. Indirect exposure of humans via the environment

Table below summarises RCR for humans exposed via the environment. Indirect exposure via the environment includes ingestion of food sources and inhalation of air concentrations.

All risk characterization ratios are below one (< 1), indicating the substance is of no concern to humans indirectly exposed via the environment.

Route of exposure and type of effects	Risk characterisation ratio	Risk characterisation
Inhalation: Long term, Systemic	RCR = 5.53E-12	Conclusion on risk characterisation: Risks adequately controlled
Oral: Long term, Systemic	RCR = 9.316E-9	Conclusion on risk characterisation: Risks adequately controlled

3.2.2. Environment

3.2.2.1. Aquatic compartment (incl. sediment)

The following tables show calculated PEC-values, PNEC-values and risk characterisation for the aquatic compartment. All calculated risk characterisation ratios are below one (< 1), indicating the substance is of no immediate concern for the environment (aquatic compartment).

Protection target	Risk characterisation ratio
Fresh Water (Pelagic)	RCR = 0.001
Fresh Water (Sediment)	RCR = 0.005
Marine Water (Pelagic)	RCR = 0.001
Marine Water (Sediment)	RCR = 0.005
Fresh Water Food Chain (Predators)	RCR = 2.626E-8
Marine Water Food Chain (Predators)	RCR = 2.621E-9
Marine Water Food Chain (Top Predators)	RCR = 2.621E-9

3.2.2.2. Terrestrial compartment

The following table shows calculated PEC-values, PNEC-values and risk characterization for the terrestrial compartment. All calculated risk characterisation ratios are below one (< 1), indicating the substance is of no immediate concern for the environment (terrestrial compartment).

Protection target	Risk characterisation ratio
Agricultural Soil	RCR = 9.674E-7
Terrestrial Food Chain (Predators)	RCR = 1.081E-9

3.2.2.3. Atmospheric compartment

3.2.2.4. Microbiological activity in sewage treatment systems

The following table shows calculated PEC-values, PNEC-values and risk characterization for the microbial activity. All calculated risk characterisation ratios are below one (< 1), indicating the substance is of no immediate concern to microorganisms at sewage treatment plants.

Protection target	Risk characterisation ratio
Sewage Treatment Plant (Effluent)	RCR = 0

3.3. Formulation of laboratory chemicals

3.3.1. Human health

3.3.1.1. Workers

Table below shows estimated risk characterisation ratios (RCR) for worker exposure for this use. All exposure estimates are below the pathway-specific DNELs (i.e., RCR <1).

The substance is classified as corrosive (chapter 9). Therefore no local effects DNEL can be derived for dermal exposures. PMM should be implemented to avoid direct contact (gloves and respiratory mask)

Risk characterisation: Control of workers exposure for "Mixing in closed batch process" [PROC 5]

Route of exposure and type of effects	Risk characterisation ratio	Risk characterisation
Inhalation: Acute, Systemic	RCR = 0.004	Conclusion on risk characterisation: Risk characterization ratio is lower than 1. Therefore risks are controlled for exposure.
Inhalation: Long term, Systemic	RCR = 0.002 Summed RCR including contribution of exposure via the environment (see section 2.x.1.3):	Conclusion on risk characterisation: Risks adequately controlled
Dermal: Acute, Systemic	RCR = 0.049	Conclusion on risk characterisation: Risks adequately controlled
Dermal: Long term, Local	Qualitative risk characterisation	Prevention of release/exposure: No dermal exposure for corrosive substances. Workers should wear dermal protection (gloves) and eyes (glasses). Expected residual exposure: Exposure just in case of accident. Conclusion on risk characterisation: Risk are adequately controlled.
Dermal: Long term, Systemic	RCR = 0.049	Conclusion on risk characterisation: Risks adequately controlled
Combined routes: Long term, Systemic	RCR = 0.051 Summed RCR including contribution of exposure via the environment (see section 2.x.1.3):	

Risk characterisation: Control of workers exposure for "Transfer" [PROC 8b]

Route of exposure and type of effects	Risk characterisation ratio	Risk characterisation
Inhalation: Acute, Systemic	RCR = 0.002	Conclusion on risk characterisation: Risks adequately controlled
Inhalation: Long term, Systemic	RCR = 0.001 Summed RCR including contribution of exposure via the environment (see section 2.x.1.3):	Conclusion on risk characterisation: Risks adequately controlled
Dermal: Acute, Systemic	RCR = 0.486	Conclusion on risk characterisation: Risks adequately controlled
Dermal: Long term, Local	Qualitative risk characterisation	Prevention of release/exposure: No dermal exposure for corrosive substances. Workers should wear dermal protection (gloves) and eyes (glasses) Expected residual exposure: Exposure just in case of accident. Conclusion on risk characterisation: Risks are minimized with appropriate protection equipment. Exposure should be avoided due to the corrosive hazard of the substance.
Dermal: Long term, Systemic	RCR = 0.486	Conclusion on risk characterisation: Risks adequately controlled
Combined routes: Long term, Systemic	RCR = 0.487 Summed RCR including contribution of exposure via the environment (see section 2.x.1.3):	

Risk characterisation: Control of workers exposure for "Transfer small quantities" [PROC 9]

Route of exposure and type of effects	Risk characterisation ratio	Risk characterisation
Inhalation: Acute, Systemic	RCR = 0.003	Conclusion on risk characterisation: Risks adequately controlled
Inhalation: Long term, Systemic	RCR = 0.002 Summed RCR including contribution of exposure via the environment (see section 2.x.1.3):	Conclusion on risk characterisation: Risks adequately controlled

Route of exposure and type of effects	Risk characterisation ratio	Risk characterisation
Dermal: Acute, Systemic	RCR = 0.486	Conclusion on risk characterisation: Risks adequately controlled
Dermal: Long term, Local	Qualitative risk characterisation	<p>Prevention of release/exposure: Dermal exposure should be avoided for corrosive substances. Workers should wear dermal (gloves) and eyes protection.</p> <p>Expected residual exposure: No dermal exposure for corrosive substances. Workers should wear dermal protection (gloves) and eyes (glasses)</p> <p>Conclusion on risk characterisation: Risks are minimized with appropriate protection equipment. Exposure should be avoided due to the corrosive hazard of the substance.</p>
Dermal: Long term, Systemic	RCR = 0.486	Conclusion on risk characterisation: Risks adequately controlled
Combined routes: Long term, Systemic	<p>RCR = 0.488</p> <p>Summed RCR including contribution of exposure via the environment (see section 2.x.1.3):</p>	

3.3.1.2. Consumers

This exposure scenario does not address consumers.

3.3.1.3. Indirect exposure of humans via the environment

Table below summarises RCR for humans exposed via the environment. Indirect exposure via the environment includes ingestion of food sources and inhalation of air concentrations.

All risk characterization ratios are below one (< 1), indicating the substance is of no concern to humans indirectly exposed via the environment.

Route of exposure and type of effects	Risk characterisation ratio	Risk characterisation
Inhalation: Long term, Systemic	RCR = 5.546E-12	Conclusion on risk characterisation: Risks adequately controlled
Oral: Long term, Systemic	RCR = 1.116E-8	Conclusion on risk characterisation: Risks adequately controlled

3.3.2. Environment

3.3.2.1. Aquatic compartment (incl. sediment)

The following tables show calculated PEC-values, PNEC-values and risk characterisation for the aquatic compartment. All calculated risk characterisation ratios are below one (< 1), indicating the substance is of no immediate concern for the environment (aquatic compartment).

Protection target	Risk characterisation ratio
Fresh Water (Pelagic)	RCR = 0.009
Fresh Water (Sediment)	RCR = 0.043
Marine Water (Pelagic)	RCR = 0.009
Marine Water (Sediment)	RCR = 0.043
Fresh Water Food Chain (Predators)	RCR = 2.898E-8
Marine Water Food Chain (Predators)	RCR = 2.894E-9
Marine Water Food Chain (Top Predators)	RCR = 2.677E-9

3.3.2.2. Terrestrial compartment

The following table shows calculated PEC-values, PNEC-values and risk characterization for the terrestrial compartment. All calculated risk characterisation ratios are below one (< 1), indicating the substance is of no immediate concern for the environment (terrestrial compartment).

Protection target	Risk characterisation ratio
Agricultural Soil	RCR = 9.674E-7
Terrestrial Food Chain (Predators)	RCR = 1.081E-9

3.3.2.3. Atmospheric compartment

3.3.2.4. Microbiological activity in sewage treatment systems

The following table shows calculated PEC-values, PNEC-values and risk characterization for the microbial activity. All calculated risk characterisation ratios are below one (< 1), indicating the substance is of no immediate concern to microorganisms at sewage treatment plants.

Protection target	Risk characterisation ratio
Sewage Treatment Plant (Effluent)	RCR = 1.39E-7

3.4. Manufacture of fine chemicals

3.4.1. Human health

3.4.1.1. Workers

Table below shows estimated risk characterisation ratios (RCR) for worker exposure for this use. All exposure estimates are below the pathway-specific DNELs (i.e., RCR < 1).

The substance is classified as corrosive (chapter 9). Therefore no local effects DNEL can be derived for dermal exposures. PMM should be implemented to avoid direct contact (gloves and respiratory mask)

Risk characterisation: Control of workers exposure for "Use in batch process" [PROC 4]

Route of exposure and type of effects	Risk characterisation ratio	Risk characterisation
Inhalation: Acute, Systemic	RCR = 0.002	Conclusion on risk characterisation: Risks adequately controlled
Inhalation: Long term, Systemic	RCR = 0.001 Summed RCR including contribution of exposure via the environment (see section 2.x.1.3):	Conclusion on risk characterisation: Risks adequately controlled
Dermal: Acute, Systemic	RCR = 0.486	Conclusion on risk characterisation: Risks adequately controlled
Dermal: Long term, Local	Qualitative risk characterisation	Prevention of release/exposure: No dermal exposure for corrosive substances. Workers should wear dermal protection (gloves) and eyes (glasses) Expected residual exposure: Exposure just in case of accident. Conclusion on risk characterisation: Risks are minimized with appropriate protection equipment. Exposure should be avoided due to the corrosive hazard of the substance.
Dermal: Long term, Systemic	RCR = 0.486	Conclusion on risk characterisation: Risks adequately controlled
Combined routes: Long term, Systemic	RCR = 0.487 Summed RCR including contribution of exposure via the environment (see section 2.x.1.3):	

3.4.1.2. Consumers

This exposure scenario does not address consumers.

3.4.1.3. Indirect exposure of humans via the environment

Table below summarises RCR for humans exposed via the environment. Indirect exposure via the environment includes ingestion of food sources and inhalation of air concentrations.

All risk characterization ratios are below one (< 1), indicating the substance is of no concern to humans indirectly exposed via the environment.

Route of exposure and type of effects	Risk characterisation ratio	Risk characterisation
Inhalation: Long term, Systemic	RCR = 5.53E-12	Conclusion on risk characterisation: Risks adequately controlled
Oral: Long term, Systemic	RCR = 9.316E-9	Conclusion on risk characterisation: Risks adequately controlled

3.4.2. Environment

3.4.2.1. Aquatic compartment (incl. sediment)

The following tables show calculated PEC-values, PNEC-values and risk characterisation for the aquatic compartment. All calculated risk characterisation ratios are below one (< 1), indicating the substance is of no immediate concern for the environment (aquatic compartment).

Protection target	Risk characterisation ratio
Fresh Water (Pelagic)	RCR = 0.001
Fresh Water (Sediment)	RCR = 0.005
Marine Water (Pelagic)	RCR = 0.001
Marine Water (Sediment)	RCR = 0.005
Fresh Water Food Chain (Predators)	RCR = 2.626E-8
Marine Water Food Chain (Predators)	RCR = 2.621E-9
Marine Water Food Chain (Top Predators)	RCR = 2.621E-9

3.4.2.2. Terrestrial compartment

The following table shows calculated PEC-values, PNEC-values and risk characterization for the terrestrial compartment. All calculated risk characterisation ratios are below one (< 1), indicating the substance is of no immediate concern for the environment (terrestrial compartment).

Protection target	Risk characterisation ratio
Agricultural Soil	RCR = 9.674E-7
Terrestrial Food Chain (Predators)	RCR = 1.081E-9

3.4.2.3. Atmospheric compartment

3.4.2.4. Microbiological activity in sewage treatment systems

The following table shows calculated PEC-values, PNEC-values and risk characterization for the microbial activity. All calculated risk characterisation ratios are below one (< 1), indicating the substance is of no immediate concern to microorganisms at sewage treatment plants

Protection target	Risk characterisation ratio
Sewage Treatment Plant (Effluent)	RCR = 0

3.5. Laboratory reagent. Professional use

3.5.1. Human health

3.5.1.1. Workers

Table below shows estimated risk characterisation ratios (RCR) for worker exposure for this use. All exposure estimates are below the pathway-specific DNELs (i.e., RCR <1).

The substance is classified as corrosive (chapter 9). Therefore no local effects DNEL can be derived for dermal exposures. PMM should be implemented to avoid direct contact (gloves and respiratory mask)

Risk characterisation: Control of workers exposure for "laboratory reagent" [PROC 15]

Route of exposure and type of effects	Risk characterisation ratio	Risk characterisation
Inhalation: Acute, Systemic	RCR = 8.045E-4	Conclusion on risk characterisation: Risks adequately controlled
Inhalation: Long term, Systemic	RCR = 4.023E-4 Summed RCR including contribution of exposure via the environment (see section 2.x.1.3):	Conclusion on risk characterisation: Risks adequately controlled
Dermal: Acute, Systemic	RCR = 0.024	Conclusion on risk characterisation: Risks adequately controlled
Dermal: Long term, Local	Qualitative risk characterisation	Prevention of release/exposure: Dermal exposure should be avoided for corrosive substances. Workers should wear dermal (gloves) and eyes protection. Expected residual exposure: Exposure just in case of accident. Conclusion on risk characterisation: Risks are minimized with appropriate protection equipment. Exposure should be avoided due to the corrosive hazard of the substance.
Dermal: Long term, Systemic	RCR = 0.024	Conclusion on risk characterisation: Risks adequately controlled
Combined routes: Long term, Systemic	RCR = 0.025 Summed RCR including contribution of exposure via the environment (see section 2.x.1.3):	

3.5.1.2. Consumers

This exposure scenario does not address consumers.

3.5.1.3. Indirect exposure of humans via the environment

Table below summarises RCR for humans exposed via the environment. Indirect exposure via the environment includes ingestion of food sources and inhalation of air concentrations. All risk characterization ratios are below one (< 1), indicating the substance is of no concern to humans indirectly exposed via the environment.

Route of exposure and type of effects	Risk characterisation ratio	Risk characterisation
Inhalation: Long term, Systemic	RCR = 5.954E-12	Conclusion on risk characterisation: Risks adequately controlled
Oral: Long term, Systemic	RCR = 7.585E-8	Conclusion on risk characterisation: Risks adequately controlled

3.5.2. Environment

3.5.2.1. Aquatic compartment (incl. sediment)

The following tables show calculated PEC-values, PNEC-values and risk characterisation for the aquatic compartment. All calculated risk characterisation ratios are below one (< 1), indicating the substance is of no immediate concern for the environment (aquatic compartment).

Protection target	Risk characterisation ratio
Fresh Water (Pelagic)	RCR = 0.009
Fresh Water (Sediment)	RCR = 0.042
Marine Water (Pelagic)	RCR = 0.009
Marine Water (Sediment)	RCR = 0.042
Fresh Water Food Chain (Predators)	RCR = 1.238E-7
Marine Water Food Chain (Predators)	RCR = 1.238E-8
Marine Water Food Chain (Top Predators)	RCR = 4.553E-9

3.5.2.2. Terrestrial compartment

The following table shows calculated PEC-values, PNEC-values and risk characterization for the terrestrial compartment. All calculated risk characterisation ratios are below one (< 1), indicating the substance is of no immediate concern for the environment (terrestrial compartment).

Protection target	Risk characterisation ratio
Agricultural Soil	RCR = 4.37E-6
Terrestrial Food Chain (Predators)	RCR = 1.851E-9

3.5.2.3. Atmospheric compartment

3.5.2.4. Microbiological activity in sewage treatment systems

The following table shows calculated PEC-values, PNEC-values and risk characterization for the microbial activity. All calculated risk characterisation ratios are below one (< 1), indicating the substance is of no immediate concern to microorganisms at sewage treatment plants.

Protection target	Risk characterisation ratio
Sewage Treatment Plant (Effluent)	RCR = 1.37E-7

3.6. Textile. Formulation of surface treatment

3.6.1. Human health

3.6.1.1. Workers

Table below shows estimated risk characterisation ratios (RCR) for worker exposure for this use. All exposure estimates are below the pathway-specific DNELs (i.e., RCR <1).

The substance is classified as corrosive (chapter 9). Therefore no local effects DNEL can be derived for dermal exposures. PMM should be implemented to avoid direct contact (gloves and respiratory mask)

Table 134. Risk characterisation: Control of workers exposure for "Mixing" [PROC 5]

Route of exposure and type of effects	Risk characterisation ratio	Risk characterisation
Inhalation: Acute, Systemic	RCR = 0.004	Conclusion on risk characterisation: Risk characterization ratio is lower than 1. Therefore risks are controlled for exposure.
Inhalation: Long term, Systemic	RCR = 0.002 Summed RCR including contribution of exposure via the environment (see section 2.x.1.3):	Conclusion on risk characterisation: Risks adequately controlled
Dermal: Acute, Systemic	RCR = 0.049	Conclusion on risk characterisation: Risks adequately controlled
Dermal: Long term, Local	Qualitative risk characterisation	Prevention of release/exposure: No dermal exposure for corrosive substances. Workers should wear dermal protection (gloves) and eyes (glasses). Expected residual exposure: Exposure just in case of accident. Conclusion on risk characterisation: Risk are adequately controlled.
Dermal: Long term, Systemic	RCR = 0.049	Conclusion on risk characterisation: Risks adequately controlled
Combined routes:	RCR = 0.051	

Route of exposure and type of effects	Risk characterisation ratio	Risk characterisation
Long term, Systemic	Summed RCR including contribution of exposure via the environment (see section 2.x.1.3):	

3.6.1.2. Consumers

This exposure scenario does not address consumers.

3.6.1.3. Indirect exposure of humans via the environment

Table below summarises RCR for humans exposed via the environment. Indirect exposure via the environment includes ingestion of food sources and inhalation of air concentrations.

All risk characterization ratios are below one (< 1), indicating the substance is of no concern to humans indirectly exposed via the environment.

Route of exposure and type of effects	Risk characterisation ratio	Risk characterisation
Inhalation: Long term, Systemic	RCR = 5.53E-12	Conclusion on risk characterisation: Risks adequately controlled
Oral: Long term, Systemic	RCR = 9.316E-9	Conclusion on risk characterisation: Risks adequately controlled

3.6.2. Environment

3.6.2.1. Aquatic compartment (incl. sediment)

The following tables show calculated PEC-values, PNEC-values and risk characterisation for the aquatic compartment. All calculated risk characterisation ratios are below one (< 1), indicating the substance is of no immediate concern for the environment (aquatic compartment).

Protection target	Risk characterisation ratio
Fresh Water (Pelagic)	RCR = 0.001
Fresh Water (Sediment)	RCR = 0.005
Marine Water (Pelagic)	RCR = 0.001
Marine Water (Sediment)	RCR = 0.005
Fresh Water Food Chain (Predators)	RCR = 2.626E-8
Marine Water Food Chain (Predators)	RCR = 2.621E-9
Marine Water Food Chain (Top Predators)	RCR = 2.621E-9

3.6.2.2. Terrestrial compartment

The following table shows calculated PEC-values, PNEC-values and risk characterization for the terrestrial compartment. All calculated risk characterisation ratios are below one (< 1), indicating the substance is of no immediate concern for the environment (terrestrial compartment).

Protection target	Risk characterisation ratio
Agricultural Soil	RRCR = 9.674E-7
Terrestrial Food Chain (Predators)	RRCR = 1.081E-9

3.6.2.3. Atmospheric compartment

3.6.2.4. Microbiological activity in sewage treatment systems

The following table shows calculated PEC-values, PNEC-values and risk characterization for the microbial activity. All calculated risk characterisation ratios are below one (< 1), indicating the substance is of no immediate concern to microorganisms at sewage treatment plants.

Protection target	Risk characterisation ratio
Sewage Treatment Plant (Effluent)	RRCR = 0

3.7. Textile. surface treatment

3.7.1. Human health

3.7.1.1. Workers

Table below shows estimated risk characterisation ratios (RCR) for worker exposure for this use. All exposure estimates are below the pathway-specific DNELs (i.e., RCR <1).

The substance is classified as corrosive (chapter 9). Therefore no local effects DNEL can be derived for dermal exposures. PMM should be implemented to avoid direct contact (gloves and respiratory mask)

Risk characterisation: Control of workers exposure for "Dipping" [PROC 13]

Route of exposure and type of effects	Risk characterisation ratio	Risk characterisation
Inhalation: Acute, Systemic	RRCR = 4.023E-4	Conclusion on risk characterisation: Risks adequately controlled
Inhalation: Long term, Systemic	RRCR = 2.011E-4 Summed RCR including contribution of exposure via the environment (see section 2.x.1.3):	Conclusion on risk characterisation: Risks adequately controlled
Dermal: Acute, Systemic	RRCR = 0.486	Conclusion on risk characterisation: Risks adequately controlled
Dermal: Long term, Local	Qualitative risk characterisation	Prevention of release/exposure: Dermal exposure should be avoided for corrosive substances. Workers should wear dermal (gloves) and eyes protection.

Route of exposure and type of effects	Risk characterisation ratio	Risk characterisation
		<p>Expected residual exposure: Exposure just in case of accident.</p> <p>Conclusion on risk characterisation: Risks are minimized with appropriate protection equipment. Exposure should be avoided due to the corrosive hazard of the substance.</p>
Dermal: Long term, Systemic	RCR = 0.486	Conclusion on risk characterisation: Risks adequately controlled
Combined routes: Long term, Systemic	RCR = 0.487 Summed RCR including contribution of exposure via the environment (see section 2.x.1.3):	

3.7.1.2. Consumers

This exposure scenario does not address consumers.

3.7.1.3. Indirect exposure of humans via the environment

Table below summarises RCR for humans exposed via the environment. Indirect exposure via the environment includes ingestion of food sources and inhalation of air concentrations. All risk characterization ratios are below one (< 1), indicating the substance is of no concern to humans indirectly exposed via the environment.

Route of exposure and type of effects	Risk characterisation ratio	Risk characterisation
Inhalation: Long term, Systemic	RCR = 5.53E-12	Conclusion on risk characterisation: Risks adequately controlled
Oral: Long term, Systemic	RCR = 9.316E-9	Conclusion on risk characterisation: Risks adequately controlled

3.7.2. Environment

3.7.2.1. Aquatic compartment (incl. sediment)

The following tables show calculated PEC-values, PNEC-values and risk characterisation for the aquatic compartment. All calculated risk characterisation ratios are below one (< 1), indicating the substance is of no immediate concern for the environment (aquatic compartment).

Protection target	Risk characterisation ratio
Fresh Water (Pelagic)	RCR = 0.001
Fresh Water (Sediment)	RCR = 0.005
Marine Water (Pelagic)	RCR = 0.001
Marine Water (Sediment)	RCR = 0.005
Fresh Water Food Chain (Predators)	RCR = 2.626E-8
Marine Water Food Chain (Predators)	RCR = 2.621E-9
Marine Water Food Chain (Top Predators)	RCR = 2.621E-9

3.7.2.2. Terrestrial compartment

The following table shows calculated PEC-values, PNEC-values and risk characterization for the terrestrial compartment. All calculated risk characterisation ratios are below one (< 1), indicating the substance is of no immediate concern for the environment (terrestrial compartment).

Protection target	Risk characterisation ratio
Agricultural Soil	RCR = 9.674E-7
Terrestrial Food Chain (Predators)	RCR = 1.081E-9

3.7.2.3. Atmospheric compartment

3.7.2.4. Microbiological activity in sewage treatment systems

The following table shows calculated PEC-values, PNEC-values and risk characterization for the microbial activity. All calculated risk characterisation ratios are below one (< 1), indicating the substance is of no immediate concern to microorganisms at sewage treatment plants.

Protection target	Risk characterisation ratio
Sewage Treatment Plant (Effluent)	RCR = 0

3.8. Metals. Surface treatment

3.8.1. Human health

3.8.1.1. Workers

Table below shows estimated risk characterisation ratios (RCR) for worker exposure for this use. All exposure estimates are below the pathway-specific DNELs (i.e., RCR < 1).

The substance is classified as corrosive (chapter 9). Therefore no local effects DNEL can be derived for dermal exposures. PMM should be implemented to avoid direct contact (gloves and respiratory mask)

Risk characterisation: Control of workers exposure for "Dipping" [PROC 13]

Route of exposure and type of effects	Risk characterisation ratio	Risk characterisation
Inhalation: Acute, Systemic	RCR = 4.023E-4	Conclusion on risk characterisation: Risks adequately controlled
Inhalation:	RCR = 2.011E-4	Conclusion on risk characterisation: Risks adequately

Route of exposure and type of effects	Risk characterisation ratio	Risk characterisation
Long term, Systemic	Summed RCR including contribution of exposure via the environment (see section 2.x.1.3):	controlled
Dermal: Acute, Systemic	RCR = 0.486	Conclusion on risk characterisation: Risks adequately controlled
Dermal: Long term, Local	Qualitative risk characterisation	<p>Prevention of release/exposure: Dermal exposure should be avoided for corrosive substances. Workers should wear dermal (gloves) and eyes protection.</p> <p>Expected residual exposure: Exposure just in case of accident.</p> <p>Conclusion on risk characterisation: Risks are minimized with appropriate protection equipment. Exposure should be avoided due to the corrosive hazard of the substance.</p>
Dermal: Long term, Systemic	RCR = 0.486	Conclusion on risk characterisation: Risks adequately controlled
Combined routes: Long term, Systemic	<p>RCR = 0.487</p> <p>Summed RCR including contribution of exposure via the environment (see section 2.x.1.3):</p>	

3.8.1.2. Consumers

This exposure scenario does not address consumers.

3.8.1.3. Indirect exposure of humans via the environment

Table below summarises RCR for humans exposed via the environment. Indirect exposure via the environment includes ingestion of food sources and inhalation of air concentrations.

All risk characterization ratios are below one (< 1), indicating the substance is of no concern to humans indirectly exposed via the environment.

Route of exposure and type of effects	Risk characterisation ratio	Risk characterisation
Inhalation: Long term, Systemic	RCR = 5.53E-12	Conclusion on risk characterisation: Risks adequately controlled
Oral: Long term, Systemic	RCR = 9.316E-9	Conclusion on risk characterisation: Risks adequately controlled

3.8.2. Environment

3.8.2.1. Aquatic compartment (incl. sediment)

The following tables show calculated PEC-values, PNEC-values and risk characterisation for the aquatic compartment. All calculated risk characterisation ratios are below one (< 1), indicating the substance is of no immediate concern for the environment (aquatic compartment).

Protection target	Risk characterisation ratio
Fresh Water (Pelagic)	RCR = 0.001
Fresh Water (Sediment)	RCR = 0.005
Marine Water (Pelagic)	RCR = 0.001
Marine Water (Sediment)	RCR = 0.005
Fresh Water Food Chain (Predators)	RCR = 2.626E-8
Marine Water Food Chain (Predators)	RCR = 2.621E-9
Marine Water Food Chain (Top Predators)	RCR = 2.621E-9

3.8.2.2. Terrestrial compartment

The following table shows calculated PEC-values, PNEC-values and risk characterization for the terrestrial compartment. All calculated risk characterisation ratios are below one (< 1), indicating the substance is of no immediate concern for the environment (terrestrial compartment).

Protection target	Risk characterisation ratio
Agricultural Soil	RCR = 9.674E-7
Terrestrial Food Chain (Predators)	RCR = 1.081E-9

3.8.2.3. Atmospheric compartment

3.8.2.4. Microbiological activity in sewage treatment systems

The following table shows calculated PEC-values, PNEC-values and risk characterization for the microbial activity. All calculated risk characterisation ratios are below one (< 1), indicating the substance is of no immediate concern to microorganisms at sewage treatment plants.

Protection target	Risk characterisation ratio
Sewage Treatment Plant (Effluent)	RCR = 0

3.9. Coatings and Inks. Formulation stage

3.9.1. Human health

3.9.1.1. Workers

Table below shows estimated risk characterisation ratios (RCR) for worker exposure for this use. All exposure estimates are below the pathway-specific DNELs (i.e., RCR <1).

The substance is classified as corrosive (chapter 9). Therefore no local effects DNEL can be derived for dermal exposures. PMM should be implemented to avoid direct contact (gloves and respiratory mask)

Risk characterisation: Control of workers exposure for "Mix" [PROC 5]

Route of exposure and type of effects	Risk characterisation ratio	Risk characterisation
Inhalation: Acute, Systemic	RCR = 0.004	Conclusion on risk characterisation: Risk characterization ratio is lower than 1. Therefore risks are controlled for exposure.
Inhalation: Long term, Systemic	RCR = 0.002 Summed RCR including contribution of exposure via the environment (see section 2.x.1.3):	Conclusion on risk characterisation: Risks adequately controlled
Dermal: Acute, Systemic	RCR = 0.049	Conclusion on risk characterisation: Risks adequately controlled
Dermal: Long term, Local	Qualitative risk characterisation	Prevention of release/exposure: No dermal exposure for corrosive substances. Workers should wear dermal protection (gloves) and eyes (glasses). Expected residual exposure: Exposure just in case of accident. Conclusion on risk characterisation: Risk are adequately controlled.
Dermal: Long term, Systemic	RCR = 0.049	Conclusion on risk characterisation: Risks adequately controlled
Combined routes: Long term, Systemic	RCR = 0.051 Summed RCR including contribution of exposure via the environment (see section 2.x.1.3):	

3.9.1.2. Consumers

This exposure scenario does not address consumers.

3.9.1.3. Indirect exposure of humans via the environment

Table below summarises RCR for humans exposed via the environment. Indirect exposure via the environment includes ingestion of food sources and inhalation of air concentrations.

All risk characterization ratios are below one (< 1), indicating the substance is of no concern to humans indirectly exposed via the environment.

Route of exposure and type of effects	Risk characterisation ratio	Risk characterisation
Inhalation: Long term,	RCR = 1.876E-9	Conclusion on risk characterisation: Risks adequately controlled

Route of exposure and type of effects	Risk characterisation ratio	Risk characterisation
Systemic		
Oral: Long term, Systemic	RCR = 5.994E-8	Conclusion on risk characterisation: Risks adequately controlled

3.9.2. Environment

3.9.2.1. Aquatic compartment (incl. sediment)

The following tables show calculated PEC-values, PNEC-values and risk characterisation for the aquatic compartment. All calculated risk characterisation ratios are below one (< 1), indicating the substance is of no immediate concern for the environment (aquatic compartment).

Protection target	Risk characterisation ratio
Fresh Water (Pelagic)	RCR = 0.001
Fresh Water (Sediment)	RCR = 0.005
Marine Water (Pelagic)	RCR = 0.001
Marine Water (Sediment)	RCR = 0.005
Fresh Water Food Chain (Predators)	RCR = 2.626E-8
Marine Water Food Chain (Predators)	RCR = 2.621E-9
Marine Water Food Chain (Top Predators)	RCR = 2.621E-9

3.9.2.2. Terrestrial compartment

The following table shows calculated PEC-values, PNEC-values and risk characterization for the terrestrial compartment. All calculated risk characterisation ratios are below one (< 1), indicating the substance is of no immediate concern for the environment (terrestrial compartment).

Protection target	Risk characterisation ratio
Agricultural Soil	RCR = 8.217E-6
Terrestrial Food Chain (Predators)	RCR = 5.106E-9

3.9.2.3. Atmospheric compartment

3.9.2.4. Microbiological activity in sewage treatment systems

The following table shows calculated PEC-values, PNEC-values and risk characterization for the microbial activity. All calculated risk characterisation ratios are below one (< 1), indicating the substance is of no immediate concern to microorganisms at sewage treatment plants.

Protection target	Risk characterisation ratio
Sewage Treatment Plant (Effluent)	RCR = 0

3.10. Cleaning products. Formulation

3.10.1. Human health

3.10.1.1. Workers

Table below shows estimated risk characterisation ratios (RCR) for worker exposure for this use. All exposure estimates are below the pathway-specific DNELs (i.e., RCR <1).

The substance is classified as corrosive (chapter 9). Therefore no local effects DNEL can be derived for dermal exposures. PMM should be implemented to avoid direct contact (gloves and respiratory mask)

Risk characterisation: Control of workers exposure for "Mix" [PROC 5]

Route of exposure and type of effects	Risk characterisation ratio	Risk characterisation
Inhalation: Acute, Systemic	RCR = 0.004	Conclusion on risk characterisation: Risk characterization ratio is lower than 1. Therefore risks are controlled for exposure.
Inhalation: Long term, Systemic	RCR = 0.002 Summed RCR including contribution of exposure via the environment (see section 2.x.1.3):	Conclusion on risk characterisation: Risks adequately controlled
Dermal: Acute, Systemic	RCR = 0.049	Conclusion on risk characterisation: Risks adequately controlled
Dermal: Long term, Local	Qualitative risk characterisation	Prevention of release/exposure: No dermal exposure for corrosive substances. Workers should wear dermal protection (gloves) and eyes (glasses). Expected residual exposure: Exposure just in case of accident. Conclusion on risk characterisation: Risk are adequately controlled.
Dermal: Long term, Systemic	RCR = 0.049	Conclusion on risk characterisation: Risks adequately controlled
Combined routes: Long term, Systemic	RCR = 0.051 Summed RCR including contribution of exposure via the environment (see section 2.x.1.3):	

3.10.1.2. Consumers

This exposure scenario does not address consumers.

3.10.1.3. Indirect exposure of humans via the environment

Table below summarises RCR for humans exposed via the environment. Indirect exposure via the environment includes ingestion of food sources and inhalation of air concentrations.

All risk characterization ratios are below one (< 1), indicating the substance is of no concern to humans indirectly exposed via the environment.

Route of exposure and type of effects	Risk characterisation ratio	Risk characterisation
Inhalation: Long term, Systemic	RCR = 5.546E-12	Conclusion on risk characterisation: Risks adequately controlled
Oral: Long term, Systemic	RCR = 1.064E-8	Conclusion on risk characterisation: Risks adequately controlled

3.10.2. Environment

3.10.2.1. Aquatic compartment (incl. sediment)

The following tables show calculated PEC-values, PNEC-values and risk characterisation for the aquatic compartment. All calculated risk characterisation ratios are below one (< 1), indicating the substance is of no immediate concern for the environment (aquatic compartment).

Protection target	Risk characterisation ratio
Fresh Water (Pelagic)	RCR = 0.007
Fresh Water (Sediment)	RCR = 0.032
Marine Water (Pelagic)	RCR = 0.007
Marine Water (Sediment)	RCR = 0.032
Fresh Water Food Chain (Predators)	RCR = 2.821E-8
Marine Water Food Chain (Predators)	RCR = 2.817E-9
Marine Water Food Chain (Top Predators)	RCR = 2.664E-9

3.10.2.2. Terrestrial compartment

The following table shows calculated PEC-values, PNEC-values and risk characterization for the terrestrial compartment. All calculated risk characterisation ratios are below one (< 1), indicating the substance is of no immediate concern for the environment (terrestrial compartment).

Protection target	Risk characterisation ratio
Agricultural Soil	RCR = 9.674E-7
Terrestrial Food Chain (Predators)	RCR = 1.081E-9

3.10.2.3. Atmospheric compartment

3.10.2.4. Microbiological activity in sewage treatment systems

The following table shows calculated PEC-values, PNEC-values and risk characterization for the microbial activity. All calculated risk characterisation ratios are below one (< 1), indicating the substance is of no immediate concern to microorganisms at sewage treatment plants.

Protection target	Risk characterisation ratio
Sewage Treatment Plant (Effluent)	RCR = 9.96E-8

3.11. Lubricants. Formulation

3.11.1. Human health

3.11.1.1. Workers

Table below shows estimated risk characterisation ratios (RCR) for worker exposure for this use. All exposure estimates are below the pathway-specific DNELs (i.e., RCR <1).

The substance is classified as corrosive (chapter 9). Therefore no local effects DNEL can be derived for dermal exposures. PMM should be implemented to avoid direct contact (gloves and respiratory mask)

Risk characterisation: Control of workers exposure for "Industrial use" [PROC 3]

Route of exposure and type of effects	Risk characterisation ratio	Risk characterisation
Inhalation: Acute, Systemic	RCR = 0.002	Conclusion on risk characterisation: Risks adequately controlled
Inhalation: Long term, Systemic	RCR = 8.045E-4 Summed RCR including contribution of exposure via the environment (see section 2.x.1.3):	Conclusion on risk characterisation: Risks adequately controlled
Dermal: Acute, Systemic	RCR = 0.024	Conclusion on risk characterisation: Risks adequately controlled
Dermal: Long term, Local	Qualitative risk characterisation	Prevention of release/exposure: Dermal exposure should be avoided for corrosive substances. Workers should wear dermal (gloves) and eyes protection. Expected residual exposure: No dermal exposure is expected for corrosive substances. Conclusion on risk characterisation: Risks are minimized with appropriate protection equipment. Exposure should be avoided due to the corrosive hazard of the substance.
Dermal: Long term, Systemic	RCR = 0.024	Conclusion on risk characterisation: Risks adequately controlled
Combined routes: Long term, Systemic	RCR = 0.025 Summed RCR including contribution of exposure via the environment (see section	

Route of exposure and type of effects	Risk characterisation ratio	Risk characterisation
	2.x.1.3):	

3.11.1.2. Consumers

This exposure scenario does not address consumers.

3.11.1.3. Indirect exposure of humans via the environment

Table below summarises RCR for humans exposed via the environment. Indirect exposure via the environment includes ingestion of food sources and inhalation of air concentrations.

All risk characterization ratios are below one (< 1), indicating the substance is of no concern to humans indirectly exposed via the environment.

Route of exposure and type of effects	Risk characterisation ratio	Risk characterisation
Inhalation: Long term, Systemic	RCR = 5.546E-12	Conclusion on risk characterisation: Risks adequately controlled
Oral: Long term, Systemic	RCR = 1.262E-8	Conclusion on risk characterisation: Risks adequately controlled

3.11.2. Environment

3.11.2.1. Aquatic compartment (incl. sediment)

The following tables show calculated PEC-values, PNEC-values and risk characterisation for the aquatic compartment. All calculated risk characterisation ratios are below one (< 1), indicating the substance is of no immediate concern for the environment (aquatic compartment).

Protection target	Risk characterisation ratio
Fresh Water (Pelagic)	RCR = 0.008
Fresh Water (Sediment)	RCR = 0.039
Marine Water (Pelagic)	RCR = 0.008
Marine Water (Sediment)	RCR = 0.039
Fresh Water Food Chain (Predators)	RCR = 3.111E-8
Marine Water Food Chain (Predators)	RCR = 3.106E-9
Marine Water Food Chain (Top Predators)	RCR = 2.719E-9

3.11.2.2. Terrestrial compartment

The following table shows calculated PEC-values, PNEC-values and risk characterization for the terrestrial compartment. All calculated risk characterisation ratios are below one (< 1), indicating the substance is of no immediate concern for the environment (terrestrial compartment).

Protection target	Risk characterisation ratio
Agricultural Soil	RCR = 9.674E-7
Terrestrial Food Chain (Predators)	RCR = 1.081E-9

3.11.2.3. Atmospheric compartment

3.11.2.4. Microbiological activity in sewage treatment systems

The following table shows calculated PEC-values, PNEC-values and risk characterization for the microbial activity. All calculated risk characterisation ratios are below one (< 1), indicating the substance is of no immediate concern to microorganisms at sewage treatment plants.

Protection target	Risk characterisation ratio
Sewage Treatment Plant (Effluent)	RCR = 1.25E-7

3.12. Dermatologist. Professional use

3.12.1. Human health

3.12.1.1. Workers

Table below shows estimated risk characterisation ratios (RCR) for worker exposure for this use. All exposure estimates are below the pathway-specific DNELs (i.e., RCR <1).

The substance is classified as corrosive (chapter 9). Therefore no local effects DNEL can be derived for dermal exposures. PMM should be implemented to avoid direct contact (gloves and respiratory mask)

Route of exposure and type of effects	Risk characterisation ratio	Risk characterisation
Inhalation: Acute, Systemic	RCR = 0.016	Conclusion on risk characterisation: Risks adequately controlled
Inhalation: Long term, Systemic	RCR = 0.008 Summed RCR including contribution of exposure via the environment (see section 2.x.1.3):	Conclusion on risk characterisation: Risks adequately controlled
Dermal: Acute, Systemic	RCR = 0.973	Conclusion on risk characterisation: Risks adequately controlled
Dermal: Long term, Local	Qualitative risk characterisation	Prevention of release/exposure: Dermal exposure should be avoided for corrosive substances. Dermatologist should wear dermal (gloves) and eyes protection. Expected residual exposure: Exposure just in case of accident. Conclusion on risk characterisation:

Route of exposure and type of effects	Risk characterisation ratio	Risk characterisation
		AAA
Dermal: Long term, Systemic	RCR = 0.973	Conclusion on risk characterisation: Risks adequately controlled
Combined routes: Long term, Systemic	RCR = 0.981 Summed RCR including contribution of exposure via the environment (see section 2.x.1.3):	

3.12.1.2. Consumers

This exposure scenario does not address consumers.

3.12.1.3. Indirect exposure of humans via the environment

Table below summarises RCR for humans exposed via the environment. Indirect exposure via the environment includes ingestion of food sources and inhalation of air concentrations.

All risk characterization ratios are below one (< 1), indicating the substance is of no concern to humans indirectly exposed via the environment.

Route of exposure and type of effects	Risk characterisation ratio	Risk characterisation
Inhalation: Long term, Systemic	RCR = 5.53E-12	Conclusion on risk characterisation: Risks adequately controlled
Oral: Long term, Systemic	RCR = 9.316E-9	Conclusion on risk characterisation: Risks adequately controlled

3.12.2. Environment

3.12.2.1. Aquatic compartment (incl. sediment)

The following tables show calculated PEC-values, PNEC-values and risk characterisation for the aquatic compartment. All calculated risk characterisation ratios are below one (< 1), indicating the substance is of no immediate concern for the environment (aquatic compartment).

Protection target	Risk characterisation ratio
Fresh Water (Pelagic)	RCR = 0.001
Fresh Water (Sediment)	RCR = 0.005
Marine Water (Pelagic)	RCR = 0.001
Marine Water (Sediment)	RCR = 0.005

Protection target	Risk characterisation ratio
Fresh Water Food Chain (Predators)	RCR = 2.626E-8
Marine Water Food Chain (Predators)	RCR = 2.621E-9
Marine Water Food Chain (Top Predators)	RCR = 2.621E-9

3.12.2.2. Terrestrial compartment

The following table shows calculated PEC-values, PNEC-values and risk characterization for the terrestrial compartment. All calculated risk characterisation ratios are below one (< 1), indicating the substance is of no immediate concern for the environment (terrestrial compartment).

Protection target	Risk characterisation ratio
Agricultural Soil	RCR = 9.674E-7
Terrestrial Food Chain (Predators)	RCR = 1.081E-9

3.12.2.3. Atmospheric compartment

3.12.2.4. Microbiological activity in sewage treatment systems

The following table shows calculated PEC-values, PNEC-values and risk characterization for the microbial activity. All calculated risk characterisation ratios are below one (< 1), indicating the substance is of no immediate concern to microorganisms at sewage treatment plants.

Table 168. Risk characterisation for the microbiological activity in sewage treatment systems

Protection target	Risk characterisation ratio
Sewage Treatment Plant (Effluent)	RCR = 0

3.13. Overall exposure (combined for all relevant emission/release sources)

3.13.1. Human health (combined for all exposure routes)

Since no exposures outside the working place are considered, no combined exposure should be assessed.

3.13.2. Environment (combined for all emission sources)

3.13.2.1. Exposure and risks due to all wide dispersive uses

All calculated risk characterisation ratios are below one (< 1), indicating the substance is of no immediate concern for the environment.

Protection target	PEC local due to all wide dispersive uses	Risk characterisation
Water:		
Fresh Water (Pelagic)	1.55E-6 mg/L	RCR = 9.118E-6
Marine Water (Pelagic)	1.55E-7 mg/L	RCR = 9.118E-6
Marine Water (Sediment)	6.02E-7 mg/kg dw	RCR = 4.21E-5

EC number:
200-927-2

Trichloroacetic acid (TCA)

CAS number:
76-03-9

Protection target	PEC local due to all wide dispersive uses	Risk characterisation
Food Chain (Fresh Water Food Chain - Predators)	2.91E-6 mg/kg ww	RCR = 1.238E-7
Food Chain (Marine Water Food Chain - Predators)	2.91E-7 mg/L	RCR = 1.238E-8
Food Chain (Marine Water Food Chain - Top Predators)	1.07E-7 mg/L	RCR = 4.553E-9
Sewage Treatment Plant (Effluent)	1.37E-5 mg/L	RCR = 1.37E-7
Soil:		
Agricultural Soil	2.01E-8 mg/kg dw	RCR = 4.37E-9
Terrestrial Food Chain (Predators)	4.35E-8 mg/kg ww	RCR = 1.851E-9